

VOLUME 3

COASTAL FISHES OF THE  
**WESTERN  
INDIAN  
OCEAN**

EDITED BY

Phillip C Heemstra • Elaine Heemstra • David A Ebert • Wouter Holleman • John E Randall



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..... **see separate PDF**

CLASS

**OSTEICHTHYES**



*Bony Fishes*

*...continued*



# ORDER PERCIFORMES

The Perciformes, or perch-like fishes (also called the Percomorpha), are the largest group of fishes in the world, with more than 10 000 species in about 160 families. They are the most numerous of vertebrates and comprise about 40% of all bony fish species.

The classification of this group is controversial and according to some authors should include the Scorpaeniformes (Volume 2), Tetraodontiformes and Pleuronectiformes

(Volume 5), which are treated as separate orders in these volumes.

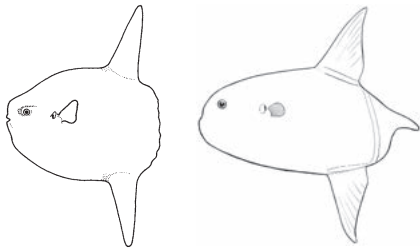
They occur in marine and fresh waters around the world, from shallow ponds to more than 2 500 m in the oceans. Most species are found in coastal areas in tropical and temperate regions. They range in size from the mature male stout flouter, *Schindleria brevipinguis* at 6.5 mm SL, to the 3.3-m bluefin tuna, *Thunnus thynnus*.

## KEY TO PERCIFORM FAMILIES

Wouter Holleman and Shirleen Smith

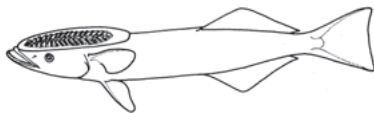
**NOTE: This key is for families of fishes with species that occur in the Western Indian Ocean in less than ~200 m. (M) designates a monotypic family.**

1a Body truncate, as if rear chopped off, orbiculate, compressed ..... see **TETRAODONTIFORMES** Volume 5



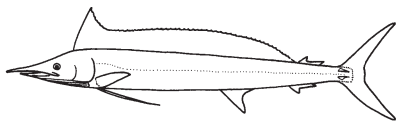
1b Body not as above ..... 2

2a Oval, laminated suction disc on top of head ..... **ECHENEIDAE**  
(Remoras) Volume 4



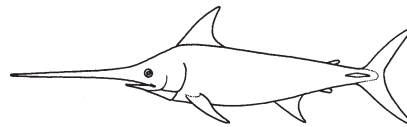
2b No suction disc on top of head ..... 3

3a Upper jaw elongated forming a bony, spear-like bill ..... 4

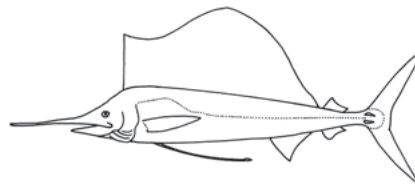


3b Upper jaw not elongated into a spear-like bill ..... 5

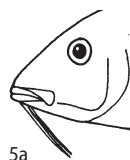
4a Bill a long, flat spear; juveniles with a long, continuous dorsal fin, adults with two well-separated, short dorsal fins; one keel each side of caudal peduncle ..... **XIPHIIDAE** (M)  
(Swordfish) Volume 5



4b Bill short, rounded; dorsal fin long, its base longer than its height; two keels each side of caudal peduncle .....  
..... **ISTIOPHORIDAE** (Billfishes) Volume 5



5a Pair of long barbels on chin; dorsal fin with 8 or 9 soft rays ..... **MULLIDAE**  
(Goatfishes) Volume 3



5b One or two short barbels on chin; dorsal fin with 21–44 soft rays ..... **SCIAENIDAE** IN PART  
(Croakers and drums) Volume 3



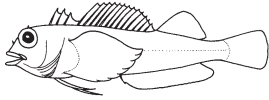
5c No barbels on chin ..... 6

Continued ...



## KEY TO PERCIFORM FAMILIES

- 6a Three separate dorsal fins, 1st of 3 or 4 spines, 2nd of 11–15 spines, 3rd of 16–22 rays ..... **TRIPTERYGIIDAE**  
(Triplefin blennies) *Volume 4*

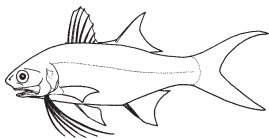


- 6b Two separate dorsal fins or one continuous dorsal fin, which may be deeply notched ..... 7

- 7a Lower pectoral-fin rays longer than upper, and membranes incised at least partially ..... 8

- 7b Lower pectoral-fin rays not longer than upper ..... 9

- 8a Lower 3–8 pectoral-fin rays separate from fin and filamentous; 2 separate dorsal fins, 1st with 8 spines; snout projecting in front of mouth ..... **POLYNEMIDAE** (Threadfins) *Volume 4*



- 8b Lower 5–7 pectoral-fin rays simple, membranes deeply incised; dorsal fin continuous and notched, with 10 spines, with cirri at tips ..... **CIRRHITIDAE** (Hawkfishes) *Volume 4*



- 8c Lower 4–7 pectoral-fin rays simple, deeply incised; dorsal fin continuous and notched, with 17–20 spines, without cirri at tips ..... **CHEILODACTYLIDAE** (Fingerfins) *Volume 4*



- 8d Lower 4 or 5 pectoral-fin rays simple, incised, with one elongated ray reaching to anal-fin origin; dorsal fin continuous and notched with 15–20 spines, without cirri at tips ..... **LATRIDAE** (Trumpeters) *Volume 4*



- 9a Pelvic fins with 2 spines, one on either side of 3 rays; anal fin with 7 spines ..... **SIGANIDAE** (Rabbitfishes or spinefoots) *Volume 5*



- 9b Pelvic fins (if present) with single spine in front (invisible in some Blenniidae), none behind ..... 10

- 10a Teeth fused into parrot-like beak ..... 11



- 10b Teeth separate or absent ..... 12

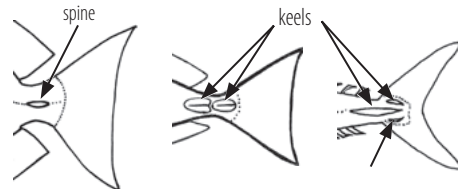
- 11a Dorsal-fin spines and rays usually of same length, fin with 9 spines, 10 rays ..... **SCARIDAE, SCARINAE** (Parrotfishes) *Volume 4*



- 11b Dorsal-fin spines shorter than rays, fin with 11 or 12 spines, 11–24 rays ..... **OPLEGNATHIDAE** (Knifejaws) *Volume 4*

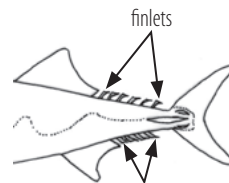


- 12a Caudal peduncle or base of caudal fin with spines or keels ... 13



- 12b Caudal peduncle without spines or keels ..... 18

- 13a Dorsal and anal fins with finlets ..... 14



- 13b No finlets present ..... 15

- 14a Finlets 4 or 5; dorsal-fin spines very short; LL in sinusoidal curve; single keel on either side of peduncle ..... **GEMPYLIDAE** IN PART,  
*Lepidocybium* (Escolar) *Volume 5*



Continued ...

**KEY TO PERCIFORM FAMILIES**

- 14b Finlets 6 or more; dorsal-fin spines usually same length or longer than rays; LL straight or curved; usually 2 keels either side of peduncle, sometimes 1 or 3 keels ..... **SCOMBRIDAE**  
(Mackerels, Spanish mackerels, bonitos and tunas) *Volume 5*



- 15a Body deep and compressed; peduncle with single sharp spine in groove on either side, or 1 or 2 bony plates, one behind the other, with sharp keel on either side; dorsal fin continuous, with 4–9 spines ..... **ACANTHURIDAE** (Surgeonfishes) *Volume 5*



- 15b Body not deep and compressed ..... **16**

- 16a Pelvic fins rudimentary or absent; dorsal and anal fins without spines but with short, unbranched, bony rays; bony keel each side of caudal peduncle; large fish (up to 2 m TL) with rounded head and small terminal mouth .... **LUVARIDAE** (M) (Luvar) *Volume 5*



- 16b Pelvic fins well-developed ..... **17**

- 17a Caudal peduncle long and square in cross-section, with 2 keels on either side at base of caudal fin; dorsal-fin spines much shorter than rays; scales with heavy keels ..... **TETRAGONURIDAE**  
(Squaretails) *Volume 5*



- 17b Peduncle not square in cross-section, with 2 small, low fleshy keels on either side at base of caudal fin (sometimes difficult to see); dorsal-fin spines longer than rays, fin divided into spinous and rayed parts; scales cycloid ..... **ARIOMMATIDAE**  
(Ariommas) *Volume 5*



- 18a Pelvic fins reduced (to scale-like spine in Trichiuridae) or absent ..... **19**

- 18b Pelvic fins present ..... **26**

- 19a Body deep, compressed, silver in colour; pelvic fins rudimentary in juveniles, absent in adults ..... **20**

- 19b Body not deep and compressed; pelvic fins present, or rudimentary in juveniles and absent in adults ..... **21**

- 20a Dorsal and anal fins with 25–30 rays, fins mostly covered by skin and scales; caudal fin lunate ..... **MONODACTYLIDAE**  
(Moonies) *Volume 3*



- 20b Dorsal fin 37–50 rays, anal fin 34–43 rays (dorsal- and anal-fin spines embedded in *P. argenteus*); fins not covered by skin and scales; caudal fin forked to lunate ..... **STROMATEIDAE** IN PART,  
*Pampus* (Pomfrets) *Volume 5*



- 21a Body elongate and compressed, or eel-like ..... **22**

- 21b Body fusiform to slightly elongate, generally blue to brownish in colour; pelvic fins, if present, fold into shallow groove; dorsal and anal fins without spines; dorsal fin with 40–51 soft rays, anal fin with 33–38 soft rays; opercle with 2 flat spines; gill membranes not separate from each other; scales usually cycloid and easily shed ..... **STROMATEIDAE** IN PART,  
*Stromateus* (Butterfishes) *Volume 5*



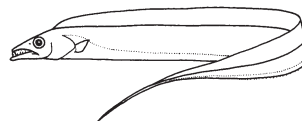
- 22a Lower jaw longer than upper, both jaws with fangs; dorsal fin with spines; body compressed ..... **23**

- 22b Lower jaw longer than upper, without fangs; dorsal fin without spines; caudal fin forked ..... **AMMODYTIDAE** (Sandlances) *Volume 4*



- 22c Lower jaw not longer than upper; lower jaw without fangs . **24**

- 23a Body long and ribbon-like; caudal fin small or absent, when absent body long and pointed ..... **TRICHIURIDAE**  
(Cutlassfishes) *Volume 5*



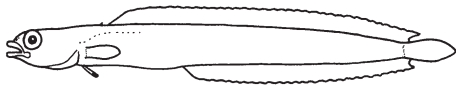
- 23b Body elongate, not ribbon-like; caudal fin deeply forked or lanceolate ..... **GEMPYLIDAE** IN PART (Snake mackerels) *Volume 5*



Continued ...

KEY TO PERCIFORM FAMILIES

- 24a Dorsal fin without spines ..... 25
- 24b Dorsal fin with 1 short, separate spine; dorsal and anal fins joined to caudal fin ..... **PSEUDOCROMIDAE, CONGROGADINAE** (Snakelets) *Volume 3*



- 25a Body <20 mm, larval-like, without scales, transparent ..... **SCHINDLERIIDAE** (Schindler's fishes) *Volume 5*



- 25b Body >20 mm, with scales; eyes on top of head; caudal fin rounded ..... **CREEDIIDAE** (Sandburrowers) *Volume 4*

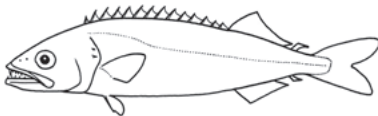


- 26a Single dorsal and anal fins, far back on body; pelvic fins modified as a sucking disc; body without scales; generally small fishes, <50 mm ..... **GOBIESOCIDAE** (Clingfishes) *Volume 4*



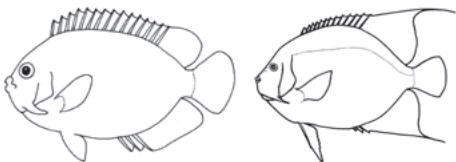
- 26b Fins not as above; body usually with scales ..... 27

- 27a Dorsal fin 13–40 spines, 11–44 rays + 0–7 finlets; anal fin 1–2 spines, 10–35 rays + 0–7 finlets; spined dorsal-fin base longer than base of rayed part of dorsal fin (excluding finlets, if present); lower jaw longer than upper, upper jaw not protrusile, both jaws with large canines ..... **GEMPYLIDAE** IN PART (Snake mackerels) *Volume 5*



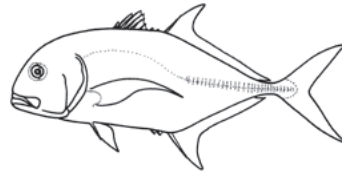
- 27b Not as above ..... 28

- 28a Corner of preopercle with long, sharp spine; body compressed and deep ..... **POMACANTHIDAE** (Angelfishes) *Volume 3*



- 28b Preopercle without spine, or if spine present, body not deep and compressed ..... 29

- 29a Anal fin with 1 or 2 separate spines, sometimes embedded, before fin, + 1 spine, 15–30 rays ..... **CARANGIDAE** (Trevallies) *Volume 4*



- 29b Anal fin without separate spines before fin ..... 30

- 30a Two separate dorsal fins, space between last element of the anterior fin and first element of the posterior fin greater than the space between spines in anterior fin; or with separate spines between anterior and posterior fins ..... 31

- 30b Single dorsal fin, continuous or notched, if notched to the base, the space between the last element of the anterior portion and the first element of the posterior portion about equal to the space between spines in the anterior portion; 1st element of soft dorsal fin often a spine ..... 52

- 31a First dorsal fin 7–9 short, isolated spines, 2nd fin with 1–3 spines, 26–33 rays; body long with broad silver band ..... **RACHYCENTRIDAE** (M) (Cobia) *Volume 4*



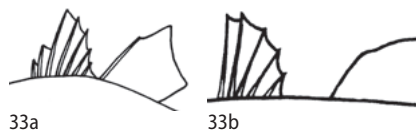
- 31b First dorsal fin not as above ..... 32

- 32a First dorsal fin 7–10 spines + 3–5 short, separate spines, 2nd fin 9–11 rays; soft dorsal and anal fins in scaly sheath ..... **EMMELICHTHYIDAE** IN PART, *Emmelichthys* (Rovers) *Volume 4*



- 32b First dorsal fin not as above; spines joined by membrane ..... 33

- 33a Soft dorsal fin with 1 spine in front of rays ..... 34
- 33b Soft dorsal fin without spine in front of rays ..... 46

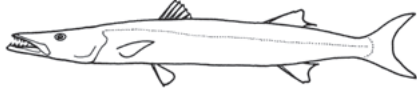


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**KEY TO PERCIFORM FAMILIES**

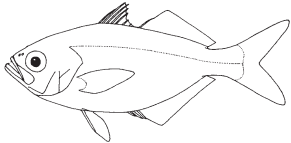
- 34a Body with LL scales ..... 35
- 34b Body without LL scales; head with rows of sensory papillae; 1st dorsal fin 4–10 spines, 2nd dorsal fin 1 spine, 6–29 rays ..... 44

- 35a First dorsal fin 5 spines, 2nd dorsal fin 1 spine, 8 or 9 rays; anal fin 2 spines, 8 or 9 rays; soft dorsal and anal fins opposite each other, situated far back on torpedo-shaped body .....  
..... **SPHYRAENIDAE** (Barracudas) *Volume 5*



- 35b First dorsal fin >5 spines ..... 36

- 36a First dorsal fin with 7 or 8 spines, 2nd dorsal fin with 1 spine, 19–23 rays; anal fin with 3 spines, 25–28 rays; body strongly compressed ..... **LACTARIIDAE** (M) (False trevally) *Volume 3*

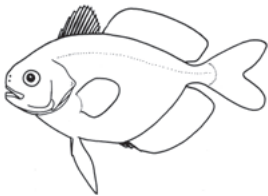


- 36b First dorsal fin 7 or 8 low spines, 2nd dorsal fin with 1 spine, 23–28 rays, fin depressible into groove; anal fin 2 minute spines, 23–27 rays ..... **POMATOMIDAE** (M) (Bluefish or elf) *Volume 3*



- 36c Not as above ..... 37

- 37a First dorsal fin with 9–11 spines, 2nd dorsal fin with 1 or 2 spines, 15–32 soft rays; anal fin with 1–3 small weak spines and 15–30 soft rays; 1st dorsal and pelvic fins fold into a groove; upper jaw not protrusile; 2 flat points on opercle .....  
..... **NOMEIDAE** (Cigarfishes and driftfishes) *Volume 5*



- 37b First dorsal fin with 10 spines, 2nd with 1 spine 10–12 rays; anal fin 3 spines, 9 or 10 rays; dorsal and anal fins with basal scaly sheath; pelvic fins with well-developed axillary process .....  
..... **EMMELICHTHYIDAE** IN PART, *Erythrocles* (Rovers) *Volume 4*



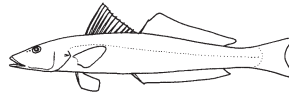
- 37c Not as above ..... 38

- 38a First dorsal fin with 8 or 9 spines, 2nd dorsal fin with 1 spine, 13 or 14 soft rays; anal fin with 3 spines, 12 or 13 soft rays; 1st dorsal and pelvic fins do not fold into a groove; upper jaw not protrusile; maxilla with scales ..... **SCOMBROPIDAE**  
(Gnomefishes) *Volume 3*



- 38b Not as above ..... 39

- 39a First dorsal fin with 11–13 spines, 2nd dorsal fin with 1 spine, 16–24 soft rays; anal fin with 2 spines, 17–26 soft rays; gill membranes not attached to isthmus and not separate from each other ..... **SILLAGINIDAE** (Sillagos, smelts or Indo-Pacific whiting) *Volume 3*



- 39b Not as above ..... 40

- 40a First dorsal fin with 12 spines, 2nd dorsal fin with 1 spine, 14 or 15 soft rays; anal fin with 2 or 3 spines, 16–18 soft rays; upper jaw with 2 or 3 large fangs in front; opercle with 5 flat points .....  
..... **SCOMBROLABRACIDAE** (M) (Black mackerel) *Volume 5*



- 40b Not as above ..... 41

- 41a One flat point or spine on opercle, 0–3 spines on preopercle; 1st dorsal fin with 6–8 spines, 2nd dorsal fin with 1 spine, 8–14 soft rays; anal fin with 2 spines, 8–18 soft rays; no scales on anal and dorsal fins ..... **APOGONIDAE** (Cardinalfishes) *Volume 3*



- 41b Not as above ..... 42

- 42a LL continues onto caudal fin; 1st dorsal fin with 6–8 spines, 2nd dorsal fin with 1 spine, 8–11 soft rays; anal fin with 1–3 spines, 7–10 soft rays; opercle with 1 or 3 spines; dorsal and anal fins with scales at least on base ..... **EPIGONIDAE**  
(Deepwater cardinalfishes) *Volume 3*



- 42b Not as above ..... 43

Continued ...

KEY TO PERCIFORM FAMILIES

43a Opercle with 2 flat spines; 1st dorsal fin with 8–10 spines, 2nd dorsal fin with 1 spine, 9 or 10 soft rays, anal fin with 2 or 3 spines, 7–8 soft rays; LL with 25–55 scales; canines may be present, if no canines then teeth are in more than one row .....  
 ..... **ACROPOMATIDAE** (Lanternbellies) *Volume 3*



43b Opercle with 1–8 spines; lower end of subopercle with 1 or 2 large spines; 1st dorsal fin with 8 spines, 2nd dorsal fin with 1 spine, 8–10 soft rays, dorsal fins are well separated; anal fin with 3 spines, 6–8 soft rays; no canines, teeth in one row.....  
 ..... **HOWELLIDAE** (Pricklefishes) *Volume 3*



44a Branchiostegal rays 5; pelvic fins with frenum, innermost rays usually joined to form a disc ..... **GOBIIDAE**  
 (Gobies and mudskippers) *Volume 5*

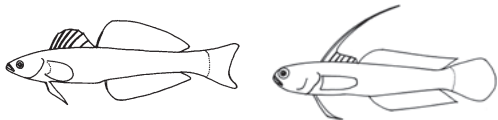


44b Branchiostegal rays 5 or 6; pelvic fins without frenum ..... 45

45a First dorsal fin 5 or 6 spines, 9–15 rays (except *Allomicrodesmus* with 2 spines, 29–33 rays, which might occur in WIO); anal fin 9–14 rays; lower lip with completely free ventral edge; body naked or with very fine scales, 6 branchiostegal rays.....  
 ..... **XENISTHMIDAE** (Wrigglers) *Volume 5*



45b First dorsal fin 5 or 6 spines, >15 rays; anal fin 13–19 or 22–39 rays; lower lip not free; body with cycloid and/or ctenoid scales, 5 branchiostegal rays..... **MICRODESMIDAE**,  
**PTERELEOTRINAE** (Dartgobies) *Volume 5*



45c First dorsal fin 6–10 spines, 6–12 rays; lower lip not free; 6 branchiostegal rays..... **ELEOTRIDAE** (Sleepers or gudgeons) *Volume 5*



46a Preopercle with strong spine ..... 47

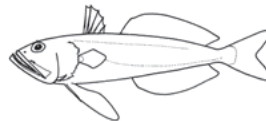


46b Preopercle without strong spine ..... 48

47a Preopercle with strong, serrate spine; dorsal fin with 1–4 spines, 6–10 rays; scales absent ..... **CALLIONYMIDAE** (Dragonets)  
*Volume 4*



47b Preopercle with strong, curved spine; dorsal fin with 5 spines, 19–20 rays; scales spinoid, resembling shark denticles; pectoral fins small, not reaching anal-fin origin; pelvic fins twice length of pectoral fins ..... **CHAMPSODONTIDAE** (Gapers) *Volume 4*



48a Opercle and subopercle with straight, sharp spine; dorsal fin with 3 spines, 12–18 rays; scales absent; pelvic-fin spine visible ..... **DRACONETTIDAE** (Slope dragonets) *Volume 4*



48b Not as above ..... 49

49a Dorsal-fin spines very low or embedded, showing as short, conical tubercles in front of rays ..... 50

49b Dorsal-fin spines at least half height of rays ..... 51

50a Dorsal-fin spines very low, with 22–27 rays; anal fin with 1 spine, 27–32 rays; pelvic-fin rays weak; LL 100–150; scales highly deciduous ..... **AMARSIPIIDAE** (M) (Amarsipa) *Volume 5*



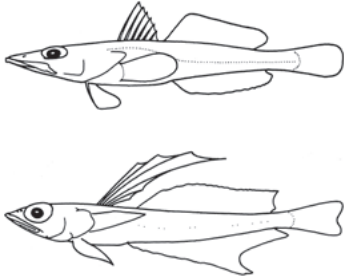
50b Dorsal-fin spines embedded, 9 or 10 rays; anal fin without spine, 10 rays, mostly covered by skin and denticles; LL obscure..... **URANOSCOPIIDAE** IN PART,  
*Pleuroscopus* (Stargazers) *Volume 4*



Continued ...

**KEY TO PERCIFORM FAMILIES**

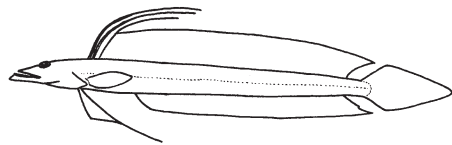
51a Mouth large, flat, bill-like, reaching to below eye; body elongate, subcylindrical and compressed posteriorly; pectoral fins reach further than anal-fin origin; no spine on preopercle; scales ctenoid ..... **PERCOPHIDAE** (Duckbills) *Volume 4*



51b Mouth large, nearly vertical; body thick and compressed; eyes on top of head; pectoral fins short, not reaching anal-fin origin; spines on ventral preopercle; pelvic-fin spine not visible; scales absent or cycloid ..... **URANOSCOPIDAE** IN PART (Stargazers) *Volume 4*



52a Dorsal fin with 3–8 spines, 34–47 rays; anal fin with 1 spine, 32–42 rays; pelvic fins 1 spine, 5 rays (no pelvic axillary scale); lower jaw longer than upper and with fleshy extension; gill membranes free from isthmus and separate from each other; pectoral fins as long as pelvic fins, pelvic fins reaching anus; scales large, cycloid ..... **TRICHONOTIDAE** (Sand-divers) *Volume 4*



52b Dorsal fin without spines ..... 53

52c Dorsal fin with 1 or more spines ..... 56

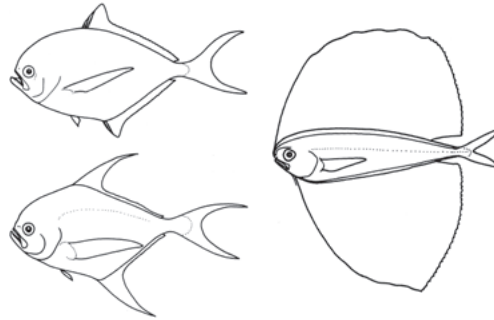
53a Body stout and depressed anteriorly or compressed and deep ..... 54

53b Body elongate or tapered to a point ..... 55

54a Body depressed; dorsal and anal fins situated far back on body; dorsal fin 12–14 rays; anal fin 17 or 18 rays; mouth large and nearly vertical ..... **URANOSCOPIDAE** IN PART, *Xenocephalus* (Stargazers) *Volume 4*



54b Body compressed; dorsal and anal fins high, origin at mid-body or further forward; pelvic-fin rays not elongate; dorsal fin 31–57 rays; anal fin 21–50 rays; mouth oblique and usually to below eye ..... **BRAMIDAE** (Pomfrets) *Volume 4*



54c Body compressed; dorsal and anal fins low; first 2 pelvic-fin rays elongate; dorsal fin with 3 or 4 rudimentary spines (lost with age), 40–45 rays; anal fin with 2 spines (lost with age), 30–33 rays ..... **MENIDAE** (M) (Moonfish) *Volume 3*



55a Body elongate, compressed, and tapered to a point, dorsal and anal fins connected to pointed caudal fin; snout rounded; dorsal fin 82–89 rays; attains 50 cm SL, body orange-red with yellow bands ..... **CEPOLIDAE** IN PART, *Acanthocephala* (Bandfishes) *Volume 4*



55b Body elongate, compressed and tapered; caudal fin forked; snout rounded, dorsal fin 52–66 rays; body with many colours ..... **CORYPHAENIDAE** (Dorado or dolphinfishes) *Volume 4*



56a Anal fin without spines (first 2 rays spine-like in Pinguipedidae) ..... 57

56b Anal fin with 1 or more spines ..... 59

57a Anal fin 17–25 rays; pelvic fins 1 spine, 5 rays; body not elongate; dorsal fin spines shorter than rays, resembling a low crest ..... **PINGUIPEDIDAE** (Sandperches) *Volume 4*

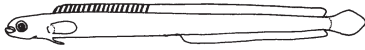


57b Not as above ..... 58

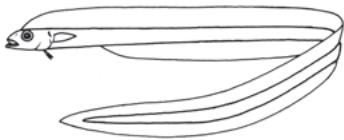
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KEY TO PERCIFORM FAMILIES

58a Dorsal fin 6–28 spines; anal fin 28–41 rays; pelvic fins with visible spine; body very elongate, almost eel-like; base of anal fin about half length base of dorsal fin ..... **MICRODESMIDAE, MICRODESMINAE** (Wormfishes) *Volume 5*



58b Dorsal fin 3–17 spines; anal fin 99–119 rays; pelvic-fin spine present, but not visible, and with 1–4 rays; body eel-like..... **BLENNIIDAE** IN PART, *Xiphasia* (Blennies) *Volume 4*



58c Dorsal fin 1 short, separate spine; anal fin 26–66 rays..... **PSEUDOCROMIDAE, CONGROGADINAE** (Snakelets) *Volume 3*



59a Dorsal fin 1–4 spines, 43–60 rays; anal fin 1 spine, 37–53 rays; pelvic fins reach halfway to anus, half length of pectoral fins; caudal fin square; scales ctenoid, except for some cycloid scales on head..... **BRANCHIOSTEGIDAE** IN PART, *Malacanthus* (Sand-tilefishes) *Volume 3*



59b Not as above..... **60**

60a Body small and elongate, depth ~8 in SL, naked; mouth with prominent chin; head with small flaps along lower edge of preopercle; dorsal fin 4–6 spines, 13–17 rays; pelvic fins 1 spine, 5 rays..... **KRAEMERIIDAE** (Sand-darts) *Volume 5*

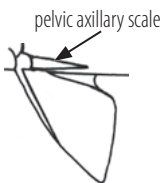


60b Not as above..... **61**

61a Body deep and compressed, depth 0.9–1.8 in SL (*Pempheris* from 2.0 in SL – see 68a)..... **62**

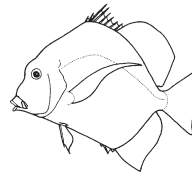
61b Body not deep or greatly compressed, depth >1.8 in SL..... **67**

62a Pelvic axillary scale present ..... **63**



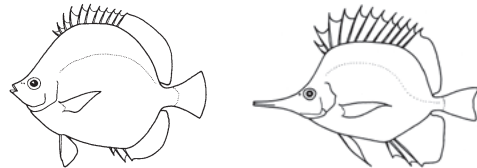
62b Pelvic axillary scale absent ..... **65**

63a Dorsal fin 8–10 spines, 19–22 rays; anal fin 3 spines, 16–19 rays; upper jaw protrusile; pectoral fins long and falciform, reaching caudal peduncle; mouth small; dorsal-, anal- and pelvic-fin spines striated..... **DREPANEIDAE** (Sicklefishes) *Volume 3*

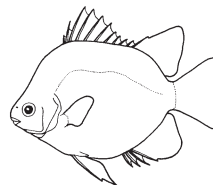


63b Not as above..... **64**

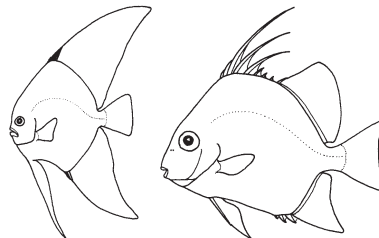
64a Dorsal fin without notch between spines and rays, with 11–17 spines, 14–30 rays; anal fin 3 or 4 spines, 14–23 rays; upper jaw protrusile..... **CHAETODONTIDAE** (Butterflyfishes) *Volume 3*



64b Dorsal fin with notch between spines and rays, with 11 or 12 spines, 16–18 rays; anal fin 4 spines, 13–16 rays; upper jaw not protrusile..... **SCATOPHAGIDAE** (Scats) *Volume 5*



65a Upper jaw not protrusile; LL complete, to base of caudal fin; dorsal fin 5–10 spines, 19–39 rays ..... **EPHIPPIDAE** (Spadefishes, orbfishes and platax) *Volume 5*



65b Upper jaw protrusile..... **66**

Continued ...

**KEY TO PERCIFORM FAMILIES**

66a Dorsal fin 6 or 7 spines, fin with long whip-like filament, and 39–42 rays; caudal fin with black bar; pectoral fins with 18 or 19 rays ..... **ZANCLIDAE** (M) (Moorish idol) *Volume 5*



66b Dorsal fin 7–10 spines, 23–38 rays; anal fin 2 or 3 spines, 22–34 rays; pectoral fins with 12–14 rays ..... **CAPROIDAE** (Boarfishes) *Volume 3*



67a Dorsal fin 1 spine, anal fin 1 spine; dorsal fin without notch; body elongate ..... **PSEUDOCHROMIDAE, ANISOCHROMINAE** (Annies) *Volume 3*



67b Dorsal and anal fins not as above ..... **68**

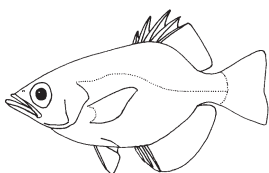
68a Base of anal fin longer than base of dorsal fin (~3× as long in *Pempheris*, and <1½× in *Parapriacanthus*); eye large; LL to end of caudal fin ..... **PEMPHERIDAE** (Sweepers) *Volume 4*



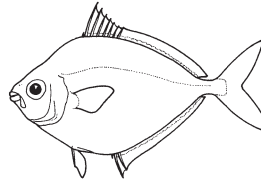
68b Base of anal fin about same length as base of dorsal fin ..... **69**

68c Base of anal fin usually ½–⅔ length base of dorsal fin ..... **70**

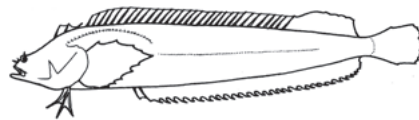
69a Dorsal fin 4–6 spines, 11–14 rays; dorsal and anal fins situated far back ..... **TOXOTIDAE** (Archerfishes) *Volume 4*



69b Dorsal fin 7–9 spines, 15–17 rays; mouth very protrusile ..... **LEIOGNATHIDAE** (Ponyfishes or slipmouths) *Volume 3*



69c Dorsal fin >30 spines, 3–14 rays; body elongate ..... **CLINIDAE** IN PART, *Cancellolus* (Klipfishes) *Volume 4*

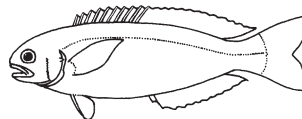


70a Head profile steep; eye large, situated far forward; mouth/maxilla more than twice eye diameter; body elongate; pelvic fins with outer 2 rays unbranched, inner 3 rays branched ..... **OPISTOGNATHIDAE** (Jawfishes) *Volume 4*

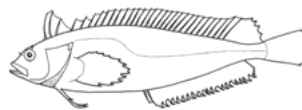


70b Not as above ..... **71**

71a Dorsal fin 3–10 spines, 13–34 rays; anal fin 1 or 2 spines, 12–20 rays; pelvic fins 1 spine, 5 rays; opercle with 1 flat spine, preopercle with spine at angle ..... **BRANCHIOSTEGIDAE** IN PART, *Hoplolatilus* (Sand-tilefishes) *Volume 3*



71b Dorsal fin 24–50 spines, 0–14 rays, first 3–5 spines often forming a crest; anal fin 2 spines, 19–57 rays; pelvic fins 1 hidden spine, 2 or 3 rays; body elongate ..... **CLINIDAE** IN PART (Klipfishes) *Volume 4*



71c Not as above ..... **72**

72a Dorsal fin deeply notched before last spine, and last spine usually longer than penultimate spine ..... **73**

72b Dorsal fin without notch before last spine or not significantly notched (first 2 or 3 spines sometimes forming crest, or elongate in *Iniistius*) ..... **77**

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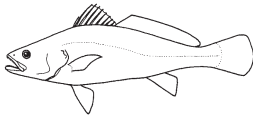


## KEY TO PERCIFORM FAMILIES

- 73a Dorsal fin 6 or 7 + 1 spines; head bones serrate; scales cycloid ..... **AMBASSIDAE** (Glassfishes) *Volume 3*



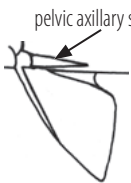
- 73b Dorsal fin 5–12 (usually 10) + 1 spines; head bones not serrate; base of anal fin < ½ length of dorsal-fin base; LL to end of caudal fin ..... **SCIAENIDAE** IN PART (Croakers and kob) *Volume 3*



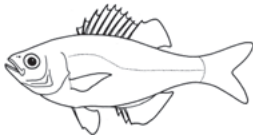
- 73c Dorsal fin >7 + 1 spines; head bones not serrate ..... **74**

- 74a Pelvic axillary scale absent ..... **75**

- 74b Pelvic axillary scale present ..... **76**



- 75a Dorsal fin 9 + 1 spines; opercle with 2 spines; scales ctenoid ..... **KUHLIIDAE** (Flagtails) *Volume 3*



- 75b Dorsal fin 10–12 + 1 spines; preopercle serrate; opercle with 2 spines ..... **TERAPONTIDAE** (Thornfishes) *Volume 3*



- 76a Dorsal fin total spines 8 or 9; caudal fin rounded; maxilla to well behind eye; preopercle with spines ..... **LATIDAE** (Barramundi) *Volume 3*



- 76b Dorsal fin total spines 10; caudal fin deeply forked; maxilla to anterior half of eye; opercle with one flat point ..... **LUTJANIDAE** IN PART, *Etelis* (Snappers) *Volume 3*



- 77a Body without scales, elongate; dorsal fin with 3–17 spines; anal fin with 2 spines, often reduced and not visible in females; pelvic fins 1 spine (often hidden), 1–4 rays; LL not divided ..... **BLENNIIDAE** IN PART (Blennies) *Volume 4*

- 77b Not as above ..... **78**

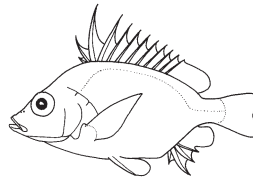
- 78a Anal fin 4–6 spines ..... **79**

- 78b Anal fin 0–3 spines ..... **80**

- 79a Anal fin 5 or 6 spines, 12–14 rays; scales cycloid and deciduous; lachrymal bone serrate ..... **GERREIDAE** IN PART, *Pentaptrion* (Silverbiddies) *Volume 3*



- 79b Anal fin 4–6 spines, 7–10 rays; scales ctenoid, head bones exposed ..... **PENTACEROTIDAE** IN PART, *Pentaceros* (Armourheads) *Volume 3*



- 80a Dorsal fin 1–4 spines ..... **81**

- 80b Dorsal fin >4 spines ..... **82**

- 81a Anal fin 3 spines, 8–10 rays; dorsal fin tall, 4 spines, 25–27 rays, spines strong; caudal fin emarginate; head bones exposed ..... **PENTACEROTIDAE** IN PART, *Histioporus* (Armourheads) *Volume 3*



- 81b Anal fin 1 spine, 13 or 14 rays; dorsal fin 3 spines, 21 rays; pelvic fins 1 spine, 5 rays; caudal fin long and pointed; reddish in colour ..... **CEPOLIDAE** IN PART, *Owstonia* (Bandfishes) *Volume 4*



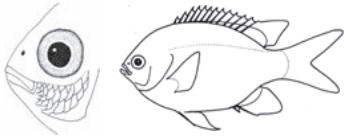
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**KEY TO PERCIFORM FAMILIES**

81c Anal fin 1–3 spines, 12–21 rays; dorsal fin even, 1–4 spines, 21–32 rays, spines weak; caudal fin rounded to truncate; cheek and opercle without scales ..... **PSEUDOCROMIDAE** (Dottybacks) *Volume 3*



82a One pair of nostrils; anal fin 2 spines; body compressed; anal fin 2 spines; LL interrupted or complete ..... **POMACENTRIDAE** (Damsel-fishes) *Volume 4*



82b Two pairs of nostrils ..... 83



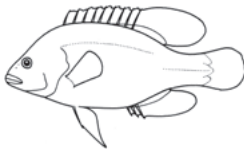
83a Anal fin 1 or 2 spines; canines present ..... 84

83b Anal fin 2 or 3 spines; no canines present ..... 85

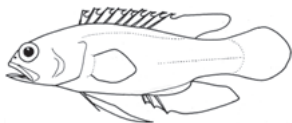
84a Anal fin 1 or 2 spines; teeth villiform with few canines; scales ctenoid; opercle with 1 spine ..... **BRANCHIOSTEGIDAE** IN PART, *Branchiostegus* (Tilefishes) *Volume 3*



84b Anal fin 2 spines; teeth molariform with canines in front, often protruding; scales large, cycloid ..... **LABRIDAE** IN PART (Wrasses) *Volume 4*



85a Pelvic fins 1 spine, 2–4 rays; scales mostly ctenoid; LL divided below rear of dorsal fin; pectoral fins long, extending to or beyond origin of anal fin; caudal fin round to pointed ..... **PLESIOPIIDAE** (Longfins, comets and spiny basslets) *Volume 3*

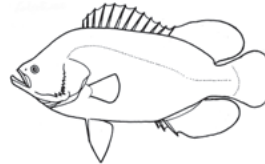


85b Pelvic fins 1 spine, 5 rays ..... 86

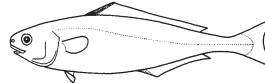
86a Dorsal-fin spines much shorter than rays ..... 87

86b Dorsal-fin spines about same length or longer than ray ..... 88

87a Dorsal and anal fins rounded posteriorly, reaching past base of caudal fin; caudal fin rounded ..... **LOBOTIDAE** (Tripletails) *Volume 3*



87b Dorsal and anal fins not rounded, do not reach past caudal-fin base; caudal fin forked ..... **CENTROLOPHIDAE** (Ruffs, butterfishes and driftfishes) *Volume 5*



87c Soft dorsal, anal and caudal fins truncate; LL to end of caudal fin ..... **DINOPERCIDAE** (Cavebasses) *Volume 3*



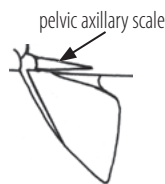
88a Pelvic fins joined to body; pectoral fins shorter than HL; scales spinoid, adherent, covering most of head; eye large, mouth strongly oblique ..... **PRIACANTHIDAE** (Bigeyes) *Volume 3*



88b Not as above ..... 89

89a Pelvic axillary scale absent ..... 90

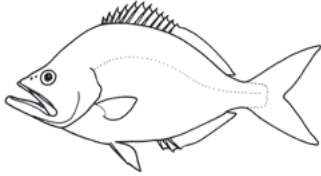
89b Pelvic axillary scale present ..... 94



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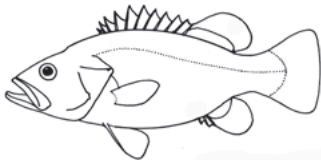
## KEY TO PERCIFORM FAMILIES

- 90a Anal fin 13–15 rays; lower jaw strongly protruding .....  
..... **PARASCORPIDIDAE** (M) (Jutjaw) *Volume 3*



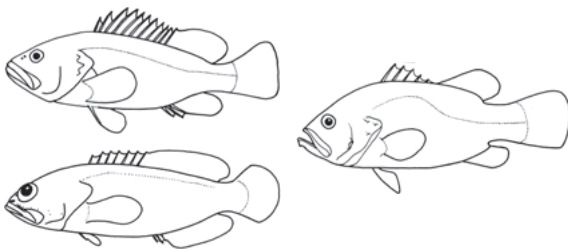
- 90b Anal fin <13 rays; lower jaw not as above ..... 91

- 91a Opercle with horizontal ridge ending in a spine; preopercle serrate in adults, without spines; pelvic- and anal-fin spines serrate; pectoral fins shorter than pelvic fins .... **POLYPRIONIDAE** (Wreckfishes) *Volume 3*



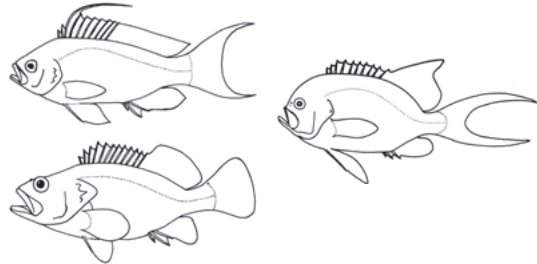
- 91b Opercle with 1–3 flat spines; preopercle serrate, sometimes with spines; pelvic- and anal-fin spines not serrate; pectoral fins generally longer than pelvic fins ..... 92

- 92a Body scales small, LSS >78, from upper end of gill opening to caudal-fin base (reduced to 40–60 in Pseudogrammini); LL scales often inconspicuous (disjunct LL in Pseudogrammini), usually smaller than main body scales, and mostly covered by them; flap of skin joining upper part of pectoral-fin base to body; maxilla naked; supramaxilla present, covered by skin and loosely attached to upper rear edge of maxilla .....  
..... **EPINEPHELIDAE** (Groupers, podges and soapfishes) *Volume 3*



- 92b Body scales larger, LSS usually <80, from upper end of gill opening to caudal-fin base; LL scales typically distinct; subequal in size and number to adjacent body scales; no flap of skin joining pectoral-fin base to body; supramaxilla typically absent (present in *Acanthistius* and present, but small, in some *Plectranthias*) ..... 93

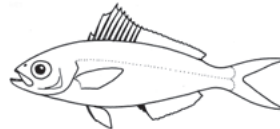
- 93a Maxilla scaly in most species; caudal fin lunate or forked in most species; branched caudal-fin rays 13 in most species (15 in *Acanthistius*); LL 25–64 scales; dorsal fin 13–20 rays .....  
..... **ANTHIADIDAE** (Goldies, basslets, perchlets and swallowtails) *Volume 3*



- 93b Maxilla naked; caudal fin emarginate to truncate; branched caudal-fin rays 15; LL 67–77 (*Serranus*) or 42–44 (*Chelidoperca*) scales; dorsal fin 13–15 (*Serranus*) or 9–10 (*Chelidoperca*) rays .....  
..... **SERRANIDAE** (Perchlets and sea basses) *Volume 3*



- 94a Premaxilla with 1 or 2 postmaxillary processes, visible from inside mouth; jaws highly protrusile; teeth small to minute; no teeth on vomer; preopercle not serrate; branchiostegal rays 7; often with blue and yellow stripes ..... **CAESIONIDAE** (Fusiliers) *Volume 3*

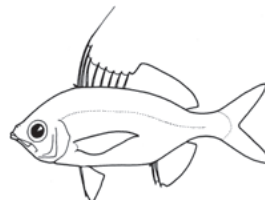


- 94b Not as above ..... 95

- 95a Scales cycloid, often very large ..... 96

- 95b Scales ctenoid ..... 99

- 96a Caudal fin deeply forked; cheeks and opercle scaly; single row of scales at base of dorsal and anal fins ..... **GERREIDAE** IN PART, *Gerres* (Silverbiddies) *Volume 3*

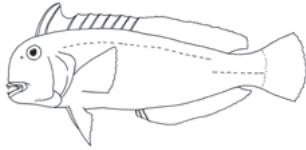


- 96b Caudal fin rounded, truncate to slightly emarginate ..... 97

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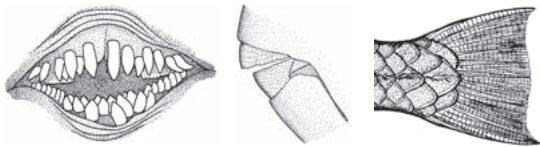
**KEY TO PERCIFORM FAMILIES**

97a Body compressed, profile of head steep and sharp, with 'razor-edge'; first 2 or 3 spines sometimes elongate or forming crest ..... **LABRIDAE** IN PART, *Iniistius* (Razorfishes) *Volume 4*

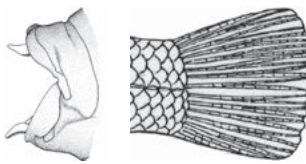


97b Not as above ..... **98**

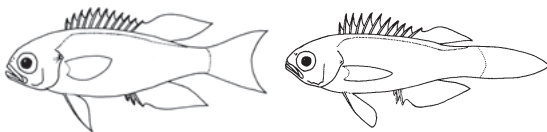
98a Three or 4 large scales at base of caudal fin; outer teeth separate or fused into a dental plate ..... **SCARIDAE, SPARISOMATINAE** (Parrotfishes) *Volume 4*



98b No large scales at caudal-fin base; teeth in jaws conical, usually with canines anteriorly (incisors in *Anampses* and *Pseudodax*) ..... **LABRIDAE** IN PART (Wrasses) *Volume 4*



99a LL runs along base of dorsal fin and just below top of peduncle; dorsal fin 9–11 rays; anal fin 9–11 rays; usually gold in colour ..... **CALLANTHIIDAE** (Seaperches) *Volume 3*



99b Not as above ..... **100**

100a Mouth highly protrusile, toothless or with few small teeth; gill rakers long and numerous; dorsal fin with deep notch before last spine, penultimate spine the shortest; dorsal and anal fins in scaly sheath (but see also 107b) ..... **EMMELICHTHYIDAE** IN PART, *Plagiogeneion* (Rovers) *Volume 4*



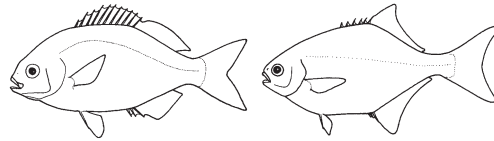
100b Not as above ..... **101**

101a Dorsal fin with 18–23 rays; fins scaly; no spines or flat points on opercle; gill membranes attached to isthmus and attached to each other ..... **DICHISTIIDAE** (Galjoen) *Volume 3*



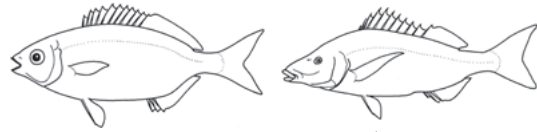
101b Not as above ..... **102**

102a Dorsal fin 11–15 rays; fins without scales; a single row of incisor-like teeth; minute canine-like teeth in 2 or 3 rows medial to incisor-like teeth; opercle with 2 small, weak, retrorse spines ..... **KYPHOSIDAE** (Sea chubs or rudderfishes) *Volume 3*



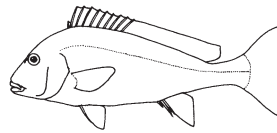
102b Not as above ..... **103**

103a Dorsal fin 10–15 spines, 9–17 rays (but never 10 spines, 9 rays); opercle with or without spines; maxilla slots into groove in outer end of premaxilla; preopercle not serrate; no teeth on vomer; gill membranes separate from each other; no pores on chin ..... **SPARIDAE** (Seabreams and porgies) *Volume 3*

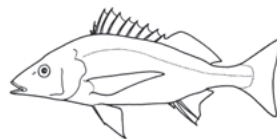


103b Not as above ..... **104**

104a Dorsal fin 15–25 rays; cheek and opercle scaly; head scaly except front of snout; pores on chin ..... **HAEMULIDAE** (Grunters and rubberlips) *Volume 3*



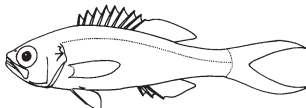
104b Not as above ..... **105**



Continued ...

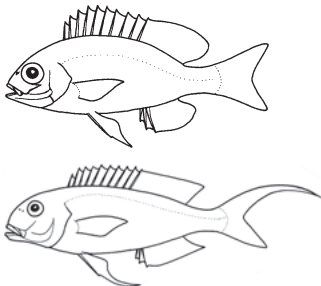
KEY TO PERCIFORM FAMILIES

105a Dorsal fin 9 spines, 10 or 11 rays; opercle with 2 spines, lower larger; uppermost pectoral- and caudal-fin rays often elongate ..... **SYMPHYSANODONTIDAE** (Slopefishes) *Volume 3*



105b Not as above ..... **106**

106a Dorsal fin 10 spines, 8–10 rays; anal fin with 7 rays; opercle without spines (some have a flat point); dorsal and anal fins in shallow groove; gill membranes separate from each other ..... **NEMIPTERIDAE** (Threadfin breams, monacle breams and dwarf monacle breams) *Volume 3*

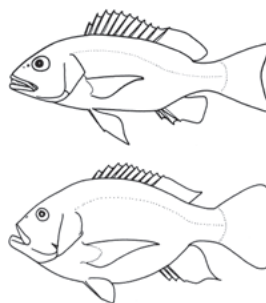


106b Not as above ..... **107**

107a Dorsal fin 9 or 10 rays; opercle with single flat spine; gill rakers few and knob-like; gill membranes not separate from each other ..... **LETHRINIDAE** (Emperors, emperor snappers and large-eye breams) *Volume 3*



107b Dorsal fin 10–16 rays; opercle with 2 flat points, upper hidden by skin and scales; gill rakers not as above; gill membranes separate from each other ..... **LUTJANIDAE** IN PART (Snappers) *Volume 3*



## FAMILY LATIDAE

### Barramundi

Phillip C Heemstra

Body elongate, oval, robust; head profile slightly concave over eyes. Upper jaw slightly protrusile, maxilla exposed, reaching below mid-eye or beyond eyes, and supramaxilla well-developed; bands of villiform teeth on jaws, vomer, palatines and pterygoids. Upper rear edge of opercle ends in flat spine. Dorsal fin single, origin well behind head, margin deeply notched before last spine, with 8–10 spines (3rd spine longest), 10–13 rays; anal fin 3 spines, 7–9 rays; last dorsal- and anal-fin rays double (split to base) but counted as single ray; pectoral fins rounded, shorter than head, 16–18 rays; pelvic fins thoracic, not reaching anus, with 1 spine, 5 rays, and well-developed scaly axillary process; caudal fin rounded, with 15 branched rays. Branchiostegal rays 7; membranes separate, narrowly joined to sides of isthmus and to one another; gill rakers long, pseudobranch rudimentary or absent. Lateral line complete, extending almost to end of caudal fin. Scales finely ctenoid, extending onto top of head, cheeks and opercle; interorbital region, snout, maxilla and lower jaw naked. Vertebrae 11 + 14.

Moderate- to large-sized, found in the sea, estuaries, lagoons, rivers and lakes. Some species restricted to freshwater with several *Lates* species in Rift Valley lakes of East Africa, others return to estuaries for spawning. Protandrous hermaphrodites wherein most individuals mature as males and then undergo sex reversion to females after a few spawning seasons. Feed on fishes and crustaceans.

Family revised by Otero (2004). Three genera and ~13 species, 1 in WIO. The record of *Psammoperca waigiensis* (Cuvier 1828) from Sri Lanka by Munro (1955) is unsubstantiated.

### *Lates calcarifer* (Bloch 1790)

Barramundi, giant perch

PLATE 1

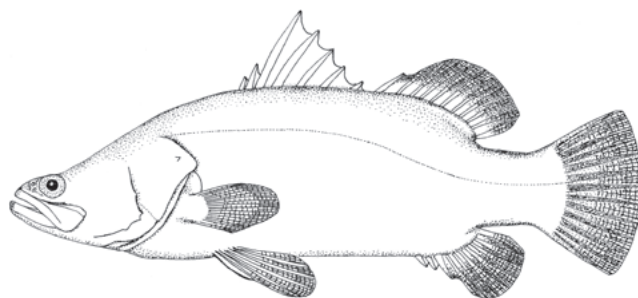
*Holocentrus calcarifer* Bloch 1790: 100, Pl. 244 (Tamil Nadu, India).

*Lates calcarifer*: Munro 1955\*; Pethiyagoda 1991\*; Manilo & Bogorodsky 2003.

Body depth 2.7–4 in SL; HL 2.9–3.8 in SL. Dorsal fin 8 or 9 spines, 10–12 rays; anal fin 3 spines (3rd spine twice length of 2nd), 7 or 8 rays; pectoral fins 17 or 18 rays. LL scales 49–58; GR 5–7/16 or 17. Dorsal fin subequal to half head length; pectoral-fin length about half HL. Maxilla extends well past eyes, width of rear end subequal to or greater than eye

diameter; lower jaw projecting. Preopercle edge vertical limb finely serrate, 3 or 4 strong spines on lower limb; preorbital region finely serrate. Anterior and posterior nostrils close together, near front edge of eyes.

Adults silvery, grading to olive-grey or grey-blue dorsally (fish from turbid water darker and duller); juveniles brownish, with median white stripe along top of head from upper lip to dorsal-fin origin, irregular white stripe behind eyes, and pale blotches on sides; median fins pale distally. Attains 200 cm TL, ~60 kg.



*Lates calcarifer*, ~45 cm SL (Pakistan).

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, India and Sri Lanka; elsewhere to Bangladesh, Thailand, Indonesia, China, Japan, New Guinea and northern Australia.

**REMARKS** Adults occur in lagoons, estuaries and shallow coastal waters around reefs, and form spawning aggregations in estuaries. Juveniles usually found in fresh and brackish water. Males change sex at 3–5 years and thereafter spawn as females. Feeds on fishes and crustaceans (mainly prawns). Excellent food fish and of considerable economic importance; caught with gillnets and by recreational anglers, and also used for aquaculture.

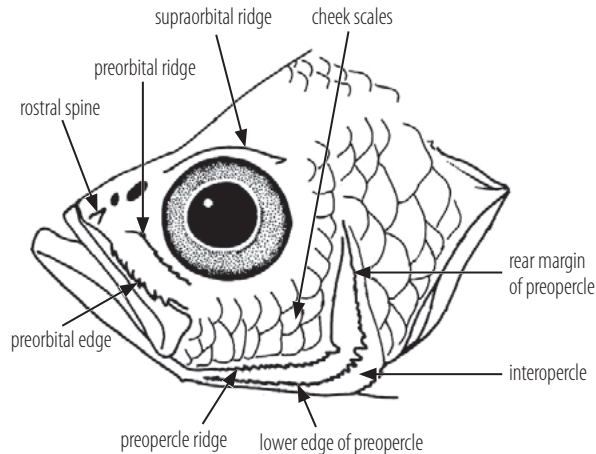
## FAMILY AMBASSIDAE

### Glassfishes

M Eric Anderson and Phillip C Heemstra

Body oblong, distinctly compressed; dorsal fin deeply divided before last spine, with 7 or 8 spines, 8–11 rays; anal fin 3 spines, 8–11 rays; last ray of dorsal and anal fins split to their base (but counted as 1 ray); caudal fin forked, with 15 branched rays. Head bones externally variously serrate (serrations often minute) or smooth; opercle with membranous flap,

no spine. Mouth oblique, lower jaw slightly projecting; maxilla naked, not reaching past vertical at front of eye; no supramaxilla; teeth minute, present on jaws, vomer, palatines and sometimes tongue. Gill rakers well-developed. Scales thin, cycloid, deciduous; dorsal- and anal-fin bases with low scaly sheath. Lateral line arched anteriorly, complete or interrupted. Swimbladder present. Vertebrae 10 + 14.



Head of a typical ambassid showing key bony features and cheek scalation.

Small-sized, translucent and silvery, usually in schools. Found in shallow tropical waters throughout Indo-Pacific, commonly in estuaries and lagoons, and several species occur primarily in freshwater. Of minor fishery interest in Southeast Asia; too small to be of commercial importance as food fish but sometimes used as live bait or dried for fertiliser, and a few species are sold in the aquarium trade.

Reviewed by Anderson & Heemstra (2003), but still in need of revision as the limits and relationships of the Ambassidae are uncertain and the genera are not well differentiated. Some previous classifications have included this group in the Centropomidae or Chandidae. Eight genera and ~50 species; 1 genus represented in WIO.

## GENUS *Ambassis* Cuvier 1828

LSS 25–30; 1–3 rows of cheek scales. Preorbital (lachrymal) and preopercle with serrated edges; preorbital sometimes with a rostral spine, angled posteriorly. Dorsal-fin membrane between spines 2–3 dusky or black. Species with a continuous lateral line may have occasional individuals with the lateral line anomalously interrupted, but not for more than 1 or 2 scales. Predorsal scales are the series along the dorsal midline from the interorbital region to dorsal fin. About 21 species, 8 in WIO.

### KEY TO SPECIES

- 1a Cheeks scaly; predorsal scales 8–16; lower GR 18–27 ..... 2
- 1b No scales on cheeks; predorsal scales 1–4; lower GR 7–9 ..... *A. fontoyonti*
- 2a Lateral line interrupted below soft-rayed dorsal fin by 2–6 scales lacking tubes; rear section continuing midlaterally on body; preorbital with exposed posteriorly directed rostral spine below anterior nostril ..... 3
- 2b Lateral line continuous; rostral spine (if present) not exposed, except in *A. miops* ..... 4
- 3a Lower corner of interopercle with 1–10 serrae; white patch on anal-fin membrane between spines 2–3; body depth 2.1–2.7 in SL; lower GR 24–27 ..... *A. interrupta*
- 3b Lower corner of interopercle smooth; no white patch at tips of anal-fin spines 2–3; body depth 2.6–3 in SL; lower GR 22–25 ..... *A. dussumieri*
- 4a Cheek with 2 or 3 scale rows; preopercle margin serrate or smooth ..... 5
- 4b Cheek with 1 scale row; preopercle margin smooth or with weak crenulations ..... *A. urotaenia*
- 5a Body depth 2.2–3 in SL; pectoral fins 13 or 14 (rarely 15) rays ..... 6
- 5b Body depth 2–2.2 in SL; pectoral fins 16 or 17 (rarely 15) rays ..... *A. nalu*
- 6a Predorsal scales 9–11; preopercle ridge smooth except for 1–5 spines at rear corner; palatine teeth in 2 or 3 rows, at least anteriorly ..... *A. natalensis*
- 6b Predorsal scales 12–18; preopercle ridge serrate; palatine teeth in 1 row ..... 7
- 7a No rostral spine; lower corner of interopercle and preopercle margin serrate ..... *A. ambassis*
- 7b Rostral spine present; lower corner of interopercle and preopercle margin smooth ..... *A. miops*

## *Ambassis ambassis* (Lacepède 1802)

Commerson's glassy

PLATE 1

*Centropomus ambassis* Lacepède (ex Commerson) 1802: 252, 273 (Réunion, Mascarenes).

*Ambassis commersonii* Cuvier in Cuv. & Val. 1828: 176, Pl. 25 (Réunion, Mascarenes; Puducherry, India; Mahé, Java, Indonesia); Bleeker 1875–1878\*; Day 1875\*; Pellegrin 1933\*; Smith 1949\*; Hill 1966; Day 1974; Blaber 1978; Masuda *et al.* 1984\*; Datta & Chaudhuri 1996\* [in part].

*Ambassis productus* Guichenot 1866: 130 (Madagascar); Fraser-Brunner 1955; SSF No. 163.3\*; Martin & Heemstra 1988\*; Van der Elst 1988\*; Skelton 1993\*; Whitfield 1998\*.

*Ambassis klunzingeri* Steindachner 1880: 238 [1] (Tohizona, Madagascar).

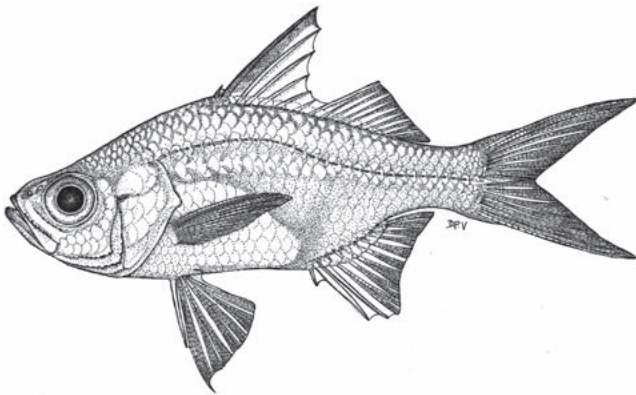
*Ambassis ambassis*: Fowler 1925; Fricke 1999; Anderson & Heemstra 2003\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Chanda commersonii*: Dor 1984.

*Ambassis urotaenia* (*non* Bleeker 1852): ?Eccles 1992; Reinthal & Stiassny 1997 [in part].

Dorsal fin 7 + 1 spines, 8–10 rays; anal fin 3 spines, 9–11 rays; pectoral fins 14 or 15 rays. Body depth 2–3 in SL; HL ~3 in SL; eye diameter 3–4 in HL. No rostral spine on upper edge of preorbital; preorbital ridge smooth or serrate; 1 supraorbital spine; preopercle ridge and rear margin serrate; interopercle with 3–10 minute serrae at angle. Palatine teeth in 1 row; vomerine teeth in 3 patches. GR 7–10/19–23. Lateral line continuous (but infrequently interrupted by 1 or 2 scales); LL scales 27–31; predorsal scales 13–18; 2 or 3 rows of cheek scales.

Head and body silvery, translucent greenish brown dorsally; lateral-line scales brilliant silvery; dorsalmost body scales with minute black dots (melanophores); dorsal-fin membrane dusky between spines 2–4, black at tip. Attains 15 cm TL.



*Ambassis ambassis*, 7 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Kenya to South Africa (Eastern Cape), Madagascar, Réunion, Mauritius and southwestern India.

**REMARKS** Found along sandy beaches, in estuaries and lagoons, and tolerant of freshwater. Also known from volcanic crater lakes in Madagascar. Captured in large amounts as a food or bait fish in India.

## *Ambassis dussumieri* Cuvier 1828

Bald glassy

PLATE 1

*Ambassis dussumieri* Cuvier in Cuv. & Val. 1828: 181 (Malabar coast,

India); Fraser-Brunner 1955; Maugé 1986; Kottelat *et al.* 1993\*; Skelton 1993\*; Anderson & Heemstra 2003\*; Heemstra & Heemstra 2004.

*Ambassis denticulata* Klunzinger 1870: 719 (Al-Qusayr, Egypt, Red Sea).

*Ambassis gymnocephala* (*non* Lacepède 1802): Bleeker 1874, 1875\*;

Day 1875\*; Weber & De Beaufort 1929; Smith 1949; Fraser-Brunner

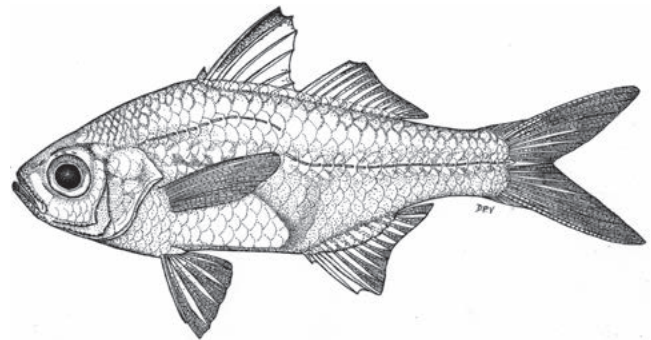
1955; Munro 1955\*; Jayaram 1981; SSF No. 163.1\*; Martin & Heemstra 1988\*; Allen & Burgess 1990\*; Talwar & Jhingran 1991; Randall 1995\*.

*Ambassis urotaenia* (*non* Bleeker 1852): Pellegrin 1933.

*Chanda gymnocephalus*: Dor 1984.

Dorsal fin 6 or 7 + 1 spines, 8–10 rays; anal fin 3 spines, 8–11 rays; pectoral fins 14–16 rays. Body depth ~3 in SL; HL ~3 in SL; eye diameter 3 in HL. Distinct rostral spine on dorsal end of preorbital bone below anterior nostril; preorbital ridge smooth or with 2 or 3 small serrae; supraorbital spines 1–4; lower edge and angle of preopercle serrate, but dorsal two-thirds of rear edge smooth; lower limb of preopercle ridge completely serrate; interopercle with 1 or 2 small spines. Teeth in bands on vomer, palatines and tongue. GR 8–10/22–25. Lateral line interrupted; LL scales 12–14 + 10–16; predorsal scales 13–16; 2 rows of cheek scales.

Head and body silvery, translucent dorsally; dorsalmost body scales edged with minute brownish dots (melanophores); dusky midlateral stripe from caudal-fin base to above pectoral fins; dorsal-fin membrane brownish between spines 2–3. Attains ~10 cm TL.



*Ambassis dussumieri*, 5 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Algoa Bay, Eastern Cape) and Seychelles; elsewhere to east coast of India, Philippines, East Timor, China and northern Australia.



**REMARKS** Found primarily in coastal waters and estuaries. Maugé (1984) showed that Bleeker's (1874, 1875) use of Lacepède's (1802) name *Lutjanus gymnocephalus* for the first record of an *Ambassis* species in the WIO with an interrupted lateral line was based on a misidentification, subsequently used uncritically by other authors. A new name for the widespread Indo-Pacific species with an interrupted lateral line was thus needed, and Maugé (1984) erected *A. bleekeri* for it. Maugé also stated that the types of *A. dussumieri* possessed a continuous lateral line. However, and without explanation, Maugé (1986) reversed his observation of *A. dussumieri*'s lateral line by synonymising *A. bleekeri* with the former, the earliest name for the common WIO species with an interrupted lateral line (= *A. gymnocephala* of most authors; *A. gymnocephalus* should be treated as a *nomen dubium* as the name cannot be assigned to any species).

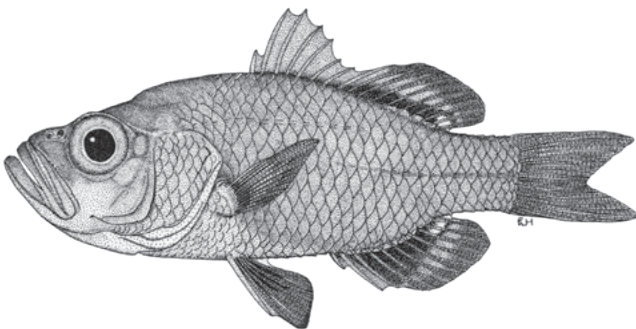
### *Ambassis fontoynti* Pellegrin 1932

Dusky glassy

*Ambassis fontoynti* Pellegrin 1932: 425 (stream tributary to Faraony River, Madagascar); Pellegrin 1933\*, 1935; Arnoult 1959\*; Kiener 1961\*, 1966; Maugé 1986; Anderson & Heemstra 2003\*.

Dorsal fin 7 + 1 spines, 7–9 rays; anal fin 3 spines, 7–9 rays; pectoral fins 11–13 rays. Body depth 2–3 in SL; HL 2–3 in SL; eye diameter 3–4 in HL. No rostral spine at dorsal margin of preorbital bone; preorbital and supraorbital ridges smooth, very small supraorbital spine developed in some; lower edge of preopercle serrate, rear margin smooth; preopercular ridge and interopercle edge smooth. Teeth on vomer and palatines few, in 1 row. GR 2 or 3/7–9. Lateral line interrupted, weak; LL scales 13–16 + 11–13; predorsal scales 1–4; no cheek scales.

Head and body brownish, with blackish areas on back, and abdomen pale; black stripe along rear part of lateral line; black bands on bases and margins of unpaired fins, with dusky areas between bands; pelvic fins black. Attains 8 cm TL.



*Ambassis fontoynti*, 5 cm SL, lectotype (Madagascar).  
Source: Anderson & Heemstra 2003

**DISTRIBUTION** WIO: endemic to Madagascar.

**REMARKS** Known from coastal rivers and streams, brackish lagoons, estuaries and mangrove stands of eastern Madagascar.

### *Ambassis interrupta* Bleeker 1853

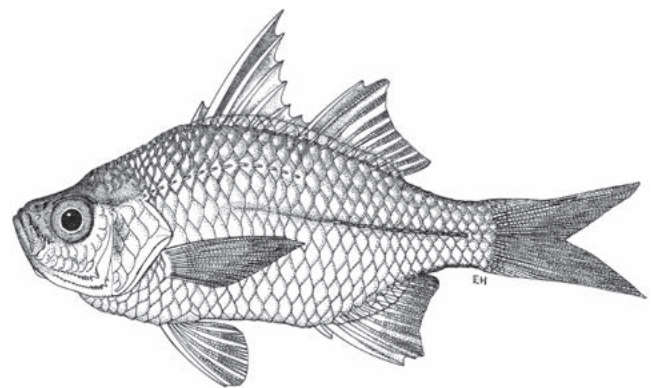
Long-spined glassy

PLATE 1

*Ambassis interrupta* Bleeker 1853: 696 (Java, Indonesia); Day 1875\*; Allen & Burgess 1990\*; Talwar & Jhingran 1991; Datta & Chaudhuri 1996; Allen 1999\*; Anderson & Heemstra 2003\*.

Dorsal fin 7 + 1 spines, 9 or 10 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 14–16 rays. Body depth 2–3 in SL; HL 2–3 in SL; eye diameter 2–3 in HL. Well-developed rostral spine at dorsal end of preorbital bone; preorbital ridge with 3–6 small serrae; supraorbital ridge with 1 small spine posteriorly; lower edge of preopercle serrate, rear margin smooth; lower limb of preopercle ridge serrate, vertical limb smooth; edge of interopercle with 2–10 small serrae. Vomer and palatine teeth in single row; 2 rows of teeth on tongue of larger fish. GR 8–10/24–27. Lateral line interrupted below soft dorsal fin by 3–6 tubeless scales; LL scales 7–13 + 9–14; predorsal scales 13–16; 2 rows of cheek scales.

Head and body silvery, translucent greyish dorsally; lateral-line scales brilliant silvery; edges of dorsalmost body scales with small black dots (melanophores); scales along dorsal- and anal-fin bases and along upper and lower edges of peduncle blackish; brilliant white patch on anal-fin membrane at tips of spines 2–3 (fresh specimens). Attains 11 cm TL.



*Ambassis interrupta*, 9 cm SL (New Guinea).  
Source: Anderson & Heemstra 2003

**DISTRIBUTION** Indo-Pacific. WIO: Seychelles and west coast of India; elsewhere to Andaman Is., Indonesia, Malaysia, Philippines, South China Sea, Japan, Australia, New Guinea, New Caledonia and Vanuatu.

**REMARKS** Found in estuaries, mangroves, and the lower reaches of coastal rivers and creeks.

## *Ambassis miops* Günther 1872

Flag-tailed glassy

PLATE 2

*Ambassis miops* Günther 1872: 655 (Rarotonga I., Cook Is.); Weber & De Beaufort 1929; Masuda *et al.* 1984\*; Allen & Burgess 1990\*; Talwar & Jhingran 1991; Datta & Chaudhuri 1996; Manilo & Bogorodsky 2003.

Dorsal fin 7 + 1 spines, 8–10 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 13–15 rays. Body depth ~3 in SL; HL ~3 in SL; eye diameter ~4 in HL. Rostral spine at dorsal margin of preorbital (may be hidden under flesh in larger fish); preorbital ridge smooth; 1 supraorbital spine; preopercle ridge serrate, rear margin smooth; lower edge of interopercle smooth. Palatine teeth in 1 row; vomerine teeth minute, in multiple rows. GR 8–11/18–25. Lateral line continuous (infrequently may be interrupted by one scale); LL scales 28–30; predorsal scales 12–15; 2 rows of cheek scales.

Head and body silvery, straw-coloured dorsally, with greenish tinges; thin black stripe along posterior half of lateral line; fins dusky; dorsal-fin membrane blackish between spines 2–3; lower half of eyes golden. Attains ~10.5 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Arabian Sea and India; elsewhere to Indonesia, Malaysia, East Timor, Taiwan, southern Japan, northern Australia, New Guinea, New Caledonia, Fiji, Samoa and Cook Is.

**REMARKS** Occurs mostly in freshwater streams, but has been caught in the Arabian Sea (Manilo & Bogorodsky 2003).

## *Ambassis nalua* (Hamilton 1822)

Scalloped glassy

PLATE 2

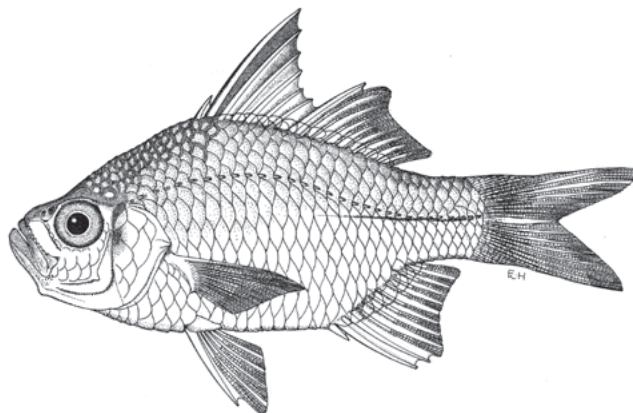
*Chanda nalua* Hamilton 1822: 107, 371, Pl. 6, Fig. 36 (freshwaters of Lower Bengal, India).

*Ambassis nalua*: Day 1875\*; Allen & Burgess 1990\*; Talwar & Jhingran 1991; Kottelat *et al.* 1993\*; Datta & Chaudhuri 1996; Allen 1999; Anderson & Heemstra 2003\*.

Dorsal fin 7 or 8 + 1 spines, 9–11 rays; anal fin 3 spines, 8–10 rays; pectoral fins 14–17 rays. Body depth ~2 in SL; HL 2–3 in SL; eye diameter ~3 in HL. No rostral spine at dorsal end of preorbital; preorbital ridge smooth or with a few weak serrae; supraorbital ridge with 1 or 2 spines; lower edge of preopercle serrate, rear margin smooth dorsally; preopercle ridge lower limb serrate, vertical limb smooth; interopercle

smooth or with 1–4 minute spines at angle. Teeth in 2 or 3 rows on jaws, vomer, palatines and tongue. GR 8 or 9/18–22. Lateral line continuous; LL scales 27–29; predorsal scales 11–13; 2 rows of cheek scales.

Head and body silvery, translucent greenish brown to dusky grey dorsally; edges of dorsalmost body scales with minute black dots (melanophores); dusky stripe along midbody; dorsal-fin membrane blackish between spines 2–3. Attains 12 cm TL.



*Ambassis nalua*, 7 cm SL (New Guinea).

Source: Anderson & Heemstra 2003

**DISTRIBUTION** Indo-Pacific. WIO: southwestern India; elsewhere to east coast of India, Andaman Is., Thailand, Indonesia, Philippines, northern Australia and New Guinea.

**REMARKS** Found in tropical fresh and brackish waters, including mangroves, estuaries and tidal creeks.

## *Ambassis natalensis* Gilchrist & Thompson 1908

Slender glassy

PLATE 2

*Ambassis natalensis* Gilchrist & Thompson 1908: 148 (Durban Harbour, KwaZulu-Natal, South Africa); Fraser-Brunner 1955; Wallace 1975; Blaber 1978; Maugé 1986\*; SSF No. 163.2\*; Martin & Heemstra 1988\*; Van der Elst 1988\*; Skelton 1993\*; Whitfield 1998\*; Anderson & Heemstra 2003\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Ambassis kopsi* (*non* Bleeker 1858): Pellegrin 1932, 1933\*.

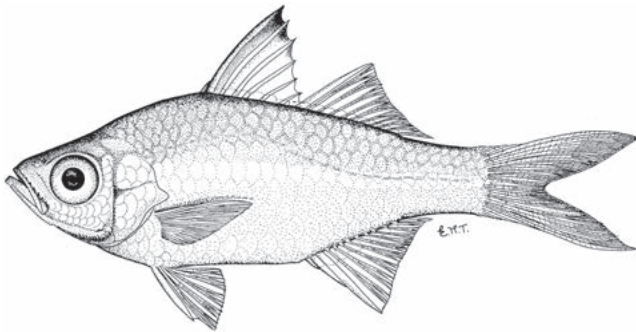
*Ambassis safgha* (*non* Forskål 1775): Smith 1949; Hill 1966; Day 1974.

*Ambassis urotaenia* (*non* Bleeker 1852): Reinthal & Stiassny 1997 [in part].

Dorsal fin 7 + 1 spines, 9 or 10 rays; anal fin 3 spines, 9–11 rays; pectoral fins 14 or 15 rays. Body depth 3–4 in SL; HL ~3 in SL; eye diameter 3–4 in HL. No rostral spine at dorsal margin of preorbital; preorbital ridge serrate in fish >3.5 cm SL; supraorbital spines 1–4; lower edge and rear

margin of preopercle serrate; preopercular ridge smooth except for 1–5 spines at angle; interopercle with 1–4 minute spines at angle. Teeth villiform, in bands on jaws, vomer, palatines and tongue. GR 8–10/19–22. Lateral line continuous (infrequently may be interrupted by 1 or 2 scales); LL scales 27–29; predorsal scales 9–11; 2 rows of cheek scales.

Head and body silvery, translucent greenish brown dorsally; dorsalmost scales with minute black dots (melanophores); dorsal-fin membranes between spines 2–4 dusky, black at tips. Attains at least 12 cm TL.



*Ambassis natalensis*, 10 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Mozambique to South Africa (Chalumna River), Madagascar, Réunion and Mauritius.

**REMARKS** Found along sandy beaches, in estuaries, lagoons and harbours. One record from a crater lake in Madagascar, far from the sea.

### *Ambassis urotaenia* Bleeker 1852

Banded-tail glassy

PLATE 2

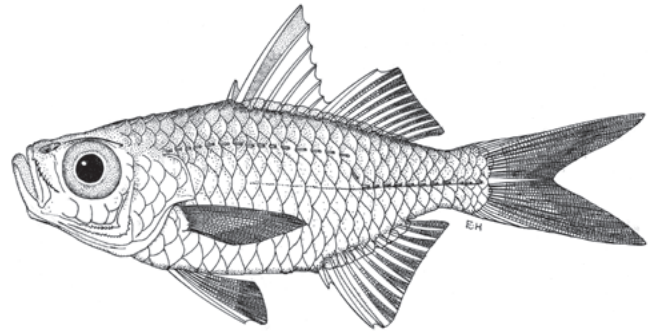
*Ambassis urotaenia* Bleeker 1852: 257 (Indonesia); Playfair in Playfair & Günther 1867; Bleeker 1878\*; Pellegrin 1933; Smith 1949 [in part]; Masuda *et al.* 1984\*; Allen & Burgess 1990\*; Kottelat *et al.* 1993\*; Anderson & Heemstra 2003\*.

?*Ambassis commersonii* (*non* Cuvier 1828): Weber & De Beaufort 1929.

Dorsal fin 7 + 1 spines, 9 or 10 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 13–16 rays. Body depth ~3 in SL; HL 2–3 in SL; eye diameter 2–3 in HL. No rostral spine at dorsal margin of preorbital bone; preorbital ridge smooth or very slightly serrate in largest specimens; supraorbital ridge smooth except for 1 or 2 small retrorse spines posteriorly; lower edge of preopercle serrate, rear margin smooth, but sometimes with small spines or weak crenulations ventrally; lower limb of preopercle ridge and interopercle ventral margin completely serrate. Teeth on vomer and palate in single row; in

2 rows on tongue in larger specimens. GR 8–10/19–24. Lateral line continuous (may be interrupted for 1–2 scales); LL scales 27–30; predorsal scales 8–11; 1 row of cheek scales.

Head and body silvery, translucent greyish dorsally; lateral line with silvery band; dorsalmost scales marked with small black dots (melanophores); dorsal-fin membrane blackish between spines 2–3; caudal-fin lobes each with wide yellow stripe and dusky membrane. Attains 15 cm TL.



*Ambassis urotaenia*, 6 cm SL (Seychelles).

Source: Anderson & Heemstra 2003

**DISTRIBUTION** Indo-Pacific. WIO: possibly Red Sea (questionable records: Dor 1984; Goren & Dor 1994), Madagascar, Seychelles, Réunion and India; not yet known from East Africa; elsewhere to Thailand, Indonesia, East Timor, Philippines, South China Sea, Japan (Sagami Bay), Micronesia, Palau, Marshall Is. and New Guinea.

**REMARKS** Commonly occurs in large schools in tropical lagoons and estuaries.

## FAMILY CAPROIDAE

### Boarfishes

M Eric Anderson

Small-sized, deep-bodied and compressed, body strongly rhomboidal to ovoid; shape variable in some species independent of size or sex (Berry 1959). Head deep; eyes large; mouth small and protrusile, with thick fleshy lips in some species; jaw teeth small, sharp, in bands; no vomerine or palatine teeth. Single dorsal fin, with 7–10 spines (1st spine tiny), 23–25 (*Capros*) or 26–38 (*Antigonia*) rays; anal fin with 3 spines, 22–24 (*Capros*) or 23–35 (*Antigonia*) rays; pectoral fins with small fused spine at fin origins, 11–14 soft rays; pelvic fins 1 spine, 5 rays; caudal fin gently rounded or truncate, with 12 (*Antigonia*) or 14 (*Capros*) principal rays

(branched + unbranched). Body scales with thorn-like ctenii giving rough texture; scales on back before dorsal fin and on head and cheeks modified into small thorns; head bones above and behind eyes with minutely thorned ridges; small head spines (in addition to minute thorns) present in some species. Branchiostegal rays 6; gill rakers elongate. Lateral line complete, steeply arched anteriorly in *Antigonia*; pored LL scales difficult to count. Swimbladder present. Vertebrae 9 or 10 + 12 or 13. Body typically orange to red and silvery. Postorbital head length is measured from rear margin of the eye to rear margin of the opercle; pre-pectoral length is measured from snout tip to upper origin of pectoral fins.

Benthopelagic, mostly near the continental shelf-slope break and on offshore rises, over soft bottoms, at ~20–900 m, in tropical to temperate regions of all three major oceans. Not of commercial importance.

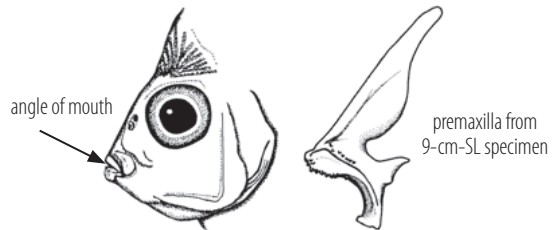
The boarfishes have been placed in or phylogenetically near the order Zeiformes by most authors (Rosen 1984; Zehren 1987), but Heemstra (1980, 1986) moved them to the Perciformes. This was justified by a later study of relationships using anatomical characters (a phylogenetic analysis) by Johnson & Patterson (1993), which has been followed here. Other analyses have shown boarfishes to be within the Tetraodontiformes (triggerfishes and allies: Zehren 1987) or to share a common ancestry with the Zeiformes (Tyler *et al.* 2003). The inclusion of *Capros* (1 species) and *Antigonia* (~16 species) in the same family has been cursorily debated (Stinton 1967; Roberts 1993; Tyler *et al.* 2003), but *Antigonia* is included in Caproidae here, following Zehren (1987) and Eschmeyer (1990), until a definitive study has been produced. Two genera, 1 in WIO.

**GENUS** *Antigonia* Lowe 1843

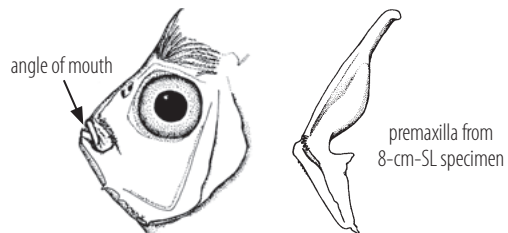
Body depth ~77–140% SL (measured from base of 2nd dorsal-fin spine to base of pelvic-fin spine); snout shorter than eye diameter; pelvic-fin origins behind pectoral-fin bases. Dorsal fin 26–38 rays; anal fin 23–35 rays. Probably 8 valid species in WIO. Revisionary studies relevant to WIO include Parin & Borodulina (1986, 2005, 2006), not all of whose decisions are accepted here. Zehren (1987) presents a detailed osteology of the genus. Observation of the presence/absence of the forward-directed strut of the premaxilla of some species and the notched anterior edge of the premaxilla of the *A. rubescens*-species group requires dissection of the upper lip on at least one side. Parin & Borodulina (2006) described *A. socotrae* from three specimens, taken in 260–350 m; hence, it is included here in the key only.

**KEY TO SPECIES**

- 1a Mouth sub-horizontal, forming <45° angle with longitudinal axis of body; ventralmost part (alveolar process) of premaxilla with forward-directed strut; lips thick, with grooves in adults ..... 2



- 1b Mouth sub-vertical, forming >45° angle with longitudinal axis of body; alveolar process of premaxilla straight, not notched anteriorly; lips thin, without grooves ..... 4



- 2a No notch on anterior edge of ventralmost part (alveolar process) of premaxilla; body depth 1.2–1.4 in SL (fish >8 cm SL) ..... 3

- 2b Anterior edge of alveolar process of premaxilla with shallow notch; body depth 0.9–1.2 in SL (fish >8 cm SL) ..... *A. rubescens*-species group

- 3a HL 36–40% SL; snout length 30–35% HL; postorbital HL 22–29% HL; pre-pectoral length 39–43% SL ..... *A. undulata*

- 3b HL 41–44% SL; snout length 26–30% HL; postorbital HL 30–37% HL; pre-pectoral length 43–46% SL ..... *A. indica*

- 4a Dorsal fin 7 or 8 spines; pectoral fins usually 1 hidden spine, 13 (rarely 12) rays ..... 5

- 4b Dorsal fin 9 spines; pectoral fins 1 hidden spine, 12 rays ..... *A. hulleyi*

- 5a Body rhomboidal to round-rhomboidal, depth in adults 1–1.3 in SL ..... 6

- 5b Body oval, depth in adults 1.3–1.4 in SL ..... 7

- 6a Orbit diameter 2.2–2.5 in HL; dorsal fin 32–37 rays ..... *A. capros*-species group

- 6b Orbit diameter 2.6–2.9 in HL; dorsal fin 31–33 rays ..... *A. ovalis*

- 7a HL 2.6–2.7 in SL; GR 20–23 ..... *A. quiproqua*

- 7b HL ~2.4 in SL; GR 19 or 20 ..... *A. socotrae* [known from >250 m]

*Antigonia* sp. aff. *A. capros* Lowe 1843

PLATE 3

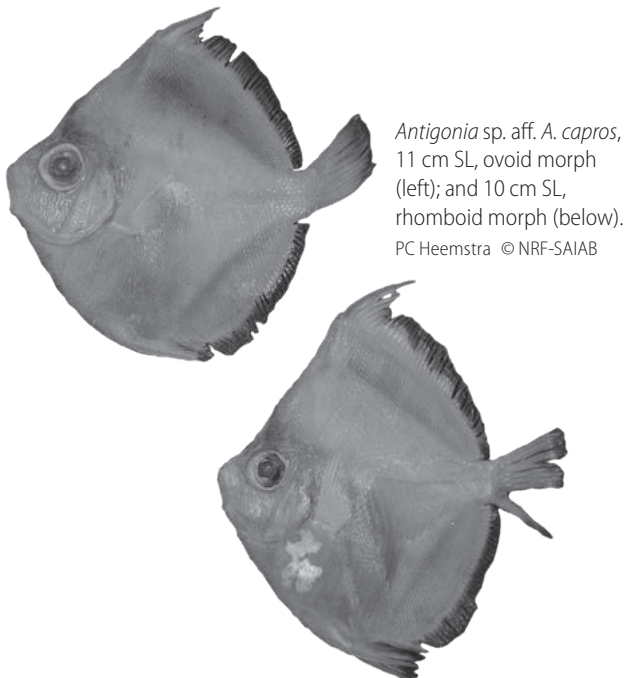
*Antigonia capros* Lowe 1843: 86 (Madeira); Parin & Borodulina 1986\*;  
Fricke *et al.* 2009.

?*Antigonia saya*: Parin & Borodulina 1986\* [in part: WIO].

*Antigonia* gr. *capros*: Parin & Borodulina 2006.

Dorsal fin 7 or 8 spines, 32–37 rays; anal fin 3 spines, 29–34 rays; pectoral fins 1 fused spine, 13 (rarely 12) rays. Lateral line continuous, not extending onto caudal fin; LSS 50–57; GR 5 or 6/1/12–14 = 19–21. Percentage SL: body depth 83–127%, HL 34–40%, predorsal length 55–70%, and preanal length 76–90%. Percentage HL: bony orbit 40–47%, snout length 26–34%, and upper jaw 23–31%. Mouth sub-vertical; no ventral strut on premaxilla; lips thin. Two body forms unrelated to sex or size: rhomboidal, with body depth exceeding SL, or else more ovoid, with body depth less than or subequal to SL (see also Berry 1959, Figs. 3–4, for the western Atlantic *A. combatia*).

Head and body orange to crimson; fin membranes red to yellowish; caudal-fin margin orange. Attains 14 cm SL.



*Antigonia* sp. aff. *A. capros*,  
11 cm SL, ovoid morph  
(left); and 10 cm SL,  
rhomboid morph (below).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Circumglobal, but not eastern Pacific.  
WIO: eastern Arabian Sea, Mozambique, South Africa and  
Mascarene Ridge.

**REMARKS** Found at 128–320 m. Under the name *A. capros*  
Parin & Borodulina (1986) described several morphotypes  
from all three major oceans. Parin & Borodulina (2006)

referred these to an *A. capros*-species group that did not  
include their *A. saya*, which has been tentatively synonymised  
here with the *A. capros*-group. No significant differences  
between their *A. saya* and the *A. capros*-group specimens were  
found (including the major character of body angle at the  
dorsal-fin origin, which depends on the variable body shape).  
A differentiation of shape versus length in the *A. capros*-group  
and *A. saya* included western Pacific specimens of the former  
(see Parin & Borodulina 1986, Fig. 2a). Thus no clear name  
applies to WIO specimens of the *A. capros*-species group.

*Antigonia* sp. aff. *A. rubescens* (Günther 1860)

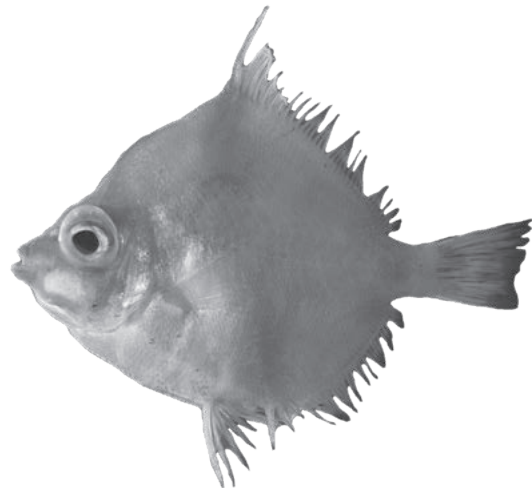
PLATE 3

*Antigonia rubescens* (*non* Günther 1860): Gilchrist 1922; SFS No. 233\*;  
SSF No. 162.1\*; Fricke *et al.* 2009.

*Antigonia* gr. *rubescens*: Parin & Borodulina 2006\*.

Dorsal fin 9 spines, 27–29 rays; anal fin 3 spines, 24–26 rays;  
pectoral fins 1 hidden spine, 12 rays. Lateral line continuous;  
LSS 46–49; GR 4 or 5/1/12 or 13 = 17–19. Percentage SL:  
body depth 89–109%, HL 36–39%, predorsal length 64–71%.  
Percentage HL: preanal length 76–81, bony orbit 36–39%, snout  
length 29–32%, and upper jaw 21–26%. Body rhomboidal;  
head profile above eyes notched. Mouth sub-horizontal; lips  
thickened; ventral strut present on premaxilla; alveolar process  
(toothed part) of premaxilla with shallow notch.

Body reddish, abdomen silvery. Attains 12 cm SL.



*Antigonia* sp. aff. *A. rubescens*, 9 cm SL (S Mozambique).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Kenya, Mozambique, South Africa  
(False Bay), Madagascar and Walters Shoals.

**REMARKS** Found at 130–350 m. This species is possibly undescribed. The *A. rubescens* species-complex is in need of more research.

*Antigonia hulleyi* Parin & Borodulina 2005

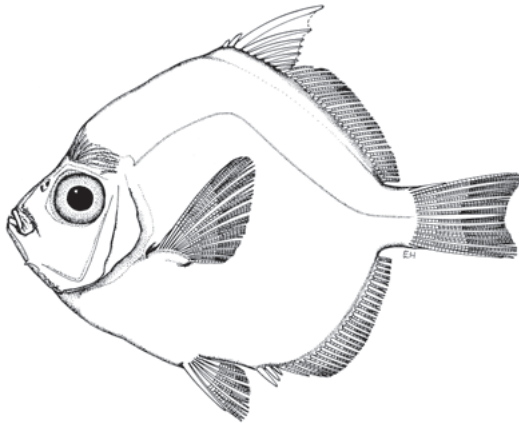
PLATE 3

*Antigonia hulleyi* Parin & Borodulina 2005: 456, Figs. 3d, 4e, 8 (Mozambique); Parin & Borodulina 2006.

*Antigonia kenyae* Parin & Borodulina 2005: 458, Fig. 9 (off Kenya).

Dorsal fin 9 spines, 26–28 rays; anal fin 3 spines, 25–28 rays; pectoral fins 1 hidden spine, 12 rays. Lateral line continuous; LSS 41–44; GR 5 or 6/1/12–14 = 19 or 20. Percentage SL: body depth 81–85%, HL 38–41%, predorsal length 53–58%, and preanal length 75–81%. Percentage HL: bony orbit 39–47%, snout length 27–31%, and upper jaw 22–24%. Body ovoid, without strong angles. Mouth sub-vertical; no ventral strut on premaxilla; lips thin.

Colour in life probably reddish. Attains 8 cm SL.



*Antigonia hulleyi*, 8 cm SL (Mozambique).

**DISTRIBUTION** WIO: Kenya to Mozambique and southeastern Madagascar (Tôlanaro).

**REMARKS** Known from 59–438 m. Parin & Borodulina (2005) described *A. kenyae* from a single juvenile; among the characters said to differentiate the specimen is a count of GR 16 (on damaged right side; GR 20 on left side), a shallow notch in front of eyes (but skull is broken there), and pelvic-fin origins under 5th dorsal-fin spine (but 3rd spine on re-examination). Thus, *A. kenyae* is considered identical to the previously described *A. hulleyi*, which was based on more and larger type specimens.

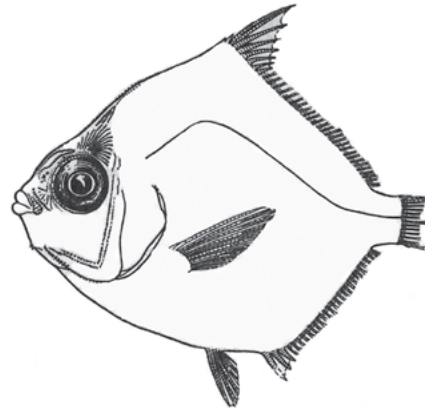
*Antigonia indica* Parin & Borodulina 1986

*Antigonia fowleri* (non Franz 1910): Talwar 1973.

*Antigonia indica* Parin & Borodulina 1986: 162, Fig. (northern Indian Ocean); Adam *et al.* 1998; Manilo & Bogorodsky 2003.

Dorsal fin 9 spines, 26–28 rays; anal fin 3 spines, 24–26 rays; pectoral fins 1 hidden spine, 12 or 13 rays. Lateral line continuous, not extending onto caudal fin; LSS 47–53; GR 4 or 5/1/9–11 = 14–17. Percentage SL: body depth 77–91%, HL 41–44%, predorsal length 62–67%, and preanal length 72–78%. Percentage HL: bony orbit 36–40%, snout length 26–30%, and upper jaw 18–24%. Body rhomboidal (only one body form); dorsal-fin origin at vertical through pelvic-fin origins to mid-pelvic region. Mouth sub-vertical; ventral strut present on premaxilla; lips thickened, larger specimens with lip folds. Head spines minute in rows under eyes and on cheeks.

Colour in life probably reddish. Attains 9 cm SL.



*Antigonia indica*, 9 cm SL, holotype (northern WIO).

Source: Parin & Borodulina 1986

**DISTRIBUTION** Indian Ocean: Oman to Andaman Sea.

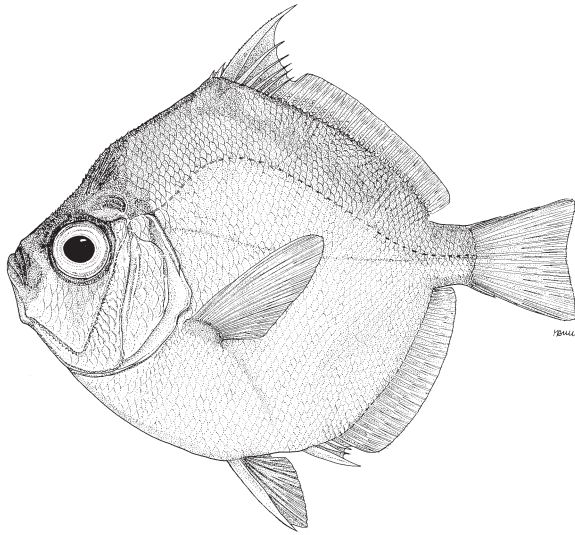
*Antigonia ovalis* Parin & Borodulina 2006

PLATE 3

*Antigonia ovalis* Parin & Borodulina 2006: 154, Fig. 7 (Saya de Malha Bank).

Dorsal fin 8 spines, 31–33 rays; anal fin 3 spines, 29–31 rays; pectoral fins 1 hidden spine, 13 rays. Lateral line continuous; LSS 48–54; GR 4 or 5/1/13 or 14 = 18–20. Percentage SL: body depth 92–120%, HL 39–46%, predorsal length 57–65%, and preanal length 79–89%. Percentage HL: bony orbit 36–41%, snout length 22–28%, and upper jaw 22–26%. Body rhomboidal in early juveniles, ovoid in larger juveniles, and unknown in adults. Mouth sub-vertical; no ventral strut on premaxilla; lips somewhat thickened.

Colour in life probably reddish. Maximum size unknown.



*Antigonia ovalis* (Myanmar). © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: Saya de Malha Bank and Maldives; elsewhere, Myanmar.

**REMARKS** Collected at 100–235 m. Known only from 12 specimens, 24–56 mm SL.

### *Antigonia quiproqua* Parin & Borodulina 2006

PLATE 3

*Antigonia quiproqua* Parin & Borodulina 2006: 155, Fig. 8 (Saya de Malha Bank).

Dorsal fin 8 spines, 30–32 rays; anal fin 3 spines, 29–31 rays; pectoral fins 12 or 13 rays. Lateral line continuous; LSS 55–57; GR 5–7/1/14 or 15 = 20–23. Percentage SL: body depth 75–82%, HL 37–39%, predorsal length 51–58%, and preanal length 73–77%. Percentage HL: bony orbit 37–41%, snout length 28–30, and upper jaw 29–32%. Body ovoid, without strong angles. Mouth sub-vertical; no ventral strut on premaxilla; lips thin.

Body pale pink dorsally and ventrally, midsection silvery; eyes and dorsal and anal fins yellow; caudal fin pink. Attains 6.5 cm SL.

**DISTRIBUTION** Known only from five juveniles collected from Saya da Malha Bank.

**REMARKS** Taken at 185–275 m.

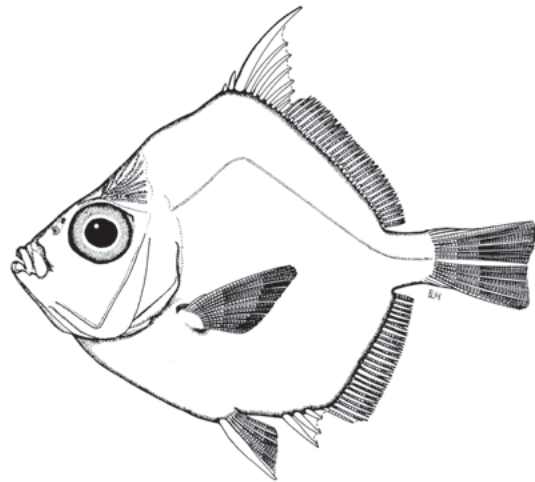
### *Antigonia undulata* Parin & Borodulina 2005

PLATE 3

*Antigonia undulata* Parin & Borodulina 2005: 450, Figs. 2, 3b, 4b (Nazareth Bank); Parin & Borodulina 2006.

Dorsal fin 8–10 spines, 26–29 rays; anal fin 3 spines, 24–27 rays; pectoral fins 12 rays. Lateral line continuous; LSS 45–53; GR 4 or 5/1/11–13 = 16–19. Percentage SL: body depth 78–94%, HL 36–40%, predorsal length 62–71%, preanal length 75–81%. Percentage HL: bony orbit 40–46%, snout length 30–35%, and upper jaw 20–26%. Body rhomboidal to slightly ovoid, without strong angles. Mouth sub-horizontal; ventral strut present on premaxilla; lips thickened.

Body reddish to reddish orange, abdomen silvery; eyes and caudal fin yellow. Attains 8 cm SL.



*Antigonia undulata*, 7 cm SL (Kenya).

**DISTRIBUTION** WIO: Kenya to South Africa, Madagascar, Seychelles and Nazareth Bank.

**REMARKS** Known from 140–438 m. Resembles the more northerly *A. indica* but distinguished by the key characters above.

#### GLOSSARY

**aff.** – abbreviation of the Latin *affinis*, meaning having a relationship with, but not identical to.

**sp. (pl. spp.)** – a single species; used when the genus is known, but not the species name.

**FAMILY KUHLIIDAE**

**Flagtails**

Phillip C Heemstra

Body elongate, oval, compressed; eyes large, eye diameter subequal to or greater than snout length; nostrils elliptical and close to eyes. Upper rear edge of opercle with 2 flat spines; preorbital and preopercle serrate, but serrae rudimentary in large adults. Mouth oblique, maxilla exposed posteriorly, reaching below front half of eye; no supramaxilla; upper jaw slightly protrusile, lower jaw slightly projecting; jaws with bands of setose teeth; bands of villiform teeth on vomer, palatines and pterygoids. Dorsal fin single but margin distinctly notched before last spine, with 10 spines (4th or 5th spine longest), 9–14 rays; anal fin 3 spines, 9–14 rays; distance between penultimate and last dorsal- and anal-fin rays is less than distance between more anterior rays, and last dorsal- and anal-fin rays split to base but counted as single ray; pectoral fins shorter than head; pelvic fins 1 spine, 5 rays, and fins thoracic, not reaching anus; caudal fin 15 branched rays, fin margin emarginate, lunate or distinctly forked. Branchiostegal rays 6; membranes separate, narrowly joined to isthmus and to one another. Scales finely ctenoid, extending onto top of head, cheek, opercle, interopercle and subopercle; interorbital, snout, maxilla and lower jaw naked; scaly sheath along bases of dorsal fin and anal fin; no scaly axillary process at pelvic-fin bases. Lateral line complete, extending onto caudal fin. Vertebrae 10 or 11 + 14 or 15.

Moderate-sized, active, schooling fishes found in estuaries, harbours, tidepools, over soft bottom and on shallow reefs, and some species restricted to freshwater. Feed on zooplankton, mainly crustaceans.

Occur throughout Indo-Pacific. One genus with ~14 species, 6 in WIO.

**KEY TO SPECIES**

- 1a Caudal fin distinctly forked, middle rays 2.2–3.3 in longest lobe; 5th spine of dorsal fin >½ HL, and slightly shorter than longest ray; anal fin 3 spines, 10–13 rays ..... 3
- 1b Caudal fin emarginate or shallowly forked, middle rays 1.3–1.8 in longest lobe; 5th spine of dorsal fin ≤½ HL, and subequal to longest ray; anal fin 3 spines, 10 or 11 rays ..... 2
  
- 2a LL scales 38–41; lower GR 20–23; caudal fin shallowly forked, pale, with oblique black blotch near middle of each lobe; anterior dorsal-fin rays with black blotch distally ..... *K. rupestris*

Continued ...

**KEY TO SPECIES**

- 2b LL scales 42–44; lower GR 18–20; caudal fin emarginate, dusky with horizontal black and white streaks and some white spots; no black blotch on soft-rayed dorsal fin ..... *K. sauvagii*
- 2c LL scales 48–50; lower GR 26 or 27; caudal fin distinctly emarginate, margin blackish; no black blotch on soft-rayed dorsal or anal fins ..... *K. splendens*
  
- 3a Dorsal fin 12–14 rays; anal fin 12 or 13 rays; LL scales 51–55; lower GR 25–28 ..... *K. caudavittata*
- 3b Dorsal fin 9–11 rays; anal fin 10 or 11 rays; LL scales 39–52; lower GR 16–27 ..... 4
  
- 4a LL scales 42–52; lower GR 24–27; dorsal fin 9–11 rays; anal fin 10–12 rays; caudal fin white with 5 blackish bands: 1 median band and each lobe with 2 broad oblique bands ..... *K. mugil*
- 4b LL scales 39–42; lower GR 16–19; dorsal fin 10–12 rays; anal fin 11–13 rays; front half of caudal fin mostly spotted black, yellowish distally, with black margin ..... *K. marginata*

***Kuhlia caudavittata*** (Lacepède 1802)

Chevron flagtail

PLATE 4

*Holocentrus caudavittata* Lacepède (ex Commerson) 1802: 332, 367 (Mauritius, Mascarenes).

*Dules caudavittatus*: Sauvage 1891\*.

*Kuhlia caudavittata*: Boulenger 1895; Regan 1913; Fricke 1999; Heemstra *et al.* 2004; Fricke *et al.* 2009.

Body depth 2.6–3 in SL; HL 3.7–4 in SL; snout length 1.5 in eye diameter. Dorsal fin 10 spines (5th longest; 9th and 10th spines subequal), 12–14 rays; anal fin 3 spines, 12 or 13 rays; pectoral fins 13–15 rays; caudal fin deeply forked, middle rays ≤½ length of longest lobes. LL scales 51–55; GR 9–11/25–28.

Body silvery, bluish grey dorsally; caudal fin pale, with black margin and pale submarginal chevron. Attains 22 cm SL.



*Kuhlia caudavittata*, 4 cm SL (Rodrigues). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Madagascar and Mascarenes.

**REMARKS** Inhabits estuaries and tidepools.



*Kuhlia marginata* (Cuvier 1829)

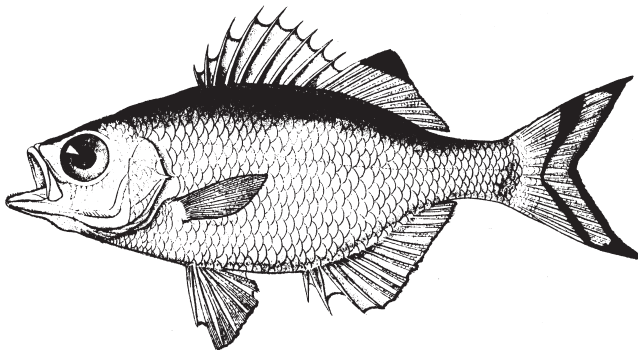
Variable flagtail

PLATE 4

*Dules marginatus* Cuvier in Cuv. & Val. 1829: 116, Pl. 52 (Java, Indonesia).  
*Kuhlia marginata*: Regan 1913; Pethiyagoda 1991\*; Randall & Randall 2001\*.

Body depth 2.6–3.2 in SL; HL 3–3.5 in SL; snout length 1.5–2 in eye diameter. Dorsal fin 10 spines (5th or 6th longest, subequal to 1st ray, and spine 1.5–2 in HL; 10th spine distinctly longer than 9th), 10–12 rays; anal fin 3 spines, 11–13 rays; pectoral fins 13 or 14 rays; caudal fin forked in juveniles, emarginate in adults, middle rays 1.6–3 in longest fin lobe. LL scales 39–42; GR 7–9/16–19.

Head and body silvery, with or without numerous small black spots dorsally; margin of soft-rayed dorsal and anal fins white, with submarginal black band (anteriorly on anal fin); pectoral-fin axil black; caudal fin mostly pale, and with several small black spots near middle of base, margin dusky, submarginal zone broadly pale, and upper and lower edges often white. Attains 22 cm SL.



*Kuhlia marginata*, holotype (Java). Source: Cuvier & Valenciennes 1829

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan, Japan, Micronesia, New Caledonia and Pitcairn Is.

**REMARKS** Occurs primarily in freshwater, but extent of its penetration into brackish and marine environments is uncertain.

*Kuhlia mugil* (Forster 1801)

Fiveband flagtail

PLATE 4

*Sciaena mugil* Forster in Bloch & Schneider 1801: 541 (Otahaite [Tahiti, Society Is.]).  
*Dules taeniurus* Cuvier in Cuv. & Val. 1829: 114 (Java, Indonesia).  
*Perca argentea* Bennett 1830: unnumbered page, Pl. 22 (south coast of Sri Lanka) [preoccupied by *Perca argentea* Linnaeus 1758].  
*Dules bennetti* Bleeker 1853: 32 (Sri Lanka) [possible replacement name for *Perca argentea* Bennett 1830].

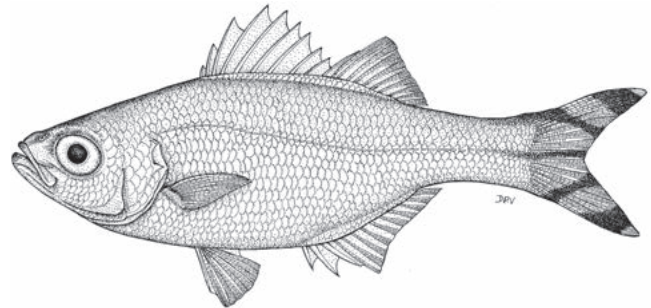
*Kuhlia taeniura*: Boulenger 1895; Regan 1913.

*Kuhlia sterneckii* Steindachner 1898: 107 (Gulf of Aqaba, Red Sea).

*Kuhlia mugil*: SSF No. 164.1\*; Winterbottom *et al.* 1989; Randall 1995\*; Randall & Randall 2001\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.7–3.1 in SL; HL 3.2–3.7 in SL. Dorsal fin 10 spines (5th spine longest, longer than 1st ray, and spine 1.5–1.7 in HL; 10th spine subequal to or longer than 9th), 9–11 rays; anal fin 3 spines, 10–12 rays; pectoral fins 13–15 rays; caudal fin forked, middle rays 2.1–3 in longest lobe. LL scales 49–52; GR 9–11/24–27. Maxilla reaches vertical at front edge of eye.

Head and body silvery, front of snout and chin blackish; caudal fin white with 5 black bands: 1 narrow median stripe, and 2 broad oblique bands on each lobe, and lobe tips white. Attains 40 cm SL (commonly 20 cm SL).



*Kuhlia mugil*, 10 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific and eastern Pacific. WIO: Red Sea, Gulf of Oman to South Africa (Cape Agulhas), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia, Japan, Australia, Tahiti, and Baja California to Colombia.

**REMARKS** Found in aggregations; juveniles common in estuaries and tidepools, adults in surge zones, on reefs, and along rocky and sandy beaches. Feeds on zooplankton, including fish larvae.

*Kuhlia rupestris* (Lacepède 1802)

River flagtail

PLATE 4

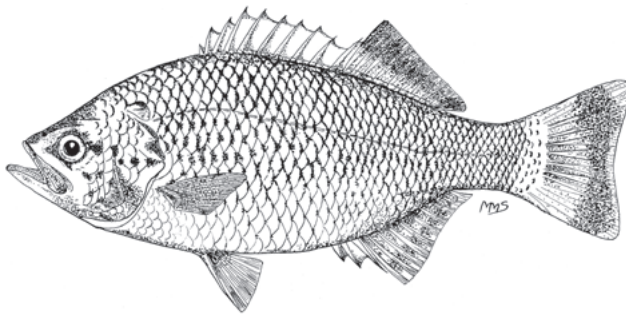
*Centropomus rupestris* Lacepède (ex Commerson) 1802: 252, 273 (Réunion, Mascarenes).

*Dules fuscus* Cuvier in Cuv. & Val. 1829: 118 (Réunion, Mascarenes).

*Kuhlia rupestris*: Boulenger 1895; Regan 1913; SSF No. 164.2\*; Reinthal & Stiassny 1997; Fricke 1999; Randall & Randall 2001\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Loiselle & Stiassny 2007\*; Fricke *et al.* 2009.

Body depth 2.6–3 in SL; HL 2.8–3.5 in SL; snout length subequal to eye diameter, 3–5 in HL. Dorsal fin 10 spines (4th or 5th spine longest, shorter than 1st ray, and spine 1.8–3 in HL; 10th spine distinctly longer than 9th), 10 or 11 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 13–15 rays; caudal fin shallowly forked, lobe tips rounded in juveniles, emarginate with angular corners in adults, middle rays 1.2–1.5 in longest lobe. Lower jaw projecting; maxilla reaches vertical at mid-eye. Anterior nostril with low fleshy rim, the rear edge produced into rounded flap that occludes the nostril. LL scales 38–41; GR 5–9/18–23. Swimbladder bifurcate posteriorly, extending to haemal spine of 4th caudal vertebra.

Head and body silvery with yellow tinge; dorsal scales with black edge, midlateral scales with black bar or spot (fish in freshwater have most scales with dusky spot; adults in the sea more silvery); spinous dorsal fin with blackish blotch anteriorly; caudal-fin lobes each with 1 transverse black blotch; iris silvery white, with dark crescent on upper third; soft-rayed dorsal fin of juveniles dusky yellow. Attains 45 cm TL, ~2.7 kg.



*Kuhlia rupestris*, 30 cm TL (South Africa). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles and Mascarenes; elsewhere to Indonesia, Japan, Australia, New Caledonia, Caroline Is. and Tuamotu Is.

**REMARKS** Adults and juveniles occur in lower reaches of rivers; juveniles often found in estuaries or in the sea near river mouths. Spawns in the sea. Juveniles feed on insect larvae and small freshwater shrimps; adults feed on shrimps and small fishes. An excellent food fish.

### *Kuhlia sauvagii* Regan 1913

Madagascar flagtail

*Dules fuscus* (non Cuvier 1829): Sauvage 1891.

*Kuhlia sauvagii* Regan 1913: 377 (Imerina, Madagascar);

Loiselle & Stiassny 2007\*.

PLATE 4

Body depth 2.6–3.1 in SL; HL 2.8–3.6 in SL; eye diameter greater than snout length. Dorsal fin 10 spines (4th or 5th spine longest, shorter than 1st ray, and spine 1.8–3 in HL; 10th spine distinctly longer than 9th), 10 or 11 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 14–16 rays; caudal fin shallowly forked, lobe tips rounded in juveniles, emarginate with angular corners in adults, middle rays 1.3–1.6 in length of fin lobes. LL scales 42–44; lower GR 18–20.

Head and body silvery, darker dorsally; sides with scattered rounded or crescentic reddish brown or black spots; membranes of spinous dorsal fin with brown to maroon spots and streaks; anal fin membranes with some black spots near base; caudal fin grey, with alternating silvery yellow and reddish brown interradiial streaks; iris pale brown with orange-red crescent over upper half of eye. Attains at least 25 cm TL.

**DISTRIBUTION** WIO: endemic to Madagascar.

**REMARKS** Juveniles common in estuaries and lower reaches of rivers, where it occurs with *K. rupestris*; adults found in rivers; large adults occupy upper areas of strong current.

### *Kuhlia splendens* Regan 1913

Silver flagtail

*Kuhlia splendens* Regan 1913: 379, Fig. 69b (Rodrigues and Mauritius).

Body depth 2.5–2.8 in SL; HL 3–3.3 in SL. Dorsal fin 10 spines (4th or 5th spine longest, shorter than 1st ray, and spine 1.8–3 in HL; 10th spine distinctly longer than 9th), 11 rays; anal fin 3 spines, 11 rays; pectoral fins 20 rays; caudal fin forked, lobe tips acute, middle rays 1.5–1.8 in length of lobes. LL scales 48–50; 4 scales from sheath at dorsal-fin base to lateral line; lower GR 26 or 27.

Head and body silvery, darker dorsally; caudal-fin margin blackish. Attains 18 cm TL.

**DISTRIBUTION** WIO: Rodrigues and Mauritius.

**REMARKS** Inhabits freshwater.

## FAMILY POLYPRIONIDAE

Wreckfishes

Phillip C Heemstra

Body oblong, robust, slightly compressed; body and head, except for snout, covered with small, adherent, strongly ctenoid

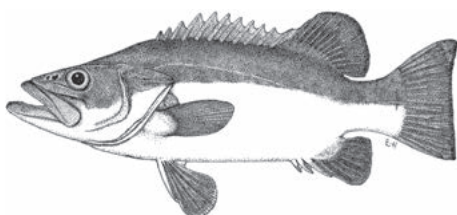
scales; soft-rayed dorsal fin and anal fin with broad scaly base. Dorsal fin 11 or 12 spines, 11 or 12 rays, fin margin distinctly notched before rays; anal fin 3 spines, 8–10 rays; dorsal- and anal-fin spines with longitudinal ridges; pelvic- and anal-fin spines serrate anteriorly; caudal fin of adults truncate or emarginate (rounded in juveniles), with 8 + 7 branched rays; pectoral fins asymmetric, shorter than pelvic fins; pelvic fins 1 spine, 5 branched rays, no scaly axillary process at fin base. Mouth large, maxilla exposed, scaly, with supramaxilla almost as long as maxilla; lower jaw projecting; small teeth in bands on jaws, vomer and palatines, and tooth patch on tongue. Preorbital and preopercle serrate; opercle with prominent horizontal ridge ending in short spine; head bones of juveniles with serrate ridges and spines. Branchiostegal rays 7. Vertebrae 13 or 14 + 13 or 14.

Huge, slow-growing, late-maturing, long-lived fishes; occur on outer continental shelf and upper slope. Gonochoristic multiple spawners; the fish are epipelagic for 3 or 4 years and switch to a demersal habitat at ~50 cm TL. Adults are generally solitary, but occasionally occur in large aggregations for spawning; adults feed on large crustaceans, cephalopods and demersal fishes.

Family definition uncertain; some authors include the Pacific genera *Stereolepis*, *Coreoperca* and *Lateolabrax*, but there are no derived characters shared by those three genera and *Polyprion*. The family diagnosis here is based solely on *Polyprion* Oken (ex Cuvier) 1817, the only genus represented in WIO. Two species recognised, but only one, *P. americanus*, known from WIO; *P. oxygeneios* (Schneider & Forster 1801) from the Indo-Pacific may be found in WIO and is included in the key.

#### KEY TO SPECIES

- 1a Body deeper, depth 2.3–2.9 in SL; snout short, eye diameter 1–1.2 in snout length (minus upper lip); juveniles (<60 cm TL) grey to black, and covered with irregular white blotches, or brownish with large dark spots on body and pale caudal fin; adults bluish to dark grey, sometimes with faint darker blotches..... *P. americanus*
- 1b Body oblong, depth 3.3–3.8 in SL (fish >25 cm SL); snout long, eye diameter 1.5–1.7 in snout length; head and body distinctly bicoloured: bluish grey dorsally, abruptly white ventrally..... *P. oxygeneios*



*Polyprion oxygeneios*. Composite

## *Polyprion americanus* (Bloch & Schneider 1801)

Wreckfish

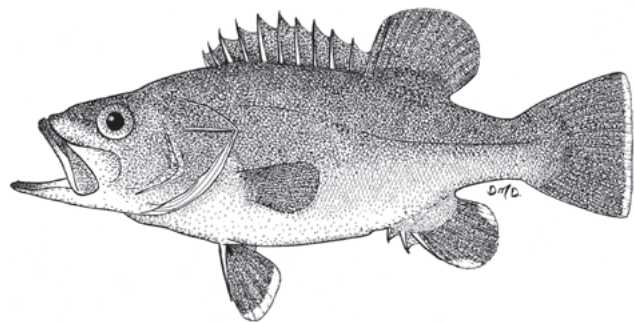
PLATE 5

*Amphiprion americanus* Bloch & Schneider 1801: 205  
(America [western North Atlantic]).

*Polyprion americanus*: Jordan & Evermann 1896; SSF No. 165.1\*;  
Roberts 1989\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 or 12 spines, 12 or 13 rays; anal fin 3 spines, 8–10 rays; pectoral fins 16–18 rays. HL 2.4–2.7 in SL. Opercle ridge indistinct on fish 86 cm SL. LL scales 69; GR 7 or 8/8–14, including rudiments.

See key for colouration. Attains 210 cm TL, ~200 kg.



*Polyprion americanus*, 60 cm TL. Source: SFSA

**DISTRIBUTION** In temperate to subtropical waters, including Mediterranean Sea, and Atlantic Ocean from Canada to Argentina, Norway to Azores, Canary Is., Madeira, Cape Verde Is., Tristan da Cunha, Vema Seamount and southern Namibia. WIO: South Africa; elsewhere to Saint-Paul and Amsterdam Is., Australia and New Zealand.

**REMARKS** Juveniles (<50 cm) often associate with flotsam in the open ocean; adults demersal offshore in 30–1 000 m, on deep reefs and sunken ship wrecks, sometimes in large aggregations. Males mature at 75–80 cm TL (age 9–11 years), and females at 78–90 cm TL (age 10 years); maximum age ~60 years.

#### GLOSSARY

**demersal habitat** – on or near the sea floor.

**gonochoristic** – separate sexes, i.e., not hermaphroditic.

## CLASSIFICATION OF SERRANOID FISHES

W Leo Smith

The Serranoidei is a large and important assemblage of marine fishes, with approximately 575 valid species worldwide. They occur in tropical to subtropical waters of all oceans, and many species are commercially important. Characterised by a robust to somewhat compressed body, often oblong to elongate; dorsal fin 7–13 spines, 10–25 rays; anal fin 2 or 3 distinct spines, 6–13 rays; pectoral fins rounded; pelvic fins 1 spine, 5 branched rays, and fin origins before, under or slightly behind pectoral-fin bases, with no scaly axillary process; branchiostegal rays 7; gill membranes separate, joined to anterior end of isthmus; scales small to moderate, adherent, mostly ctenoid, but many species with both ctenoid and cycloid scales (the latter typically on head and ventrally on body); lateral line single, usually complete (incomplete in *Pseudogramma* and some species of *Plectranthias*).

The classification of this clade into three families, namely the Serranidae, Epinephelidae and Anthiadidae, follows the results of molecular analyses that have generally recovered each of these traditional 'serranid' clades as monophyletic, but have failed to consistently recover these families as a monophyletic assemblage collectively. This classification is chosen for its stability at the family level because it is consistent with both morphological and molecular phylogenetic hypotheses. The assemblage was first united by Gosline (1966) and diagnosed by Johnson (1993) by the shared presence of a characteristic third opercular spine and three reductive specialisations (i.e., absence of posterior uroneural, procurrent spur and third preural radial cartilage). Beginning with Chen *et al.* (2003) and more

thoroughly explored by Craig & Hastings (2007) and Smith & Craig (2007), the serranoids have not been recovered as a monophyletic group in these large-scale molecular phylogenies (cf. Betancur-R *et al.* 2013). Despite serranoid polyphyly, the three included families have each generally been recovered as monophyletic (Craig & Hastings 2007; Smith & Craig 2007; Lautredou *et al.* 2013). Despite general support for the monophyly of the restricted families, these studies have consistently recovered *Acanthistius* and *Niphon* outside these three serranoid families. Although recovered outside its traditional anthiadid placement, *Acanthistius* is treated here in the Anthiadidae.

Several morphological studies (Meisler 1987; Baldwin 1990; Baldwin & Johnson 1993) and molecular studies (Pondella *et al.* 2003; Craig & Hastings 2007; Smith & Craig 2007; Smith *et al.* 2009; Betancur-R *et al.* 2013) have examined the limits and relationships of the three serranoid families and/or their placement among percomorphs. Smith & Craig (2007) identified potential synapomorphies for each of these revised families. Anthiadid monophyly has not been examined in detail, but the evidence suggests the clade is diagnosed by the absence of a tooth plate on epibranchial 2 (Baldwin 1990). Epinephelid monophyly is supported by the spine serially associated with the first dorsal-fin pterygiophore in larval epinephelids being elongated and encased in a fleshy sheath (Baldwin & Johnson 1993). Serranid monophyly is supported by the lateral position of the 2nd infraorbital with respect to the posterior portion of the lachrymal (Meisler 1987).

### KEY TO FAMILIES

- |  |   |
|--|---|
| <p>1a Body scales small; LSS &gt;78, from upper end of gill opening to caudal-fin base (reduced to LSS 40–60 in <i>Pseudogrammini</i>); LL scales often inconspicuous (lateral line disjunct in <i>Pseudogrammini</i>), usually smaller than main body scales and mostly covered by them; flap of skin joins upper part of pectoral-fin bases to body; maxilla naked; supramaxilla present, covered by skin and loosely attached to upper rear edge of maxilla ..... <b>EPINEPHELIDAE</b></p> <p>1b Body scales larger; LSS usually &lt;80, from upper end of gill opening to caudal-fin base; LL scales typically distinct, subequal in size and number to adjacent body scales; no flap of skin joining pectoral-fin bases to body; supramaxilla typically absent (present in <i>Acanthistius</i>, and present but small in some species of <i>Plectranthias</i>) ..... <b>2</b></p> | <p>2a Maxilla scaly in most species; caudal fin lunate or forked in most species, and with usually 13 branched rays (15 branched rays in <i>Acanthistius</i>); LL scales 25–64; dorsal fin 13–20 rays ..... <b>ANTHIADIDAE</b></p> <p>2b Maxilla naked; caudal fin emarginate to truncate, with 15 branched rays; LL scales 42–44 (<i>Chelidoperca</i>) or 67–77 (<i>Serranus</i>); dorsal fin 9 or 10 rays (<i>Chelidoperca</i>) or 13–15 rays (<i>Serranus</i>) ..... <b>SERRANIDAE</b></p> |
|--|---|

## FAMILY SERRANIDAE

## Perchlets and sea basses

Phillip C Heemstra

Small- to moderate-sized, body elongate, not especially compressed; dorsal fin not divided (but sometimes notched), with 10 spines, 10–16 rays; anal fin 3 spines, 6–8 rays; pectoral fins 15–18 rays; caudal fin truncate to emarginate, with 15 branched rays. No supramaxilla; depressible teeth few or none; teeth on vomer and palatines; no teeth on tongue. Lateral line complete, with scales distinct. Scales ctenoid; maxilla naked. Vertebrae 10 + 14.

This family formerly included species now placed in the Anthiadidae and Epinephelidae. About 13 genera and ~89 species; 2 genera and at least 7 species in WIO.

## KEY TO GENERA

- |    |   |                     |
|----|---|---------------------|
| 1a | Dorsal fin 9 or 10 rays; anal fin 6 rays; scales large, LL scales 42–44.....      | <i>Chelidoperca</i> |
| 1b | Dorsal fin 13–15 rays; anal fin 7 or 8 rays; scales smaller, LL scales 67–77..... | <i>Serranus</i>     |

GENUS *Chelidoperca* Boulenger 1895

Dorsal fin notched, with 10 spines, 9 or 10 rays; anal fin 3 spines, 6 rays; pectoral fins 15 rays. Mouth large, protrusile, lower jaw projecting; no supramaxilla; villiform teeth on jaws, palatines and vomer. GR short, 4–8/10–14, including rudiments. LL scales 42–44. Seven species, at least 4 in WIO.

## KEY TO SPECIES

- |    |   |                          |
|----|---|--------------------------|
| 1a | Caudal fin truncate (when fin is spread), with pointed or rounded corners (upper corner may be slightly larger than lower)..... | 2                        |
| 1b | Caudal fin emarginate or convex.....  | 3                        |
| 2a | Interorbital area naked; dark oblong blotches along body; no grey spot on caudal-fin upper lobe.....                            | <i>C. pleurospilus</i>   |
| 2b | Interorbital area scaly; colour pattern not as above.....   | <i>C. maculicauda</i>    |
| 3a | Caudal fin emarginate; LL scales 42; dark oblong blotches along body.....   | <i>C. investigatoris</i> |
| 3b | Caudal fin convex; LL scales 44; no dark oblong blotches along body.....  | <i>C. occipitalis</i>    |

*Chelidoperca investigatoris* (Alcock 1890)

Indian perchlet

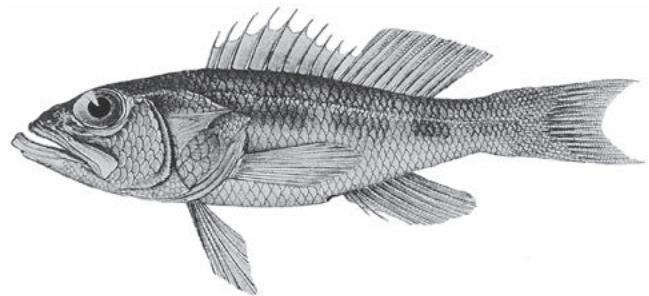
PLATE 5

*Centropristis investigatoris* Alcock 1890: 199 (off Chennai, India); Alcock 1894\*.

*Chelidoperca investigatoris*: Boulenger 1895; Bineesh *et al.* 2014\*.

Dorsal fin 10 rays; caudal fin emarginate. LL scales 42; 2½ scale rows from dorsal-fin origin to lateral line; total GR 18–21.

Head, body and caudal fin red; body whitish ventrally; 5 pairs of dark oblong blotches along upper body (upper blotches faint), and sometimes with diffuse dark spot at caudal-fin base; yellow lateral stripe from snout through eyes to caudal-fin base; yellow marks on cheek, opercle and fins; dorsal fin reddish basally, yellow to orange distally; anal fin yellow basally, whitish distally with red margin; pectoral and pelvic fins yellow. Attains 17 cm TL.



*Chelidoperca investigatoris*, 10 cm SL (India). Source: Alcock 1892

**DISTRIBUTION** Indian Ocean. WIO: western India; elsewhere, east coast of India to Myanmar.

**REMARKS** Trawled from 179–340 m.

*Chelidoperca maculicauda* Bineesh & Akhilesh 2013

Spot-tail perchlet

PLATE 5

*Chelidoperca maculicauda* Bineesh & Akhilesh in Bineesh *et al.* 2013: 74, Figs. 2–5 (off Kollam, Kerala coast, India).

Dorsal fin 10 rays; caudal fin truncate with rounded corners, the upper corner larger. LL scales 42; 2½ or 3 scale rows from dorsal-fin origin to lateral line; total GR 18–20.

Head and body pinkish, with 5 red bars on body, pale ventrally; fins mostly yellow; anal fin with red margin; pelvic fins with many bluish white spots; caudal fin with grey spot in upper corner. Attains 13 cm SL.

**DISTRIBUTION** Known only from three type specimens from southwestern India.

**REMARKS** Trawled from 180–320 m.

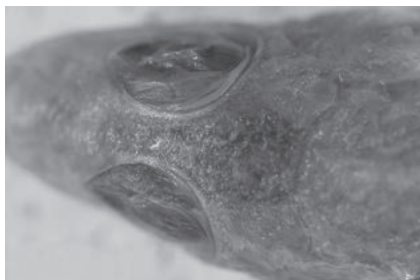
## *Chelidoperca occipitalis* Kotthaus 1973

PLATE 5

*Chelidoperca occipitalis* Kotthaus 1973: 30, Fig. 299 (southwest of Socotra, Arabian Sea); Manilo & Bogorodsky 2003.

Dorsal fin 10 rays; caudal fin convex. LL scales 44; 2½ scale rows from dorsal-fin origin to lateral line; total GR 6–13. Distinguished by 2 close-set occipital spines directly above upper edge of opercle.

Colour in life unknown. Preserved specimens: dorsal head and body above lateral line yellowish brown, iridescent pinkish blue ventrally; dark spot between eyes; underside of head and isthmus to pectoral-fin bases silvery; all fins unpigmented except for pale brown vertical band at caudal-fin base. Attains 11 cm SL.



*Chelidoperca occipitalis*, preserved holotype showing dark spot on head (Socotra).  
© R Thiel, ZMH

**DISTRIBUTION** WIO: off Socotra.

**REMARKS** Types collected from 190–290 m.

## *Chelidoperca pleurospilus* (Günther 1880)

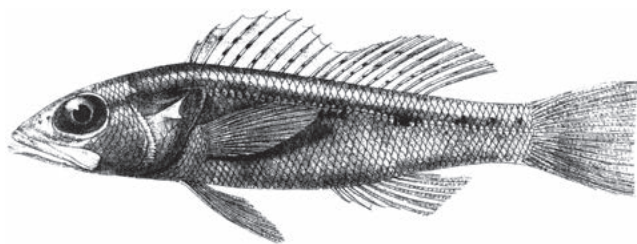
Spotted perchlet

PLATE 5

*Centropristis pleurospilus* Günther 1880: 37, Pl. 16, Fig. D (Kai Is., Indonesia).  
*Chelidoperca pleurospilus*: Katayama 1984\*; Baranes & Golani 1993\*.  
*Chelidoperca occipitalis* (non Kotthaus 1973): Bineesh *et al.* 2014\*.

Dorsal fin 10 rays; caudal fin truncate. LL scales 42–44; 3 or 4 scale rows from dorsal-fin origin to lateral line; total GR 14–17.

Head and body reddish orange, with 5 oblong black blotches along body and short whitish bars ventrally; fins yellowish. Attains ~12 cm SL.



*Chelidoperca pleurospilus*, 13 cm TL, type (Indonesia). Source: Günther 1880

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea (including Gulf of Aqaba); elsewhere, Myanmar, Indonesia, Philippines, Taiwan, southern Japan and northern Australia.

**REMARKS** Rare; taken in trawls to 250 m deep.

## GENUS *Serranus* Cuvier 1816

Dorsal fin 10 spines, 13–15 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 15–18 rays. This genus is not clearly differentiated from others of the subfamily Serraninae. About 30 species, most in the western North Atlantic; at least 3 species in WIO.

### KEY TO SPECIES

- |    |  |                        |
|----|--|------------------------|
| 1a | Lower GR 21–23 (including rudiments).....                                | <i>S. novemcinctus</i> |
| 1b | Lower GR <21 (including rudiments).....                                  | 2                      |
| 2a | Circumpeduncular scales 26–34; total GR 16–19 (including rudiments)..... | <i>S. knysnaensis</i>  |
| 2b | Circumpeduncular scales 34–38; total GR 22–24 (including rudiments)..... | <i>S. cabrilla</i>     |

## *Serranus cabrilla* (Linnaeus 1758)

Comber

PLATE 6

*Perca cabrilla* Linnaeus 1758: 294 [Mediterranean Sea].

*Serranus cabrilla*: SFSA No. 429\* [in part]; Heemstra & Randall 1984\* [in part]; SSF No. 166.76\* [in part]; Khalaf & Disi 1997\*.

*Serranus scriba*: SFSA No. 430 [in part].

Body depth ~3.4 in SL; HL 2.6–2.9 in SL. Dorsal fin 13 or 14 rays; anal fin 7 rays; pectoral fins 15 or 16 rays. Total GR 22–24, of which 2–4 on each limb are rudiments. LL scales 72–77; circumpeduncular scales 34–38.

Head and body brownish dorsally, pale pinkish to cream ventrally; usually with 2 irregular, whitish, longitudinal bands from mouth: upper band through eye, narrowing to point on peduncle just behind dorsal-fin rays; 2nd band broader, from lower jaw to below eye, bifurcating below eye to preopercle, and extending to caudal fin; area between pale bands medium to dark brown; body bands frequently overlain with ~9 irregular darker brown bars; nape, soft-rayed portions of dorsal and anal fins, and caudal fin often with pale blue spots; pectoral fins and caudal fin pinkish orange, caudal-fin tips reddish to dark brown. Attains 40 cm SL.

**DISTRIBUTION** Mediterranean Sea, Black Sea and eastern Atlantic islands (English Channel to Angola, and reported from Vema Seamount) and Red Sea (including Gulf of Suez) in WIO.

**REMARKS** Sedentary on sandy, muddy and rocky bottom, at ~20–500 m. Feeds on fishes, cephalopods and crustaceans. Previously considered an anti-Lessepsian migrant, the species was recently recognised as an isolated population present before the opening of the Suez Canal by Bos *et al.* (2020).

### *Serranus knysnaensis* Gilchrist 1904

African seabass

PLATE 6

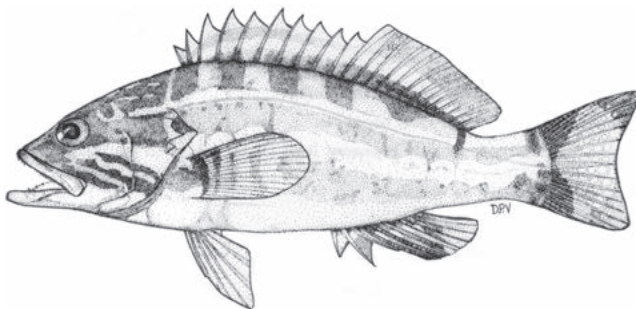
*Serranus knysnaensis* Gilchrist 1904: 2, Pl. 19 (Knysna, South Africa); SFSA No. 427\*; Heemstra & Heemstra 2004\*.

*Serranus cabrilla* (non Linnaeus 1758): SFSA No. 429\*; Smith & Smith 1966\*; Heemstra & Randall 1984\*; SSF No. 166.76\*.

*Serranus seriba* (non Linnaeus 1758): SFSA No. 430.

Body depth 2.9–3.4 in SL; HL 2.6–2.9 in SL. Dorsal fin 14 or 15 rays; anal fin 7 rays; pectoral fins 16 or 17 rays. Total GR 18–22, of which 2–5 on each limb are rudiments. LL scales 67–76; circumpeduncular scales 26–34.

Head and body brownish to yellow-brown dorsally, pale pinkish to cream ventrally; usually with 2 whitish longitudinal bands from mouth to peduncle: upper band through top of eye, narrowing to point on peduncle just behind soft-rayed portion of dorsal fin; 2nd band broader, from lower jaw and below eye (bifurcating below eye to preopercle) extending to caudal fin; area between pale bands medium to dark brown; short irregular darkish brown bars often on body; soft-rayed portion of dorsal fin and caudal fin often with pale blue spots; pectoral fins and caudal fin pinkish orange to yellow, except brown specimens with reddish caudal-fin tips, and specimens from Mozambique and Madagascar with caudal fin yellowish with deeper yellow tips. Attains 30 cm TL.



*Serranus knysnaensis*, 19 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: southern Mozambique (Bazaruto I.) to South Africa (Knysna, rarely to False Bay), and southeastern Madagascar.

**REMARKS** Sedentary, on rocky bottom from shore to ~200 m deep. Appears to be a synchronous hermaphrodite. Feeds on fishes and crustaceans. Edible, but not targeted because of its small size.

### *Serranus novemcinctus* Kner 1864

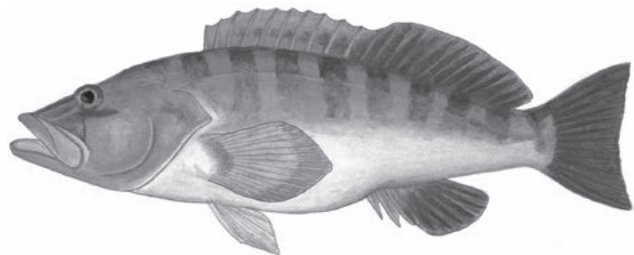
Barred seabass

PLATE 6

*Serranus novemcinctus* Kner 1864: 483 [3], Pl. 2, Fig. 1 (Saint-Paul I.; Cape of Good Hope, South Africa); SFSA No. 428; SSF No. 166.77\*; Collette & Parin 1991\*.

Body depth 3.1–3.5 in SL; HL 2.5–2.9 in SL. Dorsal fin 14 or 15 rays; anal fin 7 rays; pectoral fins 16–18 rays. Total GR 33–35, of which 1 or 2 may be rudiments. LL scales 67–75; circumpeduncular scales 34–37.

Body brown to reddish, with 9 dark bars on upper body: first on nape, last at caudal-fin base (bars more prominent in smaller specimens); occasionally with scattered yellow or white marks. Attains 32 cm TL.



*Serranus novemcinctus*, ~20 cm SL (Walters Shoals).

**DISTRIBUTION** WIO: Walters Shoals (reports from South Africa appear to be erroneous); elsewhere, UN-2 Seamount, Saint-Paul and Amsterdam Is. (all from West Wind Drift chain of islands).

**REMARKS** Found on rocky reefs with coral and algae, in 18–100 m. Feeds on fishes and crustaceans. The most common fish species at Walters Shoals.

## FAMILY EPINEPHELIDAE

### Groupers, podges and soapfishes

Phillip C Heemstra

Body robust or slightly compressed, oblong; 1 or 2 dorsal fins, with 7–11 spines, 10–21 rays; anal fin 2 or 3 spines (inconspicuous in *Plectropomus*), 7–13 rays; last dorsal- and anal-fin rays double (split to base but counted as single ray); pectoral fins rounded; pelvic fins 1 spine, 5 branched rays; caudal fin truncate, rounded, emarginate to lunate, with 13–15 branched rays. Mouth large, terminal, upper jaw slightly protrusile; maxilla exposed when mouth is closed, supramaxilla well-developed but covered by skin and loosely attached to upper edge of maxilla. One or 2 lateral lines, either complete, incomplete or interrupted; LL scales 44–115.

The family comprises 5 subfamilies: Diploprioninae (soapfishes), Epinephelinae (groupers), Grammistinae (soapfishes), Liopropomatinae (basslets) and Pseudogramminae (podges). About 30 genera and ~237 species; 19 genera and at least 88 species in WIO.

#### KEY TO SUBFAMILIES

- |    |   |                        |
|----|---|------------------------|
| 1a | Scales mainly ctenoid, not embedded, rarely absent; total GR 13–28.....   | 2                      |
| 1b | Scales cycloid, often embedded; total GR 8–12.....  | <b>Grammistinae</b>    |
| 2a | Lateral line incomplete, ending below soft-rayed dorsal fin; 2nd lateral line may be present midlaterally; dorsal fin 18–25 rays.....   | <b>Pseudogramminae</b> |
| 2b | Lateral line complete; dorsal fin 11–16 rays.....   | 3                      |
| 3a | LL scales 69–115.....   | 4                      |
| 3b | LL scales 44–66.....  | <b>Liopropomatinae</b> |
| 4a | Nasal organs with lamellae radiating to form a circle; dorsal fin single but deeply notched (may appear as 2 fins in <i>D. bifasciatum</i> ), with 10–21 rays; pelvic fins long, reaching past anal-fin origin; anal fin 2 or 3 spines, 9–13 rays.....  | <b>Diploprioninae</b>  |
| 4b | Nasal organs not as above; dorsal fin single, only slightly notched, with 10–21 rays; pelvic fins short, not reaching past anus (except for <i>Variola</i> which has a lunate caudal fin; caudal fin rounded to truncate in Diploprioninae and most other Epinephelinae); anal fin 3 spines (inconspicuous in <i>Plectropomus</i> ), 7–13 rays..... | <b>Epinephelinae</b>   |

## SUBFAMILY EPINEPHELINAE

### Groupers

Dorsal fin undivided, with 7–11 spines, 10–21 rays; anal fin 2 or 3 spines (inconspicuous in *Plectropomus*), 7–13 rays; pectoral fins rounded, subequal to HL, base of upper rays joined by flap of skin to body; caudal fin truncate, rounded, emarginate to lunate, with 15 branched rays. Jaws with bands of small, slender, depressible teeth (folding inwards); distinct canines at front of jaws in some species; no molars or incisiform teeth; vomer and palatines with bands of minute slender teeth (*Anyperodon* lacks palatine teeth). Preopercle edge rounded, with small serrae (adults of *Cephalopholis* and *Plectropomus* with reduced serrae); opercle with 3 flat spines (uppermost and lowermost often covered by skin and scales), upper edge of operculum free. Branchiostegal rays 7; gill membranes separate, joined to anterior end of isthmus. Lateral line single, complete. Body scales small; LSS >78; LL scales smaller than surrounding scales and mostly covered by them; soft-rayed portion of dorsal, anal and caudal fins scaly. Supraneural bones 2 (except *Plectropomus* with 1). Vertebrae 10 + 14 = 24.

Sizes range from ~20 cm TL (*Cephalopholis leopardus*) to 270 cm TL and 400+ kg (*Epinephelus lanceolatus*). Occur in tropical to warm-temperate waters of all oceans, from shore to ~500 m deep. Most species are demersal and associated with coral or rocky reefs; small juveniles also found in tidepools, seagrass beds and mangroves. As major predators in coral-reef ecosystems, most groupers feed on a variety of fishes, crustaceans and cephalopods. A few species (such as *Epinephelus undulosus*) have numerous long gill rakers adapted to feed on plankton; adults of *Plectropomus* and *Variola* are primarily piscivorous and usually seen cruising the reef or shallows in search of prey. Most other groupers are ambush predators, hiding among corals and rocks until an unwary fish or crustacean passes, then catching the prey with a quick rush and snap of the jaws. The large head and mouth of groupers enables them to suck in a large volume of water along with prey in less than a second, and the bands of numerous inwardly depressible sharp teeth on the jaws are well-adapted to seize prey items and prevent their escape.

Except for occasional spawning aggregations, most species are solitary. Tagging studies show that individuals are generally resident on a particular reef for long periods of time (often years). This site-specificity and the relatively slow growth rate of groupers make them particularly vulnerable to overfishing. In addition, many use localised spawning sites to which they migrate from distances of several kilometres. The presence of large groupers at these sites is often heavily exploited by local fishers, thus marine protected areas should



also include spawning areas. Consequently, the removal of a considerable number of reproductively active fish from a spawning aggregation is detrimental to sustained yields in grouper fisheries. Deepwater species are subject to barotrauma when hauled to the surface and are unlikely to survive. Represented by 9 genera and 71 species in the WIO, as well as the monotypic genus *Chromileptes* (Plate 9) recently reported from India.

## KEY TO GENERA

- 1a Dorsal fin 7 or 8 spines, 10 or 11 rays; vertical edge of preopercle smooth, lower edge with 3 or 4 large antrorse spines; anal-fin spines inconspicuous, mostly covered by skin and scales ..... *Plectropomus*
- 1b Dorsal fin 9–11 spines, 13–19 rays; vertical edge of preopercle finely serrate or smooth ..... 2
- 2a Caudal fin lunate, lobes acute; dorsal fin 9 spines, 13 or 14 rays; gill rakers rudimentary ..... *Variola*
- 2b Caudal fin rounded, truncate or emarginate; dorsal fin 9–11 spines, 14–19 rays ..... 3
- 3a Body oblong and distinctly compressed; head distinctly longer than body depth; pectoral-fin length  $\sim\frac{1}{2}$  HL; no teeth on palatines ..... *Anyperodon*
- 3b Body oblong or deep, not much compressed; HL subequal to body depth; pectoral-fin length  $>\frac{1}{2}$  HL; palatines with minute teeth ..... 4
- 4a Pectoral fins distinctly asymmetric, 5th or 6th ray longest; caudal fin truncate; head profile of adults steep and slightly concave; dorsal fin 17 or 18 rays, middle rays elongated, forming lobe-like fin margin ..... *Aethaloperca*
- 4b Pectoral fins symmetric, or nearly so, middle rays longest; caudal fin rounded, truncate or emarginate; head profile of most species convex, except for small *Dermatolepis* with slightly concave profile; dorsal fin 12–21 rays, middle rays not elongated ..... 5
- 5a Dorsal fin 9 spines; body depth 2.6–3.3 in SL ..... 6
- 5b Dorsal fin 11 spines; body depth 2.2–2.7 in SL ..... 7
- 6a Caudal fin truncate or emarginate; head small, HL 2.8–3.2 in SL; head and body of adults dark greenish grey to reddish brown, with 16–20 faint curved dark bars midlaterally on body and peduncle; juveniles mauve, with scarlet margins on median fins ..... *Gracila*
- 6b Caudal fin rounded; HL 2.1–2.8 in SL; colour not as above ..... *Cephalopholis*

Continued ...

## KEY TO GENERA

- 7a Lateral body scales smooth; opercular spines not apparent; body depth distinctly greater than HL, 2.4–2.6 in SL; dorsal-fin interspinous membranes not incised, fin with 18 or 19 rays ..... *Dermatolepis*
- 7b Lateral body scales rough or smooth; 3 opercular spines apparent; body depth usually subequal to or less than HL, 2.2–3.7 in SL; dorsal-fin interspinous membranes distinctly or deeply incised (except not *E. flavocaeruleus* and *E. multinotatus*), fin with 15–17 rays ..... 8
- 8a Anal fin 9 rays; body depth 2.2–2.7 in SL; no spots on body but 5 dark bars present below dorsal fin (may fade instantaneously upon death and only be visible near dorsal-fin base); juveniles with pelvic fins subequal to or larger than pectoral fins ..... *Hyporthodus*
- 8b Anal fin 8 (rarely 9) rays; body depth 2.3–3.7 in SL; no dark bars on body below dorsal fin, but if darkish bars present, spots also found on body; juveniles with pelvic fins usually shorter than pectoral fins ..... *Epinephelus*

GENUS *Aethaloperca* Fowler 1904

Body depth greater than HL, 2.1–2.4 in SL; HL 2.5–2.7 in SL; head profile straight or slightly concave along snout, convex on nape. Dorsal fin 9 spines (interspinous membranes slightly incised), 17 or 18 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins asymmetric, with 17–19 rays, upper rays longer than lower rays; caudal fin truncate, with 15 branched rays. One species.

*Aethaloperca rogaa* (Fabricius 1775)

Redmouth grouper

PLATES 7 &amp; 10

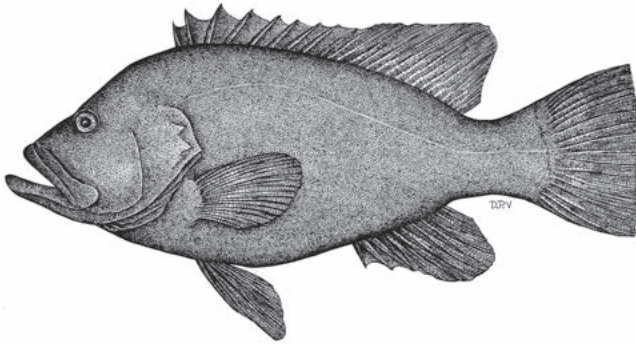
*Perca rogaa* Fabricius in Niebuhr (ex Forsskål) 1775: 38, xi (Jeddah, Saudi Arabia, Red Sea).

*Perca lunaria* Fabricius in Niebuhr (ex Forsskål) 1775: 39, xi (Jeddah, Saudi Arabia, and Al Hudaydah, Yemen, Red Sea).

*Aethaloperca rogaa*: Smith 1955; Morgans 1982; Heemstra & Randall 1984\*; SSF No. 166.19\*; Winterbottom *et al.* 1989; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall & Anderson 1993; Randall 1995\*; Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Diagnosis as for genus. Lower jaw with 2–4 rows of slender teeth at sides. GR 8–10/15–17. LL scales 48–55; LSS 90–104.

Head and body dark brown to black, sometimes with pale short vertical bar ascending from belly; inside of mouth, gill cavity and upper-jaw membranes reddish; juveniles with pale margins on median fins. Attains 60 cm TL.



*Aethaloperca rogaa*, 45 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Gulf of Oman to South Africa (Sodwana Bay), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Philippines and Japan.

**REMARKS** Matures at ~35 cm SL; appears to spawn throughout the year. Solitary, uncommon, usually near or in caves and holes on coral reefs, in 1–60 m; juveniles found in rich coral growth. Feeds on fishes, crustaceans and some stomatopods.

**GENUS** *Anyperodon* Günther 1859

Body and head elongate, markedly compressed; head pointed, profile almost straight, HL 2.3–2.5 in SL; body depth distinctly less than HL, 3.1–3.7 in SL; body width 11–15% SL (fish 10–40 cm SL). Dorsal fin 11 spines, 14–16 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 15–17 rays; caudal fin rounded. One species.

*Anyperodon leucogrammicus* (Valenciennes 1828)

Slender grouper PLATES 7 & 10

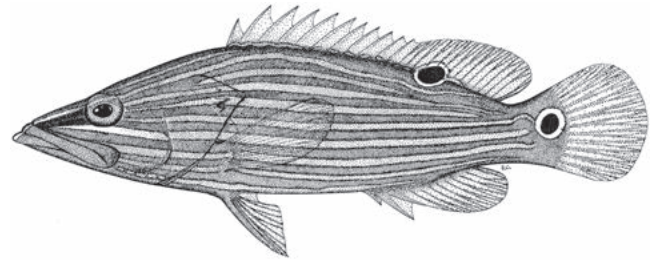
*Serranus leucogrammicus* Valenciennes in Cuv. & Val. 1828: 347 (Seychelles).

*Anyperodon leucogrammicus*: Morgans 1982; Randall & Ben-Tuvia 1983\*; Heemstra & Randall 1984\*; SSF No. 166.20\*; Allen & Steene 1987\*; Winterbottom *et al.* 1989; Randall & Heemstra 1991\*; Randall & Anderson 1993; Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*.

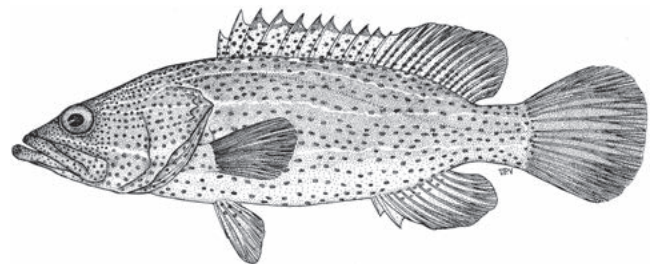
Diagnosis as for genus. Canines at front of jaws rudimentary or absent; teeth at sides of lower jaw subequal and depressible, in 2 or 3 irregular rows; small teeth on vomer, none on palatines. GR 7–9/14–17. LL scales 63–72; LSS 106–125.

Adults greenish to brownish grey, with 4 longitudinal whitish bands or pale series of streaks or elongate spots on

postorbital area of head and body (stripes lost in large adults); many orange-red spots on head, body, dorsal fin and caudal-fin base; median fins otherwise hyaline. Juveniles (<8 cm TL) with longitudinal, dark-edged, bluish grey stripes on gold background; blue-edged black spot (or double spot) at dorsal and caudal-fin base; elongate dark spot often present on each side of snout in front of nostrils. Attains 65 cm TL.



*Anyperodon leucogrammicus*, ~8 cm SL, juvenile (Indonesia). Source: Randall & Heemstra 1991



*Anyperodon leucogrammicus*, 29 cm SL, adult (Red Sea). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to Mozambique, Madagascar, Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Japan, Marshall Is., Australia, Samoa and Phoenix Is.

**REMARKS** Widespread but not abundant; fairly common in Maldives, less common at other WIO localities. Found in clear-water lagoons and on protected coral reefs, from 5–80 m (rarely in >25 m). Adults mainly piscivorous.

**GENUS** *Cephalopholis* Bloch & Schneider 1801

Body oblong, robust; snout longer than eye diameter. Dorsal fin 9 spines (interspinous membranes distinctly incised), 13–17 rays, fin origin over rear end of opercle; anal fin 3 spines, 8 or 9 rays; caudal-fin margin rounded or convex (rarely truncate), with 15 branched rays. Small canines at front of jaws; minute teeth on vomer and palatines; adults with distinct bony knob on lower rear corner of maxilla. Twenty-three species, 13 in WIO.

## KEY TO SPECIES

- 1a Caudal fin truncate to slightly emarginate; head small, HL 2.7–3.2 in SL; adults yellowish, with bright blue or purple horizontal stripes on head, body and caudal fin; small juveniles (~4 cm SL) yellowish brown, shading to lavender ventrally and at caudal-fin base, with yellow band in each caudal-fin lobe, and snout yellow with large black spot on each side in front of nostrils ..... *C. polleni*
- 1b Caudal fin rounded; HL 2.2–2.7 in SL; colour not as above ..... 2
- 2a Anal fin usually 8 rays; colour generally brown to dark brown... 3
- 2b Anal fin 9 (rarely 10) rays; colour generally red, orange or yellow (except *C. argus* and some *C. nigripinnis* and *C. sonnerati*) ..... 4
- 3a Pectoral fins 1.5–1.8 in HL; colour generally brown or yellowish brown, with dark blue lines on head, body and fins... *C. formosa*
- 3b Pectoral fins 1.3–1.6 in HL; body brown, with 7 or 8 faint darker bars, and black spot between middle and upper opercular spines; juveniles (<4 cm SL) with rear half of body greenish yellow ..... *C. boenak*
- 4a Dorsal fin 15–17 rays; lower GR 17–19; some auxiliary scales present on body; head, body and fins dark brown, covered with small black-edged blue ocelli, often with 5 or 6 pale bars on rear part of body and large pale area on chest ..... *C. argus*
- 4b Dorsal fin usually 14 or 15 rays; lower GR 13–16; no auxiliary scales on body; colour not as above ..... 5
- 5a Ventral edge of preopercle serrate; body orange-red, with widely scattered pale blue spots on body and fins, and elongate spots or short lines on head ..... *C. oligosticta*
- 5b Ventral edge of preopercle smooth and usually covered by skin (except *C. sonnerati* with a few serrae posteriorly); colour not as above ..... 6
- 6a LL scales 66–80; LSS 115–134; pectoral fins 18–20 rays; body depth 2.3–2.8 in SL; body generally red to reddish brown (juveniles and some adults may be dark purple or brown), with widely scattered whitish blotches, sometimes also with red to reddish brown spots (most evident on head) ..... *C. sonnerati*
- 6b LL scales 45–68; LSS 79–121; pectoral fins 16–19 rays; body depth 2.6–3.5 in SL; colour not as above ..... 7
- 7a LL scales 54–68; pectoral fins, peduncle and caudal fin mostly dusky red to blackish; other fins, head and body reddish brown, with small close-set orange-red spots on head; some fish from dark habitats uniformly black ..... *C. nigripinnis*
- 7b LL scales 45–56; colour not as above ..... 8
- 8a LSS 79–88; HL 2.2–2.4 in SL; dark brown saddle spot on peduncle followed by smaller spot; caudal fin with oblique dark streak on upper part and fainter streak on lower part ..... *C. leopardus*
- 8b LSS 90–121; HL 2.3–2.6 in SL; colour not as above ..... 9
- 9a Dorsal fin usually 14 rays; caudal fin and rear parts of dorsal and anal fins blackish; numerous small blue ocelli on underside of head and body, but few dorsally ..... *C. hemistiktos*
- 9b Dorsal fin usually 15 rays; median fins not blackish posteriorly; small blue spots, if present, uniformly distributed on head and body ..... 10
- 10a Head, body and fins covered with small blue ocelli ..... 11
- 10b No blue spots on head, body and fins ..... 12
- 11a Body with 4 or 5 quadrangular dark brown or black blotches along dorsal-fin base, another faint blotch on nape, and 2 smaller ones on peduncle (blotches sometimes merging with dark red vertical bars); most specimens with dark-edged blue lines radiating from eyes ..... *C. sexmaculata*
- 11b No dark blotches dorsally on body; no blue lines radiating from eyes ..... *C. miniata*
- 12a Edge of subopercle and interopercle distinctly serrate; pelvic fins usually reaching to or beyond anus, fin length 1.6–2 in HL; body generally orange-yellow to orange-red or golden, with small red to orange spots on head and dorsally on body ..... *C. aurantia*
- 12b Edge of subopercle and interopercle usually smooth (rarely with a few serrae); pelvic fins not reaching anus, fin length 1.9–2.2 in HL; body reddish orange, mottled with dark red or brownish red ..... *C. spiloparaea*

*Cephalopholis argus* Schneider 1801

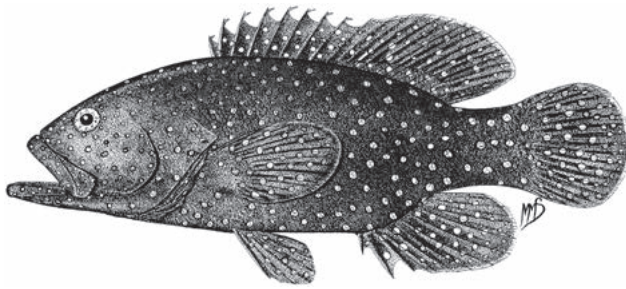
Peacock hind

PLATE 10

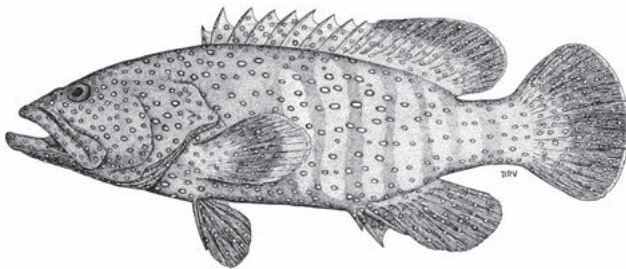
*Cephalopholis argus* Schneider in Bloch & Schneider 1801: 311, Pl. 61 (Indonesia); Randall & Brock 1960; SFSA No. 425\*; Morgans 1982\*; Randall & Ben-Tuvia 1983; Heemstra & Randall 1984\*; SSF No. 166.21\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Kuitert 1998\*; McKenna & Allen 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 2.7–3.2, HL 2.4–2.7 in SL (fish 10–40 cm SL). Dorsal fin 15–17 rays; anal fin 9 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 9–11/17–19, rudimentary rakers on lower limb difficult to distinguish. LL scales 46–51; LSS 95–110.

Head and body dark brown, covered with tiny blue ocelli, and often with 5 or 6 pale bars on rear of body, a pale area on chest and median fins with white margins; pectoral fins sometimes maroon distally; tips of spinous dorsal fin orangish brown. Attains 55 cm TL.



*Cephalopholis argus*, 23 cm TL. Source: SFSA



*Cephalopholis argus*, 30 cm SL. Source: SSF, composite

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Aliwal Shoal; juveniles to Eastern Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Japan, Australia, French Polynesia and Pitcairn Is.; introduced at Hawaii.

**REMARKS** One of the most widely distributed groupers. Found in tidepools and on rocky and coral reefs, often seen resting under coral overhangs, to 40 m (usually in >10 m); juveniles hide in coral thickets. Observed in Gulf of Aqaba in social groups of ~12 adult females and juveniles with a dominant male. Piscivorous; some reports of ciguatera poisoning in the Pacific.

### *Cephalopholis aurantia* (Valenciennes 1828)

Golden hind

PLATES 7, 8 & 10

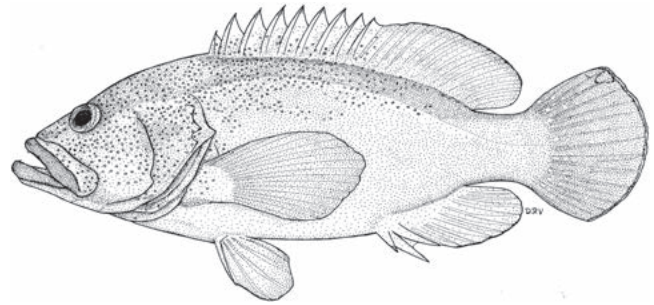
*Serranus aurantius* Valenciennes in Cuv. & Val. 1828: 305 (Seychelles).

*Cephalopholis aurantia*: SFSA No. 422\* [in part]; Heemstra & Randall 1984\*; SSF No. 166.22\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Heemstra *et al.* 2004; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 2.6–2.9, HL 2.4–2.6 in SL (fish 12–22 cm SL). Dorsal fin 14–16 rays; anal fin 8 or 9 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–9/14–17. LL scales 47–53; LSS 94–121.

Body orange-red to golden, with red or yellow spots anterodorsally on body and dorsal-fin base;

median-fin margins pale blue, caudal fin with narrow blackish submarginal line. Attains 30 cm TL.



*Cephalopholis aurantia*, 23 cm SL (Mauritius). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Pinda) to South Africa (Sodwana Bay), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes and Maldives; elsewhere to Indonesia, Philippines, Taiwan, Japan, Australia, Tuamotu Is. and Pitcairn Is.

**REMARKS** Rare; mainly insular, usually in >100 m but known to 250 m deep.

### *Cephalopholis boenak* (Bloch 1790)

Brownbarred hind

PLATE 10

*Bodianus boenak* Bloch 1790: 43, Pl. 226 (Japan [probably Java, Indonesia]).

*Serranus pachycentron* Valenciennes in Cuv. & Val. 1828: 295 [no locality given].

*Cephalopholis pachycentron*: Morgans 1982.

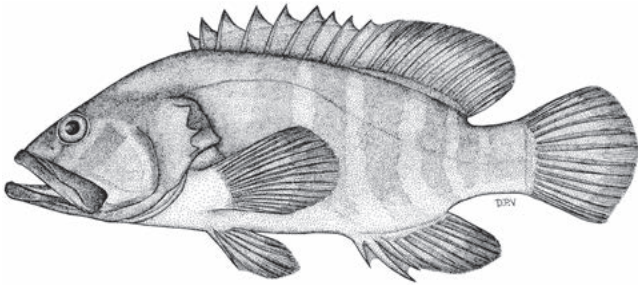
*Cephalopholis boenak*: Heemstra & Randall 1984, 1993\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Kuitert 1998\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

*Cephalopholis boenack*: SSF No. 166.23\*; McKenna & Allen 2003.

Body depth 2.6–3, HL 2.3–2.7 in SL (fish 10–19 cm SL).

Dorsal fin 15–17 rays; anal fin 8 rays, pectoral fins 16 or 17 rays; caudal fin rounded. GR 7–9/14–17. LL scales 46–51; LSS 86–100.

Head and body brown, with 7 or 8 darker bars on body; some fish with brown bands radiating from eyes and pale median band from chin to nape; large black spot between upper and middle opercular spines; median fins darker distally, with pale bluish line on outer edges (except central part of caudal fin). Juveniles (<4 cm SL) without bars, rear half of body greenish yellow. Attains 26 cm TL.



*Cephalopholis boenak*, 20 cm SL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to southern Mozambique, Madagascar, Comoros, Aldabra, Réunion, Maldives and Lakshadweep; elsewhere to Indonesia, Japan, Palau and Australia.

**REMARKS** Cryptic; usually found on dead reefs in silty protected waters in continental localities, from 4–64 m (usually to ~30 m). Fairly common at northwestern Madagascar, but reported to be in decline at Réunion.

### *Cephalopholis formosa* (Shaw 1812)

Bluelined hind

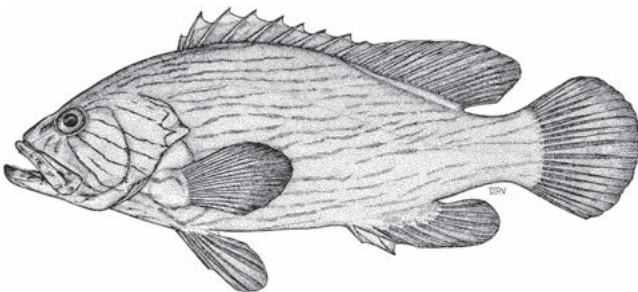
PLATE 10

*Sciaena formosa* Shaw in Shaw & Nodder 1812: no page number, Pl. 1007 (Visakhapatnam, India) [based on 'Rahtee bontoo' of Russell 1803: 22, Pl. 129].

*Cephalopholis formosa*: Heemstra & Randall 1984\*, 1993\*; SSF No. 166.24\*; Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

Body depth 2.5–2.9, HL 2.4–2.6 in SL (fish 10–26 cm SL). Dorsal fin 15–17 rays; anal fin 7 or 8 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 8–10/14–18. LL scales 47–51; LSS 91–109.

Body dark brown to yellow-brown with irregular blue lines overall (occasionally absent on fins and body); snout, lips, lower half of head and chest with small blue spots (blue markings fade to grey soon after death, later becoming golden brown and turning black in preservative, may be lost on older specimens). Attains 34 cm TL.



*Cephalopholis formosa*, 17 cm SL (India). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Lakshadweep, India and Sri Lanka; elsewhere to Indonesia, Philippines, China, Taiwan, Japan and Australia.

**REMARKS** Mainly continental, rarely at oceanic islands or atolls. Prefers shallow dead or silty reefs, in 4–30 m, but trawled to ~64 m deep.

### *Cephalopholis hemistiktos* (Rüppell 1830)

Yellowfin hind

PLATES 8 & 10

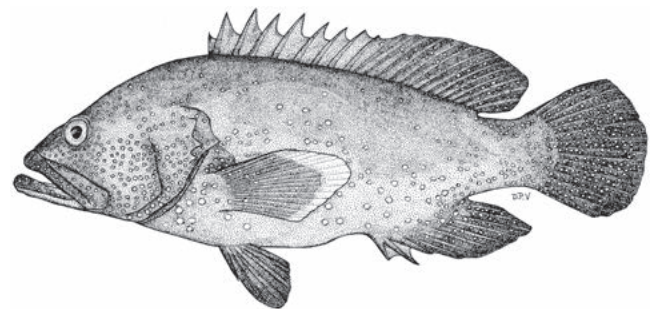
*Serranus hemistiktos* Rüppell 1830: 109, Pl. 27, Fig. 3 (Massawa, Eritrea, Red Sea).

*Cephalopholis hemistiktos*: Randall & Ben-Tuvia 1983\*; Heemstra & Randall 1984\*, 1993\*; Randall & Heemstra 1991\*; Randall 1995\*; Craig *et al.* 2011\*.

*Cephalopholis miniatus* (*non* Forsskål 1775): Mathews & Samuel 1987.

Body depth 2.7–3, HL 2.4–2.6 in SL (fish 10–20 cm SL). Dorsal fin 14 or 15 rays; anal fin 8–10 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 6–8/13–15. LL scales 47–52; LSS 95–121.

Shallow-water fish brownish, fish from 15–20 m reddish brown, and deepwater fish more reddish; head, body and fins covered with tiny blue ocelli (those on head more numerous ventrally); median fins darker than body, with pale blue margins; tips of spinous dorsal-fin membranes orange; pectoral fins brown to reddish brown, with some small blue ocelli basally, margin yellowish; pelvic fins dark red to reddish brown with dark rays; some fish with large yellowish area on body below soft-rayed dorsal fin or alternating dark and pale bars (more distinct dorsally), and dark blotches on head. Attains 35 cm TL (26 years).



*Cephalopholis hemistiktos*, 20 cm SL (Bahrain). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: northern Red Sea to Yemen, probably Socotra, and northern Oman to Persian/Arabian Gulf and Pakistan.

**REMARKS** The most common *Cephalopholis* species in Red Sea. Territorial, monogamous; found on patchy open-reef areas, in 4–55 m. Diurnal ambush predator feeding on fishes and crustaceans. Likely to become targeted with the decline of larger species. IUCN Red List conservation status Near Threatened, due to habitat loss and overfishing.

## *Cephalopholis leopardus* (Lacepède 1801)

Leopard rockcod

PLATE 10

*Labrus leopardus* Lacepède 1801: 450, 518, Pl. 30, Fig. 1 (Indian Ocean).

*Serranus spilurus* Valenciennes in Cuv. & Val. 1833: 433

(Mauritius, Mascarenes).

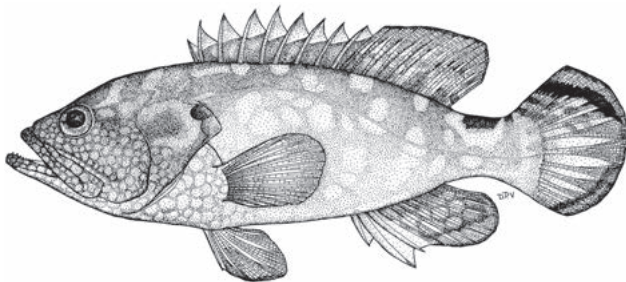
*Serranus homfrayi* Day 1871: 678 (Port Blair, Andaman Is.).

*Cephalopholis leopardus*: Morgans 1982\*; Heemstra & Randall 1984\*, 1993\*; SSF No. 166.25\*; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Heemstra *et al.* 2004; Fricke *et al.* 2009; Craig *et al.* 2011\*.

*Cephalopholis leoparda*: Kuitert 1998\*.

Body depth 2.5–2.8, HL 2.2–2.4 in SL (fish 5–14 cm SL). Dorsal fin 13–15 rays; anal fin 9 or 10 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 7–9/15–17. LL scales 47–50; LSS 79–88.

Head and body mottled orange-red or red-brown, paler ventrally, with many red-orange or pinkish red round spots on head; dark spot at rear of operculum; dark saddle on peduncle, with small spot just behind; pectoral fins orange or yellowish; caudal fin with red-brown submarginal streak dorsally and paler streak on lower part. Attains at least 20 cm TL (larger sizes unsubstantiated), may live to ~12 years (Mellin *et al.* 2006).



*Cephalopholis leopardus*, 11 cm SL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to Mozambique, Comoros, Aldabra, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Andaman Is., Japan, Palau and Australia.

**REMARKS** Cryptic, on coral reefs, usually in channels, caves, crevices and on outer-reef slopes, in 1–40 m. More common

in WIO than elsewhere. Feeds mainly on crustaceans. One of the smallest groupers, of no commercial interest except for subsistence fishers.

## *Cephalopholis miniata* (Forsskål 1775)

Coral hind

PLATES 8 & 10

*Perca miniata* Forsskål in Niebuhr 1775: 41 (Jeddah, Saudi Arabia, and Al-Luhayya, Yemen, Red Sea).

*Pomacentrus burdi* Lacepède 1802: 506, 511 [unnecessary replacement name for *Perca miniata* Forsskål].

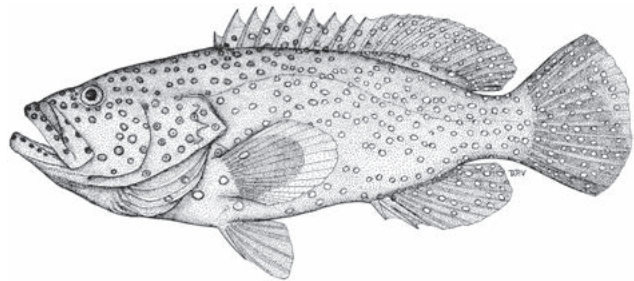
*Cephalopholis miniatus*: SFSA No. 423 [fig. and part of description is of *C. argus*]; Morgans 1982\*.

*Cephalopholis miniata*: Randall & Ben-Tuvia 1983\*; Heemstra & Randall 1984\*, 1993\*; SSF No. 166.26\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Kuitert 1998\*; McKenna & Allen 2003; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 2.6–3, HL 2.4–2.6 in SL (fish 10–30 cm SL).

Dorsal fin 14–16 rays; anal fin 8 or 9 rays; pectoral fins 17 or 18 rays; caudal fin well-rounded. GR 7–9/14–16. LL scales 47–56; LSS 94–114.

Head and body orange-red to red-brown covered with small (usually dark-edged) bluish spots; pectoral fins orange-yellow distally; median fins often with narrow blue margin and blackish submarginal line; pelvic fins orange-red, dark greyish distally. Juveniles more yellowish, with fewer and fainter spots; small juveniles without spots. Attains 45 cm TL.



*Cephalopholis miniata*, 20 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Park Rynie), Madagascar, Comoros, Aldabra, Seychelles, Agaléga Is., Réunion, Mauritius, Chagos, Maldives, Lakshadweep, southwestern India and Sri Lanka; elsewhere to Japan, Micronesia and Australia.

**REMARKS** Females mature at ~25 cm SL. Found on well-developed exposed coral reefs in clear water, at 2–150 m (but usually in shallow water). Territorial ambush predator; feeds on fishes and some crustaceans. Forms harems with

a dominant male and 2–12 females. Common species of considerable importance to local fisheries; caught with hook-and-line, by spear and in traps.

### *Cephalopholis nigripinnis* (Valenciennes 1828)

Darkfin hind

PLATES 8 & 11

*Serranus nigripinnis* Valenciennes in Cuv. & Val. 1828: 339 [probably Indian Ocean].

*Serranus erythraeus* Valenciennes in Cuv. & Val. 1830: 516 (Réunion, Mascarenes).

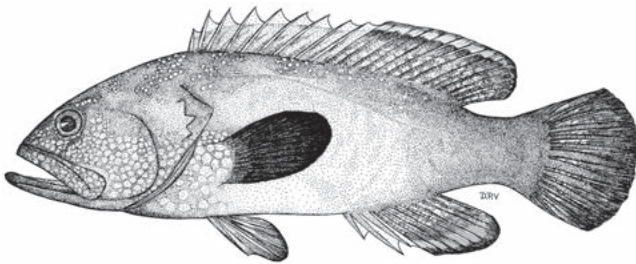
*Epinephelus playfairi* Bleeker 1879: 2 (Mauritius, Mascarenes).

*Cephalopholis nigripinnis*: Heemstra & Randall 1984\*; SSF No. 166.27\*; Randall 1987\*; Winterbottom *et al.* 1989\*; Kuitert 1998\*; McKenna & Allen 2003; Craig *et al.* 2011\*.

*Cephalopholis urodeta* (*non* Forster 1801): Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall & Anderson 1993; Heemstra *et al.* 2004.

Body depth 2.7–3.3, HL 2.4–2.7 in SL (fish 9–21 cm SL). Dorsal fin 14–16 rays; anal fin 8 or 9 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–9/15–17. LL scales 49–56; LSS 88–108.

Head and body reddish orange, with many orange spots on head, and 2 dark spots at lower jaw tip; pectoral fins, median fins and peduncle typically dusky; fish from deeper water less pigmented. Attains 28 cm TL.



*Cephalopholis nigripinnis*, 13 cm SL (N Mozambique). Source: SSF

**DISTRIBUTION** WIO: Kenya to South Africa (Aliwal Shoal, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka.

**REMARKS** Common on coral and rocky outer reefs, in 5–60 m (usually <15 m). Previously considered a synonym of *C. urodeta*. Here, these taxa are considered 2 valid species, with *C. urodeta* confined to the Pacific Ocean and *C. nigripinnis* restricted to the Indian Ocean. *Cephalopholis urodeta* has 2 oblique white stripes on the caudal fin, which are lacking on *C. nigripinnis*.

### *Cephalopholis oligosticta* Randall & Ben-Tuvia 1983

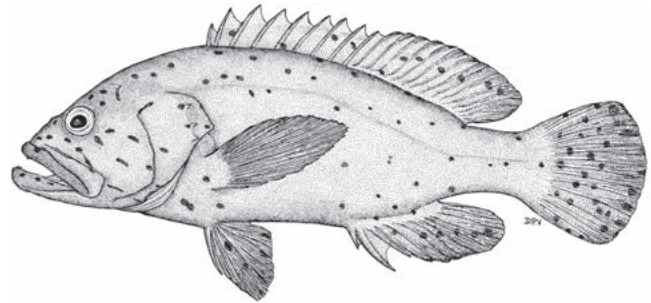
Vermilion hind

PLATES 8 & 10

*Cephalopholis oligosticta* Randall & Ben-Tuvia 1983: 386, Pl. 1, Fig. D (Port Sudan, Sudan, Red Sea); Heemstra & Randall 1984\*, 1993\*; Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

Body depth 2.6–3 (fish 16–22 cm SL), HL 2.4–2.6 in SL. Dorsal fin 14 or 15 rays; anal fin 9 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 7 or 8/14 or 15. LL scales 58–71; LSS 103–123.

Head, body and fins vermilion, with scattered pale blue spots (some elongate); median-fin margins blue. Attains ~30 cm TL.



*Cephalopholis oligosticta*, 20 cm SL (Red Sea). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: endemic to Red Sea (Gulf of Aqaba to Farasan Is.).

**REMARKS** Females mature at 17–19 cm SL, and change sex at ~22 cm SL. Found in silty lagoons and on dead reefs with silty bottom, in 20–50 m. Adults often near or in caves; juveniles in coral rubble.

### *Cephalopholis polleni* (Bleeker 1868)

Harlequin hind

PLATE 10

*Epinephelus polleni* Bleeker 1868: 336 (Réunion, Mascarenes).

*Plectropoma lineatum* Bliss (ex Steindachner) 1883: 45 (Mauritius, Mascarenes).

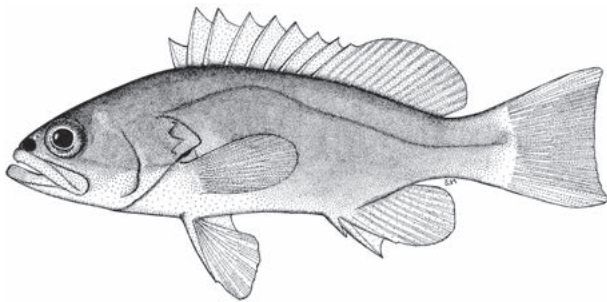
*Cephalopholis virgatus* Fourmanoir 1955: 214 (Mutsumudu, Anjouan, Comoros).

*Cephalopholis polleni*: Heemstra & Randall 1984\*, 1993\*; Randall & Heemstra 1991\*; Kuitert 1998\*; Craig *et al.* 2011\*.

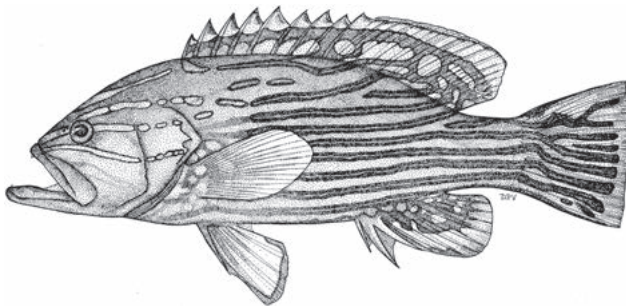
*Gracila polleni*: Winterbottom *et al.* 1989\*.

Body depth and HL both 2.7–3.1 in SL (fish 9–26 cm SL). Dorsal fin 14–16 rays; anal fin 8 or 9 rays; pectoral fins 17–19 rays; caudal fin truncate. GR 7 or 8/14–17. LL scales 66–72; LSS 112–135.

Adults yellowish, sometimes green- or brown-yellow on head and anterodorsally, with 10–12 bright blue-violet longitudinal stripes on body, upper 2 or 3 stripes broken anteriorly and extending onto soft-rayed dorsal fin, and peduncle stripes bifurcate onto caudal fin; head with 3–6 similar blue stripes; dark maxillary streak; pelvic fins and anal fin yellowish, with blue leading edges. Small juveniles (~4 cm SL) mostly yellow-brown, but lavender ventrally to yellow at caudal-fin base and with yellow extending onto both lobes; snout yellowish, with large black spot on each side in front of nostrils. Larger juveniles (~10 cm SL) brown-orange with purple stripes on head and body. Attains 43 cm TL.



*Cephalopholis polleni*, 4 cm SL, juvenile (Indonesia).  
Source: Randall & Heemstra 1991



*Cephalopholis polleni*, 20 cm SL (Mauritius). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Comoros, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Japan, Palau and Line Is.

**REMARKS** Rare; found only at oceanic islands, in clear water near steep coral-reef drop-offs, and often in caves and under overhangs, at 30–120 m.

### *Cephalopholis sexmaculata* (Rüppell 1830)

Sixblotch hind

PLATE 8

*Serranus zanana* Valenciennes in Cuv. & Val. 1828: 339  
(Mauritius, Mascarenes).

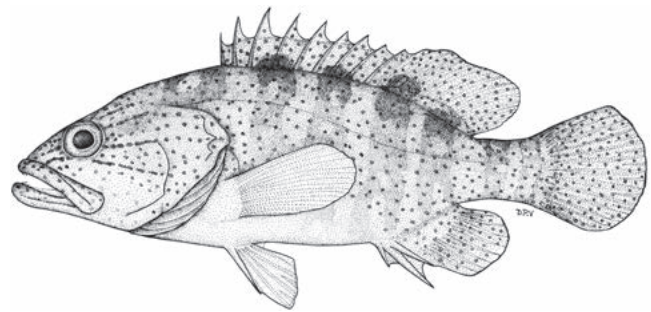
*Serranus sexmaculatus* Rüppell 1830: 107 (Red Sea).

*Cephalopholis gibbus* Fourmanoir 1955: 215 (Mutsumudu, Anjouan, Comoros).

*Cephalopholis sexmaculata*: Smith & Smith 1963\*; Heemstra & Randall 1984\*; SSF No. 166.28\*; Shpigel & Fishelson 1989; Randall & Heemstra 1991\*; Kuitert 1998\*; McKenna & Allen 2003.

Body depth 2.5–3, HL 2.3–2.5 in SL (fish 13–39 cm SL). Dorsal fin 14–16 rays; anal fin 9 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 7–9/14–16. LL scales 49–54; LSS 95–108.

Body orange-red, with pale blue spots (denser on head and median fins), elongated blue spots and lines also on head; body with 4 bars (sometimes very faint) descending from very dark blotches at dorsal-fin base, area between bars sometimes pale, and 2 similar smaller dark blotches on peduncle. Attains 50 cm TL.



*Cephalopholis sexmaculata*, 6 cm SL (Red Sea). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (Aliwal Shoal, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Japan, Palau and Marquesas Is.

**REMARKS** Mature by 24 cm SL (Fry *et al.* 2006). Cryptic; found in caves and crevices rich with invertebrate growth on outer coral-reef slopes and drop-offs, and sometimes in lagoons, at 6–150 m. Active nocturnally in shallow water, diurnal in deeper water; mainly piscivorous.

### *Cephalopholis sonnerati* (Valenciennes 1828)

Tomato hind

PLATES 8 & 11

*Serranus sonnerati* Valenciennes in Cuv. & Val. 1828: 299  
(Puducherry, India).

*Serranus zanarella* Valenciennes in Cuv. & Val. 1828: 304 (Fort Dauphin, Madagascar).

*Epinephelus unicolor* Bleeker (ex Liénard) 1874: 89  
(Mauritius, Mascarenes).

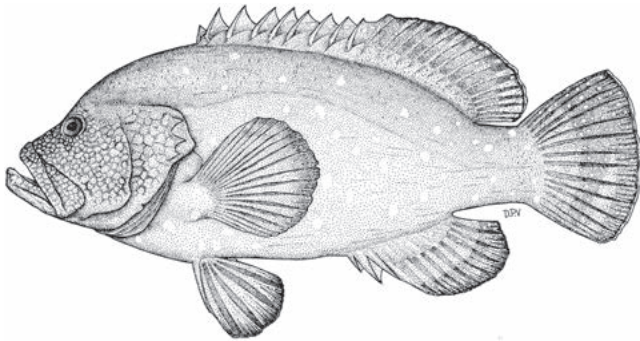
*Cephalopholis sonnerati*: Heemstra & Randall 1984\*; SSF No. 166.29\*; Randall & Heemstra 1991\*; Kuitert 1998\*; Heemstra *et al.* 2004; Fricke *et al.* 2009; Craig *et al.* 2011\*; Psomadakis *et al.* 2015.

*Serranus unicolor*: Randall & Heemstra 1993\*.



Body depth 2.3–2.8, HL 2.5–2.7 in SL. Head profile of adults slightly concave. Dorsal fin 14–16 rays; anal fin 9 rays; pectoral fins 18–20 rays; caudal fin rounded. GR 7–9/14–16. LL scales 66–80; LSS 115–134.

Adults orange-red to red-brown, sometimes dusky; often with darker scattered spots and small whitish or purple spots; blotchy purplish network on head, maxilla and lips; pectoral fins and dorsal-fin rays orange distally; membranes of median fins and pectoral fins dusky; pelvic-fin tips blackish. Juveniles dark red-brown to nearly black, rear margins of caudal fin and (sometimes) pectoral fins whitish. Large juveniles brown-orange, with scattered greenish white spots on head and body, red spots on head, and black spot between upper 2 opercular spines. Attains 57 cm TL.



*Cephalopholis sonnerati*, 33 cm SL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan to Oman, Gulf of Aden, Socotra to South Africa (Park Rynie, KwaZulu-Natal), Madagascar, Comoros, Mascarenes, Maldives and Lakshadweep; not known from Red Sea and Persian/Arabian Gulf; elsewhere to east coast of India, Indonesia, Philippines, Japan, Marshall Is., Australia and Line Is.

**REMARKS** Females mature at ~28 cm SL, males at ~34 cm SL; appears to spawn throughout the year. Found on coral and rocky reefs and steep outer slopes, from 10–100 m; juveniles often near coral heads and sponges. Feeds on fishes and crustaceans. Common and commercially important species.

### *Cephalopholis spiloparaea* (Valenciennes 1828)

Strawberry hind

PLATE 11

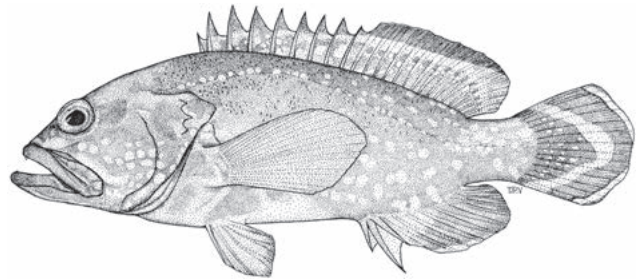
*Serranus spiloparaeus* Valenciennes (ex Commerson) in Cuv. & Val. 1828: 338 [probably Indian Ocean].

*Cephalopholis analis* (non Valenciennes 1828): Heemstra & Randall 1984\*.

*Cephalopholis spiloparaea*: Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 2.6–3.2, HL 2.3–2.5 in SL (fish 9–17 cm SL). Dorsal fin 14–16 rays; anal fin 9 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–9/14–16. LL scales 47–53; LSS 84–103.

Head and body pale red-orange, with darker red blotches and faint pale spots overall; caudal fin usually same as body colour, but sometimes yellowish with bluish white submarginal band at corners and narrow band (if present) centrally; margins of soft-rayed dorsal and anal fins narrowly bluish, dusky in preservative; some fish with ~8 faint dark saddles at dorsal-fin base and one on peduncle. Attains 30 cm TL.



*Cephalopholis spiloparaea*, 13 cm SL (Mauritius). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Japan, Australia, French Polynesia and Pitcairn Is.

**REMARKS** Found on coral reefs and reef slopes, in 15–108 m; probably the most common Indo-Pacific grouper below 40 m. An insular species except at Mozambique (Pinda). Nothing known of its biology; of little commercial importance because of its small size and deeper habitat.

### GENUS *Dermatolepis* Gill 1862

Body deep, distinctly compressed, depth subequal to or (usually) greater than HL; head profile steep, almost straight. Dorsal fin 11 spines (interspinous membranes not incised), 18 or 19 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins rounded, asymmetric, with 17–19 rays, fin length less than HL; caudal fin 15 branched rays, margin truncate, convex or emarginate. Opercular spines and preopercle serrae inconspicuous, covered with skin. Scales on head and body smooth, ctenii rudimentary or absent. Relatively rare, biology little known; cryptic on coral reefs, known from 10–213 m. Three species: 1 in western Atlantic Ocean, 1 in eastern Pacific Ocean, and 1 in WIO.

## *Dermatolepis striolata* (Playfair 1867)

Smooth grouper

PLATE 9

*Serranus striolatus* Playfair in Playfair & Günther 1867: 11, Pl. 3, Fig. 2 (Zanzibar, Tanzania).

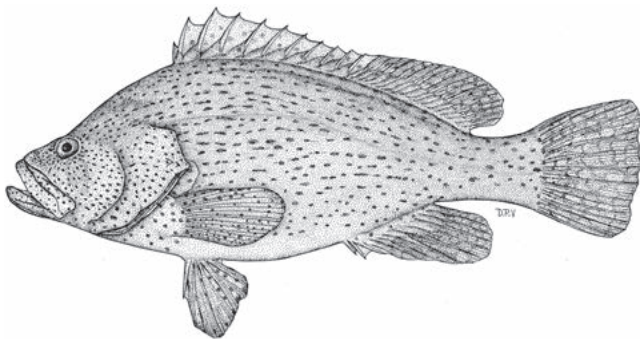
*Serranus gibbosus* Boulenger 1887: 654 (Muscat, Oman, Gulf of Oman).

*Dermatolepis aldabrensis* Smith 1955: 311, Pl. 3, Fig. B (Aldabra, Seychelles).

*Dermatolepis striolata*: SSF No. 166.32\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 2.4–2.6, HL 2.6–2.8 in SL (fish 27–40 cm SL). Pectoral fins 17–19 rays; caudal fin rounded to truncate with rounded corners. GR 5–7/13–16. LL scales 69–71; LSS difficult to count, 118–124.

Head, body and fins yellow-brown to red-brown, with unique pattern of round dark spots over pale blotches. Juveniles with dark spots on body often horizontally elongate, less marked on fins. Attains at least 85 cm TL (~34 kg).



*Dermatolepis striolata*, 40 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Gulf of Oman to Yemen, Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros, Aldabra and Sri Lanka.

**REMARKS** Generally rare, but fairly common off southern Oman. Found on coral reefs, often in or near caves, to ~15 m deep, but to 103 m at Sodwana Bay, South Africa. Piscivorous. Shoaling behaviour reported in groups of up to eight fish.

## GENUS *Epinephelus* Bloch 1793

Body oblong to oval, subcylindrical or deep and slightly compressed; body depth 2.3–3.7 in SL; HL 2.1–2.8 in SL. Dorsal fin 11 spines, 12–19 rays; anal fin 3 spines, 8 or 9 rays; caudal fin round, truncate or slightly emarginate, with 15 branched rays. Preopercle margin rounded or angular, distinctly serrate, but no large antrorse spines on lower edge. Jaws with bands of small depressible teeth and several canines

at front; vomer and palatines with small slender teeth; tongue edentate. Caught with traps, hook and line, spears, trawls and gillnets. About 108 species, 46 in WIO.

### KEY TO SPECIES

- |    |   |                          |
|----|---|--------------------------|
| 1a | Caudal fin of adults truncate to emarginate (slightly rounded in juveniles and some <i>E. bleekeri</i> ; margin may be convex in adults if broadly spread) .....  | 2                        |
| 1b | Caudal fin rounded (except truncate in some <i>E. latifasciatus</i> ) .....   | 14                       |
| 2a | Interspinous dorsal-fin membranes not incised .....   | 3                        |
| 2b | Interspinous dorsal-fin membranes incised .....   | 6                        |
| 3a | Gill rakers elongate (no rudiments) and numerous, upper GR 12–16 and lower GR 20–23; dorsal fin 17–19 rays; head and body purplish to brownish grey, with yellowish brown dots on head and longitudinal brown lines on body dorsally (not present on large adults) .....  | <i>E. undulosus</i>      |
| 3b | Gill rakers not elongate and rudiments often present, upper GR 6–11 and lower GR 13–18; dorsal fin 15–17 rays; colour not as above .....  | 4                        |
| 4a | Colour in life dark blue or grey, without black or white spots, and peduncle (at least posteriorly) and fins bright yellow; large adults lose yellow colouration and become brown, dark blue, grey or nearly black, and with numerous small irregular pale blue spots (more conspicuous underwater); dorsal fin usually 17 rays ..... | <i>E. flavocaeruleus</i> |
| 4b | Colour not as above, and numerous white or dark spots present; dorsal fin usually 16 rays .....   | 5                        |
| 5a | Body depth 2.7–3.3, HL 2.6–2.8 in SL; head and body bluish grey to brown, with scattered irregular whitish spots and blotches (faint or absent on preserved specimens); no small dark spots on lower part of head and body .....  | <i>E. jayakari</i>       |
| 5b | Body depth 2.6–2.9, HL 2.4–2.7 in SL; head and body dark purplish grey, with scattered irregular whitish spots and blotches (faint or absent on preserved specimens); many small dark reddish brown spots ventrally on head and body .....  | <i>E. multinotatus</i>   |
| 6a | LL scales 48–54; head and at least front of body with small spots, either yellow (pale in preservative) or brown .....  | 7                        |
| 6b | LL scales 56–76; small dark brown spots on head and body, or spots absent .....   | 11                       |
| 7a | Dorsal fin 14 or 15 rays; serrae at corner of preopercle slightly enlarged (~1.5 times longer than those above corner); body depth 3.2–3.6 in SL .....  | <i>E. gabriellae</i>     |
| 7b | Dorsal fin 16–18 rays (rarely 15 rays in <i>E. areolatus</i> ); serrae at corner of preopercle ~3–5 times longer than those above corner .....  | 8                        |

Continued ...

## KEY TO SPECIES

- 8a Caudal fin truncate to slightly rounded; body depth 3–3.5 in SL; head, body, dorsal fin, and upper third of caudal fin with small orange-yellow spots, lower two-thirds of caudal fin dark grey; dorsal fin usually 17 rays ..... *E. bleekeri*
- 8b Caudal fin usually slightly emarginate (truncate in some *E. chlorostigma* and *E. geoffroyi*; slightly rounded in juveniles of *E. areolatus*); body depth 2.8–3.3 in SL; head, body and fins with yellow, yellow-brown or dark brown spots, and caudal fin entirely spotted; dorsal fin usually 16 rays (except *E. geoffroyi* with 17 rays) ..... 9
- 9a Dorsal fin 15–17 rays; lower GR 14–16; pectoral-fin length 1.5–1.8 in HL; dark spots on body of adults subequal to pupil size ..... *E. areolatus*
- 9b Dorsal fin 16–18 rays; lower GR 15–18; pectoral-fin length 1.6–2 in HL; largest dark spots on body of adults distinctly smaller than pupil ..... 10
- 10a Total GR 23–26 (usually 24, including rudiments); anal fin rounded to slightly angular; caudal fin with distinct white margin ..... *E. chlorostigma*
- 10b Total GR 25–29 (usually 27, including rudiments); anal fin distinctly angular; caudal fin without distinct white margin, but margin may be pale with row of dark spots ..... *E. geoffroyi*
- 11a Anal fin 9 (rarely 8) rays; preopercle often with 1–4 small spines on lower edge near corner; dorsal fin 13 or 14 rays; posterior nostrils of adults 2–4 times larger than anterior nostrils; adults pinkish grey-brown with 3 broad dusky bars on body, paler ventrally, and with dark moustache-like streak along edge of maxillary groove (some large specimens without bars or moustache streak); juveniles with faint bars and dark brown saddle spot on peduncle ..... *E. chabaudi*
- 11b Anal fin 8 rays; no spines on lower edge of preopercle; dorsal fin 14–17 rays; posterior nostrils of adults not enlarged ..... 12
- 12a Dorsal fin 14 rays; LL scales 56–66; rear of head and body with well-separated dark brown spots; soft-rayed dorsal fin, anal fin and caudal fin with prominent white margins; pelvic and pectoral fins and outer triangle of interspinous dorsal-fin membranes yellow-orange ..... *E. albomarginatus*
- 12b Dorsal fin 16 or 17 rays; LL scales 64–76; colour not as above (brown spots close-set, if present) ..... 13
- 13a Head, body and fins with many close-set, small dark brown spots; caudal-fin margin white; 2 rows of teeth on middle of lower jaw ..... *E. polylepis*
- 13b No spots on head, body and fins, but usually 5 faint bars on body; outer triangle of interspinous dorsal-fin membranes dark red; caudal-fin margin not white; 3 or 4 rows of teeth on middle of lower jaw ..... *E. retouti*
- 14a Anal fin 9 (rarely 10) rays; head and body pale, with reddish brown spots, and interspinous dorsal-fin membranes with alternating dark brown and white stripes ..... *E. posteli*
- 14b Anal fin 8 (rarely 7) rays; colour not as above ..... 15
- 15a Dorsal fin 12 (rarely 13) rays; juveniles (<20 cm SL) with 2 broad longitudinal black-edged whitish bands, but in adults the dark edges break into dashes and spots, and might be lost altogether in large adults ..... *E. latifasciatus*
- 15b Dorsal fin 14–18 rays; colour not as above ..... 16
- 16a LL scales with branched tubules; eye diameter ~8 in HL at ~20 cm SL, ~9 in HL at 35 cm SL, and ~13 in HL at 145 cm SL; juveniles yellow, with 3 irregular broad black bars on body and other irregular black bars on head ..... *E. lanceolatus*
- 16b LL scales with single tubule (except not anterior scales of large *E. coioides* and *E. malabaricus*); eye diameter <7 in HL at 20 cm SL, <8 in HL at 35 cm SL; maximum size <150 cm TL (except *E. tukula* which may reach 200 cm TL); colour of juveniles not as above ..... 17
- 17a Numerous distinct dark spots (not dots) over most of head and body: spots brownish red to black in life and remain distinctive in preservative ..... 18
- 17b No dark spots over most of head and body: spots may be orange or yellow in life but usually do not persist in preservative ..... 33
- 18a LL scales 46–53 ..... 19
- 18b LL scales 53–74 ..... 20
- 19a Dorsal fin 16–18 rays; pelvic-fin length 2.2–2.6 in HL; dark spots on pectoral fins progressively smaller distally; black harness-like marks at bases of paired fins; fins without pale margin ..... *E. faveatus*
- 19b Dorsal fin 15–17 rays; pelvic-fin length 1.8–2.5 in HL; pectoral fins mostly dusky with pale margins; no black harness-like marks at bases of paired fins; soft-rayed dorsal and anal fins and caudal fin with pale margin ..... *E. macrospilus*
- 20a Dark spots on body elongate, oblique, more numerous posteriorly; dark spots on head separated by >2 spot diameters ..... *E. longispinis*
- 20b Dark spots on body not elongate and not more numerous posteriorly; dark spots on head separated by <1 spot diameter ..... 21

Continued ...

## KEY TO SPECIES

- 21a Dorsal fin 14 or 15 rays; longest dorsal-fin spine 2.7–3.3 in HL; peduncle with black saddle blotch; head and body covered with small orange-brown to dark brown spots, and head and upper body with irregular dark brown blotches superimposed over the small dark spots ..... *E. polyphkadion*
- 21b Dorsal fin 15–18 rays; longest dorsal-fin spine 2.1–2.7 in HL (except 2.6–2.9 in HL in *E. merra*); no black saddle on peduncle, and colour not as above ..... **22**
- 22a Dark spots on head and body ~½ pupil size; dark spots on fins (except spinous dorsal fin) much larger than those on body; maxilla reaching vertical at rear edge of eye ..... *E. miliaris*
- 22b Dark spots on head larger than pupil; dark spots on fins smaller than those on body; maxilla reaching to or past vertical at rear edge of eye ..... **23**
- 23a Pectoral fins 16–18 rays; longest dorsal-fin spine 2.6–2.9 in HL; some dark brown spots on body often joined to form short horizontal or oblique bands; black spots on pectoral fins very small and largely confined to rays ..... *E. merra*
- 23b Pectoral fins 17–19 rays; longest dorsal-fin spine 2.1–2.6 in HL; no confluent dark spots on body; dark spots on pectoral fins not uniformly small and not confined to rays ..... **24**
- 24a Most dark spots on body polygonal, close-set, and separated by pale lines forming reticulum or separated by white dots ..... **25**
- 24b Most dark spots on body round or oblong, well-separated by pale lines forming reticulum or white dots ..... **27**
- 25a Second spine of anal fin 2.1–2.3 in HL; longest dorsal-fin spine 2.5–2.7 in HL; dorsal fin 15 or 16 rays; polygonal dark spots on body separated mainly by white dots at corners of spots; yellow-brown blotch behind eye may be joined to similar horizontal blotch on opercle ..... *E. hexagonatus*
- 25b Second spine of anal fin 2.4–3.6 in HL; longest dorsal-fin spine 2.8–3.8 in HL; dorsal fin 14–16 rays; dark spots on body separated by a network of pale lines; no yellow-brown blotch behind eye or on opercle ..... **26**
- 26a Single black blotch on body below rear dorsal-fin spines, extending to mid-fin; no dark blotch on peduncle; dark spots at front of upper lip in 1 or 2 irregular horizontal rows; peduncle depth 3.2–3.7 in HL ..... *E. melanostigma*
- 26b Three or 4 black blotches (or groups of spots darker than others) at dorsal-fin base, not extending to mid-fin; dark blotch on upper peduncle; small dark spots at front of upper lip in 3 or 4 irregular horizontal rows along front of upper lip; peduncle depth 3.7–4.3 in HL ..... *E. spilotoceps*
- 27a Dorsal fin 13–15 rays; total GR 29–31; LL scales 53–58; body depth 2.6–2.9 in SL; body and head pale brown with irregular dark brown spots and many small close-set dark spots, peduncle with black saddle spot; adults with smooth midlateral body scales ..... *E. fuscoguttatus*
- 27b Dorsal fin 15 or 16 rays; total GR 22–29; LL scales 53–74; body depth 2.7–3.7 in SL; colour not as above; adults with rough midlateral body scales (except large *E. andersoni* and *E. tauvina* with mainly smooth scales) ..... **28**
- 28a Irregular black spots (<½ pupil size) on head and body (except ventrally), dorsal fin and part of caudal fin; most spots on head radiating in rows from eyes; no auxiliary scales; maxilla not reaching past vertical at rear edge of eye ..... *E. magniscuttis*
- 28b Colour not as above; auxiliary scales present on body of adults; maxilla usually reaching past vertical at rear edge of eye ..... **29**
- 29a LL scales 54–65, anterior scales with branching tubules; many small bony platelets on side of gill arch; body with 5 irregular dark bars which tend to bifurcate ventrally (bars may be faint or broken into series of 2 or 3 large blotches) ..... **30**
- 29b LL scales 62–74, none with branching tubules; no small bony platelets on side of gill arch; no dark bars on body (or only faintly on *E. tauvina*) ..... **31**
- 30a Head, body and fins with many well-separated black spots (largest spots about twice size of posterior nostrils); irregular pale or white blotches or spots usually present on head and body; pectoral fins usually 19 rays ..... *E. malabaricus*
- 30b Head, body and usually median fins with many orange- to red-brown spots (largest spots ~4–5 times size of posterior nostrils); spots become poorly defined and darker with growth; spots on head may be elongate, arranged in irregular rows radiating from eyes; no pale or white blotches or spots on head and body; pectoral fins usually 20 rays; fins brownish, spotted proximally ..... *E. coioides*
- 31a Head, body and fins grey-brown; many round to irregular dark brown spots on body, dorsal fin and upper part of caudal fin; dark maxillary streak extends posteriorly, and 2 dark streaks run posteriorly from lower edge of eye; preopercle with 2 or 3 greatly enlarged serrae at corner; midside of lower jaw with 2 or 3 rows of teeth ..... *E. andersoni*
- 31b Colour not as above; serrae at corner of preopercle slightly to moderately enlarged; midside of lower jaw with 3–6 rows of teeth in adults ..... **32**

Continued ...

## KEY TO SPECIES

- 32a Head, body and fins with orange-red to dark brown spots (those on body eye-sized in young, pupil-sized in large fish); body often with faint oblique bars and blackish blotch at base of last 4 dorsal-fin spines extending onto basal part of fin; mouth large, maxilla reaches well past eye, its greatest width more than twice suborbital depth; LSS 95–112; body scales smooth except for small patch covered by pectoral fins; maximum length ~75 cm ..... *E. tauvina*
- 32b Body grey, with several large round or oval dark brown blotches in 5 or 6 nearly vertical series, fins with smaller darker spots, and head with irregular streaks; body scales rough; LSS 113–130; maximum length ~200 cm ..... *E. tukula*
- 33a Interspinous dorsal-fin membranes slightly to moderately incised; head and body greenish brown to dark brown with paler marbling; 1 or 2 faint dark streaks from eyes ... *E. erythrurus*
- 33b Interspinous dorsal-fin membranes moderately to deeply incised; colour various, but not as above ..... 34
- 34a Upper half to two-thirds of body with dark brown or black dots (<2 mm diameter), sometimes also present posteriorly on head ..... *E. epistictus*
- 34b No dark brown or black dots on upper body or head ..... 35
- 35a Dorsal fin 15–18 rays; body usually with broad, vertical or slightly oblique, dark bars (faint or absent in some species) ... 36
- 35b Dorsal fin 13–16 rays; no broad dark bars on body ..... 40
- 36a Outer triangle of interspinous dorsal-fin membranes black; edge of orbit narrowly black surrounded by pale blue line; body usually with 5 faint darker bars (bars may have paler mottling) ..... *E. fasciatus*
- 36b Outer triangle of interspinous dorsal-fin membranes and edge of orbit not black; bars present or absent on body ..... 37
- 37a Nape and front of body above lateral line with many minute scales and many pores; each body scale with white spot (may be lost in preservative); semicircular reddish brown blotch at pectoral-fin base; dark line in crease along spinous dorsal-fin base ..... *E. rivulatus*
- 37b Nape and front of body above lateral line without minute scales and pores; colour various, but not as above ..... 38
- 38a Preopercle corner with 1–5 large spines (2 or 3 times longer than serrae above corner); dark bars on body (if present) slightly oblique ..... 39
- 38b Corner of preopercle with serrae only slightly to moderately enlarged; dark bars on body vertical (but may be faint or absent) ..... *E. diacanthus*
- 39a Rear half of body with 4 dark bars, last on peduncle; head and front part of body with dark reddish brown or orange-red spots; pectoral-fin bases pale with dark oval blotch; chest pale with dark bands ..... *E. stoliczkae*
- 39b Head, body and dorsal fin grey-brown with many white spots, some overlain with pale blotches; adults (>30 cm SL) with spots on body coalescing to form wavy lines ..... *E. coeruleopunctatus*
- 40a Midlateral body scales smooth (except area covered by pectoral fins); body depth ~3.2 in SL; body width ~1.5 in SL; many small bony plates on side of 1st gill arch ..... *E. indistinctus*
- 40b Midlateral body scales rough (except large adults of *E. marginatus*); body depth 2.6–3.2 in SL; body width 1.7–2.5 in SL; no small bony plates on 1st gill arch ..... 41
- 41a LL scales 62–72; head and body brown with irregular pale blotches, and underside of head and body usually yellowish; longest dorsal-fin spine 2.3–2.8 in HL ..... *E. marginatus*
- 41b LL scales 48–66; colour not as above; longest dorsal-fin spine 2.5–3.8 in HL ..... 42
- 42a Serrae at corner of preopercle slightly to moderately enlarged; midlateral part of lower jaw with 3–5 rows of teeth in adults; LL scales 48–55; body with auxiliary scales; colour pattern of white dots, spots or blotches ..... 43
- 42b Preopercle corner with 3–5 large spines; midlateral part of lower jaw with 2 rows of teeth in adults; LL scales 52–66; body without auxiliary scales; colour pattern of dark bands and/or series of dark spots ..... 44
- 43a Pectoral fins 15–17 rays; anterior and posterior nostrils subequal; pectoral-fin length 1.3–1.7 in HL; small whitish spots tend to coalesce forming irregular bands; no whitish spots on paired fins of adults ..... *E. ongus*
- 43b Pectoral fins 16–18 rays; posterior nostril of adults vertically ovate, length 2–4 times diameter of anterior nostril; pectoral-fin length 1.7–2.1 in HL; whitish spots not joining to form bands; paired fins of adults with small whitish spots ..... *E. summana*
- 44a Body with some dark spots and 5 irregular curved oblique dark brown bands (with age only the edges remain dark): 1st band from nape to eye, 2nd band from middle dorsal-fin spines to upper end of gill opening, 3rd and 4th bands from dorsal-fin rays bifurcating ventrally, and 5th band on peduncle ..... *E. radiatus*
- 44b Colour pattern various, but not as above ..... 45

Continued ...

**KEY TO SPECIES**

- 45a Large dark brown oval blotch (or group of small spots on larger fish) on body at base of middle dorsal-fin spines (extending onto spinous dorsal fin in juveniles) and separate from lower, broadly curved, dark bands or rows of spots on head and body paralleling the blotch curvature; dark markings faint or absent on large adults ..... *E. poecilnotus*
- 45b Dark brown blotch on body at base of middle dorsal-fin spines joined to brown band (or series of dark blotches in juveniles) passing to upper edge of gill opening ..... *E. morrhua*

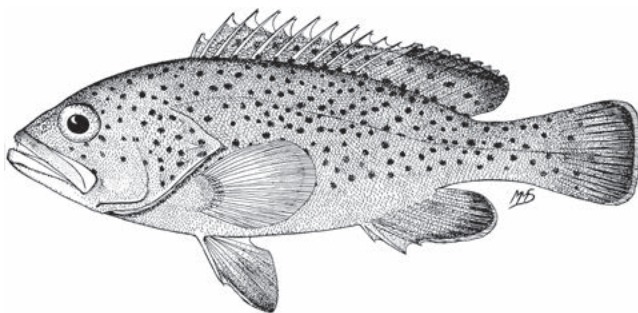
***Epinephelus albomarginatus*** Boulenger 1903

White-edged rockcod or Captain Fine PLATE 11

*Epinephelus albomarginatus* Boulenger 1903: 65, Pl. 4 (KwaZulu-Natal, South Africa); Smith 1971; Thomson *et al.* 1979; SSF No. 166.33\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 2.6–3, HL 2.3–2.5 in SL (fish 15–46 cm SL). Dorsal fin 14 rays; anal fin 8 rays; pectoral fins 17 or 18 rays; caudal fin truncate, with rounded corners in adults, margin convex in juveniles. GR 8–10/14–16. LL scales 56–66; LSS 92–106.

Head, body, and dorsal and caudal fins brownish, with many dark brown spots, but underside of head and body not spotted; on juveniles, many spots merge to form double spots; dark brown streak along upper edge of maxillary groove; pectoral fins yellowish or reddish orange; interspinous dorsal-fin tips yellow; soft-rayed dorsal and anal fins dusky distally, with prominent thin white margin; caudal-fin margin (including corners) white. Attains at least 100 cm TL (~13 kg).



*Epinephelus albomarginatus*, 23 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: southern Mozambique (Quissico) to South Africa (Eastern Cape).

**REMARKS** In Mozambique, Fennessy (2000) found mature females at 34 cm TL (3 years), males at ~59 cm TL (6 years).

Found on coral and rocky reefs, in 10–100 m (usually >30 m). Feeds on spiny lobsters, crabs, octopuses, fishes and squids. Important angling fish in South Africa, but catches off KwaZulu-Natal have declined. IUCN Red List conservation status Vulnerable.

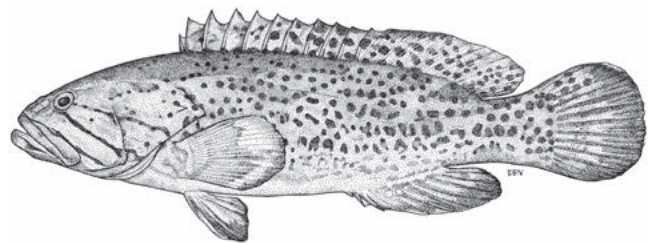
***Epinephelus andersoni*** Boulenger 1903

Catface rockcod PLATES 9 & 11

*Epinephelus andersoni* Boulenger 1903: 66, Pl. 5 (KwaZulu-Natal, South Africa); Fourmanoir 1957; SSF No. 166.34\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Fennessy 2000; Heemstra & Heemstra 2004\*; Craig *et al.* 2011\*.

Body depth 3.2–3.7, HL 2.4–2.7 in SL (fish 10–50 cm SL). Dorsal fin 13–15 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin well-rounded. GR 8–11/14–17. LL scales 66–74; LSS 97–106.

Head, body and fins brown; body, dorsal and caudal fins with many close-set, irregular, darker brown spots; 2 dark brown stripes from behind eye across operculum and another from maxillary groove to lower preopercle edge. Juveniles with paler body and longitudinal dark brown stripes that break up into spots posteriorly on body; dark blotch at base of last few dorsal-fin spines; 2 small dark blotches at base of dorsal-fin rays, and third on top of peduncle, each of these dark blotches separated by 4 or 5 round white spots. Attains at least 80 cm TL (11 years).



*Epinephelus andersoni*, 37 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: southern Mozambique (Quissico) to South Africa (Knysna, Western Cape). Reports from Madagascar (Fourmanoir 1957) are dubious.

**REMARKS** Occurs on rocky bottom, from shore to 102 m; juveniles in tidepools. Sedentary ambush predator rarely seen in aggregations; feeds on fishes, crabs and spiny lobsters. Females mature at ~60 cm TL (7 years) in South Africa, ~38 cm TL (3 years) in Mozambique; change sex at 73 cm TL (12 years). IUCN Red List conservation status Near Threatened due to fishing pressure.

*Epinephelus areolatus* (Forsskål 1775)

Areolate grouper

PLATES 9 &amp; 11

*Perca areolata* Forsskål in Niebuhr 1775: 42 (Jeddah, Saudi Arabia, Red Sea).

*Bodianus melanurus* Geoffroy Saint-Hilaire 1817: 317, Pl. 21, Figs. 1–2 (Suez, Egypt, Red Sea).

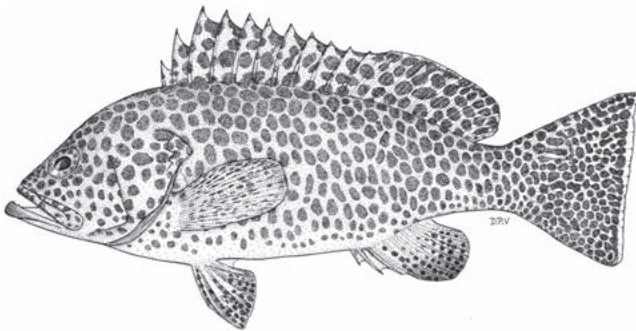
*Serranus angularis* Valenciennes in Cuv. & Val. 1828: 353 (Sri Lanka).

*Serranus glaucus* Day 1871: 678 (Andaman Is., Indian Ocean).

*Epinephelus areolatus*: Tan *et al.* 1982; Randall & Ben-Tuvia 1983; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; McKenna & Allen 2003; Craig *et al.* 2011\*; Psomadakis *et al.* 2015\*.

Body depth 2.8–3.3, HL 2.4–2.8 in SL (fish 14–31 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays, margin rounded; pectoral fins 17–19 rays; caudal fin truncate or slightly emarginate in adults, margin slightly convex in juveniles. GR 8–10/14–16. LL scales 49–53; LSS 97–116.

Head, body and fins pale, covered with close-set brownish or yellowish spots (largest about pupil-sized), spots on front of head smaller than those on opercle; pectoral fins pale, with small dark spots on rays; caudal-fin margin white. Attains 47 cm TL.



*Epinephelus areolatus*, 22 cm SL (Red Sea). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Pakistan to India and Sri Lanka, Red Sea, Kenya to South Africa (Umdloti, KwaZulu-Natal), Madagascar, Seychelles, Maldives and Lakshadweep; elsewhere to Andaman Is., Japan, Australia, New Caledonia, Fiji and Tonga. Appears to be absent from Micronesia, Polynesia and many WIO islands.

**REMARKS** Usually found in seagrass beds or on silty-sand bottom near isolated coral or rocky outcrops, at 6–200 m. Feeds on fishes and crustaceans. Common in markets of WIO.

*Epinephelus bleekeri* (Vaillant 1878)

Duskytail grouper

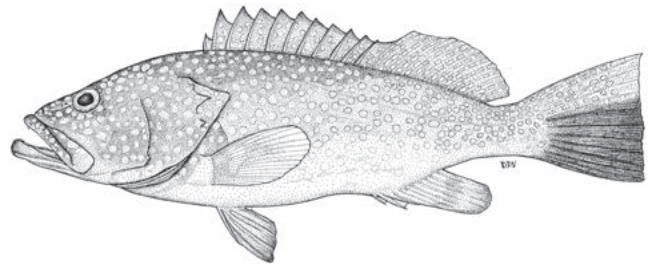
PLATES 11 &amp; 17

*Serranus bleekeri* Vaillant in Vaillant & Bocourt 1878: 47 (Jakarta, Java, Indonesia); Bleeker 1849.

*Epinephelus bleekeri*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*; Psomadakis *et al.* 2015\*.

Body depth 3–3.5, HL 2.4–2.7 in SL. Dorsal fin interspinous membranes slightly incised, 16–18 rays; anal fin 8 or 9 rays; pectoral fins 17–19 rays. Caudal fin of WIO fish truncate (fin margin convex in western Pacific fish). GR 9–11/16–18. LL scales 49–53; LSS 99–104.

Head and body brownish, reddish brown or purplish grey, covered (except ventrally) with numerous reddish orange, golden or yellow; dark streak along maxillary groove; pectoral and pelvic fins and distal part of anal fin dusky; spinous dorsal fin gold; upper third of caudal fin with spots like those on body, the lower two-thirds dusky. Juveniles (<11 cm SL) with 7 faint dark bars dorsally on body, the first 2 on nape, the last on peduncle, and all bars more or less demarcated by small dark spots; no dark spots on head or fins. Attains 76 cm TL.



*Epinephelus bleekeri*, 34 cm SL (SW India). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf to India and Sri Lanka; elsewhere to Indonesia, Thailand, China, Taiwan and Australia.

**REMARKS** Found on shallow rocky banks and adjacent soft substrate, in 30–104 m; not known from well-developed coral reefs. Used for capture-based mariculture in Southeast Asia. IUCN Red List conservation status Near Threatened.

## *Epinephelus chabaudi* (Castlenau 1861)

Moustache grouper

PLATES 11 & 17

*Serranus chabaudi* Castlenau 1861: 3 (Algoa Bay, Eastern Cape, South Africa).

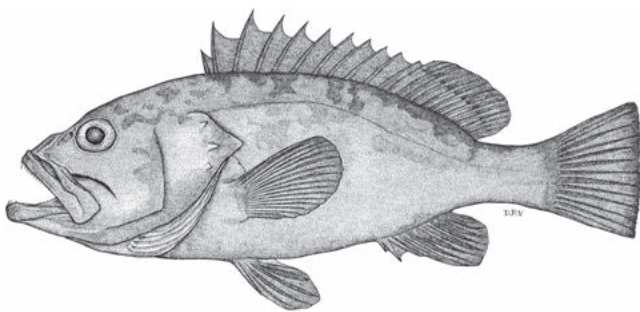
*Epinephelus modestus* Gilchrist & Thompson 1909: 218 (Durban, KwaZulu-Natal, South Africa); SFSA No. 441\*; Heemstra & Randall 1982\*; Morgans 1982\*.

*Epinephelus clarkei* Smith 1958: 123, Pl. 1, Fig. C (off Xora River mouth, Eastern Cape, South Africa); SFSA No. 438a\*.

*Epinephelus chabaudi*: SSF No. 166.37\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 2.5–2.8, HL 2.3–2.5 in SL. Dorsal fin 13 or 14 rays; anal fin 8 or 9 rays; pectoral fins 17 or 18 rays; caudal fin truncate. GR 8 or 9/15–17. LL scales 61–69; LSS 100–114.

Head and body greyish brown, paler ventrally; 3 broad, irregular, slightly darker bars between dorsal fin and lateral line, continuing faintly below lateral line on smaller fish (<35 cm SL), bars fade with growth; broad blotch dorsally on peduncle, reaching about halfway to lateral line; nape faintly yellowish; prominent dark brown streak along edge of maxillary groove; fins greyish brown; spinous dorsal-fin tips dark reddish brown; rays of median and pelvic fins paler than membranes; pectoral-fin rays brown, membranes pale. Specimens 88–115 cm SL from deep water off Kenya (Morgans 1982) described as rosy slate or chocolate brown; throat and hidden membrane of head pinkish grey; eyes silvery; no bars, spots, blotches, marginal coloured bands or conspicuous moustache streak. Attains at least 137 cm TL (~41 kg).



*Epinephelus chabaudi*, 24 cm SL, holotype of *E. clarkei* (South Africa). Source: SSF

**DISTRIBUTION** WIO: Kenya, southern Mozambique to South Africa (to Struisbaai, Western Cape, more common south of Durban, KwaZulu-Natal), Seychelles, Walters Shoals and India (Kerala coast).

**REMARKS** Found on rocky bottom, from 9–300 m; juveniles in tidepools. Fished from 30–180 m off South Africa, and 270 m off Maputo, Mozambique.

## *Epinephelus chlorostigma* (Valenciennes 1828)

Brownspeckled grouper

PLATES 11 & 17

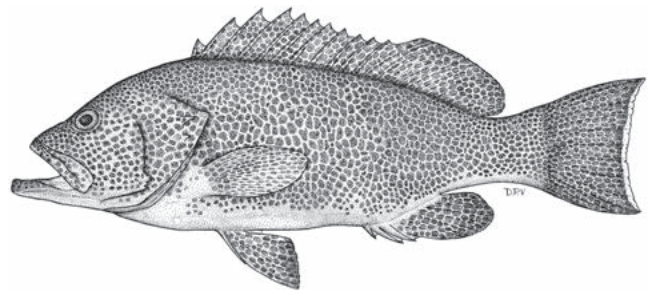
*Serranus chlorostigma* Valenciennes *in* Cuv. & Val. 1828: 352 (Seychelles).

*Serranus reevesii* Richardson 1846: 232 (Canton, China) [based on painting by John Reeves].

*Epinephelus chlorostigma*: Kyushin *et al.* 1977; Morgans 1982; De Moussac 1986; Winterbottom *et al.* 1989; Heemstra & Randall 1984\*, 1993\*; SSF No. 166.38\*; Randall & Heemstra 1991\*; Fricke *et al.* 2009; Craig *et al.* 2011\* [in part].

Body depth 2.8–3.3 in SL (fish 12–51 cm SL); HL 2.4–2.7 in SL. Dorsal fin 16–18 rays; anal fin 8 rays, fin rounded; pectoral fins 17–19 rays; caudal fin truncate or slightly emarginate. Total GR 23–26 (including rudiments). WIO specimens: LL scales 48–52, LSS 97–119; Pacific specimens: LL scales 50–53, LSS 104–125.

Head, body and fins pale with small, irregular, close-set dark brown spots, the ground colour forming a pale network; spots on pectoral fins mainly confined to rays; caudal-fin margin white. Attains 80 cm TL (~7 kg, 26 years).



*Epinephelus chlorostigma*, 32 cm SL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Kenya to South Africa (Amanzimtoti, KwaZulu-Natal), Madagascar, Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep; elsewhere to Japan, New Caledonia and American Samoa.

**REMARKS** Found on coral and rocky reefs, in 32–280 m. A protogynous hermaphrodite; females mature at 23–29 cm TL and change sex at 34–56 cm TL, but not all females change sex. Feeds on fishes and crustaceans (mainly stomatopods and crabs). Excellent food fish, fairly abundant throughout its range. The species appears to be replaced by *E. gabriellae* and *E. polylepis* in the Arabian Sea and Persian/Arabian Gulf, and by *E. geoffroyi* in the Red Sea.



*Epinephelus coeruleopunctatus* (Bloch 1790)

Whitespotted grouper

PLATES 11 &amp; 17

*Holocentrus coeruleopunctatus* Bloch 1790: 94, Pl. 242, Fig. 2  
[probably Indonesia].

*Serranus alboguttatus* Valenciennes in Cuv. & Val. 1828: 366 (Indian Ocean).

*Serranus dermochirus* Valenciennes in Cuv. & Val. 1830: 513  
(Coromandel coast, India).

*Serranus flavoguttatus* Peters 1855: 429 (Mozambique).

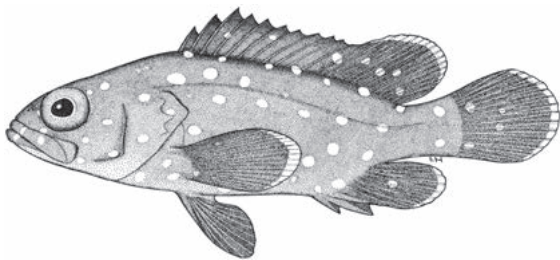
*Epinephelus caeruleopunctatus*: Heemstra & Randall 1984\*, 1993\*;

SSF No. 166.36\*; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*;  
Kuitert 1998\*; McKenna & Allen 2003.

*Epinephelus coeruleopunctatus*: Fricke *et al.* 2009; Craig *et al.* 2011\*.

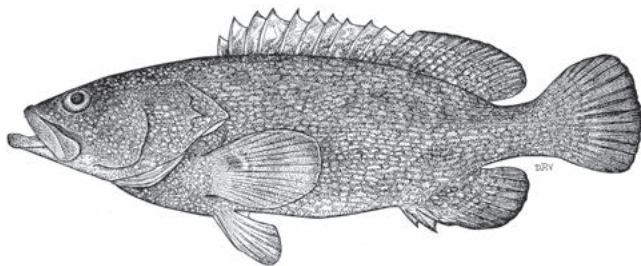
Body depth distinctly less than HL, and 2.9–3.4 in SL (fish 11–47 cm SL); HL 2.3–2.5 in SL. Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins large, fleshy, 17–19 rays; caudal fin rounded. GR 8–10/13–17 (only 4–8 developed rakers on lower limb in fish >20 cm SL, and difficult to count because of intercalated bony tooth plates). LL scales 51–61; LSS 86–109.

Adults brownish grey, with large pale blotches on body overlain with pale spots; 4 or 5 indistinct dark blotches at dorsal-fin base, and oblique black saddle on rear half of peduncle; prominent black streak on maxillary groove. Large adults (>40 cm SL) brownish, covered with indistinct, contiguous, pale spots; inside of mouth white. Juveniles (<20 cm SL) dark grey to black, with scattered, prominent, irregular white blotches and smaller white dots, but few on median fins. Small juveniles (<6 cm SL) with uniformly white spots (smaller than pupil size). Attains ~76 cm TL (commonly <60 cm TL).



*Epinephelus coeruleopunctatus*, 3 cm SL, juvenile (South Africa).

Source: Randall & Heemstra 1991



*Epinephelus coeruleopunctatus*, 43 cm SL, adult (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Oman, Persian/Arabian Gulf, Kenya to South Africa (East London), Madagascar, Seychelles, Réunion, Mauritius, Chagos, Maldives, Lakshadweep and Sri Lanka; not known from Red Sea (where it is replaced by the endemic *E. summana*); elsewhere to east coast of India, Indonesia, Japan, Marshall Is., Australia and Tonga.

**REMARKS** Found in estuaries, sheltered deep lagoons and on coral reefs, usually in or near caves, to at least 30 m; juveniles in tidepools. Feeds on fishes and crustaceans.

*Epinephelus coioides* (Hamilton 1822)

Orangespotted grouper

PLATES 11 &amp; 17

*Bola? coioides* Hamilton 1822: 82 (Ganges River mouth, India).

*Serranus nebulosus* Valenciennes in Cuv. & Val. 1828: 313

[no locality given].

*Serranus suillus* Valenciennes in Cuv. & Val. 1828: 335

(Coromandel coast, India).

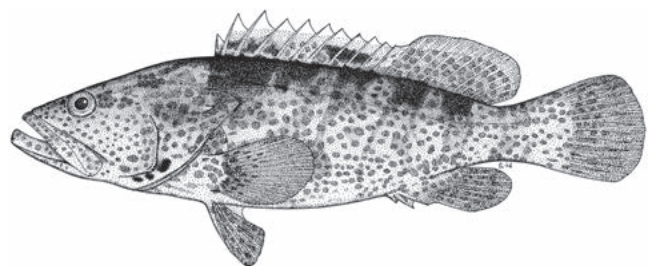
*Epinephelus coioides*: Mathews & Samuel 1991; Randall & Heemstra 1991\*;

Heemstra & Golani 1993\*; Heemstra & Randall 1993\*; Randall 1995\*;

Craig *et al.* 2011\*; Psomadakis *et al.* 2015.

Body depth 2.9–3.7, HL 2.3–2.6 in SL (fish 10–78 cm SL). Dorsal-fin interspinous membranes distinctly incised, 14–16 rays; anal fin 8 rays; pectoral fins rounded, 18–20 rays; caudal fin rounded. GR 8–10/14–17; adults with small bony platelets on lateral side of 1st gill arch. LL scales 58–65; LSS 100–118.

Head and body tan dorsally, whitish ventrally; numerous pupil-sized orange to reddish brown spots on head, body and median fins (spots become smaller, darker and more numerous with growth, turning brown on exposure to air but fainter in preservative); body with 5 faint, irregular, oblique brown bars that bifurcate ventrally (first bar below anterior dorsal-fin spines, last on peduncle); 2 dark spots on interopercle, and 1 or 2 spots at junction of subopercle and interopercle. Attains 114 cm TL (22 years).



*Epinephelus coioides*, 33 cm SL (Persian/Arabian Gulf).

Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman to India, Red Sea to South Africa (Eastern Cape), Réunion and Mauritius; elsewhere to Andaman Is., Indonesia, Philippines, Japan, Palau, Australia and Fiji.

**REMARKS** Known from continental shores and large islands, and often in estuaries, and taken offshore to 100 m deep. Age, growth and reproduction in the Persian/Arabian Gulf were studied by Mathews *et al.* (1986). The major spawning period is March to June. Females mature at 25–30 cm TL (2–3 years old); sexual transition occurs at 55–75 cm FL. Feeds on fishes, crustaceans and some cephalopods. Although present on the Mediterranean Sea coast of Israel, it does not seem to have established a viable population there (Heemstra & Golani 1993). It is of considerable economic importance; a common and expensive fish in markets of the Persian/Arabian Gulf, India, Singapore, Hong Kong and Taiwan. In Southeast Asia, wild-caught small juveniles are used in mariculture operations (Liu & Sadovy 2009). Unfortunately, this species is often misidentified as *E. tauvina* or *E. malabaricus* in aquaculture and fisheries literature.

### *Epinephelus diacanthus* (Valenciennes 1828)

#### Spinycheek grouper

*Serranus diacanthus* Valenciennes *in* Cuv. & Val. 1828: 319 (Kerala, Malabar coast, India).

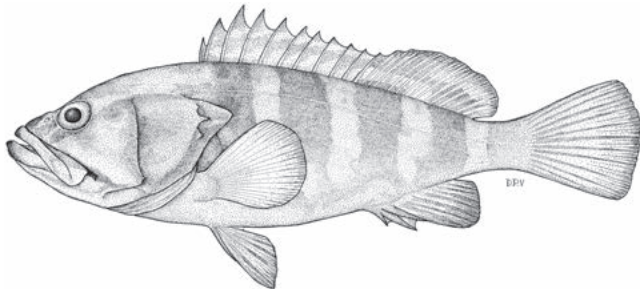
*Serranus sexfasciatus* (*non* Valenciennes 1828): Day 1865.

*Epinephelus dayi* Bleeker 1874: 105 (Cochin, India).

*Epinephelus diacanthus*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall 1995\*; Craig *et al.* 2011\*.

Body depth 2.8–3.5, HL 2.2–2.4 in SL (fish 10–34 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 17–20 rays; caudal-fin margin rounded or convex. GR 8–10/15–17. LL scales 52–60; LSS 102–121.

Body pale brownish grey, usually with 5 dark vertical bars and narrower white interspaces (4 bars below and extending onto dorsal fin, 5th bar on peduncle faintest); underside of head and body pink or reddish; dark maxillary streak continues faintly to lower edge of preopercle; fins greyish brown. Attains 55 cm TL.



*Epinephelus diacanthus*, 33 cm SL (W India). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indian Ocean. WIO: Gulf of Aden, Gulf of Oman to India and Sri Lanka; elsewhere to east coast of India. Not known from Persian/Arabian Gulf and Red Sea. Western Pacific records are presumably misidentifications of *E. stictus* Randall & Allen 1987 or *E. fasciatomaculosus* (Peters 1865).

**REMARKS** Protogynous hermaphrodite; females change sex at 2–3 years; off Oman, females mature at 39 mm FL, males at 43 mm FL (McIlwain *et al.* 2006). Occurs on mud or muddy-sand bottom in 10–120+ m. Feeds on crustaceans and fishes. Moderately common, but heavily fished throughout its range. IUCN Red List conservation status Near Threatened.

### *Epinephelus epistictus* (Temminck & Schlegel 1843)

#### Blackspotted grouper

PLATES 12 & 17

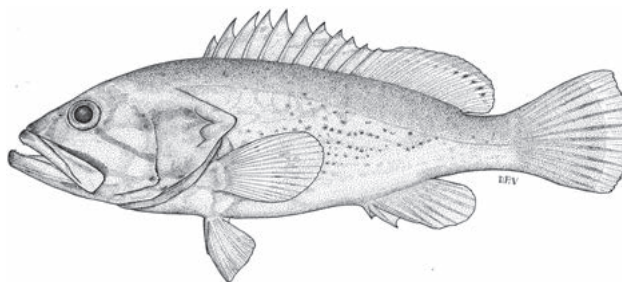
*Serranus epistictus* Temminck & Schlegel 1843: 8 (Nagasaki, Japan).

*Epinephelus praeopercularis* Boulenger 1888: 654 (Muscat, Oman, Gulf of Oman); Randall & Heemstra 1991\*.

*Epinephelus epistictus*: Baranes & Golani 1993\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 3–3.3, HL 2.2–2.5 in SL (fish 12–50 cm SL). Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 17–20 rays; caudal fin rounded or convex. GR 7–10/15–19. LL scales 55–66; LSS 105–127.

Head, body and fins brown; faint black dots usually on dorsolateral body, sometimes on postorbital part of head; 3 dark brown streaks on cheek, the darkest just behind maxilla; pectoral fins reddish brown; median-fin margins pale blue or white, some fish with row of faint dark spots on soft-rayed dorsal fin. Attains 80 cm TL.



*Epinephelus epistictus*, 32 cm SL (W India). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea (including Gulf of Suez), Oman to India, Somalia to South Africa (Umdloti, KwaZulu-Natal) and Madagascar; elsewhere to Japan, China, Taiwan, New Guinea and Australia.

**REMARKS** Occurs mainly in continental localities, on rocky and smooth bottom, in 71–290 m. Pacific Ocean specimens (Japan and Taiwan) usually have 65–70 LL scales and larger spots than fish from WIO.

### *Epinephelus erythrurus* (Valenciennes 1828)

#### Cloudy grouper

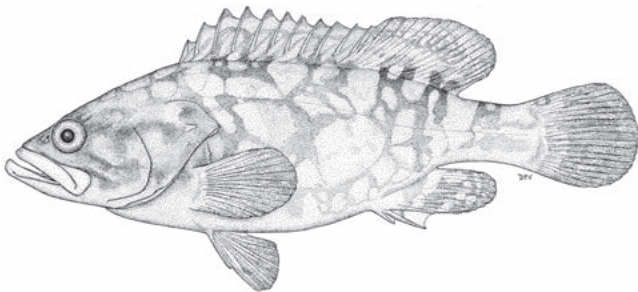
*Serranus erythrurus* Valenciennes in Cuv. & Val. 1828: 320 (Malabar coast, India).

*Epinephelus townsendi* Boulenger 1898: 133 (Karachi, Pakistan).

*Epinephelus erythrurus*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 2.8–3.2, HL 2.4–2.7 in SL (fish 11–28 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–10/15–19. LL scales 57–70; LSS 105–127.

Body olive to reddish brown, usually with pale spots and blotches randomly joined forming irregular dark network of the background colour; 3 dark streaks across operculum; median and pelvic fins mottled; pectoral fins uniform. Large fish nearly uniformly brown, or with pale blotches faintly visible. Attains 43 cm TL.



*Epinephelus erythrurus*, 18 cm SL (Gulf of Thailand).

Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Lakshadweep, Pakistan, India and Sri Lanka; elsewhere to Gulf of Thailand, Malaysia and Indonesia.

**REMARKS** Rare; found in harbours and estuaries with mud or silty-sand bottom. Females mature at ~16 cm SL.

### *Epinephelus fasciatus* (Forsskål 1775)

#### Blacktip grouper

PLATES 12 & 18

*Perca fasciata* Forsskål in Niebuhr 1775: 40 (Ras Muhammad, Sinai Peninsula, Egypt, Red Sea).

*Holocentrus erythraeus* Bloch & Schneider 1801: 320 (Ras Muhammad, Sinai Peninsula, Egypt, Red Sea).

*Holocentrus rosmarus* Lacepède 1802: 345, 389, Pl. 7, Fig. 2 [probably Indian Ocean].

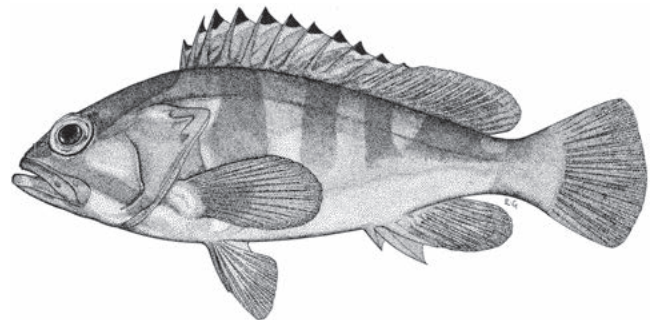
*Holocentrus oceanicus* Lacepède (ex Commerson) 1802: 345, 346, Pl. 7, Fig. 3 (Indian Ocean).

*Serranus alexandrinus* Valenciennes in Cuv. & Val. 1828: 281 (Red Sea [probably Gulf of Suez]).

*Epinephelus fasciatus*: Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuiter 1998\*; Sadovy & Cornish 2000; McKenna & Allen 2003; Pears 2005; Craig *et al.* 2011\*; Bariche & Heemstra 2012\*.

Body depth 2.8–3.3, HL 2.3–2.6 in SL (fish 11–28 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–10/14–16. LL scales 49–56; LSS 91–123.

Body and head pale greenish grey or pale reddish yellow to scarlet; body often with 5 or 6 faint dark bars (last bar on peduncle); body scales (except ventrally) with pale centre and dark edges, producing faint chequered pattern; front of upper jaw, dorsal part of head and nape dark red or reddish brown or with bands and blotches of similar colour; often a dark band from below eye to interopercle; rim of orbit black; fins reddish orange, pale yellowish green or greenish brown; outer triangular tips of interspinous dorsal-fin membranes black. Attains ~40 cm TL (19 years).



*Epinephelus fasciatus*, 17 cm SL (Tanzania). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific (widespread) and Mediterranean Sea (photographed off Lebanon). WIO: Red Sea to Oman, Kenya to South Africa (Aliwal Shoal; juveniles occasionally to Knysna), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Walters Shoals, St Brandon Shoals, Chagos, Maldives, Lakshadweep, India and Sri Lanka; elsewhere to Indonesia, Japan, Lord Howe I., Pitcairn Is. and Hawaii.

**REMARKS** Matures at 12 cm SL. Found in clear water on coral and rocky reefs, from shore to 160 m. Active day and night, feeding on brachyuran and galatheid crabs, fishes, shrimps, stomatopods, ophiuroids and octopuses. Because of its wide distribution and abundance in shallow water this species is heavily exploited by artisanal fishers.

## *Epinephelus faveatus* (Valenciennes 1828)

Barred-chest grouper

PLATE 12

*Serranus faveatus* Valenciennes in Cuv. & Val. 1828: 329 (Sri Lanka).

*Serranus bontoo* Valenciennes in Cuv. & Val. 1828: 334

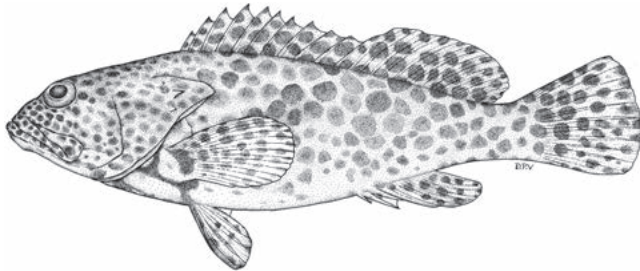
(Visakhapatnam, India).

*Epinephelus faveatus*: Heemstra & Randall 1985\*, 1993\*; Randall &

Heemstra 1991\*; Craig *et al.* 2011\*.

Body oblong, depth 3–3.5 in SL; HL 2.3–2.6 in SL (fish 9–26 cm SL). Dorsal fin 16–18 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–10/14–16. LL scales 48–52; LSS 83–98.

Head, body and fins pale, covered with close-set brown spots of unequal size (most spots on body larger than pupil); four groups of 2 or 3 spots at dorsal-fin base darker than other spots on body; 2 oblique dark bands on sides of chest; pectoral fins dusky, with dark blotch at base and faint dark spots (spots more distinct on inner surfaces); spots on median fins darker than those on body. Attains 32 cm TL.



*Epinephelus faveatus*, 21 cm SL (India). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indian Ocean. WIO: southern India and Sri Lanka; elsewhere to Cocos (Keeling) Is. and Indonesia.

**REMARKS** Females mature at 20 cm TL. Found in shallow water, on coral reefs and in rocky areas, to ~125 m. Important in artisanal fisheries.

## *Epinephelus flavocaeruleus* (Lacepède 1802)

Blue-and-yellow grouper

PLATES 12 & 18

*Holocentrus flavocaeruleus* Lacepède (ex Commerson) 1802: 331, 367 (Mauritius, Mascarenes).

*Bodianus macrocephalus* Lacepède 1802: 281, 293 (Mauritius, Mascarenes).

*Holocentrus gymnosus* Lacepède 1802: 335, 372 (Mauritius, Mascarenes).

*Serranus borbonicus* Quoy & Gaimard 1824: 312, Pl. 57, Fig. 2

(Réunion, Mascarenes).

*Perca flavopurpurea* Bennett 1830: no page number, Pl. 19 (Sri Lanka).

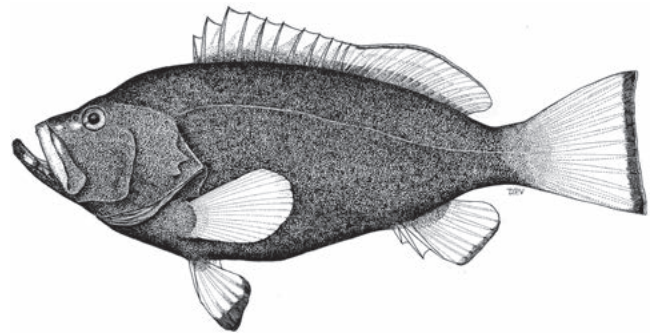
*Cynichthys flavopurpuratus* Swainson 1839: 202, Fig. 42c

[emendation for *Perca flavopurpurea* Bennett].

*Epinephelus flavocaeruleus*: Van der Elst 1981\*; Morgans 1982\*; Randall & Whitehead 1985; SSF No. 166.41\*; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; McKenna & Allen 2003; Heemstra & Heemstra 2004\*; Craig *et al.* 2011\*.

Body depth 2.3–2.7, HL 2.4–2.7 in SL. Dorsal fin 16 or 17 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin truncate. GR 8–10/15–17. LL scales 61–74; LSS 129–148.

Head and body dark blue to bluish violet (also grey, brown or almost black in large adults), occasionally with small pale flecks or blotches; some fish with front of head yellow; fins yellow, but yellow areas reduce with growth. Attains 90 cm TL (~17 kg).



*Epinephelus flavocaeruleus*, 36 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Gulf of Aden, Kenya to South Africa (Algoa Bay), Madagascar, Comoros, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Lakshadweep and Sri Lanka; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Females mature at ~50 cm SL. Juveniles (<40 cm TL) found in lagoons and on shallow reefs; adults on offshore reefs at 10–150 m. Feeds on fishes, crabs, shrimp, lobsters, squid and octopuses.

## *Epinephelus fuscoguttatus* (Forsskål 1775)

Blotch grouper

PLATES 12 & 18

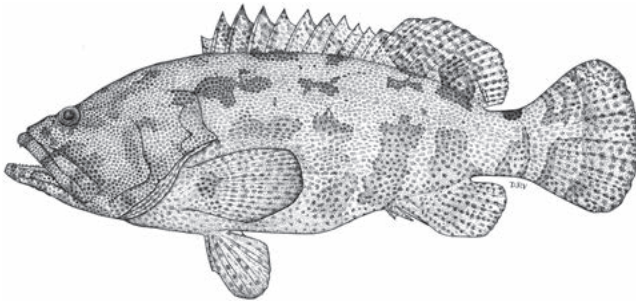
*Perca summana* var. *fuscoguttata* Forsskål in Niebuhr 1775: 42 (Suerens and Jeddah, Saudi Arabia, Red Sea).

*Serranus lutra* Valenciennes in Cuv. & Val. 1831: 474 (Mauritius, Mascarenes).

*Epinephelus fuscoguttatus*: Morgans 1959, 1982; Randall 1964; Randall & Ben-Tuvia 1983; Heemstra & Randall 1984\*, 1993\*; SSF No. 166.42\*; Randall & Heemstra 1991\*; Randall & Anderson 1993; Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*; Psomadakis *et al.* 2015\*.

Body depth 2.6–2.9, HL 2.3–2.5 in SL (fish 11–55 cm SL). Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin rounded. GR 10–12/17–21 (rudiments often difficult to count). LL scales 52–58; LSS 102–115.

Body pale yellow-brown, with 5 vertical series of irregular dark brown blotches; head, body and fins covered with close-set brown spots, those on dark blotches much darker than spots in between blotches; small black saddle on rear of peduncle; 2 or 3 faint dark bars at sides of jaws. Attains 120 cm TL (~11 kg, 42+ years).



*Epinephelus fuscoguttatus*, 55 cm SL (Red Sea). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to Mozambique, Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep, Pakistan and India; elsewhere to Indonesia, Japan, Phoenix Is. and Samoa.

**REMARKS** Juveniles in seagrass, adults in or near caves on shallow coral reefs and rocky bottom, to 60 m. A wary species for a grouper. Feeds on fishes, crabs and cephalopods. Has been implicated in ciguatera poisoning at some Pacific localities. This species is reared commercially in hatcheries. IUCN Red List conservation status Near Threatened.

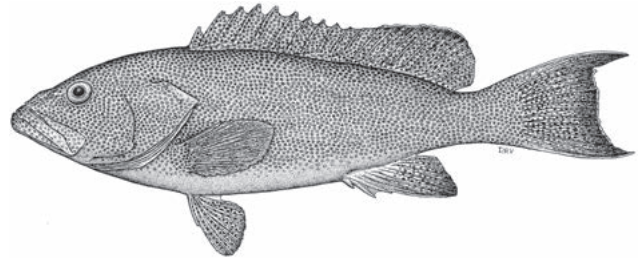
### *Epinephelus gabriellae* Randall & Heemstra 1991

Multispotted grouper PLATES 12 & 18

*Epinephelus gabriellae* Randall & Heemstra 1991: 159, Pls. 14a, 36a–b, Fig. 78 (near Mirbat, Oman); Heemstra & Randall 1993\*; Randall 1995; Craig *et al.* 2011\*.

Body depth 3.2–3.6, HL 2.4–2.6 in SL (fish 11–39 cm SL). Dorsal-fin interspinous membranes slightly incised, 14 or 15 rays; anal fin 8 rays, fin margin angular; pectoral fins 17 or 18 rays; caudal fin emarginate to concave, with acute corners. GR 10–12/17–19 (no rudiments). LL scales 52–54; LSS 106–126.

Head and body pale brownish grey, densely covered (except ventrally) with close-set, dark orange-brown spots; median and paired fins spotted like body; median fins with white margin and submarginal blackish zone. Attains 70 cm SL (~26 years).



*Epinephelus gabriellae*, 33 cm SL, paratype (Somalia).

Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Gulf of Oman to Gulf of Aden, Socotra and Somalia.

**REMARKS** Known from 6–88 m, larger fish usually in >40 m; juveniles and subadults on south coast of Oman common in inshore rocky areas with high coral cover.

### *Epinephelus geoffroyi* (Klunzinger 1870)

Geoffroy's grouper

PLATE 18

*Serranus tauvina* (non Fabricius 1775): Geoffroy Saint-Hilaire 1809\*.

*Serranus areolatus* (non Forsskål 1775): Valenciennes in Cuv. & Val. 1828; Günther 1859.

*Serranus geoffroyi* Klunzinger 1870: 675, footnote (Port Safaga, Egypt, Red Sea).

?*Serranus celebicus* var. *multipunctatus* Kossmann & Räuber 1877: 382 (Red Sea).

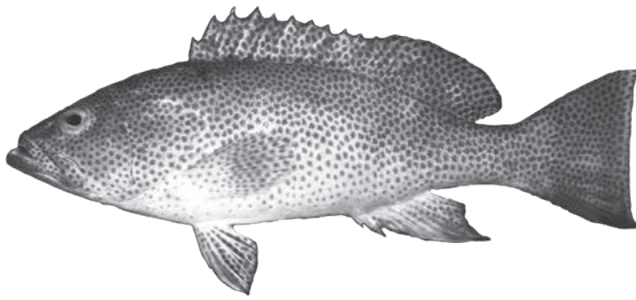
*Serranus* (*Hyposerranus*) *geoffroyi*: Klunzinger 1884.

*Serranus assabensis* Giglioli 1889: 68 (Assab, Eritrea, Red Sea).

*Epinephelus geoffroyi*: Randall *et al.* 2013\*.

Body depth 2.8–3.3, HL 2.5–2.6 in SL. Dorsal fin 16–18 rays; anal fin distinctly angular, 8 rays; pectoral fins 17 or 18 rays; caudal fin slightly truncate to emarginate. Total GR 25–29 (including rudiments). LL scales 48–52; LSS 96–113.

Head, body and fins whitish with many small close-set brown spots, spots further apart on chest and abdomen; caudal-fin margin pale with single row of dark spots. Individuals may show disruptive colouration, displaying a series of longitudinal dark brown blotches on body and head. Attains at least 41 cm SL.



*Epinephelus geoffroyi*, 33 cm SL (Red Sea). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea and Gulf of Aden (to at least Al Mukallā, Yemen).

**REMARKS** Found on sand or sand-rubble among coral-reef patches, in tidepools, and on or near coral reefs, from 3–32 m (usually in 10–20 m). Previously considered a synonym of *E. chlorostigma* which has total GR 23–26, anal fin rounded to slightly angular, and a distinct white caudal-fin margin.

### *Epinephelus hexagonatus* (Forster 1801)

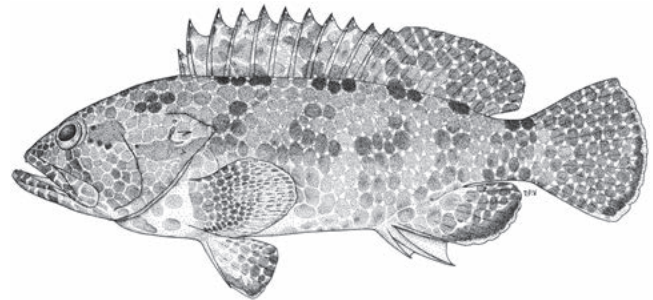
Starspotted grouper

PLATES 12 & 18

*Holocentrus hexagonatus* Forster in Bloch & Schneider 1801: 323 (Tahiti, Society Is.); Hiatt & Strasburg 1960; Randall & Brock 1960; Harmelin-Vivien & Bouchon 1976; SSF No. 166.44\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 2.8–3.4, HL 2.5–2.6 in SL (fish 10–17 cm SL). Median fins rounded. Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 17–19 rays. GR 7–9/17–19. LL scales 61–70; LSS 93–114.

Head, body and fins covered with mostly hexagonal, close-set brown to red-brown spots with conspicuous white dots between them (except distal half of pectoral fins with faint spots and no white dots), pale interspaces forming a network; 4 or 5 blackish saddle blotches of darker spots dorsally on body and peduncle, with first 4 blotches extending onto dorsal-fin base; irregular dark bar of darker polygonal spots on lower body below each blotch; dark spots on head progressively smaller anteriorly; large dark brown or olive spot just behind eye, sometimes joined to horizontally elongate spot of same colour on opercle; margin of interspinous dorsal-fin membranes with blackish brown triangle and short white or pale yellow filament behind each spine tip. Preserved specimens often retain the conspicuous white dots on body and fins. Attains 27 cm TL.



*Epinephelus hexagonatus*, 16 cm SL (Mauritius). Source: SSF

**DISTRIBUTION** Indo-Pacific (insular and abundant at most islands). WIO: Kenya (one record), Tanzania (Latham I. and Zanzibar), Mozambique (Pemba), Madagascar, Comoros, Aldabra and Mascarenes; elsewhere to Japan, Australia, Tahiti and Pitcairn Is.

**REMARKS** Found mainly on coral reefs, usually in shallow outer-reef surge areas, but also on rocky reefs in lagoons and in tidepools, to 30 m. Prefers clear water and healthy reefs. Feeds mainly on fishes and crustaceans (stomatopods and brachyurans). Caught with hook-and-line, traps, spear and gillnets.

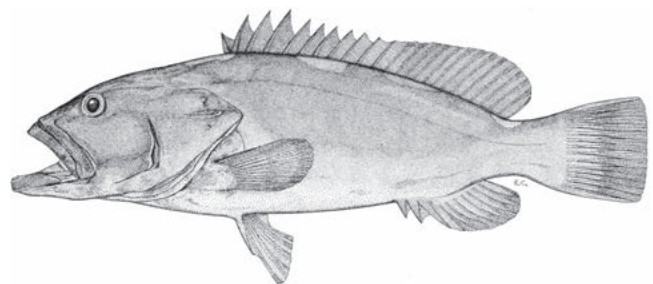
### *Epinephelus indistinctus* Randall & Heemstra 1991

Somali grouper

*Epinephelus indistinctus* Randall & Heemstra 1991: 171, Fig. 84 (off Somalia); Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

Body depth 3.2, HL 2.3 in SL. Dorsal fin 14 rays; anal fin 8 rays; pectoral fins 18 rays; caudal fin slightly convex. GR 9/14. LL scales 64; LSS 114.

Head, body and fins greyish brown, without distinct markings. Attains at least 67 cm SL, 81 cm TL.



*Epinephelus indistinctus*, 67 cm SL, holotype (Somalia). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Somalia and probably Oman.

**REMARKS** Known from the holotype, trawled in 70–80 m off Somalia, and from occasional specimens with barotrauma (indicating capture in deeper water) from Salalah market, Oman.

### *Epinephelus jayakari* (Boulenger 1889)

Muscat grouper

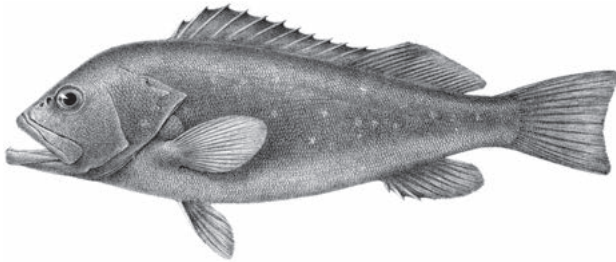
PLATES 13 & 19

*Serranus jayakari* Boulenger 1889: 237 (Muscat, Oman, Gulf of Oman).

*Epinephelus jayakari*: Boulenger 1895\*.

Body depth 2.7–3.3, HL 2.6–2.8 in SL. Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 18 or 19 rays; caudal fin truncate to slightly emarginate in adults, rounded in juveniles. GR 10/16 or 17. LL scales 75–85; LSS 132–150.

Head and body of adults uniformly dark brown to bluish grey, paler ventrally; no dark spots on ventral part of head and chest; fins blackish brown; median fins with narrow white margins; head and body of juveniles (10–30 cm TL) dark grey or brown with scattered irregular whitish blotches (faint or absent in adults and preserved specimens). Attains 90 cm TL.



*Epinephelus jayakari*, 60 cm SL (Oman). Source: Boulenger 1895

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman and Arabian Sea. Distribution uncertain as a result of confusion with *E. multinotatus*.

**REMARKS** A shallow-water species vulnerable to fishing pressure. Randall & Heemstra (1991) considered *E. jayakari* a synonym of *E. multinotatus*; but the latter has a deeper body (depth 2.6–2.8 in SL), rear end of maxilla more rounded, and small dark spots on the lower half of head and body.

### *Epinephelus lanceolatus* (Bloch 1790)

Giant grouper, brindle bass

PLATES 12 & 19

*Holocentrus lanceolatus* Bloch 1790: 92, Pl. 242, Fig. 1 (East Indies).

*Serranus abdominalis* Peters 1855: 237 (Mozambique coast).

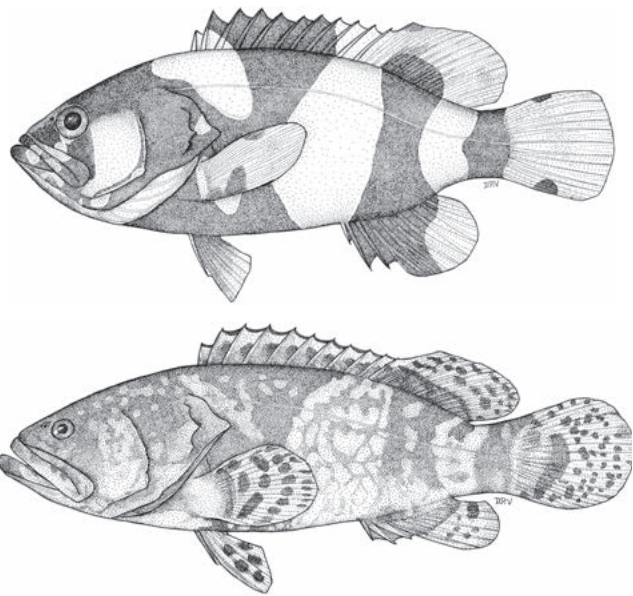
*Batrachus gigas* Günther 1869: 131 (Seychelles).

*Promicrops lanceolatus*: Van der Elst 1981\*.

*Epinephelus lanceolatus*: SSF No. 166.45\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 2.4–3.4 in SL (fish 12–179 cm SL); HL 2.2–2.7 in SL. Dorsal fin 14–16 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin rounded. GR (juveniles) 8–10/14–17, rudiments in adults difficult to distinguish from bony platelets covering gill arch. LL scales 54–62; LSS 95–105.

Small juveniles (8–14 cm SL) yellow, with irregular broad black bars (1st bar from spinous dorsal fin to chest and belly and onto head, 2nd bar from base of soft-rayed dorsal fin to anal fin, 3rd bar at caudal-fin base). Small adults (20–50 cm SL) with irregular white or yellow spots on the black bars, and fins with irregular black spots. Adults (80–150 cm SL) faintly mottled dark brown, and fins with many black spots. Large adults (160–230 cm SL) brown with darker fins. Attains 270 cm TL (400+ kg).



*Epinephelus lanceolatus*, 3 cm SL, juvenile (top); 23 cm SL, subadult (bottom) (both South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, southern Oman, Kenya to South Africa (Algoa Bay, Eastern Cape), Madagascar, Seychelles, Réunion, Mauritius, Chagos, Maldives, Lakshadweep, Pakistan to India and Sri Lanka; not known from Persian/Arabian Gulf or Gulf of Oman; elsewhere to Indonesia, Japan, Australia, Pitcairn Is. and Hawaii.

**REMARKS** The most widely distributed grouper, from oceanic islands and continental localities, but rare everywhere, and vulnerable in some areas. Known to 100 m, but usually in <50 m; found in caves on coral reefs and around wrecks, with

adults and juveniles in estuaries and harbours. Small juveniles cryptic and rarely seen. One of the largest species of groupers; females mature at 1.3 m TL. Feeds on spiny lobsters, crabs, fishes (including small sharks and batoids) and juvenile sea turtles. This species is now being reared successfully at some commercial hatcheries. IUCN Red List conservation status Vulnerable.

### *Epinephelus latifasciatus* (Temminck & Schlegel 1843)

Striped grouper

PLATES 12 & 19

*Serranus latifasciatus* Temminck & Schlegel 1843: 6 (Nagasaki, Japan).

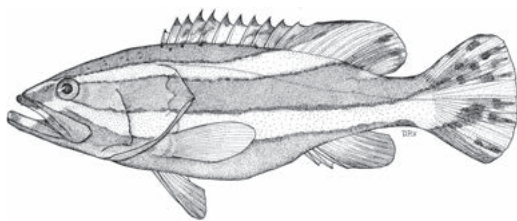
*Serranus grammicus* Day 1868: 700 (Chennai, India); Day 1875\*.

*Priacanthichthys maderaspatensis* Day 1868: 193, Fig. (Chennai, India).

*Epinephelus latifasciatus*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Craig *et al.* 2011\*.

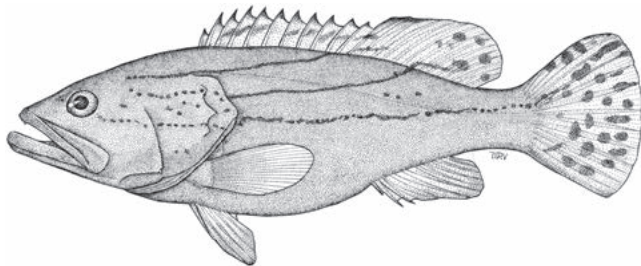
Body depth 2.9–3.4 in SL (fish 13–62 cm SL); HL 2.3–2.6 in SL. Dorsal fin 12–14 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin truncate in large adults, convex in juveniles. GR 8–11/15–18. LL scales 56–65; LSS 91–106.

Juveniles lavender-grey to brown, whitish ventrally; 2 black-edged white longitudinal bands (upper band from above eye to anterior dorsal-fin rays; lower band from below eye to lower caudal fin rays); dorsal fin and caudal fin with black spots and streaks; with growth, white bands disappear and dark edges break into dashes and spots and large adults become mostly grey. Attains 137 cm SL, 157 cm TL (~59 kg).



*Epinephelus latifasciatus*, 7 cm SL, juvenile (Japan).

Source: Heemstra & Randall 1993



*Epinephelus latifasciatus*, 29 cm SL, adult (SW India).

Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf, Gulf of Oman to India and Sri Lanka; elsewhere to Taiwan, Japan, New Guinea and northwestern Australia.

**REMARKS** Found in 20–240 m on low-relief bottom; adults on coarse sand or rocks, juveniles on mud and silty-sand.

### *Epinephelus longispinis* (Kner 1864)

Longspine grouper

PLATES 12 & 19

*Serranus longispinis* Kner 1864: 483 (Chennai, India); Kner 1865: 275, Pl. 2,

Fig. 2; Morgans 1982.

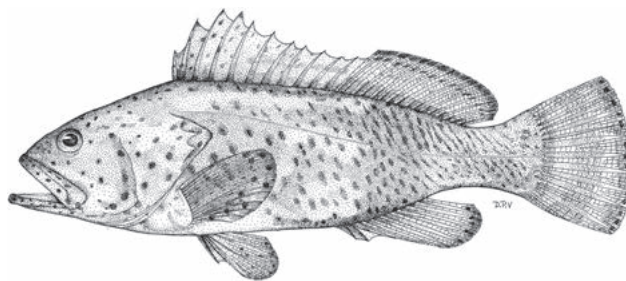
*Epinephelus longispinis*: Heemstra & Randall 1986\*, 1993\*;

Randall & Heemstra 1991\*; Kuitert 1998\*; McKenna & Allen 2003;

Craig *et al.* 2011\*.

Body depth 2.8–3.3 in SL (fish 13–35 cm SL); HL 2.4–2.6 in SL. Dorsal fin 16 or 17 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin convex. GR 8–11/15–17. LL scales 49–53; LSS 98–121.

Body pale grey-brown, with dark red-brown spots (round and widely spaced on head and front of body; obliquely elongated, close-set and darker posteriorly); fins with dark brown spots; row of dark spots along margins of soft-rayed dorsal fin and caudal fin. Juveniles with fewer dark spots on head and body, and with 2–4 dark blotches on body at dorsal-fin base extending onto fin; lower part of head and body with irregular white spots; white blotch on upper operculum. Attains 55 cm TL (~2.7 kg).



*Epinephelus longispinis*, 31 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Kenya to South Africa (KwaZulu-Natal, rarely to Transkei region), Madagascar, Comoros, Aldabra, Seychelles, Réunion, Mauritius, Nazareth Bank, Chagos, Maldives, Lakshadweep, India and Sri Lanka; elsewhere to east coast of India and eastern Banda Sea.

**REMARKS** Usually on coral reefs and rocky areas, also in estuaries and occasionally on sandy bottom, from 1–70 m. Juveniles occur inshore in areas with seaweed or coral



debris. Feeds mainly on crustaceans, especially crabs and stomatopods, rarely on fishes and squid. Rare at most localities; no specimens reported from surveys off Mozambique and South Africa since 1993, but juveniles and subadults have been photographed by divers at Pomene (southern Mozambique), Sodwana Bay, Cape Vidal and Park Rynie (South Africa).

### *Epinephelus macrospilos* (Bleeker 1855)

Snubnose grouper

PLATES 12 & 19

*Serranus macrospilos* Bleeker 1855: 499 (Batjan, Moluccas, Indonesia).

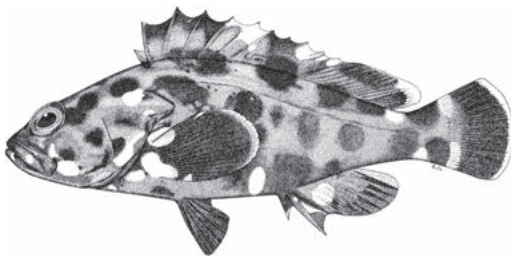
*Serranus cylindricus* Günther 1859: 151 (Madagascar).

*Epinephelus faveatus* (non Valenciennes 1828): SFSA No. 440\*; SSF No. 166.40\*.

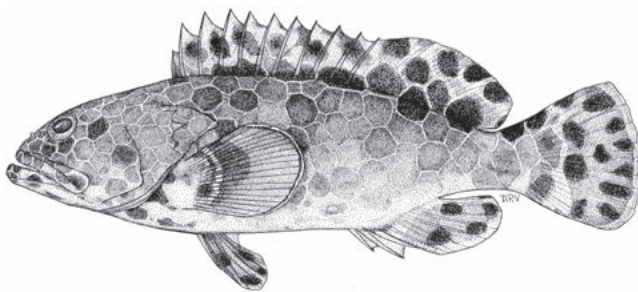
*Epinephelus macrospilos*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Craig *et al.* 2011\*.

Body depth 3–3.6 (fish 10–43 cm SL), HL 2.3–2.6 in SL. Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 17–20 rays; caudal fin rounded. GR 7–9/14–17. LL scales 48–52; LSS 86–103.

Head and body with polygonal to round, close-set, differently sized brown spots (some spots on juveniles subequal to eye size), narrow interspaces form a pale network; underside of lower jaw usually with dark spots; median fins yellowish with dark spots like those on body; margins of soft-rayed dorsal, anal and caudal fins pale. Small juveniles (5–7 cm SL) with fewer large spots on head and body than adults; caudal fin with distal two-thirds black. Attains at least 52 cm TL (~2 kg).



*Epinephelus macrospilos*, 6 cm SL, juvenile (Taiwan).  
Source: Randall & Heemstra 1991



*Epinephelus macrospilos*, 19 cm SL (Mauritius). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Hibberdene, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes and Chagos; elsewhere to Cocos (Keeling) Is., Indonesia, Japan, Taiwan, Australia and most western Pacific islands; not known from Red Sea, Persian/Arabian Gulf and Hawaii.

**REMARKS** Found on outer slopes of coral and rocky reefs and in surge zones, to at least 44 m. Feeds on crustaceans (mainly crabs), fishes, octopuses and squid. A fairly shy species, important in some artisanal fisheries.

### *Epinephelus magniscuttis*

Postel, Fourmanoir & Guézé 1963

Speckled grouper

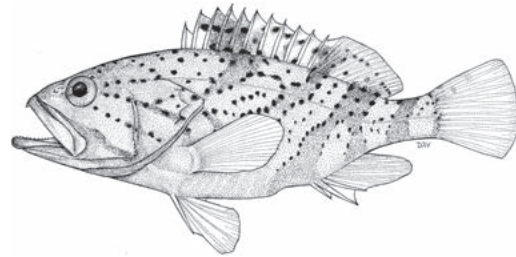
PLATE 19

*Epinephelus magniscuttis* Postel, Fourmanoir & Guézé 1963: 365, Fig. 9 (Réunion, Mascarenes); Heemstra & Randall 1986\*, 1993\*; Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

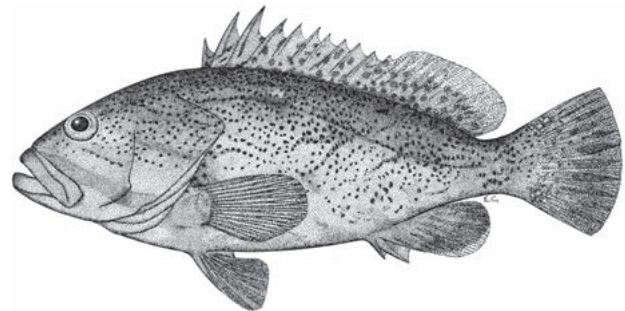
*Epinephelus pseudomorrhua* Postel, Fourmanoir & Guézé 1963: 366, Fig. 10 (Réunion, Mascarenes).

Body depth 2.7–3.2 in SL (fish 13–42 cm SL); HL 2.2–2.4 in SL. Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 8 or 9/16 or 17. LL scales 55–62; LSS 103–122.

Head, body and fins pale brown, with scattered small dark spots (but no spots on body below pectoral fins or on anal fin and paired fins); juveniles with 4 oblique darker bars on body, fading with age. Attains 150 cm TL (~50 kg).



*Epinephelus magniscuttis*, 13 cm SL juvenile (Mauritius). Source: SSF



*Epinephelus magniscuttis*, 42 cm SL (South Africa).  
Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: southern Mozambique (Bazaruto) to South Africa (Sodwana Bay), Madagascar, Réunion and Mauritius; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Philippines, New Guinea, New Caledonia, Fiji and Tonga.

**REMARKS** Found near coral reefs, in 50–300 m. Excellent food fish, fairly common in fisheries at Réunion and Mozambique.

*Epinephelus malabaricus* (Bloch & Schneider 1801)

Malabar grouper PLATE 20

*Holocentrus malabaricus* Bloch & Schneider 1801: 319, Pl. 63 (Tharangambadi, India).

*Holocentrus salmoides* Lacepède 1802: 389 ('Grand Océan' [probably Mauritius, Mascarenes]); figured in Lacepède 1801: Pl. 34.

*Serranus semipunctatus* Valenciennes in Cuv. & Val. 1828: 341 (Puducherry, India).

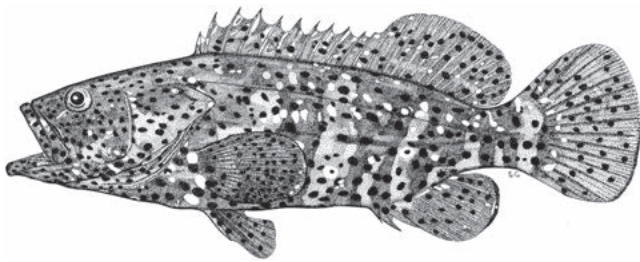
*Serranus salmonoides* Valenciennes in Cuv. & Val. 1828: 343 [emendation and redescription of *Holocentrus salmoides* Lacepède].

*Epinephelus tauvina* (non Fabricius 1775): Morgans 1966, 1982.

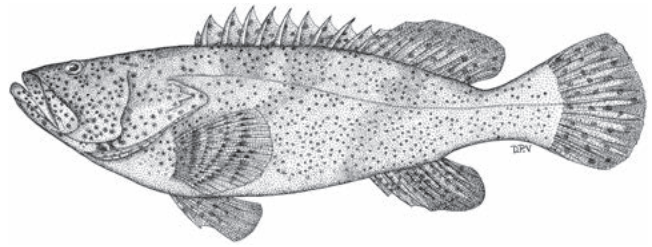
*Epinephelus malabaricus*: Van der Elst 1981\*; Heemstra & Randall 1986\*, 1993\*; Heemstra 1991\*; Randall & Heemstra 1991\*; Lau & Li 2000; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 3–3.7 in SL (fish 15–69 cm SL); HL 2.3–2.6 in SL. Dorsal fin 14–16 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin rounded. GR 8–11/14–18 (rudiments difficult to distinguish from small bony platelets on outer face of 1st gill arch). LL scales 54–64; LSS 101–117.

Head and body brownish, covered with small dark spots extending onto chest, lower jaw, gular area and roof of mouth; scattered white spots and blotches over head and body; 5 irregular oblique, dark brown bars (more or less interrupted by pale spots) often visible on body; fins with scattered small black spots. Preserved specimens retain dark spots. Attains 150 cm TL (~38 kg).



*Epinephelus malabaricus*, 25 cm SL (Taiwan). Source: Craig *et al.* 2011



*Epinephelus malabaricus*, 50 cm TL, adult. Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Transkei region, Eastern Cape), Madagascar, Comoros, Seychelles, Réunion, Mauritius, India and Sri Lanka; not known from Persian/Arabian Gulf (where the closely related *E. coioides* is common); elsewhere to Taiwan, Japan, Palau, Yap Is., Australia and Fiji.

**REMARKS** Common on coral and rocky reefs and sandy/mud bottom, from shore to 150 m; juveniles in tidepools, estuaries and mangroves. A protogynous hermaphrodite, females change sex at ~114 cm TL. Feeds on fishes and crustaceans, occasionally on octopuses. One of the most important groupers of Indo-Pacific fisheries and widely used for aquaculture. IUCN Red List conservation status Near Threatened due to fishing pressure.

*Epinephelus marginatus* (Lowe 1834)

Yellowbelly grouper PLATE 20

*Serranus marginatus* Lowe 1834: 142 (off Madeira).

*Serranus fimbriatus* Lowe 1836: 195, Pl. 1, Fig. 1 [unnecessary replacement name for *S. marginatus* Lowe].

*Epinephelus gigas* (non Brünnich 1768): Jordan & Swain 1885; Jordan & Eigenmann 1890; Boulenger 1895 [in part]; Barnard 1927.

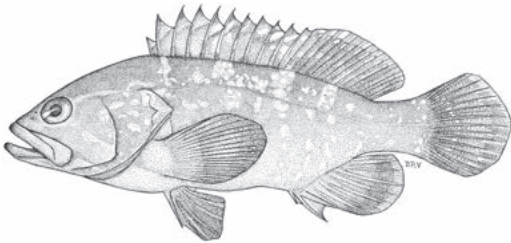
*Epinephelus guaza* (non Linnaeus 1758): Jordan & Evermann 1896; SFSA No. 435\*; Rivas 1964; Smith 1971; Van der Elst 1981\*; Heemstra & Randall 1984\*, 1986\*.

*Epinephelus marginatus*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall 1995\*; Heemstra & Heemstra 2004\*; Craig *et al.* 2011\*.

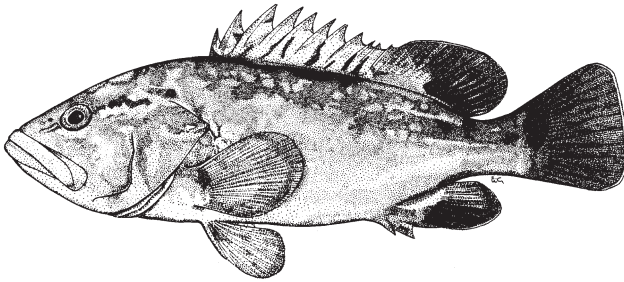
Body depth 2–3.1 in SL (fish 15–62 cm SL); HL 2.3–2.5 in SL. Dorsal fin 14–16 rays; anal fin 8 (rarely 9) rays; pectoral fins 17–19 rays; caudal fin rounded (juveniles) to truncate with rounded corners (large adults). GR 7–10/14–16. LL scales 62–73; LSS 98–116.

Head and body dark brown or grey dorsally, usually yellowish ventrally; irregular white, pale greenish yellow or silvery grey blotches on body and head in almost vertical series; black maxillary streak more or less distinct; median

fins dark brown, margins of median fins and often pectoral fins narrowly white; spinous dorsal-fin margin and basal part of paired fins often yellow; pectoral fins dark brown or grey; pelvic fins blackish distally. Attains 143 cm TL (southern African fish ~24 years).



*Epinephelus marginatus*, 8 cm SL, juvenile (South Africa). Source: SSF



*Epinephelus marginatus*, 45 cm SL (South Africa).  
Source: Heemstra & Randall 1993

**DISTRIBUTION** Widespread in eastern and western Atlantic Ocean (Brazil to Argentina), Indian Ocean and Mediterranean Sea. WIO: Oman, Mozambique to South Africa (Knysna, Western Cape), Madagascar and India.

**REMARKS** Found on rocky bottom, from tidepools to 300 m. Females mature at 44–53 cm TL (6–8 years) and change sex at 80–87 cm (15–17 years). Spawns in spring and summer off KwaZulu-Natal, South Africa; grows slowly. Feeds on fishes, crabs and octopuses. IUCN Red List conservation status Endangered.

### *Epinephelus melanostigma* Schultz 1953

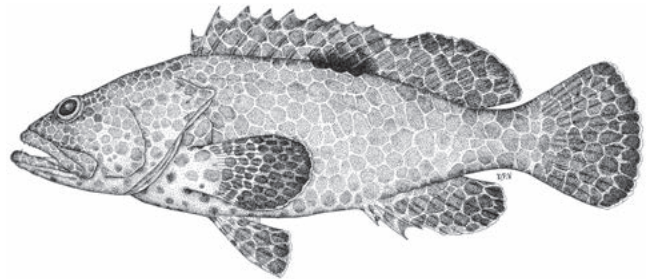
One-blotch grouper

PLATES 13 & 20

*Epinephelus melanostigma* Schultz in Schultz *et al.* 1953: 348, Fig. 54 (reef off Swains I., American Samoa); Heemstra & Randall 1986\*, 1993\*; Randall & Heemstra 1991\*; Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*.

Body depth 3–3.4, HL 2.2–2.4 in SL (fish 19–27 cm SL). Dorsal fin 14–16 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 7–10/16–19. LL scales 56–68; LSS 83–99.

Head, body and fins pale, covered with close-set dark brown spots; spots on ventral head and body more spaced and reddish brown; spots on head gradually smaller anteriorly; black blotch on body at base of last 4 dorsal-fin spines extends onto mid-fin; median and pelvic fins with narrow white margin. Attains 35 cm TL.



*Epinephelus melanostigma*, 20 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, South Africa (KwaZulu-Natal), Comoros, Madagascar, Réunion, Mauritius and Chagos; elsewhere to Taiwan, Australia, Samoa and Line Is.

**REMARKS** Found on coral reefs (sometimes silty areas), outer-reef flats and lagoons, from 1–30 m. Not fished commercially.

### *Epinephelus merra* Bloch 1793

Honeycomb grouper

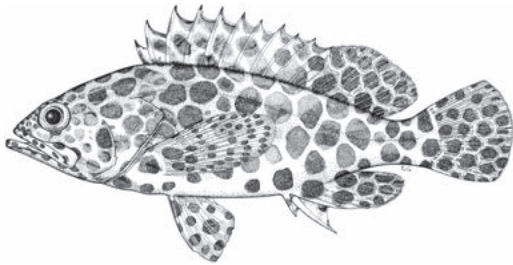
PLATES 13 & 20

*Epinephelus merra* Bloch 1793: 17, Pl. 329 ('Japan Sea' [probably Indian Ocean]; Ostindien [Indonesia]); Randall 1955; Randall & Brock 1960; SFSA No. 439\*; Harmelin-Vivien & Bouchon 1976; Morgans 1982\*; Heemstra & Randall 1984\*, 1993\*; SSF No. 166.50\*; Myers 1989; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Kuitert 1998\*; McKenna & Allen 2003; Fricke *et al.* 2009; Craig *et al.* 2011\*.

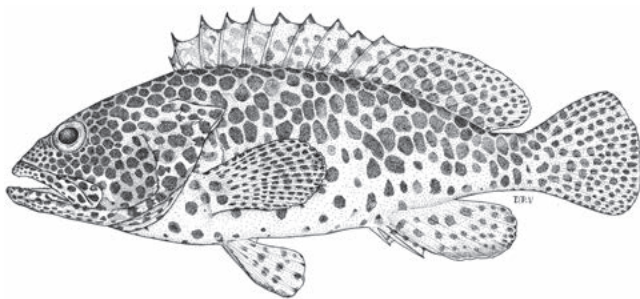
Body depth 2.8–3.3, HL 2.3–2.6 in SL (fish 10–22 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 6–9/14–17. LL scales 48–54; LSS 98–114.

Head, body and fins pale, covered with close-set dark brown or reddish brown spots, the interspaces forming an irregular pale reticulum; spots on ventral part of body paler, more spaced and with diffuse edges; some midlateral spots often joined forming horizontal bands; 5 irregular dark bars can be displayed by darkening of some body spots, but black dorsal blotches never present; dark spots on median fins become smaller towards margin; pectoral fins covered with distinct small black spots largely confined to rays (the best diagnostic

colour character for the species); tips of interspinous dorsal-fin membranes white or pale yellow, each with small submarginal black spot. Attains 26 cm SL, ~32 cm TL.



*Epinephelus merra*, 6 cm SL, juvenile (Chagos). Source: Heemstra & Randall 1993



*Epinephelus merra*, 17 cm SL, adult (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (KwaZulu-Natal; juveniles to Eastern Cape), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep; elsewhere to Indonesia, Japan, Australia, Pitcairn Is. and Tuamotu Is.; not known from Red Sea, Persian/Arabian Gulf and coasts of Asian mainland.

**REMARKS** Common insular species, except along East African coast (where it is not common); occurs in shallow water on coral reefs, patch reefs, and silty areas of lagoons and bays, from 20–50 m (usually in <20 m). Juveniles found in *Acropora* staghorn corals. Like most groupers, this species spends its entire life in one small area. Feeds on crustaceans and fishes but piscivory increases with age. An important artisanal fisheries species because of its abundance in shallow water.

## *Epinephelus miliaris* (Valenciennes 1830)

Netfin grouper

PLATES 13 & 20

*Serranus miliaris* Valenciennes in Cuv. & Val. 1830: 520 (Vanikoro I., Santa Cruz Is.).

*Epinephelus* sp.: Fourmanoir 1954.

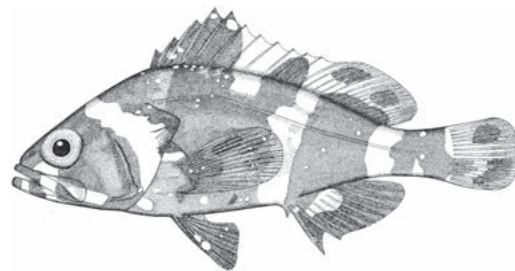
*Epinephelus fuscus* Fourmanoir 1961: 92 (Comoros); Fourmanoir 1963: 140, Fig. (west coast of Madagascar) [a second 'original' description].

*Epinephelus dictiophorus*: Morgans 1982\*.

*Epinephelus miliaris*: Heemstra & Randall 1984\*, 1993\*; SSF No. 166.52\*; Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

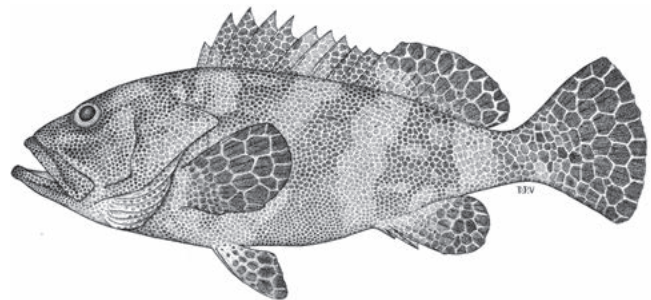
Body depth 2.8–3.2, HL 2.4–2.6 in SL (fish 15–43 cm SL). Dorsal fin 16 or 17 rays; anal fin 8 rays; pectoral fins 17 or 18 rays; caudal fin rounded. GR 8 or 9/14–16. LL scales 48–52; LSS 92–108.

Head and body pale, covered with small close-set, polygonal, dark brown, reddish or yellowish brown spots, the ground colour forming an irregular small-mesh pale network; some spots on body and dorsal fin darker than others, forming 4 or 5 broad, oblique, dark bars (1 on nape, 3 extending into dorsal fin, and 1 at caudal-fin base); fins similarly patterned but with much larger and darker spots. Juveniles with pale head, body and fins, and large irregular black spots and blotches. Attains 43 cm SL, 53 cm TL.



*Epinephelus miliaris*, 3 cm SL, juvenile (Tanzania).

Source: Heemstra & Randall 1993



*Epinephelus miliaris*, ~30 cm SL, adult (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (insular, rare throughout its range). WIO: Tanzania (Pemba I. and Zanzibar), Mozambique, Madagascar, Comoros, Aldabra, Seychelles, Mauritius, Chagos and Maldives; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Japan, Australia, Santa Cruz Is., Gilbert Is. and Cook Is.

**REMARKS** Juveniles (8–21 cm SL) on mud bottom, seagrass beds, mangroves and shallow coral reefs, from 1–16 m; adults on coral reefs, from 18–180 m. Feeds on crabs, stomatopods and gastropods.

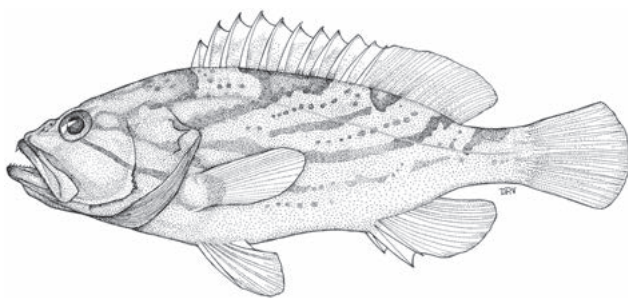
*Epinephelus morrhua* (Valenciennes 1833)

Contour grouper, comet grouper PLATES 13 &amp; 20

*Serranus morrhua* Valenciennes in Cuv. & Val. 1833: 434  
(Mauritius, Mascarenes).*Epinephelus morrhua*: SFSA No. 438\* [not fig. of larger specimen which is *E. poecilnotus*]; Postel *et al.* 1963; Randall & Ben-Tuvia 1983\*; Heemstra & Randall 1984\*, 1993\*; Randall & Klauswitz 1986; SSF No. 166.53\*; Winterbottom *et al.* 1989; Randall & Heemstra 1991\*; Craig *et al.* 2011\*; Psomadakis *et al.* 2015.

Body depth distinctly less than HL, and 2.8–3.1 in SL; HL 2.3–2.5 in SL (fish 13–61 cm SL). Dorsal fin 3rd or 4th spine longest, 14 or 15 rays; anal fin 7 or 8 rays; pectoral fins 17–18 rays; caudal fin convex to moderately rounded. GR 8–10/15–18, longest raker shorter than longest gill filaments. LL scales 55–64; LSS 108–125.

Head and body buff with dark brown bands (in juveniles, the bands begin as series of dark blotches): bifurcate band from rear edge of eye, with upper branch extending to dark brown saddle blotch on nape just in front of dorsal fin, and lower branch running to lower opercle spine and onto body as midlateral band that bifurcates above pectoral fin, upper branch running to dark blotch at base of 3rd–7th dorsal-fin rays, and lower branch curving up to base of last 4 dorsal-fin rays; another dark band from upper edge of opercle to base of dorsal-fin spines 5–9; narrow band from lower edge of eye to pectoral-fin base, continued as broken band along lower body and curving up to dorsal part of peduncle; broad band from maxillary groove to rear end of interopercle; small dark brown spots often in pale areas between bands, usually in series parallel to bands; pectoral fins hyaline yellow, other fins generally unmarked. Attains at least 61 cm SL, reported to 100 cm TL (~5 kg).

*Epinephelus morrhua*, 9 cm SL (Kenya). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman to Pakistan, Red Sea, Kenya to South Africa (northern KwaZulu-Natal), Madagascar, Comoros, Aldabra, Maldives, Mascarenes, Chagos and Sri Lanka; elsewhere to Andaman Sea, Japan, Australia, Gilbert Is. and Cook Is.

**REMARKS** Deep-water species on continental shelves, sea mounts and island slopes, from 80–370 m. Feeds on fishes and large invertebrates. Reported to cause ciguatera at Mauritius (Postel *et al.* 1963).

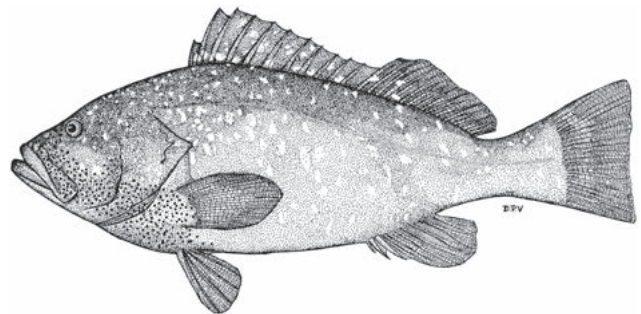
*Epinephelus multinotatus* (Peters 1876)

White-blotched grouper PLATES 13 &amp; 21

*Serranus multinotatus* Peters 1876: 435 (Mauritius, Mascarenes).*Epinephelus* sp.: Fourmanoir 1954\*.*Epinephelus leprosus* Smith 1955: 310, Pl. 1, Fig. A (Aldabra, Seychelles).*Epinephelus multinotatus*: Heemstra & Randall 1986\*, 1993\* [in part]; Randall & Heemstra 1991\* [in part]; Craig *et al.* 2011\* [in part].

Body depth 2.6–2.9, HL 2.4–2.7 in SL (fish 11–63 cm SL). Dorsal fin 15–17 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin truncate to slightly emarginate. GR 9–11/15–17. LL scales 62–77; LSS 130–151.

Head and body dark purplish grey, with scattered whitish variable blotches (faint or absent on preserved fish), and many small dark red-brown spots on lower part of head and body; pelvic fins greyish black; median fins with narrow white margins; anal, caudal and pectoral fins with spots basally. Attains 100 cm TL (~9 kg).

*Epinephelus multinotatus*, 52 cm SL (S Mozambique). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Kenya to South Africa (Eastern Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, St Brandon Shoals, Chagos and Maldives; elsewhere possibly to Western Australia.

**REMARKS** Females mature at 50 cm SL (~3.6 kg), possibly smaller. Juveniles found on inshore coral reefs, and adults in deeper water, to 100 m. Feeds on small fishes and crabs. Specimens from Western Australia lack brown spots, differ in scale counts (LL scales 71–81; LSS 137–162) and may prove to be a different species.

## *Epinephelus ongus* (Bloch 1790)

Whitestreaked grouper

PLATE 13

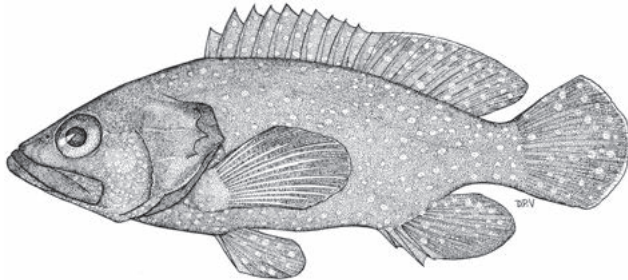
*Holocentrus ongus* Bloch 1790: 69, Pl. 234 (Japan [erroneous: Java, Indonesia]).

*Serranus tumilabrus* Valenciennes in Cuv. & Val. 1828: 346 (Seychelles).

*Epinephelus ongus*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall & Anderson 1993; Kuitert 1998\*; Craig 2007; Craig *et al.* 2011\*.

Body depth 2.7–3.2, HL 2.3–2.5 in SL. Dorsal fin 14–16 rays; anal fin 8 rays; pectoral fins 15–17 rays, fins large and fleshy; caudal fin rounded. GR 8–10/15–18 (including 6–8 rudiments on each limb). LL scales 48–53; LSS 95–109.

Head and body brown; head with many small white spots dorsally behind eyes; black maxillary streak usually hidden by maxilla; body with white spots becoming horizontally elongate in fish >10 cm SL, and wavy white lines in adults; several round or irregular pale blotches (eye-sized or larger) usually overlaying spots; median fins with white spots and streaks, blackish distally with white margin; paired fins grey-brown. Juveniles (~6 cm SL) brown, covered with dark-edged white spots, elongate on front of dorsal fin; white spots on paired fins, becoming fewer and fainter with growth, disappearing in adults. Attains 25 cm SL, 31 cm TL (20 years).



*Epinephelus ongus*, 11 cm SL (Kenya). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to Mozambique, Madagascar, Comoros, Seychelles and Maldives; elsewhere to Indonesia, Japan, Marshall Is., Australia, New Caledonia and Fiji.

**REMARKS** Found on inner coastal reefs and lagoon reefs, in caves and on rocky ledges, from 5–61 m; juveniles cryptic among corals.

## *Epinephelus poecilonotus*

(Temminck & Schlegel 1843)

Dot-dash grouper

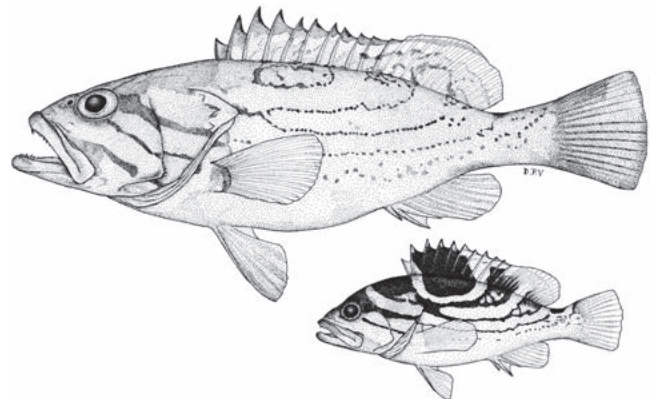
PLATE 13

*Serranus poecilonotus* Temminck & Schlegel 1843: 6, Pl. 4a, Fig. 1 (Nagasaki, Japan).

*Epinephelus poecilonotus*: SSF No. 166.56\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall & Anderson 1993; Craig *et al.* 2011\*.

Body depth 2.6–3.1, HL 2.3–2.5 in SL (fish 11–52 cm SL). Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin convex. GR 8–10/15–18. LL scales 54–63; LSS 110–121.

Small juveniles (5–12 cm SL) with pale yellow-grey body, with brown-black oval on body at base of dorsal-fin spines 3–9 (and extending upwards to fin margin), bordered below by pale band, and successive parallel curving dark and pale bands: dark brown band from nape bifurcating behind operculum, upper branch curving dorsally and expanding basally between 9th dorsal-fin spine and 4th soft ray, and lower branch curving dorsally and expanding at base of last 4 dorsal-fin rays; 2nd lower band curved parallel to one above, from interorbital and rear of eye to black peduncle saddle; 3rd band a narrow dark brown stripe from lower edge of eye to subopercle, continuing as series of dark dots along lower body to caudal-fin base; fins tinged yellowish (except for dark areas of dorsal fin). Larger juveniles (15–25 cm SL) with black oval on body at base of dorsal-fin spines; dark brown bands on body breaking into series of black spots; faint dark band extending from dark maxillary streak to corner of preopercle. Small adults (40–50 cm SL) with most dark spots on body and dark bands on head faint (or absent); fins yellow-brown; triangular interspinous dorsal-fin tips yellow-brown or abruptly orange-brown; median fins dusky distally, with narrow bluish white margins. Attains at least 65 cm TL (~4 kg).



*Epinephelus poecilonotus*, 29 cm SL, adult (Kenya); 11 cm SL, juvenile (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to South Africa (Eastern Cape), Madagascar, Comoros, Seychelles, Mauritius, Chagos, Maldives, India and Sri Lanka; elsewhere to Korea, Japan and Fiji.

**REMARKS** Matures at 35 cm SL, 41.5 cm TL. Rare; found on deep-water reefs, in 45–375 m. Feeds on fishes and crustaceans.

### *Epinephelus polylepis* Randall & Heemstra 1991

Smallscale grouper PLATES 13 & 21

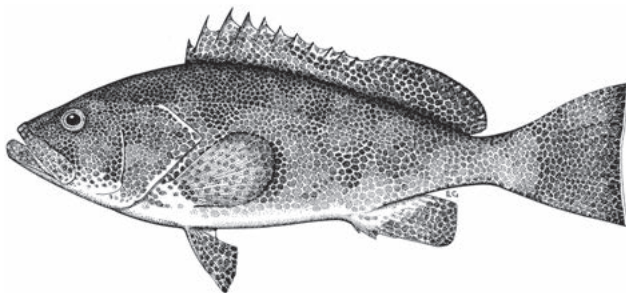
*Epinephelus chlorostigma* (non Valenciennes 1828): Boulenger 1895 [in part]; Blegvad & Løppenthin 1944; Kotthaus 1970; Randall *et al.* 1978\*; Sivasubramaniam & Ibrahim 1982\*; Al-Baharna 1986\*; Kuronuma & Abe 1986\*.

*Epinephelus* sp.: Randall 1987\*.

*Epinephelus polylepis* Randall & Heemstra 1991: 226, Pl. 19c, Figs. 118–119 (off Bahrain, Persian/Arabian Gulf); Craig *et al.* 2011\*; Psomadakis *et al.* 2015.

Body depth 2.6–3.3, HL 2.5–2.8 in SL (fish 14–45 cm SL). Dorsal fin 16 or 17 rays; anal fin 8 rays, fin margin rounded or bluntly angular; pectoral fins 18 or 19 rays; caudal fin truncate or slightly emarginate. GR 9 or 10/17 or 18. LL scales 65–72; LSS 126–137.

Head, body and fins pale with many close-set dark brown spots (except on underside of head and body); spots on fins, top of head and body smaller and closer-set than those on sides and ventrally; dark maxillary streak usually hidden by maxilla; soft-rayed dorsal fin and anal fin with pale blue-grey margins; caudal-fin margin with white line and row of dark spots. Attains 75 cm TL (2+ kg).



*Epinephelus polylepis*, 38 cm SL, paratype (SW India).

Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Gulf of Aden to Gulf of Oman, Persian/Arabian Gulf, and to India (probably more widely distributed).

**REMARKS** Trawled from 10–155 m on rocky areas near soft bottom. Under pressure from fishing in the Arabian Sea, off Oman. IUCN Red List conservation status Near Threatened.

### *Epinephelus polyphkadion* (Bleeker 1849)

Camouflage grouper PLATES 13 & 21

*Serranus polyphkadion* Bleeker 1849: 39 (Jakarta, Java, Indonesia).

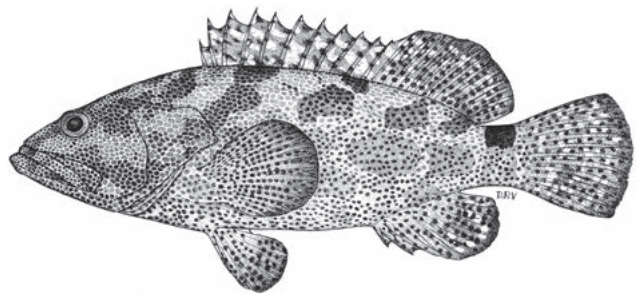
*Serranus dispar* var. B Playfair in Playfair & Günther 1867: 6, Pl. 1, Fig. 3 (Zanzibar, Tanzania).

*Epinephelus microdon* (non Bleeker 1856): Winterbottom *et al.* 1989.

*Epinephelus polyphkadion*: Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Craig *et al.* 2011\*.

Body depth 2.7–3.1, HL 2.3–2.5 in SL (fish 11–41 cm SL). Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 16–18 rays; caudal fin rounded. GR 8–10/15–17. LL scales 47–52; LSS 95–113.

Head, body and fins pale brown covered with dark spots; head and body with irregular dark blotches (more distinct on live fish) superimposed over dark spots; prominent black saddle on peduncle; dark spots over entire head, including lower jaw, lips, branchiostegal membranes, gular area and inside of mouth; many small white spots on fins (more distinct on live fish) and some on head and body. Juveniles with pair of blackish spots on each side of snout, and black spot at margin of 2nd and 3rd interspinous dorsal-fin membranes. Attains at least 61 cm SL, 75 cm TL (~4 kg).



*Epinephelus polyphkadion*, 37 cm SL (Mozambique Channel).

Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea (including Gulf of Aqaba), Gulf of Aden, Tanzania (Zanzibar) to Mozambique, Madagascar, Seychelles, St Brandon Shoals, Chagos, Maldives and India; elsewhere to Indonesia, Japan, Australia, Rapa Iti and Marquesas Is.

**REMARKS** Found in clear water on coral reefs (in lagoons or on outer reefs), or in small caves and crevices, from 2–46 m; most abundant at islands, especially atolls. Off Kenya, females mature at 38 cm SL and males at ~42 cm SL; spawning occurs in January and February. Feeds mainly on crustaceans and fishes, also some gastropods and cephalopods. Important in artisanal fisheries but occasionally implicated in cases of ciguatera. Not wary of divers, but apparently uncommon at localities with heavy spearfishing. IUCN Red List conservation status Near Threatened.

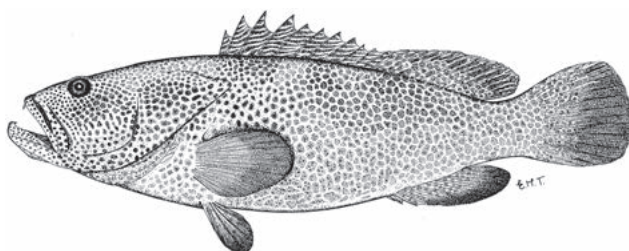
***Epinephelus posteli*** Fourmanoir & Crosnier 1964

Stripedfin grouper PLATES 14 & 21

*Epinephelus posteli* Fourmanoir & Crosnier 1964: 18, Pl. 14, Fig. C (near Fort Dauphin, Madagascar); SSF No. 166.57\*; Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

Body depth 3.1–3.5 in SL (based on 4 specimens 48–67 cm SL); HL 2.3–2.4 in SL. Dorsal fin 15 or 16 rays; anal fin 9 rays; pectoral fins 18 rays; caudal fin rounded. GR 7 or 8 (7 are rudiments)/10–15 (6–10 are rudiments). LL scales difficult to count, ~59–64; LSS difficult to count, ~98–108.

Head and body covered with small, irregular, close-set dark red or red-brown spots, pale interspaces forming an irregular network; live fish with 4 irregular, narrow, oblique pale bars running down and forward on body; all fins usually darker than body; dark spots on soft-rayed dorsal fin and caudal fin in rows parallel to rays; dorsal-fin interspinous membranes with horizontal to slightly oblique dark streaks; some dark spots on distal parts of soft-rayed dorsal fin and caudal fin may merge to form dark streaks along or in between the rays. Attains at least 67 cm SL, 90 cm TL (~11 kg).



*Epinephelus posteli*, 67 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: southern Mozambique to South Africa (Protea Banks, KwaZulu-Natal), and southwestern Madagascar.

**REMARKS** Rare; found on coral reefs, in 5–50 m.

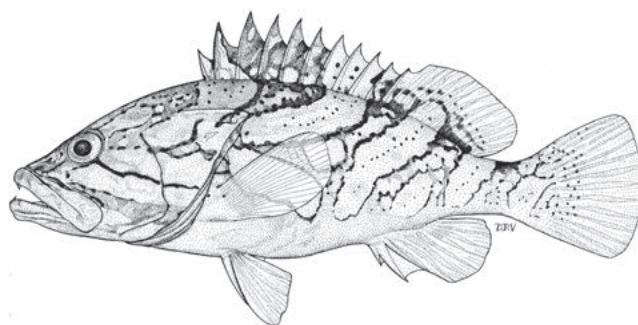
***Epinephelus radiatus*** (Day 1867)

Oblique-banded grouper PLATES 14 & 21

*Serranus radiatus* Day 1867: 699 (near Chennai, India).  
*Epinephelus radiatus*: SSF No. 166.58\*; Randall & Heemstra 1991\*;  
Craig *et al.* 2011\*; Psomadakis *et al.* 2015.

Body depth 2.6–3 in SL (fish 11–42 cm SL); HL 2.1–2.3 in SL. Dorsal fin 13–15 rays; anal fin 8 rays; pectoral fins 17 or 18 rays; caudal-fin margin convex to moderately rounded. GR 8 or 9/16–18. LL scales 52–66; LSS 102–120.

Juveniles (10–20 cm SL) dark brown, with black-edged paler (or white) bands enclosing many black spots. Small juveniles (4–7 cm SL) mostly dark green-brown, with dark-edged immaculate white markings (pale interspaces on larger specimens) and no spots; fins mostly hyaline white, except spinous dorsal fin coloured as body. Small adults (20–40 cm SL) buff, with 5 oblique dark-edged pale bands with dark spots mainly in series in middle of band (1st band from upper half of eye; 2nd band branching just behind eye, bifurcating on opercle and extending onto spinous dorsal fin; 3rd band or lower branch of 2nd band from end of opercle to last 2 dorsal-fin spines and first few rays; 4th band from rear of dorsal fin, bifurcating towards anal fin; 5th band on peduncle); dark bands also containing scattered black spots and pale blotches; dark line from eye to edge of subopercle; faint dark band along maxillary groove to edge of interopercle. Large adults (40–50 cm SL) with dark-edged bands replaced by series of dark spots (except for dark line running back from lower edge of eye, and no spots on lower third of body); dorsal fin and most of caudal fin also covered with dark spots. Attains 57 cm SL, 79 cm TL (7.3 kg).



*Epinephelus radiatus*, 28 cm SL (Japan). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman to India and Sri Lanka, Red Sea and Gulf of Aden, South Africa (KwaZulu-Natal), Comoros, Réunion, Mauritius and Chagos; elsewhere to southeast India, Sri Lanka, Japan, New Guinea and Australia.



**REMARKS** A rare, deepwater species. Adults found on deep reefs and hard substrate, in 80–383 m, and juveniles in 18–20 m.

### *Epinephelus retouti* Bleeker 1868

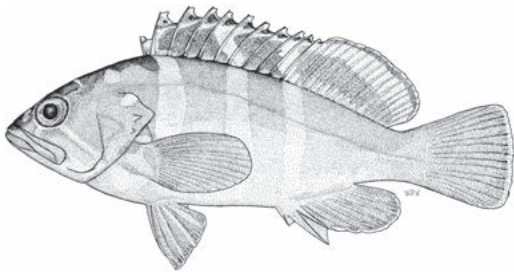
Red-tipped grouper

PLATES 14 & 21

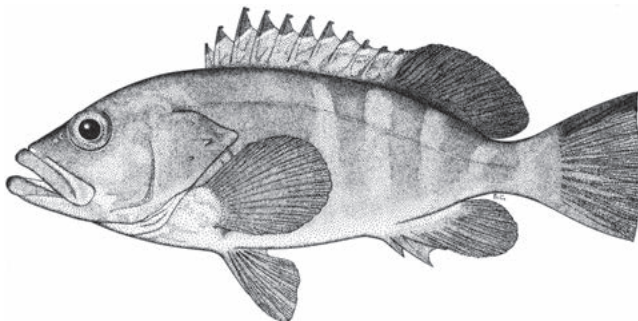
*Epinephelus retouti* Bleeker 1868: 339 (Réunion, Mascarenes);  
SSF No. 166.59\*; Winterbottom *et al.* 1989; Randall & Heemstra 1991\*;  
Heemstra & Randall 1993\*; Randall & Anderson 1993; Craig *et al.* 2011\*.  
*Epinephelus rubra* (non Bloch 1793): Baissac 1962 [*nomen nudum*].  
*Epinephelus mauritianus* Baissac 1962: 188 (Mauritius, Mascarenes).

Body depth 2.5–3.1, HL 2.4–2.6 in SL (fish 12–35 cm SL). Dorsal fin 16 or 17 rays; anal fin 8 rays; pectoral fins fleshy, with 19 or 20 rays; caudal fin truncate to slightly convex. GR 6–8/15–17. LL scales 64–76; LSS 120–141.

Adults dull yellow-orange to brown-red, each scale on dorsolateral body with dark green-grey spot; usually 5 faint dark bars on body, with 2nd and 3rd bars extending onto spinous dorsal fin where they darken; dorsal fin green-brown, rays darkest, triangular tips of interspinous membranes dark red, set off from rest of fin by orange-yellow stripe; dark red or brown line along dorsal-fin base; upper edge of caudal fin dark green-brown; eyes narrowly edged with dark red, except anteriorly (pale in preservative), and pale blue line adjacent to red rim of orbit completely surrounding eyes. Juveniles with first 3 bars on body black, 2nd and 3rd bars extending into dorsal fin; head black dorsally, and with 4 irregular transverse whitish bands. Attains 50 cm TL (~2 kg).



*Epinephelus retouti*, 10 cm SL, juvenile (Mauritius). Source: SSF



*Epinephelus retouti*, 29 cm SL (Taiwan). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Mozambique, South Africa (Sodwana Bay), Madagascar, Mascarenes, Chagos and Maldives; elsewhere to Taiwan, Japan, Marshall Is., New Caledonia, Line Is. and Tuamotu Is.

**REMARKS** Adults found on deep coral reefs and outer-reef slopes, in 70–220 m; juveniles in 18–40 m. Rare, mainly insular, of no commercial importance.

### *Epinephelus rivulatus* (Valenciennes 1830)

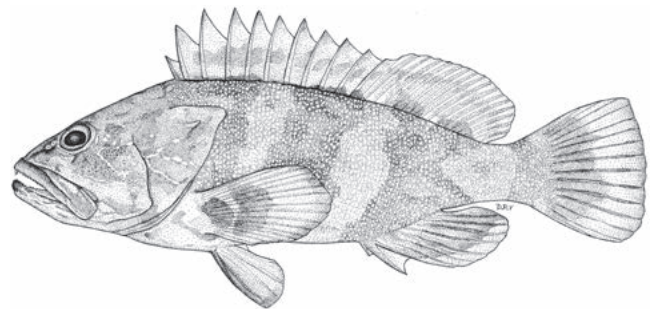
Halfmoon grouper

PLATE 14

*Serranus rivulatus* Valenciennes in Cuv. & Val. 1830: 515 (Réunion, Mascarenes).  
*Epinephelus grammatophorus* Boulenger 1903: 64, Pl. 3 (KwaZulu-Natal, South Africa).  
*Epinephelus rivulatus* SSF No. 166.60\*; Randall & Heemstra 1991\*;  
Heemstra & Heemstra 2004\*; Craig *et al.* 2011\*.

Body depth 2.7–3.2 (fish 12–35 mm SL), HL 2.3–2.6 in SL. Dorsal fin 16–18 rays; anal fin 8 rays; pectoral fins fleshy, with 17–19 rays; caudal fin rounded. GR 6–8/14–16. LL scales 48–53; LSS 86–98 scales.

Body red-brown to green-brown, with pale spot on each scale; 4 irregular dark bars usually on body and extending onto dorsal-fin base (3rd and 4th bars run from soft-rayed dorsal fin to anal fin and often join midlaterally), 5th dark bar on peduncle; 2 dark red or red-brown bands on chest and dark brown spot on front of isthmus; head dark, with irregular pale blotches and vermiculations, and 4 pale spots ventrally; fins green-yellow or grey-brown; dorsal fin with dark streak along base (may be restricted to spinous base), margin of interspinous membranes yellow to reddish next to spines, transparent posteriorly, with pale stripe below triangular tips of fin; pectoral fins dusky, with dark red or red-brown semicircular blotch at base of rays; some fish with white dots on operculum and on body. Attains ~50 cm TL (4 kg, ~13 years).



*Epinephelus rivulatus*, 22 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Yemen to South Africa (Knysna), Madagascar, Comoros, Réunion and Mauritius; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Japan, Australia and New Zealand.

**REMARKS** Occurs on coral and rocky reefs and seagrass beds, to ~150 m deep. Sedentary, solitary, and easily approached by divers; has been seen to face a diver and display its large pectoral fins so the red spot at the bases appear as eyespots of a larger fish.

### *Epinephelus spilotoceps* Schultz 1953

Foursaddle grouper

PLATES 14 & 21

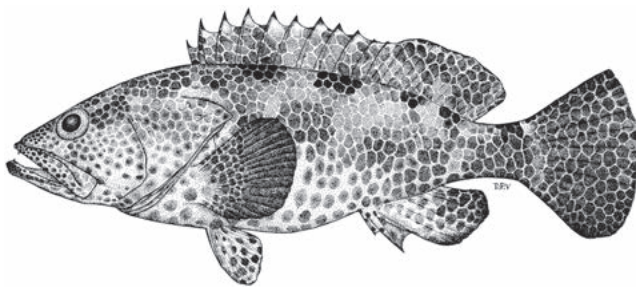
*Epinephelus spilotoceps* Schultz in Schultz *et al.* 1953: 357, Figs. 56–57 (lagoon reef at Bikini Atoll, Marshall Is.); Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Fricke *et al.* 2009; Craig *et al.* 2011\*.

*Epinephelus salonotus* Smith & Smith 1963: 15, Pl. 14, Fig. 1 (Cape Delgado, Mozambique).

*Epinephelus hexagonotus* (*non* Schneider 1801): Winterbottom *et al.* 1989\*.

Body depth 3.1–3.6, HL 2.2–2.6 in SL (fish 10–25 cm SL). Dorsal fin 14–16 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 6–9/16–18. LL scales 59–69; LSS 86–100.

Head, body and median fins pale, mostly covered with close-set dark brownish spots, those on dorsolateral parts of head and body and on median fins polygonal, spots more rounded and separated ventrally, pale interspaces form a white network; large brown-black saddle on body at base of last 4 dorsal-fin spines, extending onto fin base, and 2 similar but smaller dark blotches at bases of rays, and a 4th on rear end of peduncle; saddles appear uniformly dark (on juveniles) or as a group of extra dark body spots (on adults); spots on head progressively smaller and darker anteriorly; pectoral fins with close-set reddish brown spots, larger and more distinct towards fin base, distal area dull yellow-green; tips of dorsal-fin spines blackish with short white filament. Attains 35 cm TL.



*Epinephelus spilotoceps*, 35 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania (Zanzibar) to southern Mozambique, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Philippines, Marshall Is., Australia, Tonga and Line Is.

**REMARKS** Primarily a shallow-water insular species, on coral and rocky reefs, known to 30 m deep. Often seen towards dusk. Probably important in artisanal fisheries.

### *Epinephelus stoliczkae* (Day 1875)

Epulette grouper

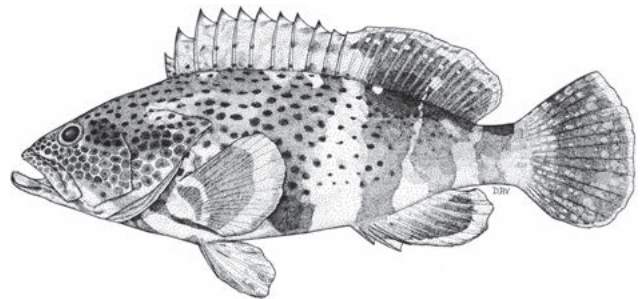
PLATES 14 & 21

*Serranus stoliczkae* Day 1875: 11, Pl. 1, Fig. 3 (coast of Sindh, Pakistan).

*Epinephelus stoliczkae*: Randall & Heemstra 1991\*; Craig *et al.* 2011\*.

Body depth 2.8–3.3, HL 2.3–2.6 in SL (fish 10–26 cm SL). Dorsal fin 16–18 rays; anal fin 8 rays; pectoral fins 17–19 rays; caudal fin rounded. GR 6–8/13–15. LL scales 48–53; LSS 93–106.

Head and body yellow-grey, with dark orange-red or red-brown spots, except ventrally and posteriorly; dark grey bar below posterior dorsal-fin spines, 2 dark bars below soft-rayed dorsal fin, and dark saddle on peduncle; pectoral fins brown-grey, distal third yellowish, bases pale with dark oval or semicircular blotch; chest pale with dark bands; spinous dorsal fin yellowish with row of dark red spots along base and 2 faint dark longitudinal bands; other fins dark yellowish grey-brown; median fins also with broad yellowish posterior margins. Attains at least 38 cm TL.



*Epinephelus stoliczkae*, 20 cm SL (Gulf of Oman).

Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Red Sea (including Gulf of Suez), Somalia, Gulf of Aden to Gulf of Oman and Pakistan; not known from Gulf of Aqaba and Persian/Arabian Gulf.

**REMARKS** Common on inshore sandy bottom near small coral heads and rocks, from 5–50 m; not known from well-developed coral reefs.

*Epinephelus summana* (Fabricius 1775)

Summan grouper

PLATES 14 &amp; 22

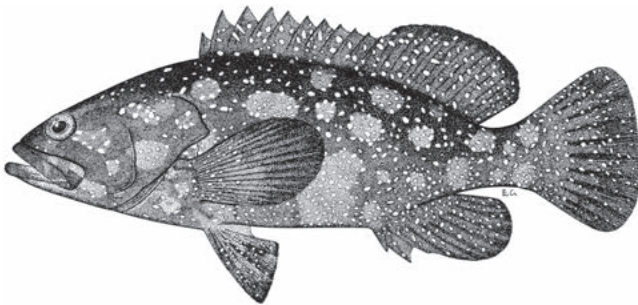
*Perca summana* Fabricius in Niebuhr (ex Forsskål) 1775: xi, 42 [Red Sea].  
*Serranus leucostigma* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1828: 346  
 (Massawa, Eritrea, Red Sea).

*Sebastes meleagris* Peters 1864: 392 (Massawa, Eritrea, Red Sea).

*Epinephelus summana*: Randall 1983\*; Randall & Ben-Tuvia  
 1983\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*;  
 Craig *et al.* 2011\*.

Body depth 2.7–3.1 (fish 15–43 cm SL), HL 2.2–2.6 in SL.  
 Dorsal fin 14–16 rays; anal fin 8 or 9 rays; pectoral fins  
 16–18 rays; caudal fin rounded. GR 8–10/14–17. LL scales  
 49–54; LSS 95–110.

Body dark olive-brown to brown-grey, and head and body  
 with large pale blotches (most larger than eye) covered by many  
 white spots; black maxillary streak present; fins covered with  
 white spots, but usually confined to bases on pectoral fins; dark  
 brown blotches sometimes at dorsal-fin base and on upper  
 part of peduncle. Juveniles dark grey, with large, variably sized,  
 dark-edged white spots on head, body and fins; small juveniles  
 (<4 cm SL) with irregular black bands across pectoral fins.  
 Attains 43 cm SL, 52 cm TL.



*Epinephelus summana*, 33 cm SL (Sudan). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden and Socotra.

**REMARKS** Not common; usually occurs on shallow coral  
 reefs in lagoons or in protected brackish waters, from 1–30 m.  
 Feeds on fishes and crustaceans. Caught with hook-and-line,  
 spear, and in gillnets and traps.

*Epinephelus tauvina* (Fabricius 1775)

Greasy grouper

PLATES 14 &amp; 22

*Perca tauvina* Fabricius in Niebuhr (ex Forsskål) 1775: 39 (Jeddah,  
 Saudi Arabia, Red Sea).

*Holocentrus pantherinus* Lacepède 1802: 345, 389 [Madagascar].

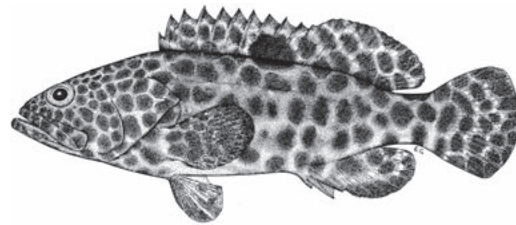
*Epinephelus chewa* Morgans 1966: 267, Pl. 9, Fig. D (Mafia I., Tanzania).

*Epinephelus salonotus* (non Smith & Smith 1963): Randall & Ben-Tuvia  
 1983\*.

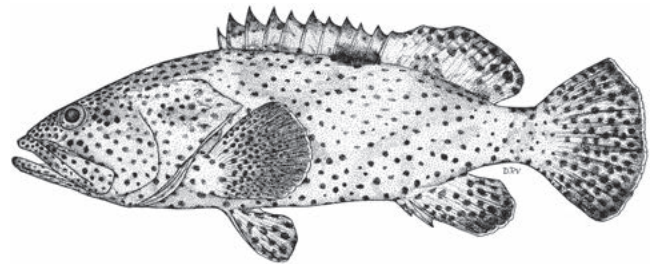
*Epinephelus tauvina*: Heemstra & Randall 1984\*; Winterbottom *et al.*  
 1989\*; Randall & Heemstra 1991\*; Kuitert 1998\*; Craig *et al.* 2011\*.

Body oblong, depth 3–3.6 in SL; head large, HL 2.1–2.4 in SL  
 (fish 10–61 cm SL). Dorsal fin 13–16 rays; anal fin 8 rays;  
 pectoral fins 18 or 19 rays; caudal fin rounded. GR 8–10/17–20.  
 LL scales 63–74; LSS 95–112.

Head and body pale green-grey or brown, with dark  
 orange-red to brown spots, the centres darkest; spots on head  
 progressively smaller anteriorly; large black blotch (or group  
 of black spots) often on body at base of last 4 dorsal-fin spines,  
 extending onto fin; 5 faint subvertical bars may be present  
 (bars may be represented by dusky blotches at dorsal-fin base  
 and as dark saddle on peduncle); fins covered with dark spots,  
 those on pectoral fins smaller and less distinct distally; margins  
 of anal, pectoral and caudal fins often white; juveniles with  
 close-set dark spots on soft-rayed dorsal, anal and caudal fins.  
 Attains 61 cm SL, 75 cm TL.



*Epinephelus tauvina*, 12 cm SL (South Africa). Source: Randall & Heemstra 1991



*Epinephelus tauvina*, 41 cm SL (Red Sea). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya  
 to South Africa (Eastern Cape), Madagascar, Comoros,  
 Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep;  
 elsewhere to Japan, Lord Howe I. and Pitcairn Is.

**REMARKS** More common at islands than along continental  
 shores. In clear water on coral and rocky reefs; juveniles in  
 tidepools and on reef flats, adults deeper, to 50 m. Feeds on fish  
 and some crabs.

## *Epinephelus tukula* Morgans 1959

Potato grouper, potato bass

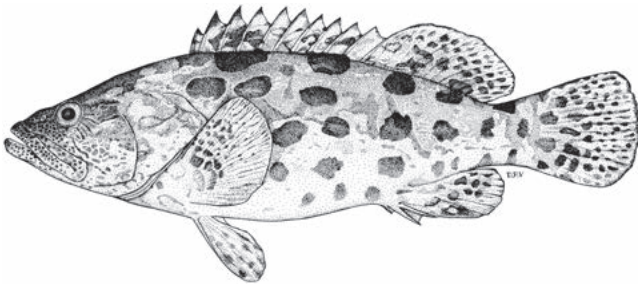
PLATES 14 & 22

*Epinephelus tukula* Morgans 1959: 651, Pls. 17, 19 (Mafia I., Tanzania); Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Heemstra & Heemstra 2004\*; Craig *et al.* 2011\*; Psoadakis *et al.* 2015.

*Serranus dispar* var. A Playfair in Playfair & Günther 1867: 7, Pl. 1, Fig. 2 (Seychelles).

Body oblong, robust, depth 2.9–3.5 in SL; HL 2.3–2.6 in SL (fish 12–41 cm SL). Dorsal fin 14 or 15 rays; anal fin 8 rays; pectoral fins 18–20 rays; caudal fin rounded. GR 8–10/15–18. LL scales 62–70; LSS 113–130.

Body pale brown-grey with widely spaced dark blotches, mostly larger than eye, from round to oval or dumbbell-shaped; head with smaller dark spots and streaks, many radiating from eyes; dark spots on fins, larger basally. Large adults may be nearly black. Attains at least 150 cm TL (~90 kg), reported to 200 cm TL.



*Epinephelus tukula*, 32 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Aden to South Africa (Aliwal Shoal), Comoros, Seychelles, Réunion, Mauritius, Oman to Pakistan, India and Sri Lanka; not known from Persian/Arabian Gulf; elsewhere to Japan, New Guinea and Australia.

**REMARKS** Females mature at 90 cm SL. Juveniles in tidepools and on reef flats; adults on coral reefs, sea mounts and in deep coral reef channels, from 10–400 m. A large, solitary, territorial fish; it is illegal to spearfish the species in South Africa.

## *Epinephelus undulosus* Quoy & Gaimard 1824

Wavylined grouper

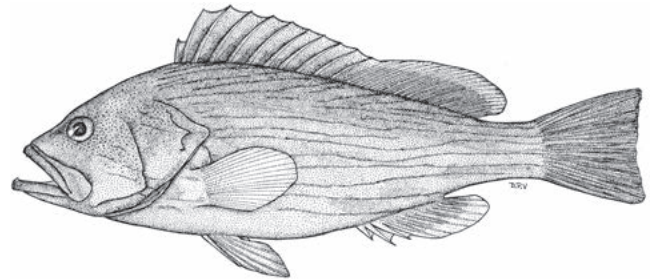
PLATES 14 & 22

*Epinephelus undulosus* Quoy & Gaimard 1824: 310 (Waigeo I. [Papua Province, Indonesia]; Rawak I. [Bismarck Archipelago, New Guinea]); Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Craig *et al.* 2011\*.

*Serranus lineatus* Valenciennes in Cuv. & Val. 1828: 312 (Puducherry, India).

Body depth 2.7–3.1, HL 2.5–2.7 in SL (fish 11–60 cm SL). Dorsal fin 17–19 rays; anal fin 8 rays; pectoral fins 18 or 19 rays; caudal fin truncate to emarginate. GR 12–16/20–23 (1 or 2 rudimentary rakers in juveniles, none in adults). LL scales 63–76; LSS 124–150.

Head, body and fins purplish to brown-grey, with brown to golden-brown dots on head, and wavy longitudinal lines and some dots of the same colour on upper body (lines faint or absent on large specimens); margin of interspinous dorsal fin narrowly blackish. Attains 120 cm TL.



*Epinephelus undulosus*, 30 cm SL (India). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Yemen, Gulf of Aden to Kenya, Maldives, Lakshadweep, India and Sri Lanka; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Philippines, Taiwan, New Guinea and Solomon Is.

**REMARKS** Females mature at ~46 cm SL, ~55 cm TL. Found on open muddy or silty-sand offshore banks (not on coral reefs), from 24–90 m; juveniles shallower (~5 m), near *Montipora* corals. Feeds on a variety of small fishes, small crustaceans (especially stomatopods), shrimp and pelagic tunicates. Important in some fisheries.

## GENUS *Gracila* Randall 1964

Diagnosis as for the single species.

## *Gracila albomarginata* (Fowler & Bean 1930)

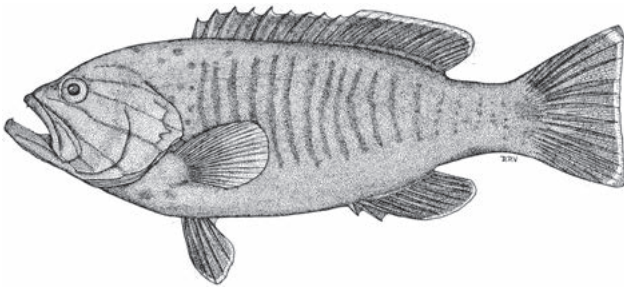
Masked grouper

PLATE 22

*Cephalopholis albomarginatus* Fowler & Bean 1930: 235, Fig. 11 (Danawan I., Borneo [Sabah, Malaysia]); Fourmanoir & Laboute 1976. *Gracila albomarginata*: Randall 1964; Smith-Vaniz *et al.* 1988; Winterbottom *et al.* 1989; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; Craig *et al.* 2011\*.

Body oblong, somewhat compressed, body depth 2.6–3.3 in SL; HL 2.9–3.2 in SL. Dorsal fin 9 spines, 14–16 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 18 or 19 rays; caudal fin truncate to slightly emarginate, with 15 branched rays. Rear part of maxilla in adults with hook-shaped expansion on ventral edge. GR 8–10/14–16. LL scales 66–76; LSS 101–114. Supraneurals 0/0/1/1+1/1/1/. Vertebrae 10 + 14.

Adults green-brown, red-brown or brown-grey, with several narrow, curved, dark bars midlaterally, and dark brown midlateral spot on peduncle; 3–5 blue lines (often broken into spots) across head; area under maxilla and along edge of gill opening often orange; soft-rayed dorsal fin and anal fin with narrow blue margin; upper and lower edges of caudal fin darker than rest of fin. A transient colour phase has a white peduncle with black spot, and large white area flanked by black on upper body. Juveniles brown or violet, with red-orange stripe on dorsal and anal fins and along upper and lower edges of peduncle and caudal fin. Attains at least 38 cm TL (50 cm TL reported).



*Gracila albomarginata*, 31 cm SL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania (Zanzibar), northern Mozambique, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Malaysia, Japan, Marshall Is., Australia, New Caledonia and French Polynesia.

**REMARKS** Mostly insular, on outer slopes of offshore coral or rocky reefs, in 15–120 m. Uncommon; usually solitary, but occasional sightings of 3 or 4 fish together. Primarily piscivorous; an active swimmer that roams the reef.

## GENUS *Hyporthodus* Gill 1861

Body depth subequal to HL, 2.2–2.7 in SL. Dorsal fin 11 spines, 14 or 15 rays; anal-fin 3 spines, 9 rays. The genus was resurrected by Craig & Hastings (2007), who included 15 species previously recognised in the genus *Epinephelus*: 9 species from the Pacific Ocean, 5 from the Atlantic Ocean, and 1 from the Indo-central Pacific.

## *Hyporthodus octofasciatus* (Griffin 1926)

Eightbar grouper

PLATES 13 & 23

*Epinephelus octofasciatus* Griffin 1926: 540, Pl. 95 (Arid I., Great Barrier I., New Zealand); Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Randall & Anderson 1993; Kalish *et al.* 2002.

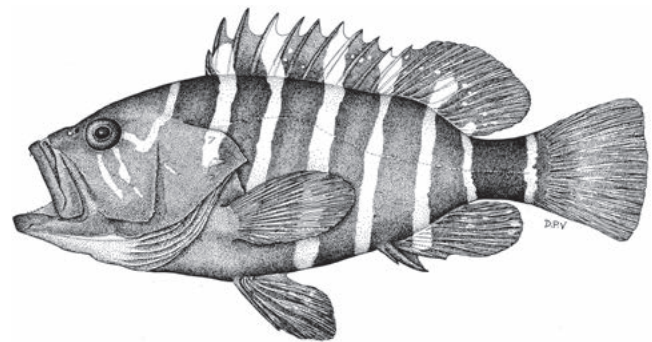
*Epinephelus compressus* Postel, Fourmanoir & Guézé 1963: 364, Fig. 8 (Réunion, Mascarenes).

*Epinephelus septemfasciatus* (non Thunberg 1793): SSF No. 166.61\*.

*Hyporthodus octofasciatus*: Craig *et al.* 2011\*; Psomadakis *et al.* 2015\*.

Body depth 2.2–2.7, HL 2.4–2.5 in SL (fish 10–47 cm SL). Dorsal fin 14 or 15 rays; anal fin 9 rays; pectoral fins 18 or 19 rays; caudal fin rounded. GR 7–9/15–17. LL scales 65–71; LSS 114–126.

Body dark brown, with 8 white to buff bars of similar width (1st on nape; 2nd–6th extending onto dorsal fin; 8th at caudal-fin base), bars faint and mottled on very large fish and not evident after death; blackish maxillary streak present; gill arches covered with minute melanophores; paired fins and distal half of soft-rayed dorsal and anal fins blackish brown; some specimens with narrow white margins on anterior two-thirds of soft-rayed dorsal fin, on anal fin, and at corners of caudal fin. Juveniles <10 cm TL with caudal fin yellowish, membranes becoming dusky with growth. Attains 100+ cm TL (~31.5 kg, 56 years).



*Hyporthodus octofasciatus*, 23 cm SL (South Africa).

Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Yemen to South Africa (Transkei region), Madagascar, Mauritius, Réunion, Chagos, Maldives, Pakistan to India and Sri Lanka; elsewhere to Japan, Australia, New Zealand and Marquesas Is.

**REMARKS** Probably occurs on rocky reefs; known from 80–300 m, but juveniles might be found at lesser depths.

GENUS *Plectropomus* Oken 1817

Body robust, depth subequal to HL; fin spines slender; dorsal fin 8 (rarely 7) spines, 10–12 rays, membranes of spinous portion distinctly incised; anal fin 3 spines, 8 rays, 3rd anal-fin spine longest (1st and 2nd spines closely applied to 3rd and may be covered by skin in large specimens); pectoral fins 14–18 rays, fins short; flap of skin joining base of upper rays to body poorly developed; pelvic fins short, 1.7–2.5 in HL; caudal fin truncate to emarginate. LL scales 83–115; LSS 107–153; scales weakly ctenoid to cycloid; auxiliary scales present; snout naked (except *P. areolatus* which may have embedded scales dorsally on snout); maxilla with narrow band or small patch of very small scales posteriorly. Gill rakers 7–10/13–17; developed gill rakers (higher than width of base) 0–3/2–10. Interorbital space flat except at edge of orbit where rounded; posterior part of maxilla evenly expanded (no step, hook or bony knob on ventral edge); pair of stout canine teeth at front of both jaws; sides of lower jaw with 1–4 (usually 2) enlarged canine teeth. Opercle with 3 flat spines, upper and lower spines covered by skin; upper edge of operculum convex; preopercle broadly rounded, ventral edge with 3 large downward-projecting spines (often hidden by skin); margins of subopercle and interopercle smooth; rear edge of first dorsal-fin pterygiophore slightly indented at tip of third neural spine. Vertebrae 10 + 14; 1 supraneural bone; epipleural ribs on vertebrae 1–8. Seven species, 5 in WIO.

KEY TO SPECIES

- 1a Body uniformly coloured or marbled brown (without blue spots or black saddles), juveniles with pale horizontally elongate spots or streaks; caudal fin slightly emarginate to truncate; pectoral fins 16–18 (usually 17) rays ..... *P. punctatus*
- 1b Body either with numerous small blue spots or with black saddle-like bars and few small blue spots; caudal fin emarginate except *P. areolatus* (which may be truncate); pectoral fins usually 16 rays (except *P. laevis*) ..... 2
- 2a Caudal fin truncate to slightly emarginate, caudal concavity contained 13 or more in HL; small embedded scales in interorbital space; head and body of adults with numerous relatively large round (rarely slightly oval) dark-edged blue spots, most of which are within a spot diameter of adjacent spots; blue spots present on underside of abdomen ..... *P. areolatus*
- 2b Caudal fin emarginate, caudal concavity 4.6–12 in HL; no embedded scales in interorbital space; blue spots on head and body either relatively smaller at a given length or most not within a spot diameter of adjacent spots; blue spots usually not present on underside of abdomen ..... 3

Continued ...

KEY TO SPECIES

- 3a Pectoral fins 16–18 rays; LL scales 92–115; caudal-fin length 1.5–1.8 in HL; pectoral-fin length 2.2–2.5 in HL, pelvic-fin length 2.1–2.5 in HL; head and body pale with 5 dark saddle-like or wedge-shaped bars dorsally (dark fishes with or without faint darker bars); head, body and fins with small round dark-edged blue spots, pale form sparsely spotted (pale juveniles occasionally without spots) ..... *P. laevis*
- 3b Pectoral fins 15 or 16 (usually 16) rays; LL scales 85–104; caudal-fin length 1.3–1.7 in HL; pectoral-fin length 2–2.4 in HL; pelvic-fin length 1.9–2.4 in HL; no dark saddle-like blotches on body; head (dorsally), body and fins with small dark-edged blue spots, some elongated (horizontally elongate on head, vertically elongate on body) ..... 4
- 4a Cheeks with numerous blue spots (30–50 behind and below centre of eye to preopercle margin); pectoral-fin rays dark brown, abruptly pale distally ..... *P. marisrubri*
- 4b Cheeks with few blue spots (5–12 behind and below centre of eye to preopercle margin); pectoral-fin rays uniformly pale ..... *P. pessuliferus*

*Plectropomus areolatus* (Rüppell 1830)

Squairetail coralgroupers

PLATES 15 & 23

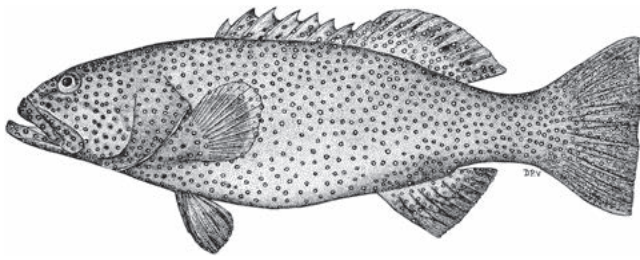
*Plectropoma areolatum* Rüppell 1830: index p. 2, footnote (Al-Muwaylih, Saudi Arabia, Red Sea).

?*Plectropoma maculatum* (non Bloch 1790): Rüppell 1830.

*Plectropomus areolatus*: Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Winterbottom & Anderson 1997; Kuiter 1998\*; Craig *et al.* 2011\*.

Pectoral fins 15 or 16 rays; soft-rayed dorsal- and anal-fin margins slightly to moderately convex; caudal fin truncate to slightly emarginate, caudal concavity  $\geq 13$  in HL, fin length 1.4–1.9 in HL. GR 0–2/2–7. LL scales 83–97; LSS 107–138.

Head and body reddish, greenish grey or brown, covered with numerous round to slightly oblong dark-edged blue spots (largest subequal to pupil); spots on head and body subequal, and most spots within one-spot diameter to adjacent spots; pectoral fins with small dark-edged blue spots; median fins darker distally; caudal fin with blackish edge on entire triangular outline of fin, and often with narrow whitish margin. Attains 91 cm TL (~11 kg).



*Plectropomus areolatus*, 37 cm SL (Red Sea). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Chagos and Maldives; elsewhere to Cocos (Keeling) Is., Philippines, Japan, Marshall Is., Phoenix Is., Australia and Samoa.

**REMARKS** Piscivorous; cruises outer slopes of reefs and reef channels, to at least 30 m deep; difficult to approach. Spawns in large aggregations; spawning season variable but may last several months. Common species under fishery pressure in several localities; IUCN Red List conservation status Vulnerable.

### *Plectropomus laevis* (Lacepède 1801)

Blacksaddle coralgroup

PLATE 15

*Labrus laevis* Lacepède (ex Commerson) 1801: 431, 477, Pl. 23, Fig. 2 (Indian Ocean).

*Bodianus cyclostomus* Lacepède (ex Commerson) 1802: 282, 293 [no locality given].

*Bodianus melanoleucus* Lacepède 1802: 283, 296 (Mauritius, Mascarenes).

*Plectropoma maculatum* var. A–C Playfair & Gunther 1867: 13 (Zanzibar, Tanzania).

*Plectropoma maculatum* var. C–D Boulenger 1895: 161 (Zanzibar, Tanzania; Mauritius, Mascarenes; Sri Lanka; Palau).

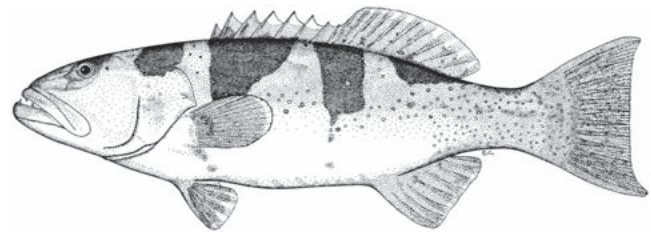
*Plectropomus maculatus* (non Bloch 1790): SFSA No. 417\*.

*Plectropomus laevis*: Randall & Hoese 1986; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; SSF No. 166.71\*; Heemstra & Randall 1993\*; Winterbottom & Anderson 1997; Kuitert 1998\*; McKenna & Allen 2003; Craig *et al.* 2011\*.

Pectoral fins 16–18 rays; anal-fin margin slightly rounded to slightly concave; caudal fin emarginate. GR 1–3/4–10. LL scales 92–115; LSS 123–153.

Two colour phases: first phase yellowish to white, with 5 dark brown to black saddle-like blotches dorsally (1st just posterior to interorbital space, 2nd on nape, and 3rd–5th below dorsal fin), blotch shape variable, any of the last 3 may have a narrow ventral extension; peduncle usually yellow; body with scattered small dark-edged blue spots, variable in number and position, but mainly posteriorly and few or no spots on head;

a dark brown spot centrally at bases of paired fins. Second phase brown, olive, red or nearly black, with or without dark bars (as seen on pale phase); numerous small dark-edged blue spots (diameter ~2–3 in pupil diameter) on head, body (except lower thorax and abdomen), pectoral-fin bases and median fins (except spinous portions of dorsal and anal fins); pectoral fins dark brown, rays darker. Juveniles whitish, with 4 brown blotches on nape and body (2nd blotch extending onto spinous dorsal fin); upper half of head brownish, from mouth to rear margin of eyes; peduncle pale brownish yellow; fins hyaline, but caudal fin yellowish. Some adult specimens from Seychelles with ~4 faint saddle-like bars on upper body, overlain with small whitish blue spots; head and fins pale greyish brown; caudal-fin margin dark grey; lower jaw blackish. Attains 130 cm TL.



*Plectropomus laevis*, 60 cm SL (Marshall Is.). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Sodwana Bay), Madagascar, Comoros, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Japan, Marshall Is., Australia, Palau, Tuamotu Is. and Rapa Iti.

**REMARKS** Rare but wide-ranging; the largest species of the genus. Found on outer coral-reef slopes and in coral-rich areas of lagoons, in 4–90 m. Piscivorous. Small juveniles appear to mimic the model toby or sharpnose puffer *Canthigaster valentini* which has a skin toxin unpalatable to most predaceous fishes.

### *Plectropomus marisrubri* Randall & Hoese 1986

Red Sea coralgroup

PLATES 15, 23 & 24

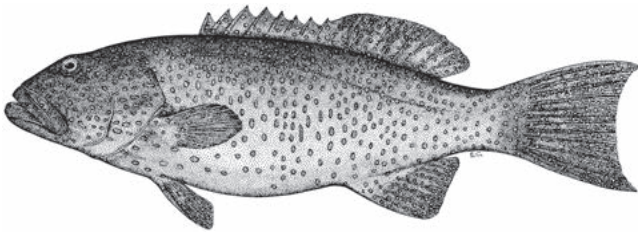
*Plectropomus pessuliferus marisrubri* Randall & Hoese 1986: 23, Pl. 3b–c, Pl. 5f–g (Dahab, Sinai Peninsula, Gulf of Aqaba, Red Sea).

*Plectropomus maculatus* (non Bloch 1790): Pilosof & Fishelson 1981; Randall 1983\*; Randall & Ben-Tuvia 1983 [in part].

*Plectropomus pessuliferus* (non Fowler 1904): Randall & Heemstra 1991\* [in part]; Heemstra & Randall 1993\* [in part]; Winterbottom & Anderson 1997; Kuitert 1998\*; Craig *et al.* 2011\* [in part].

Pectoral fins 15 or 16 rays; caudal fin emarginate, sometimes truncate in juveniles. GR 1 or 2/7–9. LL scales 90–104; LSS 120–142.

Body and fins brown to orange-red with numerous small dark-edged blue spots (smallest on fins, present only basally on pectoral fins), ~30–50 spots behind and below centre of eye to edge of preopercle; some spots on sides of body of adults vertically elongate, and some on head obliquely elongate; spots usually absent or few on underside of thorax and abdomen; body often with 7 dark bars subequal to pale interspaces; pectoral-fin rays dark brown, abruptly pale distally; eyes narrowly rimmed in blue (may be interrupted); caudal-fin margin sometimes narrowly whitish. Attains 120 cm TL.



*Plectropomus marisrubri*, 48 cm SL (Red Sea). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: endemic to Red Sea (common in northern Red Sea, including Gulf of Aqaba).

**REMARKS** Piscivorous; found on or near coral reefs and outer-reef slopes, sometimes in lagoons or over seagrass and sandy areas, to at least 85 m deep. A popular food fish on Saudi Arabian coast and heavily fished. Formerly considered a subspecies, with *Plectropomus pessuliferus marisrubri* from the Red Sea and *P. p. pessuliferus* from the Indo-Pacific. IUCN Red List conservation status Vulnerable.

### *Plectropomus pessuliferus* (Fowler 1904)

Roving coralgroupers

PLATE 24

*Plectropoma maculatum* var. D Playfair & Günther 1867: 13 (Zanzibar, Tanzania).

*Plectropoma maculatum* var. A Boulenger 1895: 161 (Zanzibar, Tanzania) [in part].

*Plectropoma pessuliferum* Fowler 1904: 520, Pl. 17 (Padang, Sumatra, Indonesia); Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Winterbottom & Anderson 1997; Kuitert 1998\*; Craig *et al.* 2011\*.

Pectoral fins 15 or 16 rays; caudal fin emarginate. GR 1 or 2/7–10. LL scales 85–95; LSS 112–141.

Body and fins brown to orange-red with numerous small dark-edged blue spots (smallest on fins, and only basally on pectoral fins), 5–12 spots behind and below centre of eye to edge of preopercle; some spots on sides of body of adults vertically elongate, and some on head obliquely elongate; spots usually absent or few on underside of thorax and abdomen; eyes narrowly rimmed blue (may be interrupted); pectoral-fin rays uniformly pale; caudal-fin margin sometimes narrowly whitish. Attains at least 63 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania (Zanzibar), Mozambique Channel, Mauritius, Nazareth Bank, St Brandon Shoals, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia and Fiji.

**REMARKS** Not common; found on or near coral reefs and outer-reef slopes, also in lagoons or over seagrasses and sandy areas, at 3–147 m.

### *Plectropomus punctatus* (Quoy & Gaimard 1824)

Marbled coralgroupers

PLATES 15 & 24

*Plectropoma punctatum* Quoy & Gaimard 1824: 318, Pl. 45, Fig. 1 (Mauritius, Mascarenes).

*Plectropoma maculatum* var. G Playfair & Günther 1867: 14 (Seychelles).

*Plectropoma maculatus* (*non* Bloch 1790): Wheeler & Ommanney 1953.

*Plectropomus* sp.: Fourmanoir 1954.

*Plectropomus marmoratus* Talbot 1959: 751, Pl. 21 (Zanzibar, Tanzania).

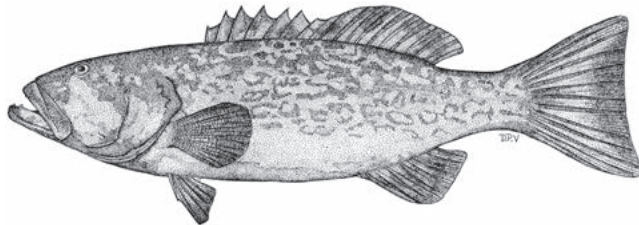
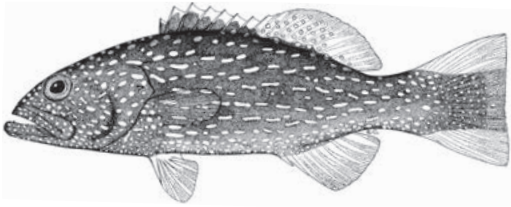
*Plectropomus* sp.: Kyushin *et al.* 1977\* [p. 188, upper photo].

*Plectropomus punctatus*: Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Winterbottom & Anderson 1997; McKenna & Allen 2003; Craig *et al.* 2011\*.

Pectoral fins 16–18 rays; caudal fin slightly emarginate to (usually) truncate. Developed GR 1 or 2/6–9. LL scales 88–95; LSS 123–130.

Adults brown to reddish or purplish brown, often with paler irregular marbling, and paler ventrally; eyes rimmed blue; pectoral fins reddish, with dark brown or blue margin; pelvic, anal and caudal fins sometimes with blue submarginal band or row of blue spots. Juveniles (7–12 cm SL) brown with numerous horizontally elongate whitish spots; fins hyaline except for dark brown basal portion of spinous dorsal fin and central portion of caudal fin; white spots on larger juveniles expand, forming irregular white polygons dorsally over head and body. Attains 110 cm TL (12.2 kg).





*Plectropomus punctatus*, ~8 cm SL, juvenile (top); 90 cm SL (bottom) (both South Africa). Source: Randall & Heemstra 1991

**DISTRIBUTION** WIO: Oman, Yemen, Socotra, northern Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Nazareth Bank, St Brandon Shoals and Chagos; not known from Red Sea, Persian/Arabian Gulf, Gulf of Oman and coast of India.

**REMARKS** Solitary, rarely in small groups; roves over coral or rocky reefs, from 5–65 m. A bold, relatively uncommon fish that approaches divers entering its territory. Feeds mainly on fishes. Probably under pressure from fishing, also juveniles used in the aquarium trade.

## GENUS *Variola* Swainson 1839

Body oblong, depth less than HL. Dorsal fin 9 spines, 13–15 rays; interspinous membranes not incised; no notch before soft-rayed fin; anal fin 3 small spines, 8 rays; adult with rear end of dorsal and anal fins distinctly pointed. GR counts include 4–8 rudiments on each limb; caudal fin lunate, upper and lower lobes produced, about twice length of middle rays. Two Indo-Pacific species, both in WIO.

### KEY TO SPECIES

- 1a Median and pectoral fins with broad yellow margin; pelvic fins of adults reach past anus; lower GR 15–18; juveniles with irregular dark oblique stripe on upper body, and dark spot at base of upper caudal fin rays ..... *V. louti*
- 1b Caudal fin red, with white margin and narrow black submarginal line; dorsal, anal and pectoral fins without distinct yellow margin; lower GR 13–16; pelvic fins usually not reaching anus; juveniles without dark stripe on upper body and no dark spot at base of upper caudal-fin rays ..... *V. albimarginata*

## *Variola albimarginata* Baissac 1953

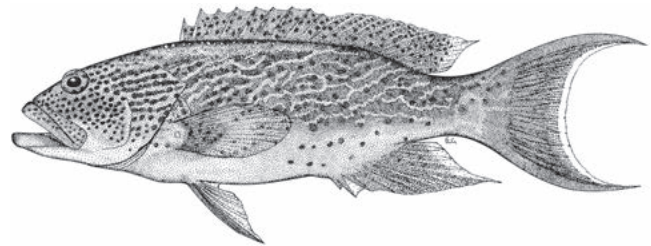
White-edged lyretail

PLATES 15 & 24

*Variola albimarginata* Baissac 1953: 214 (Mauritius, Mascarenes); Postel *et al.* 1963; Morgans 1982; Randall & Ben-Tuvia 1983; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; McKenna & Allen 2003; Craig *et al.* 2011\*.

Body depth 2.8–3.5, HL 2.6–2.8 in SL (fish 19–25 cm SL). Dorsal fin 14 rays; pectoral fins 17–19 rays. GR 7–9/13–16. LL scales 66–76; LSS 109–127.

Colour variable: head and body pink, orange-brown or reddish purple, with irregular red bands containing small irregular pale blue to pink spots alternating with yellow lines; head orange-yellow with dense red spots; median fins with small pink and red spots; caudal fin usually dusky distally, with narrow white margin; dorsal- and anal-fin margins hyaline (no trace of yellow); pectoral fins yellow, with bases of rays often red-brown. Juveniles similar in colour to adults, but with fewer, larger, blue or pink spots. Attains at least 33 cm SL, 47 cm TL (possibly 55 cm TL, ~1 kg).



*Variola albimarginata*, 23 cm SL (Mauritius). Source: Randall & Heemstra 1991

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania (Zanzibar and Mafia I.), Madagascar, Comoros, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Japan, Palau, Marshall Is., Australia and Samoa.

**REMARKS** Females mature at 32 cm SL. Piscivorous; found on coral reefs and outer drop-offs, at 4–200 m. Of little interest to fisheries because of its small size and rarity; however, it is abundant during the dry season (southern winter) at Réunion. Flesh excellent, but may cause ciguatera poisoning.

## *Variola louti* (Fabricius 1775)

Yellow-edged lyretail

PLATES 15, 24 & 25

*Perca louti* Fabricius in Niebuhr (ex Forsskål) 1775: 40, xi (Jeddah, Saudi Arabia, and Al-Luhayya, Yemen, Red Sea).

*Labrus punctulatus* Lacepède (ex Commerson) 1801: 431, 477, Pl. 17, Fig. 2 (Indian Ocean).

*Serranus roseus* Valenciennes in Cuv. & Val. 1828: 306 (Tahiti, Society Is.) [based on a Parkinson drawing].

*Serranus luti* Valenciennes in Cuv. & Val. 1828: 363 [unjustified emendation of *Perca louti* Fabricius 1775].

*Serranus flavimarginatus* Rüppell 1830: 109 (Al-Muwaylih, Saudi Arabia, Red Sea).

*Serranus phaenistomus* Swainson 1839: 201 [based on Rüppell 1830, Pl. 26, but possibly an error].

*Variola longipinna* Swainson 1839: 202 [based on *Serranus louti* of Rüppell 1830, Pl. 26].

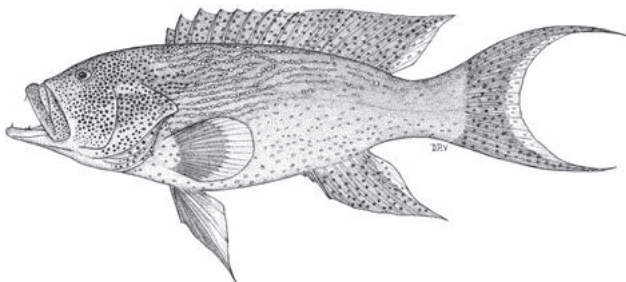
*Variola louti*: Randall 1980; Morgans 1982; Winterbottom *et al.* 1989\*; Randall & Heemstra 1991\*; Heemstra & Randall 1993\*; Kuitert 1998\*; McKenna & Allen 2003; Craig *et al.* 2011\*.

Body depth 2.8–3.3, HL 2.5–2.8 in SL (fish 12–40 cm SL).

Dorsal fin 13 or 14 rays; pectoral fins 16–19 rays.

GR 7–10/15–18. LL scales 66–77; LSS 113–135.

Colour variable: head, body and median fins yellowish brown to orange-red (fish from deep water more reddish), with numerous small round or elongate spots of blue, lavender or pink; median-fin margins broadly yellow; pectoral fins red to brown, distal third abruptly yellow. Large juveniles (8–18 cm SL) with irregular black band dorsally along body, from below rear of dorsal fin and continuing onto head (to eye) as 3 irregular black spots; irregular black blotch at base of upper caudal-fin rays; head and body (including black band) with small pale blue to pink spots; some large juveniles and some adults show a transitory pale yellow or white stripe on dorsal midline from tip of lower jaw to dorsal-fin origin. Small juveniles (<7 cm SL) lack the black band and black spots on upper parts of head and body. Attains 81 cm SL (~12 kg).



*Variola louti*, 40 cm SL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman (Arabian Sea) to South Africa, Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep,

India and Sri Lanka; elsewhere to Andaman Is., Indonesia, Philippines, Japan, Marshall Is., Society Is., Australia, Pitcairn Is. and Rapa Iti; not known from Persian/Arabian Gulf and Hawaii.

**REMARKS** Inhabits offshore coral reefs, from 3–240 m (usually >15 m), in clear water. Prefers islands and offshore reefs rather than continental shores, and seems to be more common than *V. albimarginata*. Females mature at 33 cm SL; off Kenya, spawning occurs between December and February. Primarily piscivorous with some crustacean prey. An important food fish despite the fact that it often causes ciguatera poisoning; apparently not toxic at Réunion, but is not allowed to be sold at nearby Mauritius..

## SUBFAMILY DIPLOPRIONINAE

### Soapfishes

Gill opening restricted dorsally, with upper edge of operculum joined by skin to body; opercle spines 3, preopercle strongly serrate or with 1–5 spines. Dorsal fin divided or margin continuous but deeply notched, with 7–9 spines, 10–25 rays; anal fin with 2 or 3 spines, 9–13 rays; last pelvic-fin ray broadly joined to abdomen by skin; caudal fin rounded to truncate, with 15 branched rays. Mouth large, lower jaw projecting in front of upper jaw; maxillae reaching to or beyond vertical through centre of eye; supramaxillae present; bands of villiform teeth on jaws, vomer and palatines, no canines. Vertebrae 24 or 25. Three genera and 4 species in WIO.

### KEY TO GENERA OR SPECIES

- 1a Anal fin 3 spines, 9 rays; dorsal fin deeply notched before soft rays, 9 spines, 12 rays; pelvic fins small, not reaching anus; body oblong, robust, body width ~2.8 in body depth; body deep blue, with bright yellow band from upper jaw along dorsal midline of head, dorsal-fin base and upper part of peduncle ..... *Aulacocephalus temminckii*
- 1b Anal fin 2 spines, 12 or 13 rays; body deep and compressed, body width behind gill opening 3.3–4 in body depth; pelvic fins large, reaching past anus; single dorsal fin (may appear as 2 dorsal fins in *D. bifasciatum*, or deeply notched in *D. drachi*), with 8 spines, 13–16 rays ..... *Diploprion*
- 1c Anal fin 2 spines, 8 rays; 2 dorsal fins, with 8 or 9 spines + 1 minute spine, 10 rays; pelvic fins small, not reaching anus; head and body brown, with bright yellow spot on peduncle behind last dorsal-fin ray, and large black ocellated spot on spinous dorsal fin ..... *Belonoperca chabanaudi*

GENUS *Aulacocephalus*

Temminck &amp; Schlegel 1843

Diagnosis as for the single species.

*Aulacocephalus temminckii* Bleeker 1855

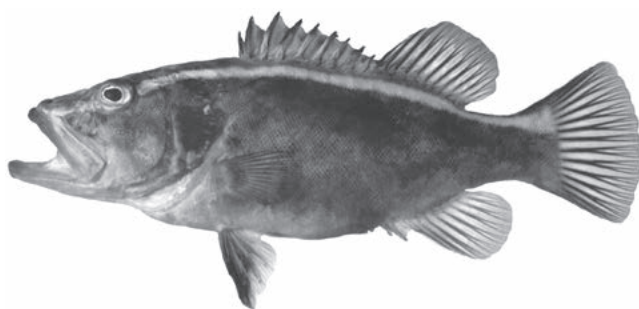
Goldribbon soapfish

PLATE 15

*Aulacocephalus temminckii* Bleeker 1855: 12 (Nagasaki, Japan); Fricke 1999; Khalaf & Zajonz 2007\*; Fricke *et al.* 2009.*Aulacocephalus temminckii*: SFSA No. 419\*; Randall *et al.* 1971\*; Masuda *et al.* 1984\*; SSF No. 167.1\*.

Body oblong, depth 2.9–3 in SL; HL 2.4–3 in SL. Dorsal fin 9 spines, 12 rays, fin deeply notched before soft-rayed part; anal fin 3 spines, 9 rays; pectoral fins small, with 14–16 rays. Nasal organ a circular rosette. Preopercle coarsely serrate; subopercle and interopercle serrate. Scales ctenoid; LL scales 76–82; head naked including maxilla. GR 7 or 8/18–20.

Head and body deep blue, with bright yellow band along upper jaw, through eye and below dorsal fin to caudal-fin base; fins blue, membranes hyaline blue. Attains 40 cm TL.



*Aulacocephalus temminckii*, 19 cm SL (South Africa).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Antitropical in Indo-Pacific. WIO: northern Red Sea to Gulf of Aden, southern Mozambique (Ponta Milibangalala) to South Africa (Protea Banks, KwaZulu-Natal), Comoros, Réunion and Mauritius; elsewhere to Thailand, Japan, New Zealand, Kermadec Is. and Rapa Iti.

**REMARKS** Found on rocky reefs, in 20–180 m. Although widespread in the Indo-Pacific, there are relatively few records in WIO, and all records are within the latitude range 20° N–36° S.

GENUS *Belonoperca* Fowler & Bean 1930

Two species, 1 in WIO.

*Belonoperca chabanaudi* Fowler & Bean 1930

Arrowhead soapfish

PLATE 16

*Belonoperca chabanaudi* Fowler & Bean 1930: 182, Fig. 4 (Gulf of Tomini, Sulawesi, Indonesia); Randall *et al.* 1980\*; SSF No. 167.2\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Kuitert 1998\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body fusiform, depth 3.5–3.7 in SL; HL 2.5–2.7 in SL. Dorsal fin notched to its base, 8 or 9 spines + 1 spine, 10 rays; anal fin 2 spines, 8 rays; pectoral fins 13–15 rays. Nasal organ a rosette. Preopercle coarsely serrate; subopercle and interopercle with a few serrae. GR 6–8/13–15. Lateral line complete. Scales ctenoid; LL scales 69–76.

Adults greenish brown, with many dark spots (except ventrally) and some irregular lines on head; bright yellow saddle spot on peduncle; ventral two-thirds of membrane between dorsal-fin spines 4–8 black. Juveniles brownish blue-green, covered with many small black spots overall; bright yellow spot on peduncle behind dorsal fin; large black spot with blue-green edge between dorsal-fin spines 1–4; pelvic fins with black spots of varying size; rays of soft-rayed dorsal fin, anal fin and caudal fin with dark spots. Small juveniles (<4 cm SL) pale brown, with several small and mostly round dark spots; horizontal dark brown streak from eye to rear edge of opercle. Attains 15 cm TL.



*Belonoperca chabanaudi*, ~14 cm SL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Sodwana Bay), Comoros, Chagos and Maldives; elsewhere to Indonesia, Japan, Australia and Samoa.

**REMARKS** Cryptic on reefs, in caves and near drop-offs, in 4–50 m; becomes active and moves out of shelter at dusk. Feeds on fishes and crustaceans. The grammistin in the epidermal mucous cells of this species is distasteful but less bitter than that of the sixstripe soapfish *Grammistes sexlineatus*.

**GENUS** *Diploprion* Cuvier 1828

Scales mainly ctenoid, not embedded; body compressed, width behind gill opening 3–4 in body depth; dorsal fin 8 spines, 13–16 rays; anal fin 2 spines, 12 or 13 rays; pelvic fins reach anus or slightly beyond; lateral line complete to caudal-fin base. Two species, both in WIO.

**KEY TO SPECIES**

- 1a Body deep, depth 2–2.4 in SL; dorsal fin 13–16 rays; head and body yellow, with broad black bar below spinous dorsal fin, and narrow curved black bar from cheek and over eye to dorsal-fin origin ..... *D. bifasciatum*
- 1b Body oblong, depth 2.4–2.6 in SL; dorsal fin 15 or 16 rays; head and body mostly uniformly bluish grey; spinous dorsal fin dark brown, with 1st interspinous membrane pale grey; soft-rayed dorsal fin pale grey, with brownish black band along base; orange patch on snout and surrounding eyes; pelvic fins dark distally ..... *D. drachi*

*Diploprion bifasciatum* Cuvier 1828

Barred soapfish

PLATE 9

*Diploprion bifasciatum* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1828: 137, Pl. 21 (Java, Indonesia); Randall *et al.* 1971\*; Baldwin & Johnson 1993; Kuiter 1998\*.

Body deep and compressed, depth 2–2.4 in SL; HL 2.7–2.9 in SL. Dorsal fin 8 spines, 13–16 rays; anal fin 2 spines, 12 or 13 rays; pectoral fins 17 or 18 rays. GR 7/18. LL scales 80–89.

Head and body yellow, with large black midlateral bar from anal-fin origin to spinous dorsal fin and curved black band from cheek over eye to dorsal-fin origin; some fish with entire body, anterior half or rear half of body black. Attains 25 cm TL.



*Diploprion bifasciatum*, 16 cm SL. PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, India and Sri Lanka; elsewhere to Indonesia, Japan, Australia and New Caledonia.

**REMARKS** Favours silty conditions among rocky formations, in 1–100 m (usually 5–50 m); adults sometimes in small groups.

*Diploprion drachi* Roux-Estève 1955

Yellowface soapfish

PLATE 9

*Diploprion drachi* Roux-Estève in Roux-Estève & Fourmanoir 1955: 197 (Abu Latt I., Saudi Arabia, Red Sea); Randall *et al.* 1971\*; Randall 1992\*; Manilo & Bogorodsky 2003.

Body oblong, depth 2.4–2.6 in SL; HL 2.6–2.8 in SL. Dorsal fin 8 spines, 15 or 16 rays, with deep notch before soft-rayed part; anal fin 2 spines, 12 rays; pectoral fins 15 or 16 rays. GR 8/19 or 20. LL scales 87.

Head and body lavender grey; large orange blotch on snout and around eyes; spinous dorsal fin dark brown, 1st membrane bluish grey; soft-rayed dorsal fin pale bluish, base blackish brown; anal fin pale bluish; pelvic fins dusky grey, darker distally; caudal fin whitish, rays dusky brown. Attains 14 cm TL.



*Diploprion drachi* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Solitary, diurnal. Feeds on small fishes and crustaceans; has been seen to use large nonpredatory fishes as a ‘stalking horse’ to approach prey.

## SUBFAMILY GRAMMISTINAE

## Soapfishes

Scales cycloid, often embedded; preopercle margin smooth (except for 1–4 spines on upper limb); nasal organ vertically elongate, lamellae horizontal; skin with mucous cells in the epidermis and multicellular glands in the dermis producing a thick coat of mucus containing grammistin, a bitter-tasting toxin. Three genera and 3 species in WIO.

## KEY TO GENERA AND SPECIES

- 1a Chin with large fleshy flap, about as long as eye diameter; dorsal fin 8 spines, 12 or 13 rays; fins and body dark, with close-set white spots ..... *Pogonoperca ocellata*
- 1b Chin flap very small or not present; dorsal fin 7 spines, 13–15 rays; colour not as above ..... 2
- 2a Chin flap very small; pectoral fins 16–18 rays; dorsal fin 13 or 14 rays; anal fin 2 spines; head and body blackish brown; adults with 6 longitudinal white lines, white lines break up into series of dashes in large adults ..... *Grammistes sexlineatus*
- 2b No chin flap; pectoral fins 14 or 15 rays; dorsal fin 12 or 13 rays; anal fin 3 spines; body and fins dull yellowish brown, except prominent dark ocellus on opercle ..... *Grammistops ocellatus*

GENUS *Grammistes* Bloch & Schneider 1801

Diagnosis as for the single species.

*Grammistes sexlineatus* (Thunberg 1792)

## Sixstripe soapfish

PLATE 16

*Perca sexlineata* Thunberg 1792: 142, Pl. 5 (Japan or East Indies [Indonesia]).

*Grammistes lineatus* Arnould in Arnould *et al.* 1958: 62, Fig. 2 (Aldabra, Seychelles).

*Grammistes sexlineatus*: Bloch & Schneider 1801; SFSA No. 418\*; Randall *et al.* 1971\*, 1983\*; SSF No. 167.3\*; Winterbottom *et al.* 1989\*; Baldwin & Johnson 1993; Kuitert 1998\*; McKenna & Allen 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.3–2.8, HL 2.3–2.7 in SL. Dorsal fin 7 spines, 13 or 14 rays; anal fin 2 spines, 9 rays; pectoral fins 16–18 rays. Preopercle with 2–4 short broad-based spines; subopercle and interopercle smooth. GR 1–3/7–9 excluding rudiments. Scales cycloid, embedded; LL scales 60–72.

Body dark brown with yellow or whitish longitudinal stripes; very small juveniles with 2 rows of yellow spots (white in preservative), fish <5 cm SL with 2 or 3 yellowish stripes, fish >8 cm SL with ~6 stripes, and adults with increasing number of stripes which break into dashes. Attains 27 cm TL.



*Grammistes sexlineatus*, 5 cm SL (Rodrigues). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Eastern Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia, Kermadec Is. and Marquesas Is.

**REMARKS** Hides beneath rocky ledges and in small caves during the day, commonly to ~50 m deep; juveniles found in tidepools. The bitter taste of the skin toxin grammistin provides very effective protection from piscivores, which soon learn to avoid this conspicuous species.

GENUS *Grammistops* Schultz 1953

Diagnosis as for the single species.

*Grammistops ocellatus* Schultz 1953

## Ocellated soapfish

PLATE 16

*Grammistops ocellatus* Schultz in Schultz *et al.* 1953: 386, Fig. 62 (lagoon at Arji I, Bikini Atoll, Marshall Is.); Randall *et al.* 1971\*; SSF No. 167.4\*; Baldwin & Johnson 1993.

*Tulelepis canis* Smith 1954: 869, Pl. 27, Fig. A (Pemba I., Tanzania).

Body depth 3.1–3.7, HL 2.5–2.7 in SL. Dorsal fin 7 spines, 12 or 13 rays; anal fin 3 spines, 9 rays; pectoral fins 14 or 15 rays; caudal fin rounded. Preopercle smooth or with 1 or 2 short spines on upper edge; subopercle and interopercle smooth. GR 1 or 2/6–9 excluding rudiments. Body scales cycloid, embedded; LL scales 58–67.

Body and fins dull yellowish brown; large dark ocellus on opercle; dark brown spots on each side of chin. Attains 10 cm TL.



*Grammistops ocellatus*, 8 cm SL (Comoros). © R Winterbottom, ROM

**DISTRIBUTION** Indo-Pacific (rare). WIO: Tanzania (Zanzibar), northern Mozambique and Comoros; elsewhere to Japan, Marshall Is., Australia and Society Is.

**GENUS** *Pogonoperca* Günther 1859

Dorsal fin deeply notched, with 7 or 8 spines, 12 or 13 rays; anal fin 2 or 3 spines, 8 rays. Chin with large fleshy flap. Scales small, cycloid, embedded. Two species, 1 in WIO.

*Pogonoperca ocellata* Günther 1859

Multispotted soapfish

PLATE 16

*Pogonoperca ocellata* Günther 1859: 169 [Mauritius, Mascarenes];

Anderson *et al.* 1998\*; Kuitert 1998\*; Fricke *et al.* 2009.

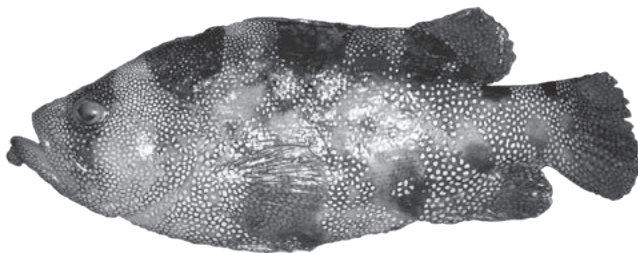
*Pogonoperca reticulata* Bliss (ex Steindachner) 1883: 46 (Mauritius, Mascarenes).

*Pogonoperca punctata* (non Valenciennes 1830): Randall *et al.* 1971\*; Fricke *et al.* 2009.

*Grammistes punctatus* (non Valenciennes 1830): Baldwin & Johnson 1993.

Dorsal fin 8 spines, 12 or 13 rays; anal fin 2 or 3 spines, 8 rays. Preopercle with 3–5 spines on rear edge. GR 1/8 or 9. Scales small, cycloid, embedded; LL scales 59–70.

Head, body and fins brown with numerous small close-set white spots; 4–6 saddle-like blackish brown blotches on body (1 on nape, the others below dorsal fins, some extending onto anal and dorsal fin bases, and usually broken midlaterally); dark eyeband across interorbital space; 2 or 3 black spots at caudal-fin base. Attains 33 cm TL.



*Pogonoperca ocellata* (S Mozambique). AD Connell © NRF-SAIAB

**DISTRIBUTION** Indian Ocean. WIO: southern Mozambique (Pomene) to South Africa (Ramsgate, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Réunion, Mauritius and Maldives; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Inhabits coral and rocky reefs, to at least 42 m, adults usually in >20 m. The allopatric *P. punctata* of the Pacific Ocean lacks white spots on the fins and has fewer black markings on the body.

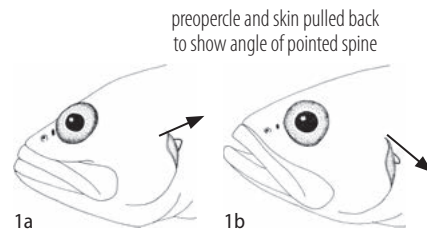
**SUBFAMILY PSEUDOGRAMMINAE**

Podges

Dorsal fin 6–8 stout spines, 18–25 rays; anal fin 3 stout spines, 14–22 rays; pectoral fins 13–18 rays; mouth large, maxilla extending beyond vertical at rear edge of eye; lateral line incomplete, parallel to dorsal contour of body, ending below base of 5th dorsal-fin ray; band of villiform teeth on palatines with inner teeth at front of upper jaw long, slender, and depressible (inner row of teeth at side of upper jaw not enlarged but depressible), band shorter than side of V-shaped tooth patch on vomer; one (rarely 2) short, stout, incurved canine anteriorly on each side of upper jaw, no canines on lower jaw; scales ctenoid (ctenii absent on scale edges of *Suttonia*). Three genera and 5 species in WIO.

**KEY TO GENERA AND SPECIES**

- 1a No large pores on interorbital area (except small juveniles); preopercle spine projecting slightly upward; 2 lateral lines; LSS 53–59; no canines at front of upper jaw; anal fin 3 spines, 20 or 21 rays; adults pale brown, with vertically elongate dark brown spots ..... *Aporops bilinearis*
- 1b Pair of large pores on interorbital, one on each side near edge of orbit; preopercle spine projecting obliquely downward; dark brown or black spot about eye size on opercle; single lateral line; LSS 42–53; pair of small teeth usually present at front of upper jaw palatine teeth in 3–5 rows in band longer than side of V-shaped patch of vomer teeth; longest pectoral-fin ray reaches well past vertical at 1st anal-fin ray; dorsal and anal fins reach well past caudal-fin base; colour not as above..... 2



Continued...

## KEY TO GENERA AND SPECIES

- 2a Ctenii of body scales not longer than membranous scale edges; dorsal fin 22–24 rays; anal fin 18–20 rays; 1 lateral line; pale mid-dorsal stripe on head; distinct round to slightly elliptical dark brown spot on opercle ..... *Suttonia suttoni*
- 2b Ctenii of body scales longer than membranous scale edges; dorsal fin 19–23 rays; anal fin 16–19 rays; no pale mid-dorsal stripe on head ..... 3
- 3a Opercle with dark brown or black eye-sized spot; lateral line of adults 31–41 scales; LSS 46–50; dorsal and anal fins reaching to or slightly past vertical at caudal-fin base ..... *Pseudogramma polyacantha*
- 3b No dark spot on opercle; lateral line of adults 21–26 scales; LSS 51–53; rear end of dorsal and anal fins reaching well beyond caudal-fin base ..... 4
- 4a Anterior nostril tube reaches about halfway to posterior nostril; snout length 5.4–5.8 in HL; peduncle depth 3.2–3.6 in HL; pectoral fins 14 or 15 rays; brown-edged pale stripe from lower part of eye only to edge of preopercle; body with many interconnecting pale blotches ..... *Pseudogramma astigmum*
- 4b Anterior nostril tube reaching or nearly reaching posterior nostril; snout length 6–6.3 in HL; peduncle depth 2.9–3 in HL; pectoral fins 15 rays; brown-edged pale stripe from lower part of eye to rear edge of opercle; body with pale blotches not connected ..... *Pseudogramma megamycterum*

GENUS *Aporops* Schultz 1943

Diagnosis as for the single species.

*Aporops bilinearis* Schultz 1943

Blotched podge

PLATES 7 & 15

*Aporops bilinearis* Schultz 1943: 112, Fig. 9 (reef at Hull I., Phoenix Is.);

Baldwin & Johnson 1993; Randall & Baldwin 1997\*.

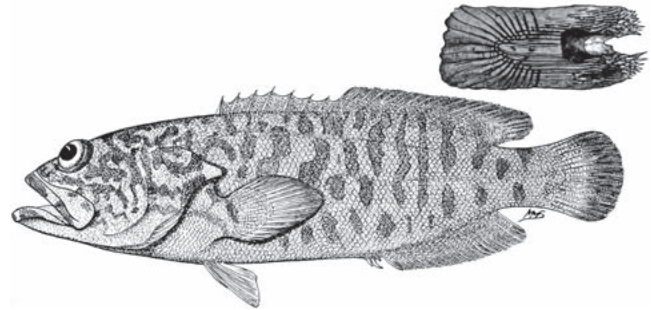
*Aporops allfreei* Smith 1953: 553, Fig. 2 (Kisiti I., Kenya);

Winterbottom 1978; SSF No. 171.1\*; Winterbottom *et al.* 1989\*.

*Pseudogramma bilinearis*: Allen & Smith-Vaniz 1994.

Dorsal fin 7 spines, 23–25 rays; anal fin 3 spines, 19–21 rays; pectoral fins 15–17 rays. Snout length subequal to eye diameter; maxilla reaches past eye. Jaws with band of villiform teeth, no canines. Juveniles with 3 preopercle spines, adults with only 1 upward-pointing spine visible. Lateral line interrupted: anterior LL scales 32–38, posterior LL scales 14–28; scales cover median fins and most of interorbital area.

Head and body brownish yellow, with vertically elongate darker spots; fins grey, spinous dorsal fin yellow-grey; lips, chin, snout and nape yellowish; lower half of eyes dark brown, iris yellow. Attains 10 cm SL.



*Aporops bilinearis*, 9 cm TL, female holotype and enlarged LL scale (N Mozambique). Source: SSF

**DISTRIBUTION** WIO: Kenya to South Africa (Aliwal Shoal, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Chagos, Maldives and Sri Lanka; elsewhere to Cocos (Keeling) Is., Japan, Marshall Is., Australia, Phoenix Is., Marquesas Is. and Hawaii.

**REMARKS** Occurs in shallow water around corals, to ~15 m deep, often in surge areas.

GENUS *Pseudogramma* Bleeker 1875

Body oblong, depth 2.8–3.7 in SL; HL 2.4–2.9 in SL. Dorsal fin 6–8 short spines (7 spines in WIO specimens); anal fin 3 spines, 14–19 rays; pectoral fins 13–18 rays; pelvic fins small, inserted distinctly in advance of pectoral-fin bases; caudal fin rounded, with 15 branched rays. Anterior nostril a prominent tube. One or 2 lateral lines; body scales small, adherent and ctenoid, ctenii extending posterior to membranous scale edge. Ten species, 3 species in WIO (see key to genera and species, above).

*Pseudogramma astigmum* Randall & Baldwin 1997

Reticulated podge

PLATE 16

*Pseudogramma* sp.: Wass 1984.

*Pseudogramma astigmum* Randall & Baldwin 1997: 14, Pl. 1, Fig. B (cave in reef at drop-off, Enewetak Atoll, Marshall Is.).

Body depth 2.8–3.4 in SL; HL 2.4–2.5 in SL; peduncle depth 3.2–3.6 in HL. Dorsal fin 21–23 rays; anal fin 17 or 18 rays; pectoral fins 14 or 15 rays. Anterior nostril reaches about

halfway to posterior nostril. GR 5–7/11–13. Lateral line single, incomplete; LL scales 21–26.

Head and body brownish, covered with pale yellowish eye-sized spots separated by medium brown reticulum; median fins pale yellow, faintly mottled with brown on basal scaly parts, fin margins tinged red. Attains 7 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Comoros; elsewhere, Marshall Is., New Guinea, Australia and Samoa.

**REMARKS** Insular, on coral reefs, in 6–46 m. Appears to be most similar to the allopatric Red Sea species *P. megamycterum*.

## *Pseudogramma megamycterum*

Randall & Baldwin 1997

Polkadot podge

PLATE 16

*Pseudogramma megamycterum* Randall & Baldwin 1997: 32, Pl. 1, Fig. F (Eilat, Israel, Gulf of Aqaba, Red Sea).

Body depth 3–3.5 in SL; body width 1.8–2 in body depth; HL 2.6 in SL. Dorsal fin 21 or 22 rays; anal fin 17–19 rays; pectoral fins 15 rays. Anterior nostril long, reaching or nearly reaching posterior nostril. Jaws with bands of villiform teeth: upper jaw with 5 or 6 rows anteriorly, 1 or 2 rows posteriorly; inner teeth at front of premaxilla long, slender and depressible; inner teeth at sides of premaxilla not enlarged but depressible; 1 or 2 short, slightly incurved canines anteriorly on each side of symphysis; lower jaw teeth similar, but canines small and closer to symphysis. GR 5/11–13. Lateral line single; LL scales 21–25.

Body grey-brown, with 5 longitudinal rows of pale yellow round spots (pale blotches on body not interconnected); upper half of head dark brownish, with white streak from eye to rear end of opercle; lower half of head pale brown. Attains at least 6 cm SL.

**DISTRIBUTION** WIO: endemic to Red Sea.

**REMARKS** Found near scattered coral heads on sand and among *Halophila* seagrasses; known to 21 m deep.

## *Pseudogramma polyacantha* (Bleeker 1856)

Honeycomb podge

PLATE 16

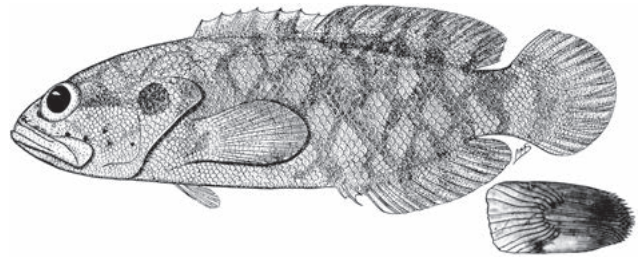
*Pseudochromis polyacanthus* Bleeker 1856: 375 (Ternate, Moluccas, Indonesia).

*Pseudogramma polyacanthum*: Randall *et al.* 1971; Baldwin & Johnson 1993; Randall & Baldwin 1997\*; Winterbottom & Anderson 1997; McKenna & Allen 2003.

*Pseudogramma polyacantha*: Winterbottom *et al.* 1989\*; Fricke *et al.* 2009.

Body depth 3.6–3.7, HL 2.4–2.6 in SL; peduncle depth 2.9–3.6 in HL. Dorsal fin 19–21 rays; anal fin 16–18 rays; pectoral fins 14–17 rays. One lateral line; LL scales 31–41 in adults (occasional specimens with a few pored scales midposteriorly).

Adults brownish, with 5 longitudinal rows of pale yellowish blotches; large black ocellus on opercle; maxilla, lower jaw, chest, pectoral-fin bases and belly whitish. Attains 7 cm SL.



*Pseudogramma polyacantha*, 6 cm TL, female, and enlarged LL scale (Kenya). Source: Smith 1955

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Protea Banks, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia and French Polynesia.

**REMARKS** Common in rotenone collections on coral reefs, from shore to 61 m deep, but very cryptic and rarely observed alive. Appears to be a protogynous hermaphrodite. Feeds on shrimps, amphipods, stomatopods, crabs and polychaetes.

## GENUS *Suttonia* Smith 1953

Body scales with ctenii not longer than membranous scale edge; dorsal fin continuous (not notched), with 7 spines, 22–25 rays; anal fin 3 spines, 18–22 rays; preopercle spine projecting obliquely downward; 1 lateral line. Two species, 1 in WIO.

## *Suttonia suttoni* Smith 1953

Rosy podge

PLATE 16

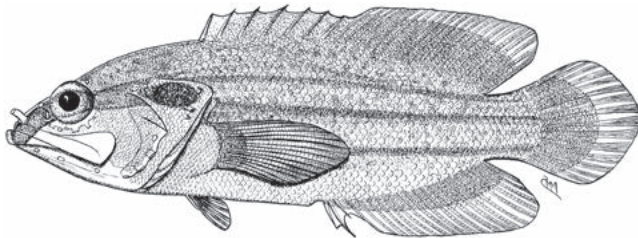
*Suttonia suttoni* Smith 1953: 556, Fig. 3 (Pemba I., Tanzania); Baldwin & Johnson 1993; Randall & Baldwin 1997.

Body depth 3.1–3.7, HL 2.5–2.7 in SL; peduncle short, length 6.3–8.9 in HL. Dorsal fin 22–24 rays; anal fin 18–20 rays; dorsal and anal fins extend past caudal-fin base; pectoral fins 14 or 15 branched rays. Mouth large, maxilla extends past eye.



Teeth villiform on jaws, vomer and palatines; upper jaw also with small, slightly recurved, canine tooth anteriorly in outer row on each side, and inner teeth at front of jaw long and slender (as long as or longer than canines); vomerine teeth in 3 or 4 rows forming V-shaped patch, lateral teeth in back row longest; palatine teeth in 2 or 3 rows in adults. Anterior nostrils tubular, extending in front of upper lip. Preopercle margin with sharp slender spine. GR 5 or 6/10–12. LL scales 27–35 (one adult with a few pored scales posteriorly on midsides).

Body red with indistinct dusky blotches, most evident dorsally; fins red, with variable dusky areas on median fins; head and nape dusky red dorsally, with dark brown stripe on sides of snout from lower part of eye towards dark brown opercle spot; head pale red below dark stripe; median pale pink stripe on head from tip of lower jaw to dorsal-fin origin; iris reddish brown. Attains ~8 cm TL.



*Suttonia suttoni*, 8 cm TL, female holotype (N Mozambique).  
Source: Smith 1953

**DISTRIBUTION** WIO: Tanzania (Pemba I.), Mozambique (Pinda) and Comoros.

**REMARKS** Known from coral reefs, in 10–25 m.

## SUBFAMILY LIOPROPOMATINAE

### Basslets

Body oblong, fusiform; 1 fin or 2 separate dorsal fins, with 8 spines + 11–14 rays, rays longer than spines; anal fin 3 spines, 8–11 rays, fin margin rounded or pointed; pectoral fins 13–17 rays; pelvic fins not much smaller than pectoral fins; caudal fin truncate, emarginate or slightly convex, with 15 branched rays. GR 4–8/11–20. Lateral line complete, distinctly arched over pectoral fin; LL pored scales 44–66. Vertebrae 24. The composition and interrelationships of the Liopropomatinae and the genus *Liopropoma* are uncertain.

## GENUS *Liopropoma* Gill 1861

Characters as for subfamily Liopropomatinae. Occur in Indo-Pacific; 19 species, at least 5 in WIO, plus probably 1 undescribed species (included here in key only).

### KEY TO SPECIES

- |    |   |  |
|----|---|--|
| 1a | Body with 4–8 dark stripes .....  | 2                                      |
| 1b | Body with 1 or no dark stripes .....  | 3                                      |
| 2a | Body with 4 or 5 dark stripes, each twice width of pale interspaces; pectoral fins 14 or 15 rays .....  | <i>L. africanum</i>                    |
| 2b | Body with 6–8 dark stripes, each ~½ width of pale interspaces; pectoral fins 15 or 16 rays .....  | <i>L. susumi</i>                       |
| 3a | Body with 1 dark nearly horizontal stripe and semicircular black spots .....  | 5                                      |
| 3b | Body without dark stripe but may have faint dark horizontal lines ventrally or semicircular black spots .....   | 4                                      |
| 4a | Body red to brownish red, often with faint linear pattern following horizontal scale rows; yellow stripe from snout to eye, another stripe across interorbital area, and 1–3 stripes extending back from eyes; body depth 3.1–4.2 in SL ..... | <i>L. mitratum</i>                     |
| 4b | Body dusky orange, with scattered small dark brown spots extending onto head, dorsal fin and caudal fin; body depth 2.9–3.3 in SL .....   | <i>L. lunulatum</i>                    |
| 5a | Anal fin 8 rays; snout length 4.1–4.3 in HL; lower GR 12 or 13 (including 4 or 5 rudiments); dark stripe from snout to joining dark blotch at caudal-fin base; dark spots above and below stripe .....  | <i>L. randalli</i>                     |
| 5b | Anal fin 9 rays; snout length ~3.7 in HL; lower GR 14 (including 6 rudiments); dark stripe from snout to dorsal surface of peduncle; above dark blotch on caudal fin; dark spots only above stripe .....                                      | <i>Liopropoma</i> sp. [Plates 16 & 23] |

### *Liopropoma africanum* (Smith 1954)

African basslet

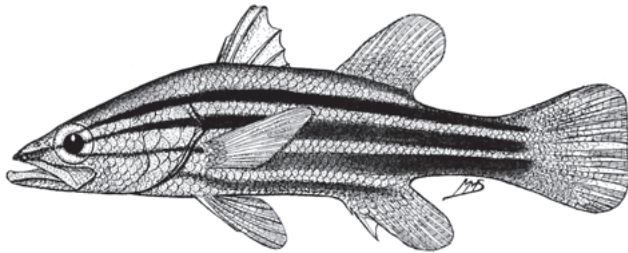
PLATE 16

*Chorististium africanum* Smith 1954: 866, Fig. 1, Pl. 27, Fig. B (Tecomaji I., Mozambique).

*Liopropoma africanum*: Randall & Taylor 1988\*; Winterbottom *et al.* 1989 [as *africana*]; Randall & Anderson 1993; Kuitert 1998\*; McKenna & Allen 2003.

Dorsal fin divided, with 8 spines (8th spine usually scaled over, rarely visible) + 12 rays; anal fin 3 spines, 8 rays; pectoral fins 14 or 15 rays. GR 5 or 6/12–14. LL scales 45–48.

Head and body brownish red; horizontal stripes on body reddish brown, with narrow white interspaces; rear of peduncle yellowish; yellow stripe on side of snout, another from maxilla across cheek to brown stripe on chest. Attains 7 cm SL.



*Liopropoma africanum*, 7 cm TL, type (N Mozambique). Source: Smith 1954

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden (Djibouti), Kenya to Mozambique, Madagascar, Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Secretive, found in crevices and at the back of caves and overhangs, to ~50 m deep.

### *Liopropoma lunulatum* (Guichenot 1863)

Speckled basslet

PLATE 23

*Grystes lunulatus* Guichenot 1863: C-4 (Réunion, Mascarenes).

*Glaucosoma semilunifera* Bliss (ex Steindachner) 1883: 47

(Mauritius, Mascarenes).

*Anthias (Odontanthias) luteoroseus* Liénard in Sauvage 1891: 136

(Mauritius, Mascarenes).

*Liopropoma lunulatum*: Randall & Taylor 1988\*; Khalaf & Zajonz 2007.

Dorsal fin undivided, with 8 spines, 12 rays; anal fin 3 spines, 8 rays; pectoral fins 14 or 15 rays; caudal fin emarginate. GR 5 or 6/12–14 (including 3 or 4 rudiments). LL scales 46–49.

Head, body and median fins pinkish yellow; small black semicircular spots on upper half of body and peduncle; specimens from Red Sea and India also with black spots on lower half of body and bases of dorsal fins and caudal fin. Attains ~19 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Réunion, Mauritius, southwestern India and Red Sea; elsewhere to Japan and Society Is.

**REMARKS** An insular species known from 100–350 m. Specimens reported from the Red Sea and southwestern India might be a different species.

### *Liopropoma mitratum* Lubbock & Randall 1978

Pinstripe basslet

PLATES 16 & 23

*Liopropoma* sp.: Burgess & Axelrod 1975\*.

*Liopropoma mitratum* Lubbock & Randall 1978: 191, Fig. 2 (near fringing reef, Al Korae, Jeddah, Saudi Arabia, Red Sea); Randall & Taylor 1988\*.

Dorsal fin divided, with 7 spines (7th spine tip usually visible) + 1 spine, 11 or 12 rays; anal fin 1 spine, 8 rays; pectoral fins 13–15 rays; caudal fin truncate to slightly emarginate. GR 5–7/12–14 (including 5 rudiments). LL scales 45–48.

Head and body red to reddish brown, but with faint darker horizontal lines along scale rows and peduncle often yellowish; greenish yellow to yellow band across forehead, and another band on sides of snout from eyes to snout tip. Attains 8 cm SL.



*Liopropoma mitratum* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Red Sea. Elsewhere in Indo-Pacific: Christmas I., Indonesia, Philippines, Japan, Australia and Tuamotu Is.

**REMARKS** Collected in 3–46 m, usually in >15 m.

### *Liopropoma randalli* Akhilesh, Bineesh & White 2012

Indian basslet

PLATE 23

*Liopropoma randalli* Akhilesh, Bineesh & White 2012: 44, Figs. 1–2

(off Mangalore, southwestern India).

Dorsal fin undivided, with 8 spines, 12 rays; anal fin 3 spines, 8 rays; pectoral fins 14 or 15 rays; caudal fin emarginate. GR 1 or 2/12 or 13 (with 4 upper-limb and 4 or 5 lower-limb rudiments). LL scales 46–49.

Head, body and median fins pinkish red; dark yellowish brown stripe from snout through eye to caudal-fin base, where it joins a blackish blotch; small black semicircular spots on body, peduncle, dorsal and caudal fins, and sometimes on head. Attains 13 cm SL.

**DISTRIBUTION** Indian Ocean: southwestern India and Indonesia.

**REMARKS** Trawled off India from 170–260 m.

*Liopropoma susumi* (Jordan & Seale 1906)

Candystripe basslet

PLATES 16 &amp; 23

*Chorististium susumi* Jordan & Seale 1906: 256, Fig. 48  
(Apia, Upolu I., Samoa).

*Liopropoma susumi*: Randall & Taylor 1988\*; Winterbottom *et al.* 1989\*;  
Randall & Anderson 1993; Kuitert 1998\*; Khalaf & Zajonz 2007;  
Fricke *et al.* 2009.

Dorsal fin divided, with 8 spines (6 visible then 2 spines short and embedded) + 12 rays; pectoral fins 15 or 16 rays; caudal fin slightly convex to slightly emarginate with rounded lobes. GR 4–6/13–15. LL scales 44–47.

Body pale grey or reddish grey, becoming pale red on peduncle and caudal fin; 8 yellow-brown horizontal stripes ( $\frac{1}{3}$ – $\frac{1}{2}$  width of pale interspaces), 3rd–7th stripes narrow anteriorly onto head. Attains 8 cm SL.



*Liopropoma susumi*, 5 cm SL (Comoros). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Mascarenes, St Brandon Shoals and Chagos; elsewhere to Indonesia, Taiwan, Japan, Caroline Is., Australia, Samoa and Line Is.

**REMARKS** Probably the most common species in the genus, but cryptic. Found at the back of outer-reef caves and in crevices, occasionally in lagoons, from 2–34 m.

**GLOSSARY**

**amphipods** – a group of bilaterally compressed crustaceans.  
**barotrauma** – gas expansion in the swimbladder leading to haemorrhaging and death.  
**ciguatera poisoning (ciguatoxic)** – a type of food poisoning affecting the nervous system in humans caused by eating certain large reef fishes contaminated with ciguatoxin, a toxin produced by the dinoflagellate *Gambierdiscus toxicus*.  
**lamella (pl. lamellae)** – plate-like fold of skin.  
**polychaetes** – segmented marine worms with bristles.  
**protogynous hermaphrodite** – an individual that functions first as a female and then changes to a male.  
**stomatopods** – mantis shrimps.

**FAMILY ANTHIADIDAE**

Goldies, basslets, perchlets and swallowtails

Phillip C Heemstra and Elaine Heemstra

A motley assemblage of species previously included in the Serranidae, with dorsal fin-margin complete or notched to its base, and 10–13 spines, 13–20 rays; caudal-fin shape sexually dimorphic in most species, varying from convex to lunate or deeply forked, sometimes with elongated filamentous rays; anal fin 3 spines, 6–9 rays. LL scales 25–74. Vertebrae 10 + 15, or 11 + 15, or 10 + 16; supraneural bones 0–3.

Most anthiadid species seem to be protogynous hermaphrodites, with males developing by transformation of large females, and with different colour patterns for the female and male.

Worldwide, ~30 genera and 217 species; possibly 10 genera and 46 species in WIO. The genus *Holanthias* now comprises 2 species restricted to St Helena I. and nearby seamounts in the southeastern Atlantic; other species previously recognised as *Holanthias* and occurring in WIO were reassigned to the genera *Odontanthias* and *Meganthias* (Randall & Heemstra 2006). The Indo-Pacific species previously included in *Anthias* were assigned to *Pseudanthias* (Heemstra & Akhilesh 2012). Although *Acanthistius* is included here as a member of the Anthiadidae, as has long been the custom, recent studies suggest that it is not allied with any serranoid families (Craig & Hastings 2007; Smith & Craig 2007).

**KEY TO GENERA**

- 1a Dorsal fin 11–13 spines; anterior nostril with broad fringed flap posteriorly; lower edge of preopercle with 2 or 3 large antrorse spines; supramaxilla attached to upper rear edge of maxilla; caudal fin slightly convex, with 15 branched rays. .... *Acanthistius*
- 1b Dorsal fin 10 or 11–13 spines; no fringed flap on anterior nostril; no antrorse spines on lower edge of preopercle (except some species of *Plectranthias* with antrorse spines on lower edge of preopercle and rudimentary supramaxilla); supramaxilla not attached to upper rear edge of maxilla; caudal fin usually lunate or deeply forked, with 13 branched rays. .... 2
- 2a Dorsal fin continuous or notched, but not divided to base (except fin divided in *Plectranthias longimanus* without cirrus at tips of dorsal-fin spines); body depth 2.6–3.1 in SL; lateral line incomplete, ending below dorsal-fin rays, LL scales 12–15; maxilla naked; caudal fin truncate to slightly rounded. .... 3
- 2b Dorsal fin divided to base between spinous and soft-rayed parts, spines tipped with short cirrus; body depth 3–4 in SL; lateral line complete, LL scales 49–74; maxilla scaly; caudal fin lunate, lobes attenuated. .... *Luzonichthys*

Continued ...

**KEY TO GENERA**

3a	LL scales 52–55.....	4
3b	LL scales 25–51.....	5
4a	Body depth 2.9–3.1 in SL; dorsal fin 11 or 12 spines.....	<i>Nemanthias</i>
4b	Body depth 3.8–3.9 in SL; dorsal fin 10 spines.....	<i>Rabaulichthys</i>
5a	Tongue with patch of minute teeth (tooth patch reduced or absent in specimens of <i>Meganthias natalensis</i> >30 cm SL); body depth 1.8–2.7 in SL.....	6
5b	No teeth on tongue; body depth 2.3–3.6 in SL.....	7
6a	Body depth 1.8–2.2 in SL; vomerine tooth patch triangular, with rounded corners and no median posterior extension; dorsal fin 17–19 rays; caudal fin lunate to deeply forked, and lobes slender and elongated in males.....	<i>Meganthias</i>
6b	Body depth 1.9–2.9; vomerine tooth patch diamond- or arrow-shaped, with short median posterior extension; dorsal fin 14–18 rays; caudal fin deeply forked, lobes acute and elongated or rounded.....	<i>Odontanthias</i>
7a	LL scales 25–31.....	8
7b	LL scales 34–64.....	9
8a	Caudal-fin branched rays 13, fin deeply forked with slender lobes; dorsal-fin margin either not notched or slightly notched before soft-rayed part.....	<i>Sacura</i>
8b	Caudal-fin branched rays 13–17, if 13 branched rays then fin rounded or truncate; dorsal-fin margin slightly to deeply notched before soft-rayed part.....	<i>Plectranthias</i>
9a	Dorsal fin 13 or 14 rays; pectoral fins 15 or 16 rays; vomerine tooth patch triangular.....	<i>Tosana</i> [1 species: presence in WIO based on one dubious record of <i>T. niwae</i> from Bahrain, Persian/Arabian Gulf (Al-Baharna 1986); Plate 35]
9b	Dorsal fin 15–18 rays; pectoral fins 16–21 rays; vomerine tooth patch oval, or chevron-shaped and concave posteriorly.....	<i>Pseudanthias</i>

**GENUS *Acanthistius* Gill 1862**

Dorsal fin complete, with 11–13 spines, 15–17 rays, and no spines or rays elongated; anal fin 3 spines, 7–9 rays; pectoral fins rounded; caudal fin 15 branched rays, margin convex. Anterior nostrils with broad fringed flap; preopercle rear edge rounded, upper two-thirds finely serrate, serrae increasing in size ventrally, lower edge with 2–5 large antrorse spines. Supramaxilla loosely attached to upper rear edge of maxilla and covered by skin. Jaws with inner row or rows of small slender teeth and a few outer teeth enlarged as small canines; vomer and palatines with small cardiform teeth; tongue edentate. Scales ctenoid; LL scales

47–52, tubes with 2–5 branches. GR 2–4/8–9. Vertebrae 10 + 16; 3 supraneural bones: 0/0/0+2//1/1/1/1/; epineural bones on first 9 vertebrae; ribs on vertebrae 3–10. Found in shallow, subtropical and warm-temperate waters of Southern Hemisphere. Eleven species, 2 in WIO.

**KEY TO SPECIES**

1a	Maxilla covered with distinct ctenoid scales; pectoral fins 17–19 rays; no small reddish orange spots on head and body, but with larger russet blotches and dark brownish blotch on middle spine of opercle and another faint blotch just behind eye.....	<i>A. joanae</i>
1b	Maxilla apparently naked, with scales minute, embedded and inconspicuous; pectoral fins 19–21 rays; head, body and spinous part of dorsal fin covered with numerous small orange spots, and no dark blotch at rear edge of eye or on opercle.....	<i>A. sebastoides</i>

***Acanthistius joanae* Heemstra 2010**

Whiteblotch koester

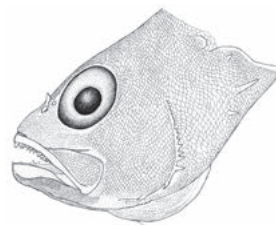
PLATE 25

*Acanthistius* sp.: SSF No. 166.2\*; Beckley 1994\*; King & Fraser 2001\*; Heemstra & Heemstra 2004.

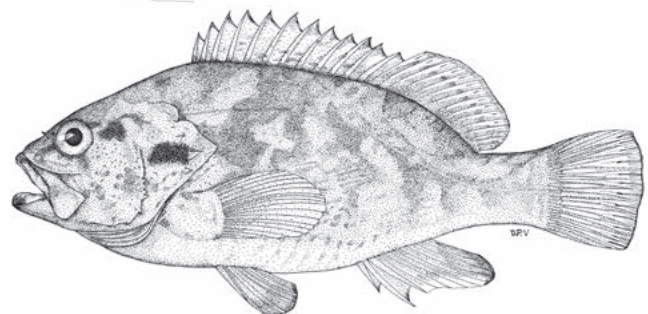
*Acanthistius joanae* Heemstra 2010: 61, Figs. 1–4 (off Umdloti, KwaZulu-Natal, South Africa).

Dorsal fin 12 spines, 14–16 rays; anal fin 8 or 9 rays; pectoral fins 17–19 rays. LL scales 47–52, tubes with 2 branches; 13–17 scale rows from base of 6th dorsal-fin spine to lateral line.

Head and body pale whitish grey, with irregular russet spots and blotches; conspicuous dark blotch covering most of opercle; series of 5 irregular whitish blotches along dorsal-fin base, and vertical white streak at caudal-fin base. Attains 14 cm SL.



*Acanthistius joanae*, 11 cm SL, head of holotype; 13 cm SL, paratype (both South Africa).  
Source: Heemstra 2010



**DISTRIBUTION** WIO: southern Mozambique to South Africa (Algoa Bay, Eastern Cape).

**REMARKS** Solitary on coral and rocky reefs, in 14–140 m.

### *Acanthistius sebastoides* (Castelnau 1861)

Koester

PLATE 25

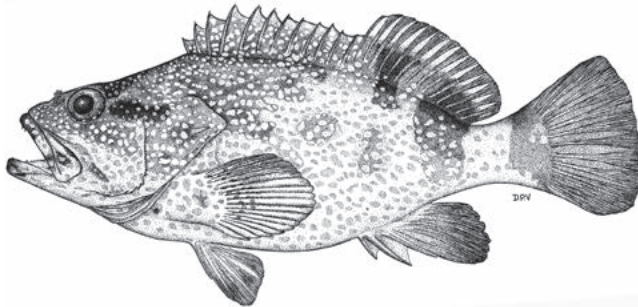
*Serranus cuvieri* (*non* Smith): Castelnau 1861.

*Serranus sebastoides* Castelnau 1861: 3 [Algoa Bay, Simons Bay and False Bay, South Africa].

*Acanthistius sebastoides*: Boulenger 1895; Barnard 1927; Smith & Smith 1966\*; SSF No. 166.1\*; Heemstra & Heemstra 2004\*; Heemstra 2010\*.

Dorsal fin 11–13 spines, 15–17 rays; anal fin 7 or 8 rays; pectoral fins 19–21 rays. LL scales 47–52, tubes with 3–5 branches; 13–17 scale rows from base of 6th dorsal-fin spine to lateral line.

Head, body and dorsal fin buff, covered with small reddish orange spots; pectoral fins reddish orange distally, proximal half buff with orange spots; anal fin dusky orange, with white margin; rear half of peduncle and caudal fin blackish, margin white. Attains 25 cm SL.



*Acanthistius sebastoides*, 19 cm SL (South Africa). Source: Heemstra 2010

**DISTRIBUTION** Endemic to Southern Africa: South Africa (Cape Point to KwaZulu-Natal) in WIO and reported from Namibia in southeastern Atlantic.

**REMARKS** Adults solitary; sedentary ambush predator on rocky reefs, in 1–30 m.

### GENUS *Luzonichthys* Herre 1936

Dorsal fin with 10 slender spines tipped with short fleshy cirrus, 15–17 rays (some anterior rays unbranched), fin origin behind head and fin divided to base between spinous and soft-

rayed parts; anal fin with 3 spines, 7 rays, or with 2 spines, 9 rays; caudal fin lunate, with 13 branched rays. Maxilla scaly; no supramaxilla. Teeth on jaws small, uniserial; palatines with 1 or 2 rows of minute teeth; vomer and tongue edentate. Rear edge of orbit with several papillae; rear edge of preopercle with small serrae, lower edge smooth; rear edge of opercle with 2 flat spines. GR 6–10/19–23. Scales ctenoid; lateral line complete, LL scales 49–74; no auxiliary scales. Vertebrae 11 + 15; supraneurals 2 or 3. Very small, slender schooling fishes, found on reefs, at 15–100 m. About 7 species, 3 known from WIO.

#### KEY TO SPECIES

- |    |   |                      |
|----|---|----------------------|
| 1a | Body depth 4.1–4.4 in SL; anal fin 2 spines, 8 or 9 rays; LL scales 70–76.....  | <i>L. microlepis</i> |
| 1b | Body depth 3.3–4.1 in SL; anal fin 3 spines, 7 rays; LL scales 51–68.....   | 2                    |
| 2a | LL scales 59–68; peduncle depth 2.6–2.9 in HL; scales on snout not extending in front of anterior nostrils; caudal-fin concavity 6.1–7.3 in SL..... | <i>L. earlei</i>     |
| 2b | LL scales 51–59; peduncle depth 2.3–2.6 in HL; scales on snout extending in front of anterior nostrils; caudal-fin concavity 4–5.6 in SL.....       | <i>L. waitei</i>     |

### *Luzonichthys earlei* Randall 1981

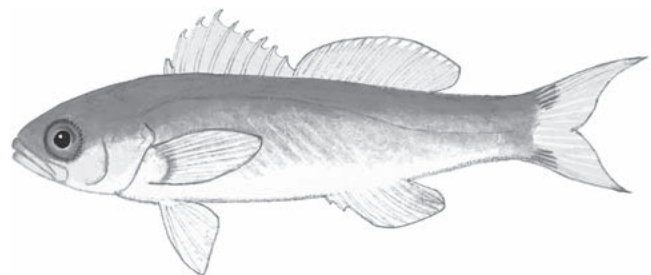
Orange splitfin

PLATES 25 & 27

*Luzonichthys earlei* Randall 1981: 14, Fig. 4 (Oahu I., Hawaii); Kuitert 2004\*.

Body depth 3.6–4.1 in SL; HL 3.2–3.4 in SL. Dorsal fin 16 or 17 rays; anal fin 3 spines, 7 rays; pectoral fins 19–21 rays. GR 6–9/19–22. LL scales 59–68.

Head and body orange-yellow dorsally, pink to lavender below, underside of head pale pink to silvery; dorsal fin hyaline yellow, cirri on spines yellow; caudal fin pale orange-yellow, membranes on upper and lower parts of base magenta. Attains 4 cm SL.



*Luzonichthys earlei*, 4 cm TL (Maldives).

**DISTRIBUTION** Indo-Pacific. WIO: Maldives and Comoros (photographed at ~60 m); elsewhere to Christmas I., Micronesia, Marshall Is. and Hawaii.

**REMARKS** Known from ~48 m in Maldives (Randall & McCosker 1992) and in 45–140 m in western Pacific.

*Luzonichthys microlepis* (Smith 1955)

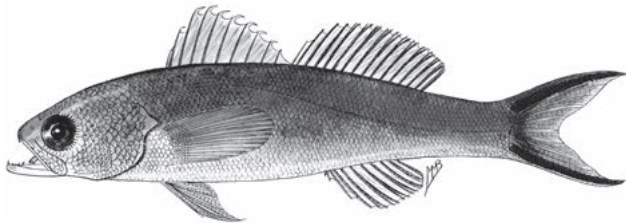
Slender splitfin PLATE 27

*Naurua microlepis* Smith 1955: 345, Fig. 3 (Malindi, Aldabra, Seychelles).

*Luzonichthys microlepis*: Smith 1961\*; SSF No. 166.14\*; Randall & McCosker 1992\*.

Body depth 4.1–4.4 in SL; HL 3.5–3.7 in SL. Dorsal fin 16 rays; anal fin 2 spines, 8 or 9 rays; pectoral fins 22–24 rays. GR 7 or 8/21 or 22. LL scales 70–76.

Body scarlet dorsally, mauve-pink below. Attains 6 cm SL.



*Luzonichthys microlepis*, 7 cm TL, holotype (Aldabra). Source: SSF

**DISTRIBUTION** WIO: records from Aldabra, Seychelles, St Brandon Shoals and Agaléga Is.

**REMARKS** Found on coral reefs, in 15–21 m.

*Luzonichthys waitei* (Fowler 1931)

Magenta splitfin PLATES 25, 26 & 27

*Mirolabrichthys waitei* Fowler 1931: 228, Fig. 16 (Luzon, Philippines).

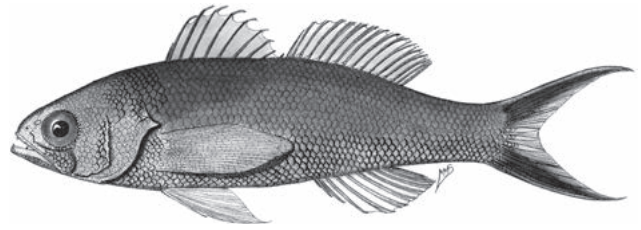
*Naurua addisi* Smith 1955: 348, Fig. 4 (Aldabra, Seychelles).

*Luzonichthys addisi*: Winterbottom & Anderson 1997.

*Luzonichthys waitei*: Randall & McCosker 1992\*.

Body depth 3.3–3.8 in SL; HL 3–3.6 in SL. Dorsal fin 15–17 rays; anal fin 3 spines, 7 rays; pectoral fins 17–21 rays. GR 8/22. LL scales 51–59.

Colour variable, upper third of head and body usually dusky yellowish pink, lavender-pink laterally, becoming whitish ventrally; dorsal surface of peduncle and caudal-fin upper and lower lobes with magenta band, the magenta shading to yellow or pink tips. Attains 5.5 cm SL.



*Luzonichthys waitei*, 7 cm TL, holotype of *Naurua addisi* (Aldabra). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Aldabra, Seychelles, Agaléga Is., St Brandon Shoals and Chagos; elsewhere to Indonesia, Philippines, Japan and Loyalty Is.

**REMARKS** Often occurs in dense aggregations on outer coral-reef drop-offs, in 1.5–50 m.

**GENUS** *Meganthias* Randall & Heemstra 2006

Body depth greater than head length, 1.8–2.2 in SL; head profile of adults distinctly convex, HL 2.6–2.9 in SL. Dorsal fin complete, with 10 slender spines, 17–19 rays (in males, anterior rays much longer than longest spine), and fin origin over rear edge of opercle; anal fin 3 spines, 7 or 8 rays; pectoral fins 17 or 18 rays; caudal fin 13 branched rays, fin deeply forked, lobes long and slender, longest lobe 1.2–2.3 in SL. Preopercle edge finely serrate, but no spine or enlarged serrae at angle. Jaws with bands of villiform teeth, outer teeth enlarged: upper jaw with mostly villiform teeth; 6 short stout conical teeth on each side of lower jaw symphysis, projecting slightly upward and exposed when mouth closed; vomerine tooth patch triangular with rounded corners; palatines with long, slender, curved patch of villiform teeth; tongue with oval patch of minute teeth, mostly hidden by rugose skin folds and short fleshy cirri. Lips rugose. GR 10–13/24–28. Body and head with numerous tiny auxiliary scales; scales dorsally on snout extend to upper lip; maxilla and lower jaw covered with minute embedded scales; LL scales 43–51; 3 or 4 scale rows from middle spines of dorsal fin to lateral line. Supraneural bones 2: 0/0/2/1/1/1/1/. Vertebrae: 10 + 16. Three species, 2 in WIO.

**KEY TO SPECIES**

- 1a HL 2.4–2.5 in SL; lower edge of preopercle crenulate; head and body reddish pink, with broad dusky yellow swathe from interorbital area to 5th spine of dorsal fin; soft-rayed part of dorsal fin pink, with row of red spots along margin, 2nd and 3rd rays elongated, attenuated, yellow, with red spot in line with posterior row of red spots; anal fin pink basally, yellow distally; caudal fin reddish pink, with dusky yellow submarginal band along upper and lower margins; paired fins dusky yellow; rear edge of preopercle and opercle yellow ..... *M. filiferus*

Continued ...

## KEY TO SPECIES

- 1b HL 2.7–3 in SL; preopercle edge serrate; head and body pink, suffused with yellow laterally; spinous part of dorsal fin reddish orange to yellow, soft-rayed part pink, rays 3–5 slightly longer (at ~17 cm SL), becoming lobe-like on larger specimens; paired fins, anal fin and caudal fin yellow-pink; rear edge of preopercle and lower edge of opercle marked with yellow ..... *M. natalensis*

*Meganthias filiferus* Randall & Heemstra 2008

Filamentous basslet

PLATE 26

*Meganthias filiferus* Randall & Heemstra 2008: 6, Figs. 1–2  
(Thailand, Andaman Sea); Akhilesh *et al.* 2009\*.

Body depth ~2 in SL; HL ~2.4 in SL. Dorsal fin 18 rays, rays 1–4 longest, 2nd and 3rd rays greatly elongated and merging to form slender filament subequal to HL; anal fin 8 rays; pectoral fins 17 rays. GR 12/25. LL scales 44; 3 scale rows from middle spines of dorsal fin to lateral line.

Head and body pink, with several yellow markings; broad greenish yellow area on top of head from interorbital area to below first 4 spines of dorsal fin and extending over first 4 membranes; spinous part of dorsal fin pink posteriorly, last 6 spines with scarlet spot at tips; elongated 2nd and 3rd dorsal-fin rays pinkish proximally, yellow distally, with small red spot on lower edge of yellow part, rest of soft-rayed part of fin pinkish, with row of small red spots near margin; caudal fin pink, with dull yellow submarginal band along each lobe. Attains at least 29 cm SL.

**DISTRIBUTION** Known only from two specimens from southwestern India and Thailand.

**REMARKS** Caught with bottom longline, at 150 m off southwestern Thailand, and in similar depth off Kochi, India.

*Meganthias natalensis* (Fowler 1925)

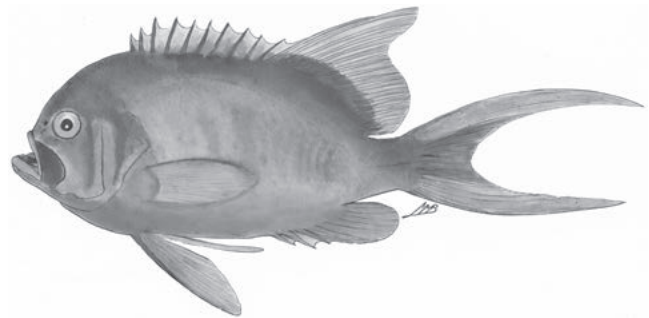
Goliath basslet

PLATES 26 &amp; 27

*Sacura natalensis* Fowler 1925: 226, Fig. 2 (KwaZulu-Natal, South Africa).  
*Holanthias furcatus* Pellegrin 1935: 51 (Réunion, Mascarenes).  
*Glaucosoma peaolopesi* Smith 1939: 216, Fig. 1 (southern Mozambique).  
*Holanthias natalensis*: SFSA No. 200\*; SSF No. 166.12\*.  
*Meganthias natalensis*: Randall & Heemstra 2006\*; Schneider & Janke 2013\*.

Body depth ~2 in SL; HL 2.7–3 in SL. Dorsal fin 17–19 rays, rays 3–5 slightly longer (at ~17 cm SL) and forming pointed lobe on larger specimens; anal fin 8 or 9 rays; pectoral fins 16–18 rays; caudal fin forked with rounded lobes, to lunate with elongate pennant-like lobes on large specimens. GR 10–12/24–26. LL scales 45–50; 3 or 4 scale rows from middle spines of dorsal fin to lateral line.

Head and body pink; females (at ~17 cm SL) with yellow area on nape from lateral line to first 5 spines of dorsal fin; large specimens with yellow band from eyes to top of peduncle; pectoral fins and caudal fin mostly yellow, middle membranes pinkish; pelvic fins yellow; spinous parts of dorsal and anal fins yellow, and soft-rayed parts of fins pink basally. Attains at least 40 cm SL.



*Meganthias natalensis*, 51 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** WIO: Kenya to South Africa (Eastern Cape), Seychelles, Walters Shoals, Réunion and Mauritius.

**REMARKS** Known from 88–300 m, over hard bottom; one juvenile (16 mm SL) collected in northern Mozambique from tidepool in ~1 m.

**GENUS** *Nemanthias* Smith 1954

Body elongate, depth subequal to HL, 3.1–3.3 in SL. Dorsal fin with 11 or 12 flexible spines, first 2 spines elongated and filamentous (12 spines in small juveniles, but first spine is minute and disappears with growth), 16 or 17 rays, and fin origin of adults on head above rear edge of eyes; caudal fin deeply lunate, males with lower lobe longer than upper lobe. Small juveniles with large spines on preopercle and supracleithrum, resorbed with growth. Vertebrae 10 + 15; no supraneurals. One species.

***Nemanthias carberryi*** Smith 1954

Threadfin goldie

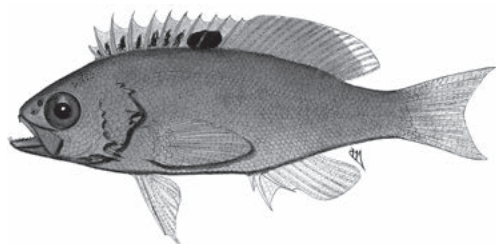
PLATES 26 & 27

*Nemanthias carberryi* Smith 1954: 4, Fig. 2 (Malindi, Kenya); Smith 1955, 1961\*; SSF No. 166.15\*; Winterbottom *et al.* 1989\*; Kuitert 1998\*; Heemstra & Heemstra 2004\*.

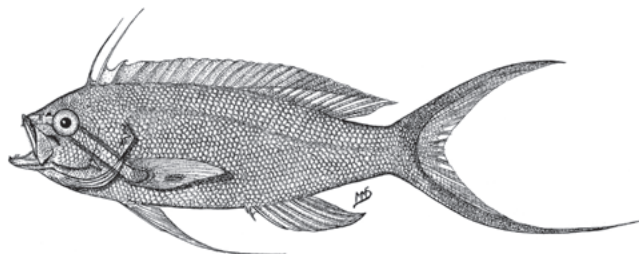
*Emmelanthias stigmapteron* Smith 1955: 342, Fig. 2 (east of Port Alfred, Eastern Cape, South Africa); Smith 1961\*.

Body depth 2.9–3.1 in SL; HL 3.2–3.3 in SL. Anal fin 3 spines, 6–8 rays; pectoral fins 19 or 20 rays. No supramaxilla; upper jaw with outer series of inwardly curved sharp conical teeth, 2 or 3 rows of much smaller teeth on inner sides of jaw, large curved canine projecting on each side of symphysis, and pair of similar but recurved canines, one of each pair markedly larger than the other; lower jaw with row of recurved fine conical teeth ending well before symphysis at larger recurved canine; vomer with 2 or 3 rows of small sharp teeth, easily shed, and palatines with 3 or 4 rows of similar teeth; no teeth on tongue. GR 10–12/24–27. LL scales 52–56; maxilla scaly.

Head and front of body pink, paler pink below, grading to cerise on underside of peduncle; most scales on flanks marginally scarlet, centres bright orange; thin stripe from snout to eye yellow above, cerise below, and similar red-edged yellow stripe from eye to pectoral-fin base; papilla on front of upper lip orange; dorsal fin scarlet, with yellow wedge along soft-rayed part; caudal fin usually gold. Attains 7 cm SL.



*Nemanthias carberryi*, 3 cm TL, juvenile, holotype of *Emmelanthias stigmapteron* (South Africa). Source: SSF



*Nemanthias carberryi*, 10 cm TL, holotype (Kenya). Source: SSF

**DISTRIBUTION** WIO: Kenya to South Africa (Aliwal Shoal, KwaZulu-Natal; juveniles to Port Alfred, Eastern Cape), Madagascar, Chagos and Maldives.

**REMARKS** Found on shallow coral reefs, in ~10–30 m, often in large schools. Smith's (1955) description of *Emmelanthias stigmapteron* was based on a small juvenile *N. carberryi*.

**GENUS** *Odontanthias* Bleeker 1873

Dorsal fin complete, with 10 spines, 12–19 rays, anterior rays more or less elongated and longer than spines, but 3rd spine elongate in some species; anal fin 3 spines, 7 or 8 rays. No supramaxilla. Vomerine tooth patch with median posterior projection. GR 37–51. LL scales 30–51; maxilla scaly. Vertebrae 10 + 16; supraneurals 2. Fifteen species, 4 in WIO.

**KEY TO SPECIES**

- 1a Dorsal fin 12–14 rays; body depth 2.4–2.9 in SL..... 2
- 1b Dorsal fin 16–18 rays; body depth 1.9–2.3 in SL..... *O. borbonius*
- 2a In males, 3rd spine of dorsal fin longer than other spines; caudal fin emarginate to forked, fin length 2.7–3.5 in SL..... 3
- 2b Third spine of dorsal fin not longer than other spines; caudal fin lunate, with filamentous lobes, fin length 1.9–2.7 in SL..... *O. caudicinctus*
- 3a Dorsal fin 12 or 13 rays; no black marks on interspinous membranes of dorsal fin; black crescent at caudal-fin base; pectoral fins 3.1–3.4 in SL..... *O. rhodopeplus*
- 3b Dorsal fin 14 rays; black band on outer two-thirds of 3rd interspinous membrane of dorsal fin, and black spot near tips of 4th and 5th membranes; pectoral fins 3.6–3.8 in SL..... *O. dorsomaculatus*

***Odontanthias borbonius*** (Valenciennes 1828)

Checked swallowtail

PLATES 26 & 27

*Serranus borbonius* Valenciennes *in* Cuv. & Val. 1828: 263 (Réunion, Mascarenes).

*Serranus delissii* Bennett 1831: 126 (Mauritius, Mascarenes).

*Aylopon mauritianus* Guichenot 1868: 86 (Réunion and Mauritius, Mascarenes).

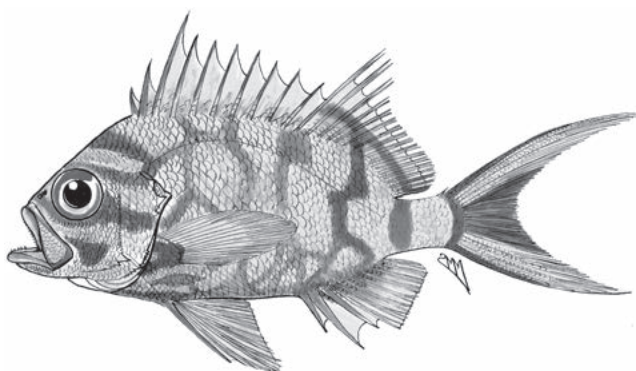
*Anthias ornatus* Fourmanoir 1955: 213, Fig. 8 (Grande Comore and Anjouan, Comoros).

*Odontanthias borbonius*: Randall & Heemstra 2006\*.



Body depth 1.9–2.3 in SL; HL 2.6–2.8 in SL. Dorsal fin 16–18 rays, anterior rays filamentous, 2nd or 3rd ray longest; anal fin 7 or 8 rays; pectoral fins 16–18 rays; caudal fin lunate with pointed lobes (fish >9 cm SL), to deeply emarginate with rounded (paddle-shaped) lobes. GR 11–13/27–29. LL scales 39–43.

Head and body pink, with 9–11 brownish yellow spots dorsally, and 3 yellow bands on head (1st band on nape may break into 2 spots; 2nd band behind eye; 3rd band from snout and below eye to pectoral-fin base); fins yellowish, with pink leading edges, and pinkish spot near centre of caudal fin. Attains 15 cm SL.



*Odontanthias borbonius*, 13 cm TL (Comoros). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Xai-Xai) to South Africa (KwaZulu-Natal), Comoros, Réunion, Mauritius, and possibly Madagascar; elsewhere to Indonesia, Taiwan, Japan and Palau.

**REMARKS** Transforms to male at 6–8 cm SL. Known from ~70–300 m. Females in small loose groups with one or two males have been seen in coelacanth habitat at Comoros.

### *Odontanthias caudicinctus*

(Heemstra & Randall 1986)

Blackblotch swallowtail

PLATE 27

*Holanthias caudicinctus* Heemstra & Randall 1986: 513, Pl. 34 (Kenya).

*Odontanthias caudicinctus*: Randall & Heemstra 2006\*.

Body depth 2.6–2.9 in SL; HL 2.5–2.8 in SL. Dorsal fin 14 rays; anal fin 7 or 8 rays; pectoral fins 18 or 19 rays; caudal fin lunate, with filamentous lobes. GR 11 or 12/25–28. LL scales 46–51.

Head and body of females and males mostly pink, paler ventrally, yellowish dorsally; eyes yellow; yellow band from snout below eye to pectoral-fin base; faint reddish band from

nostril over eye to lateral-line origin. Females with pale yellow fins. Males with black spot on caudal-fin base, preceded by white cuneate mark, upper and lower caudal-fin leading edges dusky yellow, rest of fin pinkish; dorsal fin mauve to pink, yellow distally; anal-fin rear tip mauve; paired fins white to pinkish or mauve. Attains 17 cm SL.



*Odontanthias caudicinctus*, 9 cm SL, holotype (Kenya). Source: Randall & Heemstra 2006



*Odontanthias caudicinctus*, 6 cm SL, female (Kenya).

PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Kenya and South Africa (St Lucia, KwaZulu-Natal, to Eastern Cape).

**REMARKS** Known from 99–301 m. Transforms to male at ~6–8 cm SL. Feeds on small shrimps.

### *Odontanthias dorsomaculatus*

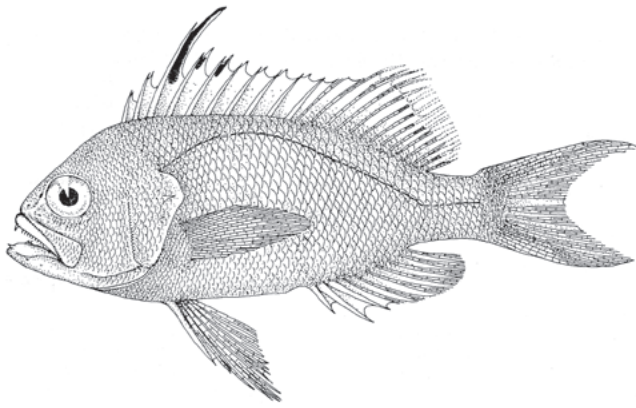
Katayama & Yamamoto 1986

Blacktips swallowtail

*Odontanthias dorsomaculatus* Katayama & Yamamoto 1986: 387, Fig. 1 (Saya de Malha Bank); Randall & Heemstra 2006\*.

Body depth 2.6–2.7 in SL; HL 2.7–2.8 in SL. Dorsal fin 14 rays; anal fin 7 rays; pectoral fins 19 rays; caudal fin lunate. Males with 3rd spine of dorsal fin elongated, with flap at tip. GR 13/28. LL scales 44.

Head and body orange, with white spots on sides, and 3 pinkish spots dorsally (1st spot below front of dorsal fin; 2nd spot at base of dorsal-fin rays 3–7; 3rd spot on upper part of peduncle); dorsal fin orange, distal two-thirds of 3rd membrane with black band (present in preservative), and black oval spot near tips of 4th and 5th interspinous membranes. Attains at least 14 cm SL.



*Odontanthias dorsomaculatus*, 13 cm SL (Saya de Malha Bank).  
Source: Katayama & Yamamoto 1986

**DISTRIBUTION** Known only from two type specimens on the Saya de Malha Bank.

**REMARKS** Trawled from 120 m and 158 m.

### *Odontanthias rhodopeplus* (Günther 1872)

Tailring swallowtail

PLATE 26

*Anthias rhodopeplus* Günther 1872: 654, Pl. 55 (Manado, Sulawesi, Indonesia).

*Holanthias perumali* Talwar 1976: 362, Fig. 1 (Kollam, India).

*Odontanthias rhodopeplus*: Randall & Heemstra 2006\*.

Body depth 2.4–2.7 in SL; HL 2.4–2.7 in SL. Dorsal fin 12 or 13 rays; anal fin 7 rays; pectoral fins 17 or 18 rays; caudal fin forked, lobes pointed in females, paddle-shaped in males. GR 12–14/27–30. LL scales 30–33.

Head and body pinkish red, with whitish spot on each body scale; broad yellow band above eyes extending onto nape and above lateral line to below anterior rays of dorsal fin; oblique yellow band from snout and below eyes to opercle edge; dark brown or black bar at caudal-fin base, bordered with white bar anteriorly and whitish bar posteriorly; fins mostly reddish, except dorsal-fin rays with dark brown spots, membranous tip of 3rd spine of dorsal fin black, and pectoral-fin base with yellow-orange spot. Attains 22 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden (Somalia) and southwestern India; elsewhere to Indonesia, Taiwan and Japan.

**REMARKS** Known from 160–300 m. Variation in recorded colour patterns of this species suggests that it may represent a species-complex.

## GENUS *Plectranthias* Bleeker 1873

Dorsal fin 10 spines, 13–20 rays, fin margin slightly to deeply notched before soft-rayed part; anal fin 3 spines, 6–8 rays; last ray of dorsal and anal fins double (split to base but counted as single ray); pectoral fins 12–18 rays, branched in most species; caudal fin variously rounded, truncate or emarginate, with 13–15 branched rays. Jaws with small sharp conical teeth; vomer and palatines with villiform teeth; no teeth on tongue. Maxilla naked (except *P. gardineri* with a few scales dorsally); supramaxilla small, splint-like, hidden by skin, as is a low ridge on it below dorsal edge of maxilla. Opercle rear edge with 3 spines, middle spine largest and most posterior; preopercle rear edge rounded and serrate, lower edge with 1–3 small antrorse spines. GR 4–6/9–15, including rudiments. Lateral line complete or incomplete; LL counts are of tubed scales. Vertebrae 10 + 16; supraneurals 2 or 3. Small, solitary, sedentary, most found perching on or near coral or rocky reefs, in 6–300 m (usually >50 m). Deep-reef species are rare in collections, and several species are known from only 1 or 2 specimens. Largely occur in Indo-Pacific; ~50 species, 13 in WIO.

### KEY TO SPECIES

- |    |  |                     |
|----|--|---------------------|
| 1a | Preopercle, interopercle and subopercle smooth; dorsal fin 16–20 rays; pectoral fins 13 rays, none branched  | <i>P. inermis</i>   |
| 1b | Preopercle serrate dorsally, serrae distinct, small or minute; interopercle and subopercle smooth or serrate; dorsal fin 13–17 rays; pectoral fins 12–15 rays, middle rays branched in adults of some species    | 2                   |
| 2a | Lateral line interrupted below soft-ray part of dorsal fin, with 12–22 tubed scales, and peduncle with or without pored scales   | 3                   |
| 2b | Lateral line complete, extending to caudal-fin base, with 27–34 tubed scales   | 6                   |
| 3a | Body depth 2.3–2.5 in SL, subequal to HL; maxilla with row of 5–11 small ctenoid scales dorsally; no antrorse spines on lower edge of preopercle   | <i>P. gardineri</i> |
| 3b | Body depth 2.6–3.4 in SL, less than HL; no scales on maxilla (except <i>P. intermedius</i> with a few scales); ventral edge of preopercle with 1 or 2 separate antrorse spines (often hidden by skin and scales) | 4                   |

Continued...

## KEY TO SPECIES

- 4a Dorsal fin 13–15 rays; pectoral fins 12 or 13 rays; body mottled dark brown, with small black spots on peduncle, row of 5 black spots from base of lower caudal-fin rays along ventral surface of peduncle and anal-fin base ..... *P. longimanus*
- 4b Dorsal fin 16 or 17 rays; pectoral fins 14–18 rays; colour pattern not as above ..... 5
- 5a Pectoral fins 14–16 rays; caudal fin 13–15 (usually 15) branched rays; head and body mottled dark brown, with dark brown spot on upper and lower parts of caudal-fin base ..... *P. nanus*
- 5b Pectoral fins 16–18 rays; caudal fin 13 branched rays; head and body reddish brown with red spots, but no small dark brown spots at caudal-fin base ..... *P. winniensis*
- 6a Body pale, with dark band or series of dark spots along dorsal-fin base and curving ventrally onto peduncle; cheek with 10 oblique scale rows ..... *P. intermedius*
- 6b No dark band along dorsal-fin base; cheek with 4–8 oblique scale rows ..... 7
- 7a Top of head and interorbital area naked; ventral edge of preopercle with 2 or 3 antrorse spines, but hidden by skin ..... *P. pelicierii*
- 7b Top of head scaly to at least mid-interorbital area; ventral edge of preopercle smooth or irregular, or with 2 antrorse spines ... 8
- 8a Ventral edge of preopercle with 2 antrorse spines (usually hidden by skin and scales); body depth 2.1–2.6 in SL; adults with dorsal-fin interspinous membranes 3–6 produced with fleshy cirrus at spine tips ..... *P. bauchotae*
- 8b Ventral edge of preopercle smooth or irregular; body depth 2.3–3.1 in SL ..... 9
- 9a Dorsal fin 17 rays, a few rays elongated, and fin margin slightly notched before soft-rayed part; 3rd spine of dorsal fin elongate, with long banner at tip, and shorter cirrus at upper end of each interspinous membrane ..... *P. vexillarius*
- 9b Dorsal fin 13–15 rays; if 3rd spine of dorsal fin elongate with long banner at tip, then no cirri on other fin spines ..... 10
- 10a Caudal fin emarginate to lunate; short cirrus at tip of each dorsal-fin spine, and fin moderately notched before rays, some rays also exerted; head and body pale, with 4–8 small dark blotches dorsally ..... 11
- 10b Caudal fin emarginate to truncate; some dorsal-fin spines without cirrus at tips, and fin deeply notched before rays; colour not as above ..... 12
- 11a Pectoral fins 13 rays; circumpeduncular scales 14; soft-rayed part of dorsal fin and caudal fin with some exerted rays ..... *P. maugei*
- 11b Pectoral fins 14 rays; circumpeduncular scales 10; no exerted rays in soft-rayed part of dorsal fin and caudal fin ..... *P. alcocki*
- 12a Body oval, depth 2.4–2.6 in SL; LL scales 9–16, with dark pigment; first 2 interspinous membranes of dorsal fin white, 3rd spine elongate (1.7–2.3 in HL) and with long white banner (~½ spine length) at tip, no cirri on other spine tips; pectoral fins 13 or 14 rays, middle rays usually unbranched ... *P. morgansi*
- 12b Body oblong, depth 2.7–3.1 in SL; LL scales 29, with no dark pigment; 3rd spine of dorsal fin longest (1.9–2.3 in HL) and with short cirrus at tip, spines 4–6 with shorter cirrus at tips; pectoral fins 14 or 15 rays, middle rays branched ... *P. klausewitzi*

*Plectranthias alcocki*

Bineesh, Gopalakrishnan &amp; Jena 2014

## Alcock's perchlet

PLATE 29

*Plectranthias alcocki* Bineesh, Gopalakrishnan & Jena 2014: 490,  
Figs. 2–4 (off Kollam, Kerala coast, India).

Body depth ~2.9 in SL; HL 2–2.2 in SL. Dorsal fin 15 rays, fin margin slightly notched; anal fin 7 rays; pectoral fins 14 rays, all unbranched; caudal fin possibly slightly emarginate [fin broken in type specimens], with 17 branched rays. Preopercle with small serrae on rear edge, no antrorse spines on lower edge. GR 5/11. Lateral line complete; LL scales 28.

Body brownish anteriorly, reddish posteriorly (from nape to anal-fin origin), becoming dusky on peduncle; front of head and fins yellowish orange; blackish blotch along dorsal-fin base at spines 4–8, and also at rays 1–3, 6–7 and 11–14, with 2 dark blotches on dorsal surface of peduncle; opercle with black blotch posteriorly; abdomen with dusky spot. Preserved specimens uniformly buff, with traces of dark blotches on upper body. Attains at least 7 cm SL.

**DISTRIBUTION** Known only from two specimens from southwestern India.

**REMARKS** Trawled from 180–320 m.

## *Plectranthias bauchotae* Randall 1980

Robust perchlet

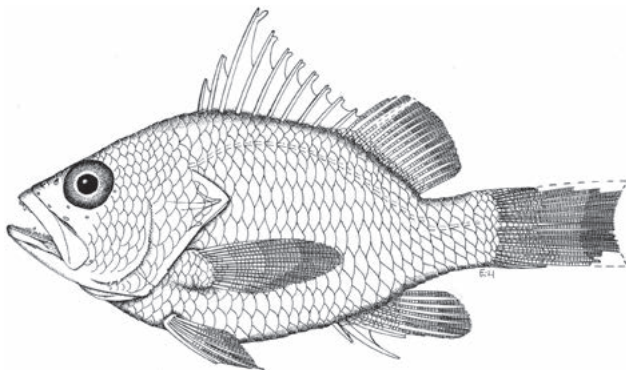
PLATE 29

*Plectranthias bauchotae* Randall 1980: 118, Fig. 4 (Banc de l'Etoile, south of Madagascar); Katayama & Yamamoto 1986; Heemstra & Randall 2009\*.

*Plectranthias elaine* Heemstra & Randall 2009: 7, Fig. 2 (off Qolora River, Eastern Cape, South Africa).

Body depth 2.1–2.6 in SL; HL 2.2–2.4 in SL. Dorsal fin 15 or 16 rays, fin margin distinctly notched; anal fin 7 rays; pectoral fins 14 rays, uppermost and lowermost rays unbranched, others branched; caudal fin emarginate, with 15 branched rays. Preopercle with small serrae on rear edge, 2 small antrorse spines on lower edge. GR 5/10–12. Lateral line complete; LL scales 28–32.

Body reddish yellow, with yellow spots or flecks on sides, and 2 diffuse dark red to orange bars: 1st bar under posteriormost dorsal-fin spines and anteriormost soft rays, 2nd bar at peduncle; broad oblique yellowish band from eyes to pelvic fins; fins reddish yellow. Preserved specimens uniformly buff. Attains 12 cm SL.



*Plectranthias bauchotae*, 6 cm SL, holotype of *P. elaine* (South Africa).

Source: Heemstra & Randall 2009

**DISTRIBUTION** WIO: South Africa (Kosi Bay and Sodwana Bay, KwaZulu-Natal; off Qolora River, Eastern Cape), southern Madagascar and Saya de Malha Bank.

**REMARKS** The largest *Plectranthias* species in WIO; occurs on reefs and rocky outcrops, in 68–273 m.

## *Plectranthias gardineri* (Regan 1908)

Seychelles perchlet

PLATE 28

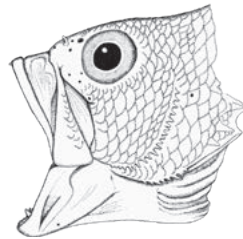
*Xenanthias gardineri* Regan 1908: 223, Pl. 28, Fig. 1 (Amirante Is., Seychelles); Smith 1961\*.

*Plectranthias gardineri*: Randall 1980\*; Randall & Shimizu 1994\*; Heemstra & Randall 2009\*.

Body depth 2.3–2.5 in SL; HL 2.3–2.5 in SL. Dorsal fin 14 or 15 rays; anal fin 6 or 7 rays; pectoral fins 14 or 15 unbranched rays; caudal fin rounded, with 13 or 14 branched rays.

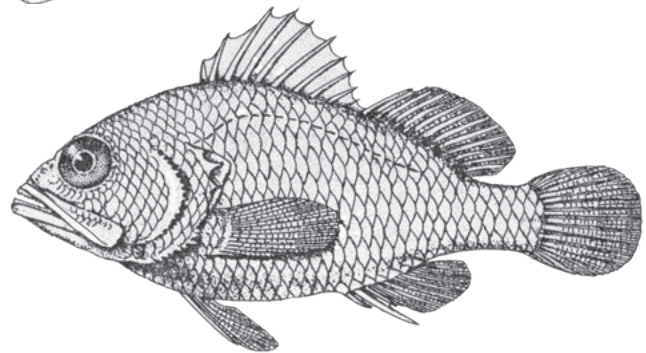
Preopercle rear edge with coarse serrae, no antrorse spines. GR 4 or 5/9–11. Lateral line incomplete, ending below middle of soft-rayed part of dorsal fin; LL scales 16–20.

Head and body reddish, shading to pale yellow ventrally; upper lip pale, with several red or white vertical bars; irregular pale yellow or white blotches at bases of median fins and pectoral fins; spinous part of dorsal fin bluish white; iris orange-red, with short thin radiating blue-grey streaks. Attains at least 3.8 cm SL.



*Plectranthias gardineri*, 3 cm SL (Seychelles).

Source: Heemstra & Randall 2009



*Plectranthias gardineri*, ~3 cm SL type (Seychelles). Source: Regan 1908

**DISTRIBUTION** WIO: Seychelles.

**REMARKS** Collected in 45–64 m.

## *Plectranthias inermis* Randall 1980

Bald perchlet

PLATE 28

*Plectranthias inermis* Randall 1980: 135, Fig. 11 (Caban I., Batangas, Luzon, Philippines [Verde I. inland passage, South China Sea]); Heemstra 1996\*; Kuiter 2004\*; Heemstra & Randall 2009\*.

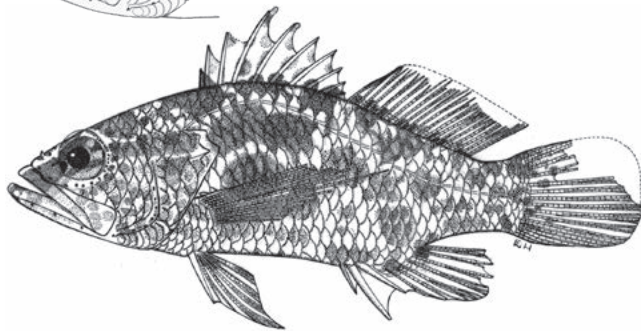
Body depth 2.3–2.9 in SL; HL 2.2–2.4 in SL. Dorsal-fin spine tips each with short slender cirrus, except 3rd spine longest and enveloped with white sheath-like banner, fin divided to base before soft-rayed part with 16–20 rays; anal fin 7 rays; pectoral fins 13 unbranched rays; caudal fin truncate to emarginate, with 13 or 14 branched rays. Edges of opercle,

sub-, inter- and preopercle smooth, or sometimes a few minute serrae on edge of preopercle. GR 5 or 6/10–12. LL scales 28 (1–3 scales may be without tubes).

Head and body covered with irregular or square, close-set, reddish yellow blotches, those on head more yellow; median fins hyaline to whitish, with red rays and spines; 3rd interspinous membrane of dorsal fin reddish proximally; red spot at pelvic-fin axils and at base of 2nd spine of anal fin. Attains 5 cm SL.



*Plectranthias inermis*,  
45 mm SL (Mauritius).  
Source: Heemstra 1996



**DISTRIBUTION** Indo-Pacific. WIO: Mauritius; elsewhere, Christmas I., Indonesia (Moluccas), Philippines and New Guinea.

**REMARKS** Found in caves and on coral rubble and reefs, at 14–65 m.

### *Plectranthias intermedius* (Kotthaus 1973)

Blackstreak perchlet

*Xenanthias intermedius* Kotthaus 1973: 26, Fig. 293 (off Socotra, Arabian Sea).

*Plectranthias intermedius*: Randall 1980\*; Heemstra & Randall 2009\*.

Body oval, depth 2.6–2.7 in SL; HL 2.2 in SL. Dorsal fin 17 rays, fin distinctly notched before rays; anal fin 6 or 7 rays; pectoral fins 14 or 15 rays; caudal fin truncate to slightly emarginate, with 15 branched rays. GR 5 or 6/12. Lateral line complete; LL scales 31–34.

Colour in life unknown. Preserved specimens: head and body buff, with series of small dark blotches at base of spinous part of dorsal fin or a distinctive black stripe below dorsal-fin base continued to midlateral part of peduncle, and narrow black bar at caudal-fin base. Attains at least 9 cm SL.



*Plectranthias intermedius*, 8 cm SL, holotype (Socotra).  
Source: Kotthaus 1973, www.schweizerbart.de/publications/list/series/meteor

**DISTRIBUTION** Known only from two type specimens collected from Socotra.

**REMARKS** Taken at 190–290 m.

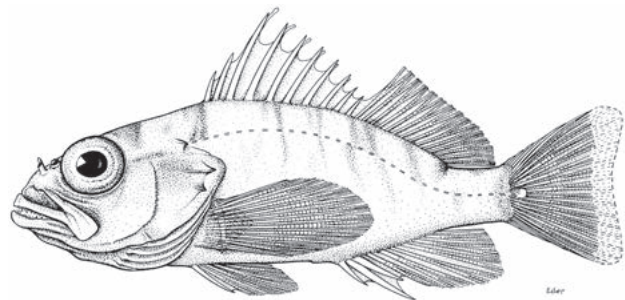
### *Plectranthias klausewitzii* Zajonz 2006

Perim perchlet

*Plectranthias klausewitzii* Zajonz 2006: 21, Figs. 2–3 (NW of Perim I., Strait of Perim, Yemen, Red Sea); Heemstra & Randall 2009\*.

Body depth 2.7–3.1 in SL; HL 2.2–2.4 in SL. Dorsal-fin spines 3–6 with short cirrus at tips, fin deeply notched before 14 or 15 rays; anal fin 7 rays; pectoral fins 14 or 15 rays, most branched; caudal fin emarginate, with 15 branched rays. GR 3–5/11–13. Lateral line complete; LL scales 29.

Colour in life unknown. Preserved specimens pale, with 9 or 10 faint, narrow, dark oblique bars extending ventrally from dorsal midline of body. Attains at least 6 cm SL.



*Plectranthias klausewitzii*, 5 cm SL, holotype (Red Sea). Source: Zajonz 2006

**DISTRIBUTION** Known only from type specimens collected from southern Red Sea.

**REMARKS** Taken at 228–235 m. Females mature at ~5 cm SL.

## *Plectranthias longimanus* (Weber 1913)

Longfin perchlet

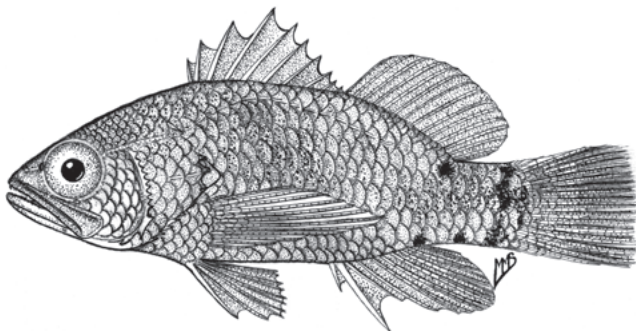
PLATES 28 & 29

*Pteranthias longimanus* Weber 1913: 209, Fig. 54 (Paternoster Is., Indonesia); Smith 1961\*.

*Plectranthias longimanus*: Randall 1980\*; Heemstra & Randall 1986\*; Winterbottom *et al.* 1989\*; Randall 1996; Winterbottom & Anderson 1997; Kuitert 2004\*; Heemstra & Randall 2009\*.

Body depth 2.6–3.1 in SL; HL 2.2–2.4 in SL. Dorsal fin 13–15 rays, fin divided to base before soft rays; anal fin 6 or 7 rays; pectoral fins 12 or 13 unbranched rays, fin length 1–1.3 in HL, reaching vertical at 5th ray of anal fin; caudal fin truncate to slightly rounded, with 13–15 branched rays. GR 4–6/9–12. Lateral line incomplete, ending below dorsal-fin rays; LL scales 12–15.

Body pale with longitudinal series of blotchy brown stripes; square black spot at bases of upper and lower 6 caudal-fin rays, followed posteriorly by golden spot above and below smaller black spot on upper and lower mid-rays; black spot on each side of white spot at base of anal-fin rays; dorsal fin reddish brown proximally and 1st fin membrane red, some dorsal-fin spines with red tips, and dark brown square blotch at bases of last 6 dorsal-fin rays; several irregular white spots scattered over head and body; lower part of head and abdomen white; snout and front of lower jaw reddish brown; iris yellow with radiating red lines. Attains 3 cm SL.



*Plectranthias longimanus*, 3 cm TL (Kenya). Source: Smith 1961

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Aliwal Shoal), Chagos, Comoros, Madagascar and Seychelles; elsewhere to Indonesia, Taiwan, Japan, Marshall Is., New Caledonia and Fiji.

**REMARKS** Females mature at ~19 mm SL, males at ~23 mm SL. A common cryptic species on coral and rocky reefs, in continental areas and island groups, in 6–73 m.

## *Plectranthias maugaei* Randall 1980

Fringed perchlet

PLATE 29

*Plectranthias maugaei* Randall 1980: 152, Fig. 18 (off Toliara, SW Madagascar); Heemstra & Randall 2009\*.

Body depth 2.6–2.7 in SL; HL 2.3–2.4 in SL. Dorsal fin with short cirrus behind tip of each spine, 15 rays, and some rays exerted; anal fin 7 rays; pectoral fins 13 rays; caudal fin lunate, with 14 branched rays. GR 5/11 or 12. Lateral line complete; LL scales 29 or 30.

Colour in life unknown. Preserved specimens pale, with series of 8 irregular dark blotches dorsally on head and body (1st blotch in interorbital area and behind eyes; 2nd on nape ending at dorsal-fin origin; 3rd beneath dorsal-fin spines 4–9, with some black pigment extending below lateral line; 4th below last dorsal-fin spine and first 4 or 5 rays, extending ventrally more than halfway onto body; 5th and 6th blotches small, below rear half of soft-rayed part of dorsal fin; 7th and 8th on dorsal surface of peduncle). Attains at least 6 cm SL.

**DISTRIBUTION** WIO: Madagascar.

**REMARKS** Trawled off southwestern Madagascar in ~250 m.

## *Plectranthias morgansi* (Smith 1961)

Whitefin perchlet

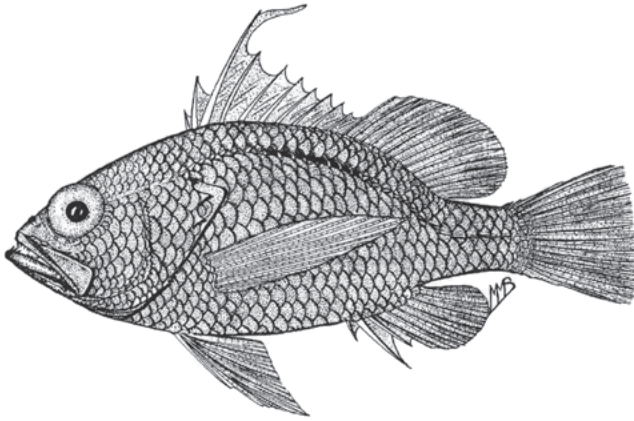
PLATE 28

*Pelontrus morgansi* Smith 1961: 365, Fig. 3 (off Lamu, Kenya); Kotthaus 1973\*.

*Plectranthias morgansi*: Randall 1980\*; SSF No. 166.16\*; Kuitert 2004\*; Heemstra & Randall 2009\*.

Body depth 2.4–2.6 in SL; HL 2.2–2.4 in SL. Dorsal fin with 3rd spine longest, with long white flap (~½ spine length) at spine tip, 13–15 rays; anal fin 7 or 8 rays; pectoral fins 13 or 14 unbranched rays (may have 3 or 4 middle rays bifurcate at tips); caudal fin truncate, with 14 or 15 branched rays. GR 4–6/11 or 12. Lateral line complete; LL scales 28–30.

Head and body reddish orange dorsally, with scattered yellow blotches; first 3 interspinous membranes of dorsal fin white, red blotch on mid-spinous part of fin, continued ventrally as oblique reddish orange band across 6 darkly pigmented lateral-line scales, blotch fainter ventrally. Preserved specimens buff, with dusky areas on nape and below rear half of spinous part of dorsal fin; LL scales 9–16, darkly pigmented. Attains 5 cm SL.



*Plectranthias morgansi*, 4 cm TL, holotype (Kenya). Source: Smith 1961

**DISTRIBUTION** WIO: Kenya (Lamu and Mombasa), South Africa (Aliwal Shoal; off Mtentu River mouth, Eastern Cape) and Nazareth Bank.

**REMARKS** Found in 73–273 m.

### *Plectranthias nanus* Randall 1980

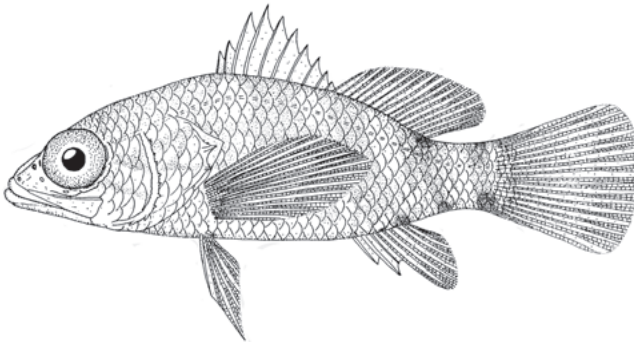
Midget perchlet

PLATE 29

*Plectranthias nanus* Randall 1980: 159, Fig. 22 (reef off Cocos I., Guam, Mariana Is.); Randall 1994\*, 1996; Kuitert 2004\*; Heemstra & Randall 2009\*.

Body depth 2.9–3.6 in SL; HL 2.2–2.6 in SL. Dorsal fin notched almost to base before soft-rayed part with 16 rays; anal fin 6 or 7 rays; pectoral fins 14–16 rays; caudal fin rounded, with 13–15 branched rays. GR 4–6/11–14. Lateral line incomplete, ending below dorsal-fin rays; LL scales 15, with midlateral series of pored scales on peduncle.

Colour similar to *P. longimanus*, with several black blotchy spots on rear half of body and dark spots at caudal-fin base but without first 1 or 2 dorsal-fin membranes red basally. Attains ~4 cm SL.



*Plectranthias nanus*, 2 cm SL (Red Sea). Source: Randall 1994

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea (2 specimens); elsewhere widely distributed in Indo-Pacific where it appears to be an insular species, including Mariana Is., Christmas I., New Caledonia, Marquesas Is., Pitcairn Is., Line Is. and Hawaii.

**REMARKS** Cryptic on coral reefs or rubble bottoms, in 6–57 m (~23 m in Red Sea).

### *Plectranthias pelicierii* Randall & Shimizu 1994

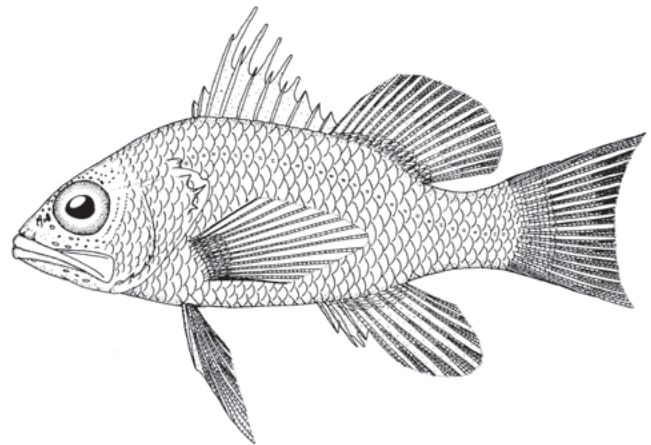
Psychedelic perchlet

PLATE 28

*Plectranthias pelicierii* Randall & Shimizu 1994: 109, Figs. 1–2 (Mauritius, Mascarenes); Senou & Yunokawa 1995\*; Heemstra 1996; Kuitert 2004\*; Heemstra & Randall 2009\*.

Body depth 2.6–2.9 in SL; HL 2.2–2.4 in SL. Tip of 3rd spine of dorsal fin with long cirrus (~½ length of spine) and tips of spines 4–7 with shorter cirri, fin deeply notched before soft-rayed part with 15 or 16 rays; anal fin 7 rays; pectoral fins 13 or 14 unbranched rays; caudal fin emarginate, with 14 or 15 branched rays. GR 4–6/11 or 12. Lateral line complete; LL scales 28–30.

Body reddish orange, shading to orange-yellow ventrally, with several thin vertical pale bluish white streaks, edged with red on lower part of body; head gold-orange with irregular red streaks, and 3–5 pale pink or white spots on cheeks and below eyes; yellow-edged red ocellus on opercle; pale diffuse area below dorsal fin, and 10 red spots along fin base; cirri on dorsal-fin spines greyish brown; anal fin with red spots proximally, dull gold spots distally; caudal fin pale greenish yellow, with red blotches at base. Attains ~5 cm SL.



*Plectranthias pelicierii*, 4 cm SL, holotype (Mauritius). Source: Randall & Shimizu 1994

**DISTRIBUTION** Indo-Pacific. WIO: South Africa (Sodwana Bay and Kosi Bay) and Mauritius; elsewhere, Izu and Ryukyu Is.

**REMARKS** Females mature at ~3 cm SL, males at ~4 cm SL. Found in 50–95 m.

### *Plectranthias vexillarius* Randall 1980

Frilled perchlet

*Plectranthias vexillarius* Randall 1980: 173, Fig. 27 (Gulf of Oman); Randall 1995\*.

Body depth 2.7 in SL; HL 2.1 in SL. Dorsal fin with 3rd spine longest (2.1 in HL) with banner-like flap (~½ spine length) behind tip, shorter cirrus on other spine tips, and shallow notch before 17 rays; anal fin 7 rays; pectoral fins 13 unbranched rays; caudal fin emarginate, with 15 branched rays. Opercle scaly; snout, maxilla, suborbital and lower jaw naked. GR 6/13. Lateral line complete; LL scales 28.

Preserved specimen pale, with 4 irregular rows of large brown blotches (some eye-sized) on body; dorsal blotches U-shaped or roundish, with pale centre; nape and upper rear part of head with brown blotches; faint broad brown band from middle of eye to front of opercle, another band extending posteriorly from lower part of eye; all fins pale. Attains at least 8 cm SL.



*Plectranthias vexillarius*, 8 cm SL, holotype (Gulf of Oman). Source: Randall 1980

**DISTRIBUTION** Known only from the holotype from Gulf of Oman.

**REMARKS** Trawled from 49–63 m, on black sand with clay and shell fragments.

### *Plectranthias winniensis* (Tyler 1966)

Redblotch perchlet

PLATE 28 & 29

*Plectranthias winniensis* Tyler 1966: 2, Fig. 1 (St Joseph I., Amirante Is., Seychelles).

*Plectranthias winniensis*: Randall 1980\*; SSF No. 166.18\*; Heemstra & Randall 2009\*.

Body depth 2.8–3.2 in SL; HL 2.3–2.4 in SL. Dorsal fin 15–17 rays, fin notched almost to base before soft rays; anal fin 7 rays; pectoral fins 16–18 unbranched rays; caudal fin truncate to rounded, with 13 branched rays. GR 4–6/11–15. Lateral line incomplete, ending below dorsal-fin rays, upper segment with 14–20 scales and a lower segment of 3 scales on peduncle.

Head and body russet to reddish orange, with dusky scales dorsally; abdomen yellow-orange; dorsal and anal fins yellow proximally, hyaline distally, with pale pink rays; red blotch at base of first 3 dorsal-fin spines and at base of last 3 anal-fin rays; caudal fin hyaline, rays silvery red, and white-edged red spot at base of lower 6 rays. Attains 4 cm SL.



*Plectranthias winniensis*, 3 cm SL (South Africa). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa to South Africa (Kosi Bay, Sodwana Bay, Aliwal Shoal and Margate, KwaZulu-Natal), Comoros, Seychelles, Madagascar, Maldives and Mauritius; elsewhere to Tuamotu Is. and Hawaii.

**REMARKS** Females mature at ~3 cm SL. Found on outer reefs, in 23–58 m.

### GENUS *Pseudanthias* Bleeker 1871

Genus description based on *Pseudanthias pleurotaenia* (from Pacific) and *Pseudanthias* species in WIO: dorsal fin 10 (rarely 11) spines, 15–18 rays, fin not notched before rays; anal fin 3 spines, 6–8 rays; pectoral fins 16–21 rays; pelvic fins 1 spine, 5 rays; caudal fin with 13 branched rays, fin truncate, emarginate, convex, concave, crescentic, asymmetric, or deeply forked with elongate lobes (depending on species and sex). LL scales 36–64; 2½–6 scale rows from 5th dorsal-fin spine



to lateral line. Jaws with small, slender, conical teeth and a few larger canines; front of upper jaw with small recurved canine tooth on each side pointing anteriorly and laterally and separated by gap subequal to pupil diameter from following row of 17–21 forward-curving teeth; band of villiform teeth in ~5 rows behind canines, narrowing to single row posteriorly on sides of jaw; small stout canine projects forward and laterally on each side at front of lower jaw; sides of lower jaw with row of 16–20 forward-projecting, slender, slightly curved teeth, preceded by 2 or 3 short, stout, conical teeth; vomer and palatines generally with villiform teeth, vomerine tooth patch triangular, oval or chevron-shaped with rounded ends, rear edge concave; tongue and pterygoid bones edentate. No supramaxilla. Opercle with 3 flat spines (except *P. evansi* with 2 spines: uppermost missing); preopercle edge serrate, number of serrae increasing with growth; subopercle and interopercle smooth or with a few small serrae. Vertebrae 11 + 15, or 10 + 16; supraneural bones 1–3.

Small, diurnal, planktivorous fishes, aggregating over coral and rocky reefs, from ~10–300 m. Feed actively on plankton above the reef, diving into the reef to escape predators. Most *Pseudanthias* species appear to be sexually dichromatic and/or dimorphic protogynous hermaphrodites. Their harem reproductive system involves separate colonies or social groups comprising a distinctively coloured, large, territorial male and several smaller females with a simpler colour pattern. The male usually spawns with more than one female, and defends not only his territory, but also defends females from other roving males of nearby colonies. Each colony includes numerous small juveniles that mature first as females. If the male dies or is taken by a predator, one of the larger females transforms to a male. With the ovary restructured as a testes, the fish's colouration changes to the distinctive male pattern, and the new male takes on the behavioural role of a male, defending his territory and his harem. Transformation from female to functional male (with a male colour pattern) can take one to two weeks. The time required for transformation may be influenced by the number and behaviour of other females in the colony. In addition to the differences in male and female colour patterns of a species, males often show enhanced variations of their typical colour patterns for courtship and spawning.

Katayama & Amaoka (1986) redefined the genus *Anthias* to include species from the Atlantic and eastern Pacific; species of the Indo-Pacific region, including WIO, were assigned to the genus *Pseudanthias* by Heemstra & Akhilesh (2012). Sixty-four species, 19 in WIO.

## KEY TO SPECIES

[Identifications are easier using fresh specimens showing live colour patterns, or with preserved specimens and a colour photograph of the live or freshly dead fish.]

- 1a Dorsal-fin origin anterior to gill opening; males with 2nd and 3rd spines of dorsal fin elongate, filamentous, with yellow fleshy tips; females with 3rd spine of dorsal fin elongate and filamentous; LL scales 57–64; lower jaw naked; both sexes with upper half of head and body orange-yellow, lower half lavender-pink ..... *P. bicolor*
- 1b Dorsal-fin origin above gill opening; males without elongate 2nd dorsal-fin spine (3rd spine elongate in adult males of some species); females without elongate 3rd dorsal-fin spine; LL scales 37–58; lower jaw scaly; colour not as above ..... 2
- 2a Caudal fin deeply forked, lobes scarlet; LL scales 53–58; head and body yellow-orange, pinkish purple dorsally; dorsal fin red-orange; yellow stripe from front of upper lip along lower edge of eye to red spot at pectoral-fin base ..... *P. ignitus*
- 2b LL scales 36–52; colour not as above ..... 3
- 3a Caudal fin of males distinctly asymmetric, rear edge slightly convex, with upper corner elongate and filamentous; caudal fin of females emarginate, with upper lobe slightly longer, lobes with scarlet tips; body scales yellow with red margins; LL scales 47–50 ..... *P. marcia*
- 3b Caudal fin symmetric; colour not as above ..... 4
- 4a Males: caudal fin emarginate, reddish purple, with pale blue-grey subterminal band at corners; head and front half of body with dark red band from snout and interorbital area across head to above anus, where it joins a dark band from nape to below rear dorsal-fin spines; rest of body red or mauve. Females: caudal fin slightly forked; head, body and dorsal fin mostly reddish orange, lower half of head and body white; caudal fin red with greyish margin and red lobe tips ..... *P. connelli*
- 4b Caudal-fin shape various; colour pattern not as above ..... 5
- 5a Caudal fin crescentic or deeply forked, with filamentous lobes; LL scales 37–50 ..... 7
- 5b Caudal fin truncate to slightly emarginate or slightly convex; LL scales 36–38 or 42–47 ..... 6
- 6a HL 2.6–2.7 in SL; LL scales 36–38; pectoral fins 19 rays; pelvic fins not enlarged; caudal fin slightly convex to slightly emarginate. Males: body deep pink, with yellow stripes and broad yellow zone from nape to above pectoral fins; caudal fin deep pink, margin yellow. Females: body orange-pink; anal fin and caudal fin yellow ..... *P. pillai*

Continued...

**KEY TO SPECIES**

- 6b HL 3.2–3.4 in SL; LL scales 42–47; pectoral fins 16 or 17 rays; pelvic fins enlarged. Males: body reddish, most scales red with yellow spot; head yellow, whitish below eyes; caudal fin red, margin yellow. Females: head and body yellow dorsally, pinkish ventrally; dorsal and caudal fins yellow; anal fin pinkish..... *P. heemstrai*
- 7a Caudal fin convex to truncate; LL scales 37–47..... **8**
- 7b Caudal fin emarginate to deeply forked; LL scales 38–52..... **9**
- 8a LL scales 44–47; body depth 2.6–2.9 in SL; males and females with head and body red dorsally, each scale with yellow spot, grading to white ventrally; pale violet stripe from lower edge of eye to pectoral fin; caudal fin reddish orange basally, margin hyaline reddish. Males: caudal fin convex or truncate with small central notch and short filament at each corner; dorsal fin with red blotch basally on dorsal-fin spines 6–9. Females: caudal fin emarginate, tips brilliant red..... *P. hypselosoma*
- 8b LL scales 37–42; body depth 2.8–3.3 in SL; caudal fin of males and females concave to forked. Males: head and body white to yellow with 2 longitudinal red-brown bands, bands joined on caudal fin by dark U-shaped band; caudal fin corners with subterminal pale blue-grey band and red lobe tips; paired fins red; anal fin white anteriorly, red posteriorly. Females: body scales pink and yellow, more yellow dorsally more pink ventrally; lavender stripe from below eye to pectoral-fin base; caudal fin dusky yellow, lobe tips yellow, with short filaments..... *P. townsendi*
- 9a LL scales 44–49. Males: head and front of body red or reddish brown, white ventrally, with mauvish white midlateral band from nape to peduncle; paired fins scarlet; caudal fin whitish with red subterminal bands. Females orange dorsally, pinkish white ventrally; caudal fin whitish with red lobe tips..... *P. taeniatus*
- 9b Colour not as above..... **10**
- 10a LL scales 38–43. Males with 2 broad dark bands from head to caudal fin, upper band from nape to base of upper caudal-fin rays, lower band from eyes to lower caudal-fin base, where it bends slightly dorsally to join rear end of upper band, forming dark V-shape on caudal fin. Females probably orange in life (pale in preservative), with faint subvertical series of dark spots (one spot on each scale on upper half of body)..... *P. conspicuus*
- 10b Colour not as above..... **11**
- 11a Head and lower two-thirds of body pink to mauve, with yellow spots in males, without spots in females; upper body, dorsal fin and caudal fin yellow. Males with dorsal and anal fins pointed posteriorly..... *P. evansi*
- 11b Colour not as above; males with dorsal and anal fins rounded posteriorly..... **12**
- 12a LL scales 38–43; GR 22–25 on lower limb; body depth 2.8–3 in SL. Body with magenta-edged yellow triangular saddle below spinous part of dorsal fin. Males: head and body red or pink, with dusky yellow spot on each scale (persisting as dark spot in preservative); head yellowish dorsally. Females: head and body orange-yellow, with lavender-edged yellow stripe from front of upper jaw to pectoral-fin base; leading edge of pelvic fins broadly white..... *P. lunulatus*
- 12b Colour not as above..... **13**
- 13a Small males (~8 cm SL): body depth 2.8–3.1 in SL; 3rd spine of dorsal fin distinctly longer than other spines; head and body below spinous part of dorsal fin reddish orange, with pink spot on each body scale, and rear part of body with red spot covering most of each scale; magenta-edged bright yellow stripe from snout across lower portion of eye to pectoral-fin base; soft-rayed part of dorsal fin with 2 or 3 longitudinal rows of dark spots; caudal fin pink with orange-yellow streaks. Large males (15–18 cm SL): body depth 2.4–2.8 in SL; head and body reddish, paler ventrally; dark red swathe from spinous dorsal fin to pectoral fins; body scales with central golden spot; dorsal fin reddish; caudal fin golden, upper and lower edges pink, fin lobes thick, tips acute with short filaments. Females: head and body reddish orange dorsally, paler ventrally; broad, white-edged, red midlateral band from head to caudal-fin base; lower third of body with 5 or 6 longitudinal rows of red spots; caudal fin yellow, deeply lunate, lobes distinctly longer than HL..... *P. gibbosus*
- 13b Colour not as above..... **14**
- 14a Median fins covered by scales on proximal two-thirds of fin; anterior nostril with slender cirrus reaching to or over posterior nostril. Males: 3rd spine of dorsal fin greatly elongated and flexible, fin red; head reddish purple; body scales mostly yellow, with red margins; orange stripe from snout tip to pectoral-fin base; pectoral fins pinkish, with oval magenta spot at upper edge; caudal fin red, rear margin yellow. Females: head and body orange, yellow ventrally; body scales yellow with reddish margins; purple stripe from eye to pectoral-fin base; median fins yellow..... *P. squamipinnis*
- 14b Median fins with scales restricted to proximal one-fourth of fin; tentacle on anterior nostril not reaching over posterior nostril; 3rd spine of dorsal fin not elongate (except in *P. pulcherrimus*); colour not as above..... **15**
- 15a Males: head, body and caudal fin reddish pink; middle of caudal fin whitish distally; dorsal fin yellow, 3rd spine elongate, and last 3 rays pale violet; pelvic fins yellow and anal fin white, with pelvic-fin margins and leading edge of anal fin scarlet. Females: body pink, with snout, peduncle and caudal fin yellow; dorsal fin hyaline yellow, anal fin and paired fins hyaline pink..... *P. pulcherrimus*
- 15b Colour not as above..... **16**

Continued...

## KEY TO SPECIES

- 16a LL scales 42 or 43; both sexes with front of upper lip slightly swollen, front of snout naked. Males: body lavender pink, head yellow dorsally and underside white or pinkish white; narrow magenta band across front of snout and up to eyes on each side, then curving back to form diamond-shaped outline joining median band on nape; dorsal fin lavender; caudal fin red, upper and lower edges broadly lavender. Females: body yellow, paler ventrally, with purple diamond outline on top of head similar to that of males. .... *P. bimarginatus*
- 16b LL scales 43–52; colour not as above. .... 17
- 17a LL scales 43; front of upper lip thickened, slightly protuberant. Males: body orange-yellow, pale pink ventrally; head yellow, paler ventrally; large elliptical orange area, bordered by magenta, on top of head from snout to nape; front of upper lip pale pink; caudal fin yellow, with broad pale blue upper edge and red submarginal band that narrows posteriorly; other fins hyaline yellow. .... *P. unimarginatus*
- 17b LL scales 43–52; upper lip not thickened; colour of males not as above. .... 18
- 18a LL scales 43–47; body depth 2.6–2.9 in SL; caudal-fin margin of both sexes emarginate. Males: head, body and caudal fin red, with irregular-length blue stripes (1 or 2 from lower half of head to peduncle) and spots; dorsal fin reddish orange, with dark oval spot between 4th and 6th spines, some fish also with dark spot at rear end of fin; pelvic fins pale blue-grey, with scarlet spots along distal margin. Females: head and body pink dorsally, paler below; upper body scales with yellow spot; lilac-edged yellow stripe from snout to pectoral-fin base and along flanks to peduncle; median fins yellow. .... *P. bimaculatus*
- 18b LL scales 48–52; body depth 2.8–3.2 in SL. Males: body pale grey or reddish; head reddish dorsally, white below eyes; transient pink or silver stripe just above lateral line, and vertically elongate, irregular red blotch at midbody below lateral line (this blotch can be 'switched on or off'); dorsal fin and caudal fin red; caudal fin lunate, upper and lower rays filamentous. Females: reddish orange dorsally, paler orange below lateral line (no red blotch at midbody); head white below eyes. .... *P. cooperi*

*Pseudanthias bicolor* (Randall 1979)

Bicolour basslet

PLATES 28 &amp; 29

*Anthias (Mirolabrichthys) bicolor* Randall 1979: 4, Figs. 1–3 (off Pokai Bay, Oahu I., Hawaii).

*Anthias bicolor*: Randall & Lubbock 1981\*; Allen & Steene 1987\*.

*Pseudanthias bicolor*: Debelius 1993\*; Randall & Anderson 1993;

Kuiter 1998\*, 2004\*; Randall & Pyle 2001; Heemstra & Akhilesh 2012\*.

Body depth 2.7–3.2 in SL; HL 2.8–3.2 in SL; caudal fin forked, lobes attenuate, concavity 23–32% SL. Dorsal fin 16–18 rays; males with 2nd and 3rd spines elongated, flexible, with small

yellow fleshy tab at tips, and adult females with 3rd spine elongated, fin rounded; anal fin angular, with 7 or 8 rays; pectoral fins rounded, with 19–21 rays. Upper lip slightly thickened in males. Vomer with 6–11 large, stout, conical teeth (much larger than in other species of *Pseudanthias*). GR 10–12/26–29, notably longer than gill filaments. LL scales 57–64.

Males: head and body yellow-orange dorsally, lavender ventrally; yellow-orange stripe on cheeks; dorsal fin yellow with scarlet blotch at front; pectoral, pelvic, anal and caudal fins pinkish, except reddish distally on pelvic, anal and caudal fins. Females similarly coloured but with whitish pelvic fins and no blotch on dorsal fin. Attains 10 cm SL (~9 cm SL in Indian Ocean).

**DISTRIBUTION** Indo-Pacific. WIO: Mauritius, Chagos, Maldives and Sri Lanka; elsewhere to Philippines, Japan, Marshall Is., New Caledonia and Hawaii.

**REMARKS** Known from lagoon patch reefs, deep reefs and outer-reef slopes, and found in small groups near caves, in 20–30 m at Mauritius, and reported to at least 68 m.

*Pseudanthias bimaculatus* (Smith 1955)

Twospot basslet

PLATES 28 &amp; 30

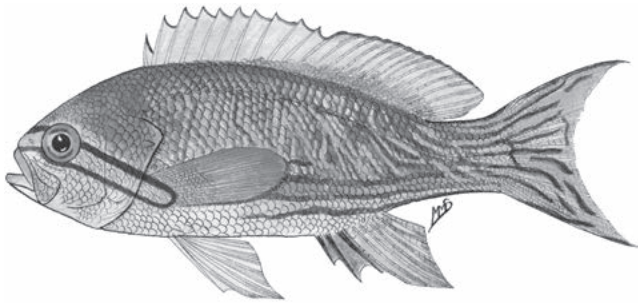
*Anthias bimaculatus* Smith 1955: 339, Fig. 1 (Porto de Bocage,

Mozambique); Smith 1961\*; Fourmanoir & Guézé 1967; SSF No. 166.3\*.

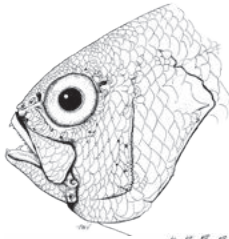
*Pseudanthias bimaculatus*: Randall & Hutomo 1988; Randall & Anderson 1993; Kuiter 1998\*; Manilo & Bogorodsky 2003; McKenna & Allen 2003; Kuiter 2004\*; Allen 2005; Fricke *et al.* 2009; Heemstra & Akhilesh 2012\*.

Body depth 2.6–2.9 in SL; HL 3–3.2 in SL; caudal fin emarginate, concavity 6–17% SL. Dorsal fin spines 3–10 subequal, 16 rays; anal fin pointed, with 7 or 8 rays; pectoral fins rounded, with 17 or 18 rays. GR 10 or 11/26–28. LL scales 43–47.

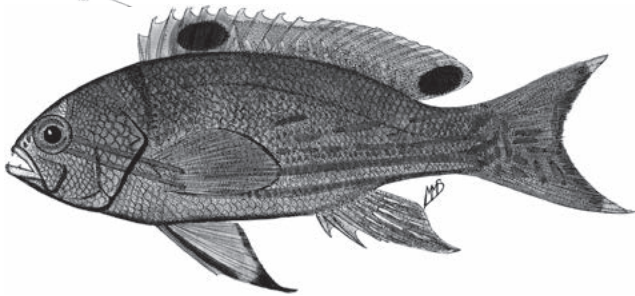
Both sexes with 3–6 narrow mauve stripes along flanks, from pectoral fins to caudal fin (less obvious on females). Males: head and body purple to reddish, paler ventrally; dorsal fin reddish orange to deep pink, with dark red or purplish blotch on middle dorsal-fin spines, sometimes with indistinct 2nd spot at rear end of fin; anal fin mauve, with yellow streaks and spots; pelvic fins pale mauve with 1–5 red spots; caudal fin deep reddish pink, lobes with yellow tips; specimens from Maldives with yellow stripe on cheeks, irregular yellow stripes dorsally on head and body, and yellow spots on central caudal-fin rays; specimens from Madagascar and Mozambique with jagged white or pinkish streaks (pattern unique for each fish), and stripe on cheeks red or yellow. Females: head and body orange-yellow, with mauve streaks ventrally and on caudal fin; yellow stripe on cheeks; median fins yellow. Attains 9 cm SL.



*Pseudanthias bimaculatus*, 11 cm TL, female paratype (N Mozambique).  
Source: SSF



*Pseudanthias bimaculatus*, 12 cm TL, male holotype (N Mozambique).  
Source: Heemstra & Akhilesh 2012 (head detail); SSF (lateral view)



**DISTRIBUTION** Indian Ocean. WIO: Mozambique (Nacala Bay, Pinda and Pemba), northwestern Madagascar, Aldabra, Réunion and Maldives; elsewhere to Indonesia.

**REMARKS** Found on steep outer slopes and coral reefs, in 4–62 m. Colour pattern similar to *Pseudanthias pleurotaenia* (Bleeker 1857) from western Pacific, with which it hybridises in Indonesia (Kuitert 1990). Colour patterns of *P. bimaculatus* in WIO seem more variable than fish identified as this species from Bali and other Indonesian islands.

### *Pseudanthias bimarginatus* Randall 2011

Crowned basslet

PLATE 30

*Pseudanthias parvirostris* (non Randall & Lubbock 1981): Debelius 1993\*; Randall & Anderson 1993; Kuitert 1998; Randall 2011\*.

*Pseudanthias bimarginatus* Randall 2011: 80, Pl. 1a–c (North Malé Atoll, Furana I., Maldives); Heemstra & Akhilesh 2012\*.

Body depth 3–3.3 in SL; HL 2.9–3.1 in SL; caudal fin forked, lobe tips acute, fin length 2.4–2.6 in SL, concavity 3.7–4.1 in SL. Dorsal fin 16 rays, soft-rayed part of fin higher than spinous part; anal fin 7 rays, fin pointed in males; pectoral fins pointed, with 16 or 17 rays. Front of upper lip thickened and slightly swollen; rear edge of orbit with 18 prominent fleshy papillae. GR 9/23–25. LL scales 42 or 43.

Males: body lavender-pink; head yellow dorsally, pinkish white ventrally, with narrow magenta band across front of snout to upper edge of eyes and curving back to form median band on nape; narrow magenta band from upper edge of iris to above upper end of gill opening, another less distinct, broader, magenta band from level of centre of eye to yellow opercle flap; dorsal and anal fins pinkish blue; pectoral fins hyaline, with pale pink rays; pelvic fins hyaline, with pale yellow rays; centre of caudal fin red, with broad pinkish blue upper and lower margins. Females (~3 cm SL): head and body yellow, shading to pinkish white on abdomen and underside of head, with magenta flecks, mainly one per scale on upper two-thirds of body; magenta bands on head similar to that in males; median fins and pelvic fins yellow. Attains 5 cm SL.



*Pseudanthias bimarginatus*, 4 cm SL, female (Maldives).  
© JE Randall, Bishop Museum



*Pseudanthias bimarginatus*, 5 cm SL, male (Mauritius).  
© JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: South Africa (Sodwana Bay), Mauritius and Maldives; elsewhere to Indonesia.

**REMARKS** Found on deep reefs; type specimens collected at ~48 m.

*Pseudanthias connelli* (Heemstra & Randall 1986)

Harlequin goldie

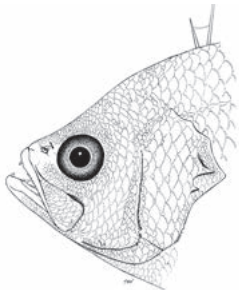
PLATES 28 &amp; 30

*Anthias connelli* Heemstra & Randall 1986: 511, Pl. 33, Fig. 166.4  
(off Brighton Beach, Durban, KwaZulu-Natal, South Africa).

*Pseudanthias connelli*: Heemstra & Akhilesh 2012\*.

Body robust, depth 2.4–3 in SL; HL 2.9–3.3 in SL; caudal-fin concavity 7–12% in SL. Dorsal fin 15–17 rays, fin pointed posteriorly; anal fin 6–8 rays, fin enlarged and pointed in males; pectoral fins pointed, with 16–19 rays; caudal fin emarginate in males, lobe tips bluntly pointed or rear margin slightly concave to slightly forked in females. GR 10–12/25–29. LL scales 39–45.

Males: head and front half of body with dark red band from snout and interorbital area across head to above anus, joining dark band from nape below posterior dorsal-fin spines; underside of head and abdomen white to pinkish; rear half of body, caudal fin and lobe tips red, with submarginal violet bands; dorsal and anal fins pinkish; pelvic fins pinkish proximally, hyaline distally. Male nuptial colours: rear half of body pinkish white; dorsal, anal and pelvic fins blue-grey; caudal fin violet, with broad pale blue-grey bands cutting off dark violet lobe tips. Females: head and upper two-thirds of body reddish orange, scales with yellow margins; head below eyes and abdomen white to pinkish; dorsal fin reddish orange with yellow spots; anal fin hyaline blue-grey; caudal fin red, margin pale grey and lobe tips red. Attains 11 cm SL.



*Pseudanthias connelli*, 10 cm SL, head  
(South Africa).

Source: Heemstra & Akhilesh 2012

**DISTRIBUTION** WIO: southern Mozambique (Zavora) to South Africa (Margate, KwaZulu-Natal).

**REMARKS** Females mature at ~7 cm SL and may change sex at ~10 cm SL. Known mainly from around wrecks, in 23–30 m, and at Sodwana Bay in 48–54 m.

*Pseudanthias conspicuus* (Heemstra 1973)

V-tail basslet

PLATE 30

*Anthias conspicuus* Heemstra 1973: 200, Fig. 1 (off Diu, India,  
Arabian Sea).

*Anthias bitaeniatus* Kotthaus 1973: 19, Fig. 289 (west of Mumbai, India,  
Arabian Sea); Manilo & Bogorodsky 2003.

*Pseudanthias conspicuus*: Heemstra & Akhilesh 2012\*.

Body depth 2.6–3 in SL; HL 2.6–2.9 in SL; caudal fin crescentic, length 29–36% SL, concavity 12–29% SL. Dorsal fin with short filament from interspinous membrane behind each spine tip, 15–17 rays; anal fin 6 or 7 rays; pectoral fins 17–19 rays. GR 10–13/26–30. LL scales 38–43.

Colour in life unknown. Preserved specimen (male) with pale head and body, and 2 broad dark bands from head to caudal fin: upper band from nape to end of dorsal fin, joining dark band of opposite side to cover upper third of peduncle, then splitting again as it bends downward from base of upper caudal-fin rays to meet lower band running from eyes to lower part of caudal-fin base, where it bends slightly to join rear end of upper band, forming dark V in middle of caudal fin. Females probably orange in life (pale in preservative), upper half of body with faint subvertical dark spots (one on each scale). Attains 8 cm SL.



*Pseudanthias conspicuus*, 6 cm SL, female (W India).

PC Heemstra © NRF-SAIAB



*Pseudanthias conspicuus*, 7 cm SL, male (W India). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Somalia, Oman (Muscat), Pakistan (photograph only) and India (Diu to Mumbai).

**REMARKS** Females mature at ~4 cm TL and change sex at ~6 cm TL. Collected at ~21 m and 86–93 m.

## *Pseudanthias cooperi* (Regan 1902)

Silverstreak basslet

PLATES 28 & 30

*Anthias cooperi* Regan 1902: 273 (Haddummati Atoll, Maldives);  
SSF No. 166.5\*.

*Planctanthias preopercularis* Fowler 1935: 385, Figs. 18–19 (washed ashore  
at KwaZulu-Natal, South Africa); Smith 1965.

*Anthias altus* Smith 1961: 363, Fig. 2 (off Lamu, Kenya).

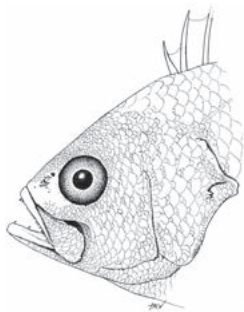
*Pseudanthias taeniatus* (non Klunzinger 1884): Katayama 1978.

*Anthias kashiwae*: Allen & Steene 1987\*.

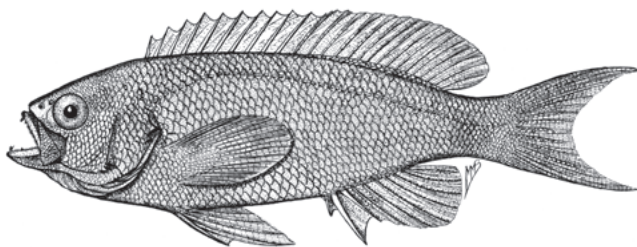
*Pseudanthias cooperi*: Debelius 1993\*; Randall & Anderson 1993;  
Winterbottom & Anderson 1997; Kuitert 1998\*, 2004\*; Manilo &  
Bogorodsky 2003; Fricke *et al.* 2009; Heemstra & Akhilesh 2012\*.

Body depth 2.8–3.2 in SL; HL 3.1–3.4 in SL. Dorsal fin 15–17 rays; anal fin 7 or 8 rays; pectoral fins obtusely pointed, with 18–20 rays; caudal fin of males lunate, concavity 19–35% SL, outer rays elongated into filaments; caudal fin of females emarginate. GR 8–11/22–28. LL scales 48–52.

Male colouration variable: head, body and fins red, reddish grey or almost white, with white streak from front of snout along lower edge of eye and across cheek to pectoral-fin base; often with an irregular, vertically elongate scarlet blotch below lateral line at midbody; silvery white streak running parallel to and just above lateral line often present; anal fin yellowish; pelvic fins reddish; caudal fin scarlet, with elongated upper- and lowermost rays bluish. Females: head and body reddish orange dorsally, yellow-orange below lateral line; underside of head white, with red spot on front of lower jaw; caudal fin red basally, margin bluish, lobe tips scarlet. Attains 10 cm SL.



*Pseudanthias cooperi*, 9 cm SL (South Africa).  
Source: Heemstra & Akhilesh 2012



*Pseudanthias cooperi*, 7 cm SL, male holotype of *Anthias altus* (Kenya).  
Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Socotra, Kenya to South Africa (Aliwal Shoal), Madagascar, Chagos, Comoros, Seychelles, Réunion, Mauritius, St Brandon Shoals and Maldives; elsewhere to Indonesia, Philippines, Taiwan, Japan, Australia, Tonga, Samoa and Line Is.

**REMARKS** Found at 4–73 m (usually >20 m). No significant differences in live colour patterns, meristics and morphological characters among specimens from WIO localities.

## *Pseudanthias evansi* (Smith 1954)

Yellowback basslet

PLATES 28 & 31

*Anthias evansi* Smith 1954: 1, Fig. 1 (Shimoni, Kenya); Smith 1955, 1961\*;  
SSF No. 166.6\*; Allen & Steene 1987\*.

*Mirolabrichthys evansi*: Heemstra 1973; Winterbottom *et al.* 1989\*.

*Pseudanthias evansi*: Debelius 1993\*; Randall & Anderson 1993;

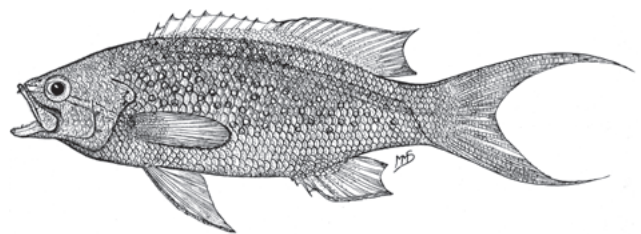
Kuitert 1998\*, 2004\*; Fricke 1999; Manilo & Bogorodsky 2003;

McKenna & Allen 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009;

Heemstra & Akhilesh 2012\*.

Head pointed, front of upper lip with rounded protuberance. Body depth 3–3.4 in SL; HL 3.3–3.7 in SL; caudal concavity ~27% SL. Dorsal fin 16–18 rays, fin pointed posteriorly; anal fin 8 or 9 rays, fin of adults pointed posteriorly; pectoral fins 16–18 rays; caudal fin large, lunate, lobes attenuate, fin length 33–47% SL. Males with relatively longer caudal fin than females, with upper lobe slightly longer than lower lobe, and about twice HL. GR 9–11/22–26. LL scales 47–50.

Males: head and lower two-thirds of body pink to mauve, densely covered with yellow spots; upper third of body, dorsal and caudal fins yellow; orange-yellow stripe from front of upper jaw to eye and upper end of pectoral-fin base; pelvic fins and anal fin whitish. Females with similar colouration, but yellow spots sparse or absent. Attains 10 cm SL.



*Pseudanthias evansi*, 11 cm TL (Kenya). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Socotra, Kenya to South Africa (Sodwana Bay, KwaZulu-Natal), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos and Maldives; not known from Red Sea; elsewhere to Christmas I., Andaman Sea and Indonesia.

**REMARKS** Found in outer-reef lagoons and on reef drop-offs, in 4–30 m.

*Pseudanthias gibbosus* (Klunzinger 1884)

Redstripe basslet

PLATES 28 &amp; 31

*Anthias (Pseudanthias) gibbosus* Klunzinger 1884: 9 (Al-Qusayr, Egypt, Red Sea); Kuitert 2004\*.

*Anthias squamipinnis* (non Peters 1855): Boulenger 1895.

*Anthias fasciatus* (non Kamohara 1954): Connell 1993\*.

*Pseudanthias fasciatus* (non Kamohara 1954): Krupp & Paulus 1991\*;  
Debelius 1993\*; Khalaf & Disi 1997\*; Kuitert 2004\*.

*Pseudanthias gibbosus*: Heemstra & Akhilesh 2012\*.

Body depth 2.5–2.6 in SL; HL 3–3.4 in SL; caudal-fin concavity 25–31% SL. Dorsal fin with 3rd spine slightly to distinctly longer than 4th spine, but stiff and not filamentous, 16 rays; anal fin pointed, with 7 rays; pectoral fins 17 or 18 rays; caudal fin lunate, lobes attenuate, small males with upper lobe longer, large males with lobes thick and pointed, with short filaments. GR 10–13/24–28. LL scales 39–43.

Small males: body pinkish purple dorsally, with broad reddish swathe from nape and spinous part of dorsal fin to abdomen, each scale in the swathe with orange centre; lower rear half of body with orange spots forming longitudinal series; caudal-fin rays pink, with yellow submarginal streaks; soft-rayed part of dorsal fin with 3 rows of brown spots, spots fainter distally. Large males: head and body reddish, paler ventrally; dark red swathe from spinous part of dorsal fin to pectoral fins; body scales with red margin and gold centre spot; dorsal fin mostly reddish, but yellowish with red streaks distally; caudal fin golden, with pink upper and lower margins. Females: head and body reddish orange dorsally, each scale with dark centre; lower body pale, each scale with yellow spot; mauve stripe from snout to pectoral-fin base; white-edged red midlateral band from opercle to caudal-fin base; caudal-fin lobes yellow. Attains at least 18 cm SL.



*Pseudanthias gibbosus*, 13 cm TL (Mozambique). © Alvheim © IMR

**DISTRIBUTION** WIO: Red Sea, Mozambique and South Africa (Sodwana Bay to northern Eastern Cape).

**REMARKS** Found on rocky and coral reefs, in 30–120 m. Previously known as *Pseudanthias fasciatus* in WIO.

*Pseudanthias heemstrai*

Schuhmacher, Krupp &amp; Randall 1989

Redtail basslet

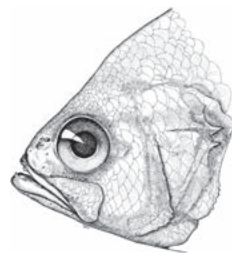
PLATE 31

*Pseudanthias heemstrai* Schuhmacher, Krupp & Randall 1989: 339,

Figs. 1–3, Pls. 1–9 (south of Aqaba, Jordan, Gulf of Aqaba, Red Sea); Debelius 1993; Khalaf & Disi 1997\*; Kuitert 2004\*; Heemstra & Akhilesh 2012\*.

Caudal fin truncate or slightly emarginate in females, convex or truncate in males, and with upper- and lowermost rays exerted in some males. Dorsal fin 15–17 rays; anal fin 7 rays, fin pointed and reaching past caudal-fin base; pectoral fins 16 or 17 rays, fins of males elongated. GR 11 or 12/26–31. LL scales 42–47.

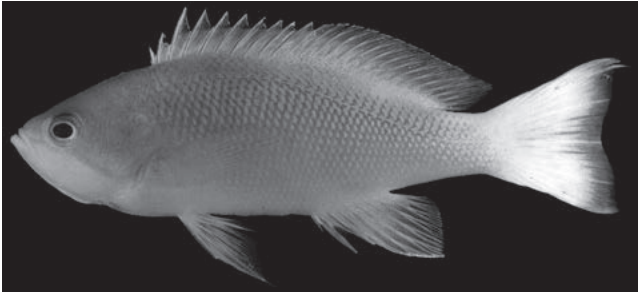
Upper body scales on both sexes with central yellow spot; median red streak on throat; lavender stripe from snout and below eye to opercle edge. Males reddish dorsally; head orange laterally, yellow ventrally; pelvic fins and anal fin pale blue-grey, with yellow spots; caudal fin dark red (appears black underwater), margin yellow or pale blue-grey. Male courtship colours: margins of scales on flanks become scarlet; a diffuse irregular midlateral white band appears behind opercle, widening towards caudal fin to form white oval spot on peduncle (also seen on territorial males); otherwise pale orange median band from tip of upper jaw to dorsal-fin origin darkens to reddish, joining depressed dorsal fin to form long red band; caudal-fin margin bright red. Females yellowish dorsally, pinkish to white ventrally; dorsal and caudal fins yellow. Attains 9 cm SL.



*Pseudanthias heemstrai*, 9 cm SL, head (Red Sea). Source: Schuhmacher *et al.* 1989



*Pseudanthias heemstrai*, 9 cm SL, male (Red Sea). PC Heemstra © NRF-SAIAB



*Pseudanthias heemstrai*, 8 cm SL, female (Red Sea).  
© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea, from northern Gulf of Aqaba to Yemen and Djibouti.

**REMARKS** Occurs in large aggregations of several hundred fish, in 13–70 m.

### *Pseudanthias hypselosoma* Bleeker 1877

Robust basslet PLATES 31 & 32

*Pseudanthias hypselosoma* Bleeker 1877: 3 (New Guinea); Bleeker 1878\*; Randall & Anderson 1993; Kuitert 1998\*; Heemstra & Akhilesh 2012\*.

Body depth 2.6–2.9 in SL; HL 2.8–3 in SL. Dorsal fin 16 or 17 rays; anal fin 7 rays; pectoral fins 18–20 rays; caudal fin convex to truncate, or slightly concave, upper- and lowermost rays slightly exerted. GR 10–13/26–30. LL scales 44–47.

Males pinkish red dorsally, paler ventrally; head with pale blue-grey stripe from lower edge of eye to lower end of pectoral-fin base; dorsal fin orangish with scarlet spot between spines 6–9; caudal fin reddish; median fins of courting males red. Females reddish orange, paler ventrally; fins hyaline yellowish; caudal-fin tips scarlet. Attains ~12 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives; elsewhere to Indonesia, Philippines, Australia and New Caledonia.

**REMARKS** Females mature at ~3 cm SL. Found in 10–40 m, usually >30 m on remote patches of coral reef in Maldives.

### *Pseudanthias ignitus* (Randall & Lubbock 1981)

Flame basslet PLATE 32

*Anthias (Mirolabrichthys) ignitus* Randall & Lubbock 1981: 18, Fig. 12 (lagoon reef at Villingili I., North Malé Atoll, Maldives).

*Pseudanthias ignitus*: Debelius 1993\*; Randall & Anderson 1993\*; Kuitert 1998\*, 2004\*; Heemstra & Akhilesh 2012\*.

Body depth 2.5–3 in SL; HL 3–3.2 in SL; caudal fin concavity 23–33% SL. Dorsal fin 16 or 17 rays; anal fin rounded, with 7 rays; pectoral fins bluntly pointed, with 19 or 20 rays; caudal fin deeply forked, lobes distinctly longer than head. Males with fleshy protuberance at front of upper lip. GR 11 or 12/22–25. LL scales 53–58.

Males: head and body mostly orange, reddish dorsally and suffused with lavender ventrally; underside of head yellowish; upper lip reddish orange, tip of proboscis yellow; orange stripe from front of snout over lower part of eye to opercle near upper part of pectoral-fin base; small red spot at upper end of pectoral-fin base; dorsal fin scarlet, rear half of base yellow, the yellow increasing posteriorly; anal fin hyaline lavender; pelvic fins hyaline yellow; caudal-fin base orange, lobes red. Females similar to males, but with less intense colours. Attains 6 cm SL.

**DISTRIBUTION** Indian Ocean. WIO: Maldives (common); elsewhere in Andaman Sea to Indonesia.

**REMARKS** Found on lagoon reefs and upper drop-offs with coral growth, in 15–25 m. Resembles *Pseudanthias dispar* (Herre 1955) from the western Pacific.

### *Pseudanthias lunulatus* (Kotthaus 1973)

Crescent-tail basslet PLATE 32

*Anthias lunulatus* Kotthaus 1973: 20, Fig. 290 (Somali Basin, Somalia).  
*Pseudanthias lunulatus*: Kuitert 1998\*; Heemstra & Akhilesh 2012\*.  
*Pseudanthias* n. sp.: Randall & Pyle 2001; Manilo & Bogorodsky 2003; Kuitert 2004\*.

Body depth 2.8–3 in SL; HL 3–3.3 in SL; caudal-fin concavity 20–24% SL. Dorsal fin 15 or 16 rays; anal fin pointed, with 7 rays; pectoral fins 17 or 18 rays; caudal fin deeply lunate in both sexes, lobes attenuate, slender. GR 9 or 10/22–25. LL scales 38–43.

Body with magenta-edged yellow triangular saddle below spinous part of dorsal fin; dorsal and anal fins blue, with small greenish yellow spots, and dorsal-fin margin violet; series of close-set small yellow spots along scaly sheath at dorsal-fin base; magenta-edged yellow stripe from front of upper jaw to lower edge of eye and pectoral-fin base; pelvic fins white; caudal fin greenish yellow, upper and lower margins violet. Males: head and body red or pink, with dusky yellow spot on each scale (persisting as dark spot in preservative); head yellowish dorsally. Females: head and body orange-yellow, with lavender-edged yellow stripe from front of upper jaw to pectoral-fin base; leading edge of pelvic fins broadly white. Attains 12 cm SL.





*Pseudanthias lunulatus* (Red Sea). © F Krupp, SMF

**DISTRIBUTION** Indian Ocean. WIO: Somalia, Sudan, South Africa (Sodwana Bay), Seychelles, Mauritius and Maldives; elsewhere to Indonesia.

**REMARKS** Females mature at ~6 cm SL. Usually occurs on reefs in <50 m but known to 72 m.

*Pseudanthias marcia* Randall & Hoover 1993

Whiptail basslet

PLATE 32

*Pseudanthias marcia* Randall & Hoover 1993: 47, Figs. 1–5 (off Rahah Bay, SW coast of Oman); Randall 1995\*; Randall & Pyle 2001\*; Kuitert 2004\*; Heemstra & Akhilesh 2012\*.

Body depth 2.5–2.9 in SL; HL 3–3.1 in SL. Dorsal fin 16 rays, longest rays about twice length of longest spines; anal fin 7 rays, fin of males enlarged, pointed, reaching past caudal-fin base, fin of females rounded; pectoral fins 19–21 rays, fins of males elongated; caudal fin of males asymmetric, rear edge convex, upper rays distinctly elongated, forming long filament, concavity 32–37% SL; caudal fin of females symmetric, deeply emarginate to crescentic, upper rays slightly elongated, concavity 16% SL. GR 11–13/27–30. LL scales 47–50.

Head and body reddish orange, lower body scales yellow with reddish margins, pale ventrally; lavender streak below eye to lower end of pectoral-fin base. Males with diffuse red streak on midbody, from lateral line to pectoral fins; white streak on upper surface of peduncle; caudal fin yellow, becoming reddish posteriorly, with red or yellow filament. Females with scarlet caudal-fin lobe tips. Attains 10 cm SL, 16 cm TL (including caudal filament).

**DISTRIBUTION** WIO: Gulf of Oman, Djibouti to southern Oman and Socotra.

**REMARKS** Usually occurs in aggregations over rocky reefs or drop-offs, in 14–30 m.

*Pseudanthias pillai* Heemstra & Akhilesh 2012

Indian basslet

PLATES 32 & 33

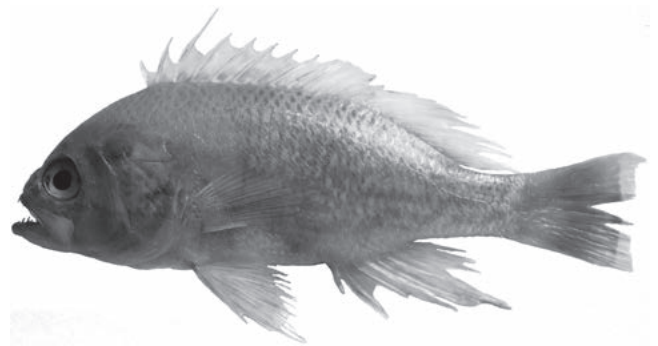
*Pseudanthias pillai* Heemstra & Akhilesh 2012: 152, Figs. 39–40 (off Chavakkad, Kerala, India).

Body depth 2.6–2.9 in SL; HL 2.6–2.7 in SL. Dorsal fin with 3rd spine pungent, slightly longer than 4th spine, spines 3–5 with fleshy cirrus at tips, 16 rays, rear margin of fin pointed, elongate, reaching past caudal-fin base; anal fin 7 rays; pectoral fins rounded, with 19 rays; caudal-fin margin slightly convex. GR 11/28. LL scales 36–38.

Males (colours more vivid than in females): dorsal head and anterior body yellow becoming deep pink posteriorly, broad golden swathe from nape to pectoral-fin base; upper body scales with central dark spot, pinkish purple margins, lower body with 2 or 3 irregular pink lines following scale rows; lower lip purple, and purple line from snout to pectoral-fin base; paired fins hyaline pinkish white to yellowish; dorsal fin yellow, spines and rays purple; caudal fin deep pink, with yellow corners. Females: head and body pinkish orange, belly whitish; caudal fin mostly yellow, reddish proximally; dorsal fin orange; pelvic fins pale yellow to white. Attains 12 cm SL.



*Pseudanthias pillai*, 12 cm SL, holotype (SW India). Source: Heemstra & Akhilesh 2012



*Pseudanthias pillai*, 10 cm SL, paratype (E India). KV Akhilesh © CMFRI

**DISTRIBUTION** WIO: southwestern India (Kochi and Chavakkad).

**REMARKS** Known from 175–200 m.

## *Pseudanthias pulcherrimus*

(Heemstra & Randall 1986)

Resplendent basslet

PLATE 33

*Anthias pulcherrimus* Heemstra & Randall 1986: 512, Pl. 33, Fig. 166.8

(Mauritius, Mascarenes).

*Anthias* sp.: Winterbottom *et al.* 1989\*.

*Pseudanthias pulcherrimus*: Randall & Anderson 1993; Kuitert 1998\*;  
Randall & Pyle 2001; McKenna & Allen 2003; Kuitert 2004\*; Fricke *et al.*  
2009; Heemstra & Akhilesh 2012\*.

Body depth 2.9–3 in SL; HL 3.1–3.4 in SL; caudal concavity 7.6–11% SL. Dorsal fin with 3rd spine elongate in both sexes, 16–18 rays; anal fin pointed, with 7 rays; pectoral fins 17–20 rays; pelvic fins angular, reaching 3rd spine of anal fin; caudal fin lunate, lobes attenuate. Upper lip thickened at symphysis. GR 9–11/23–27. LL scales 40–45.

Males: head and body red to dark pink, abdomen pale pink; faint, irregular, reddish orange band from pectoral-fin base to peduncle; dorsal and pelvic fins yellow; pelvic fins with conspicuous scarlet margin; anal fin whitish with yellow or red leading edge; caudal fin dark red, pinkish white distally. Females and juveniles: body pink; snout, peduncle and caudal fin yellow; dorsolateral body scales with dark spot at centres. Attains 8 cm SL.



*Pseudanthias pulcherrimus*, 4 cm SL, lectotype (Mauritius).

Source: Heemstra & Akhilesh 2012



*Pseudanthias pulcherrimus*, 4 cm SL, female paralectotype (Mauritius).  
© JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: South Africa (Aliwal Shoal; Sodwana Bay), Madagascar, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Andaman Sea.

**REMARKS** Females mature at ~5 cm SL. Found on reefs, in 10–55 m. Similar to *Pseudanthias randalli* (Lubbock & Allen 1978) of the western Pacific, which has males with lower body dark reddish purple, and pelvic fins pale blue with red margin.

## *Pseudanthias squamipinnis* (Peters 1855)

Sea goldie

PLATES 33 & 34

*Serranus (Anthias) squamipinnis* Peters 1855: 429 (Mozambique).

*Anthias squamipinnis*: Smith 1965\*; SFSA No. 459\*; Heemstra 1973;

Jones & Kumaran 1980; Van der Elst 1981\*; SSF No. 166.9\*;

Allen & Steene 1987\*; Winterbottom *et al.* 1989\*; Winterbottom &

Anderson 1997.

*Pseudanthias squamipinnis*: Debelius 1993\*; Randall & Anderson 1993;

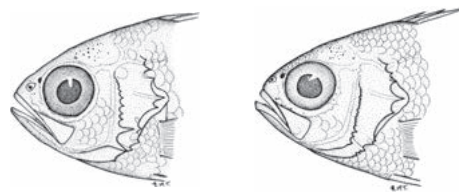
Khalaf & Disi 1997\*; Kuitert 1998\*; Randall & Pyle 2001; Terashima *et al.*

2001\*; McKenna & Allen 2003; Heemstra & Heemstra 2004\*; Fricke *et al.*

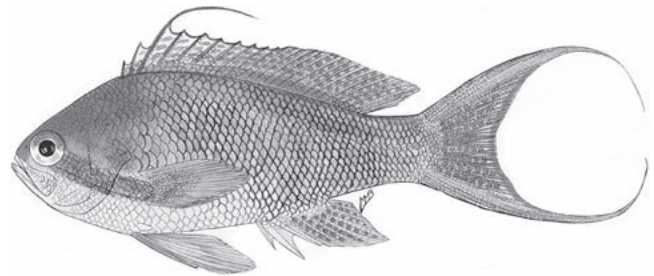
2009; Heemstra & Akhilesh 2012\*.

Body depth 2.4–3.1 in SL; HL 2.6–3.4 in SL; caudal concavity 12–41% SL. Dorsal fin with 3rd spine elongated (up to 80% SL) in males, 16–18 rays; anal fin 6–8 rays, fin of males angular; pectoral fins 16–19 rays; caudal fin lunate, lobes produced in males. GR 8–11/23–28, distinctly longer than gill filaments. LL scales 38–44.

Males: body scales yellow, with red or blue-grey margins; head reddish purple dorsally; orange stripe from eye to pectoral-fin base, and head below stripe whitish; dorsal fin reddish distally, margin pale blue, the proximal rear part of fin with small red spots extending onto peduncle and anal-fin membranes; pectoral fins with oval magenta spot; pelvic-fin membranes red; caudal fin red, rear margin yellow, upper and lower fin-lobe margins pale violet. Females: head, body and fins orange; lavender-edged gold stripe from lower edge of eye to pectoral-fin base. Attains 9 cm SL.



*Pseudanthias squamipinnis*, 2 cm SL (left); 3 cm SL (right)  
(both South Africa). Source: Heemstra & Akhilesh 2012



*Pseudanthias squamipinnis*, 12 cm TL, female (Kenya). Source: SSF

**DISTRIBUTION** WIO: Red Sea, Kenya to South Africa (Margate, KwaZulu-Natal; juveniles south to Knysna in summer), Madagascar, Comoros, Aldabra, Mascarenes, Agaléga Is., Seychelles, Chagos, Maldives and Lakshadweep.

**REMARKS** Common on coral reefs, in 10–25 m, but known to 40 m deep. Females mature at ~5 cm SL and can change to males at ~6 cm SL. Similar to *P. cheirospilos* (Bleeker 1857) from the western Pacific, which has similar counts and measurements and also an elongated 3rd dorsal-fin spine, but caudal fin of males less concave and with pale blue margin.

### *Pseudanthias taeniatus* (Klunzinger 1884)

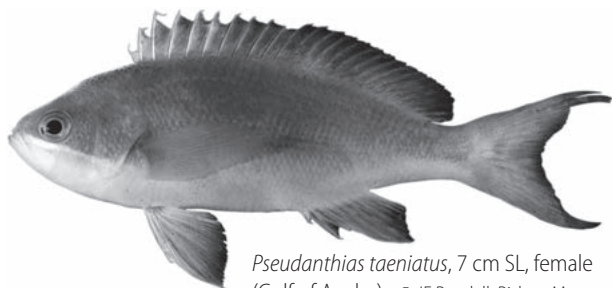
Striped basslet PLATES 33 & 34

*Anthias (Pseudanthias) taeniatus* Klunzinger 1884: 9, Pl. 3, Fig. 2 (Al-Qusayr, Egypt, Red Sea).

*Pseudanthias taeniatus*: Randall 1995\*; Khalaf & Disi 1997\*; Kuitert 2004\*; Heemstra & Akhilesh 2012\*.

Body depth 2.6–3.5 in SL; HL 3.2–3.4 in SL; caudal concavity 13–22% SL. Dorsal fin 16 or 17 rays; anal fin 6–8 rays, fin angular in males, rounded in females; pectoral fins rounded, with 17–20 rays; caudal fin emarginate, lobes acute. GR 8–12/26–29, distinctly longer than gill filaments. LL scales 44–49.

Males: head and body dark reddish brown, pinkish ventrally; irregular mauvish white streak from nape to caudal fin; paired fins red; dorsal and anal fins pinkish; caudal fin whitish with red subterminal bands. Females: body orange, whitish pink ventrally; with red spot on each body scale; caudal fin hyaline yellow, lobe tips red. Attains 9 cm SL.



*Pseudanthias taeniatus*, 7 cm SL, female (Gulf of Aqaba). © JE Randall, Bishop Museum



*Pseudanthias taeniatus*, 7 cm SL, male (Gulf of Aqaba).

© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea (including Gulf of Aqaba).

**REMARKS** Females mature at ~7 cm SL. Known from 10–70 m (usually 20–40 m).

### *Pseudanthias townsendi* (Boulenger 1897)

Townsend's basslet

PLATE 34

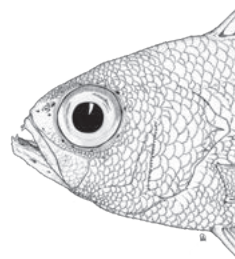
*Anthias townsendi* Boulenger 1897: 420 (Makran coast, Iran).

*Pseudanthias townsendi*: Randall 1995\*; Manilo & Bogorodsky 2003;

Kuitert 2004\*; Field 2005\*; Heemstra & Akhilesh 2012\*.

Body depth 2.8–3.3 in SL; HL 2.9–3.2 in SL; caudal-fin concavity ~7.4 in SL. Dorsal fin with 3rd spine slightly longer than 4th spine, 15–17 rays; anal fin pointed, with 7 rays; pectoral fins 16–18 rays; caudal-fin lobe tips rounded with 2 or 3 short exerted rays. GR 10 or 11/25–28. LL scales 37–42.

Males yellow, with deep red to dark brown band from nape to caudal fin, where band narrows and makes U-turn to run anteriorly, becoming dark reddish towards head, where it joins band on opposite side, forming a reddish mask over front of head; underside of head white; dorsal fin pale pink proximally, reddish distally; paired fins lavender to red; anal fin white distally, pinkish proximally, with posterior reddish blotch and leading edge pale blue; caudal fin pinkish proximally, where it surrounds brown U-band, with dark red semicircle distal to pinkish area, and red lobe tips set off by 2 pale blue stripes. Females nondescript orange, body scales with yellow centre and pink margin, more yellow dorsally and pinker ventrally; orange-red to lavender stripe from cheeks below eye to pectoral-fin base. Attains 9 cm SL.

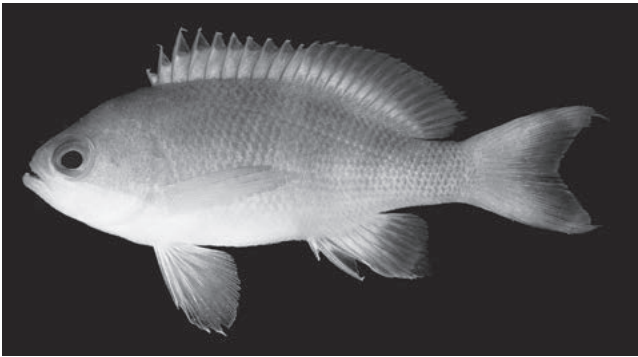


*Pseudanthias townsendi*, 9 cm TL, holotype, head (Iran). Source: Heemstra & Akhilesh 2012



*Pseudanthias townsendi*, 6 cm SL, male (Persian/Arabian Gulf).

© JE Randall, Bishop Museum



*Pseudanthias townsendi*, 5 cm SL, female (Persian/Arabian Gulf).  
© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman, and southern Oman to southern Iran.

**REMARKS** Usually found over rocky bottom, in 20–63 m.

### *Pseudanthias unimarginatus* Randall 2011

Onemargin basslet

PLATE 34

*Pseudanthias unimarginatus* Randall 2011: 82, Pl. 2a–b (reef north of Flic-en-Flac, Mauritius, Mascarenes); Heemstra & Akhilesh 2012\*.

Body depth 3.1 in SL; caudal-fin concavity 3.4 in SL. Dorsal fin 16 rays; anal fin 7 rays; pectoral fins 17 or 18 rays; caudal fin forked, lobe tips filamentous. Front of upper lip swollen; lower rear part of orbit with 22 papillae. GR 8 or 9/25. LL scales 43; pectoral fins with scales on basal quarter; scales on dorsal fin extend three-fourths distance to margin at middle of fin; scales on soft-rayed part of anal fin extend halfway to margin; scales on caudal fin reach three-fourths distance to rear margin.

Males: head and body orange-yellow, becoming pale pink or pinkish yellow ventrally; scale centres with faint lavender-pink spot; head with large elliptical orange area with magenta border, dorsally from snout to nape; caudal fin yellow, with broad pale blue upper margin and red submarginal band; other fins hyaline yellow. Colour of females unknown. Attains at least 6 cm SL.

**DISTRIBUTION** WIO: South Africa (Sodwana Bay) and Mauritius.

**REMARKS** The male holotype was collected on a small reef, in 53 m. Randall (2011) remarks that *Pseudanthias unimarginatus* is a close relative of both *P. parvirostris* and *P. bimarginatus*, all three species having a unique dorsal head colour pattern. However, a specimen of *P. bimarginatus* with a blue band on the upper and lower edges of the caudal fin

has been photographed (R Kuitert) on the same rocky reef in Maldives, as has a specimen with a single blue band on the upper edge of the caudal fin. It is possible that what has been described as *P. unimarginatus* is a young male *P. bimarginatus* undergoing its sex change.

### GENUS *Rabaulichthys* Allen 1984

Body slender, depth 3.4–3.9 in SL; caudal fin deeply forked, lobe tips filamentous. Dorsal fin single, greatly enlarged in males, with 10 slender, flexible spines, 15 or 16 rays; anal fin 3 spines, 6 or 7 rays; pectoral fins 19–21 rays (only upper 2 rays and lowermost rays unbranched); pelvic fins short and rounded, with 1 spine and 5 rays; caudal-fin branched rays 15. Body and head covered with ctenoid scales, except for lips and front of snout. LL scales 52–55; circumpeduncular scales 28 or 29. Opercle with 3 flat spines; upper limb of preopercle with 23–35 small serrae and 1 slightly enlarged serra at angle; subopercle and interopercle smooth. Front rim of orbit with narrow adipose margin, rear edge with 14–16 cirri. Mouth oblique, upper jaw slightly protrusile; maxilla reaching to or slightly past vertical at rear edge of pupil; lips slender, not overlapping maxilla; upper jaw slightly protrusile; large canine (or close-set pair of canines) directed forward at front of jaw; band of small slender conical teeth medial to canines, in 2 irregular rows (outer teeth larger), narrowing to 1 row posteriorly on sides of jaw; lower jaw with band of small conical teeth, extending anteriorly on each side of jaw and medial to each laterally projecting canine on each side of symphysis, and medial to upper jaw canines when mouth closed. Vertebrae 10 + 16; supraneurals 2. Four species, at least 1 in WIO.

### *Rabaulichthys stigmaticus* Randall & Pyle 1989

Spotted sailfin basslet

PLATES 27 & 34

*Rabaulichthys stigmaticus* Randall & Pyle 1989: 2, Figs. 1–2 (reef north of Bathala I., Ari Atoll, Maldives); Pethiyagoda 1994; Fricke 1999.

Body elongate, body depth 3.8–3.9 in SL; HL 3.3–3.4 in SL. Dorsal fin 16 rays, spinous part of fin very elevated in adult males; anal fin 7 rays; pectoral fins 20 rays. GR 9/23 or 24. LL scales 52–55.

Males orangish brown, pink ventrally, with large dark orange-brown, pale-edged, quadrangular blotch on side of body between rear part of dorsal and anal fins; spinous part of dorsal fin pale bluish grey, with yellow spines and yellow margin, soft-rayed part pinkish with horizontally elongate

black spot; pelvic fins reddish black; caudal fin brownish pink. Male courtship colour: body bronze; anal fin, caudal fin, and soft-rayed part of dorsal fin enclosing the black spot entirely brilliant blue. Female colouration unknown. Attains at least 5 cm SL.



*Rabaulichthys stigmaticus*, 5 cm SL, male holotype (Maldives).  
© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Madagascar, Maldives, Mauritius and Sri Lanka.

**REMARKS** Type specimens collected from rubble bottom, in ~35 m.

**GENUS** *Sacura* Jordan & Richardson 1910

Body deep, moderately compressed, depth 40–50% SL, subequal to HL. Dorsal fin 10 spines, 14–18 rays, with 3rd spine and 1 or 2 anterior rays exerted and much elongated, and fin margin not or only slightly notched before soft-rayed part; anal fin 3 spines, 7 rays; pectoral fins 17 rays; caudal fin deeply forked, lobes attenuated, with 13 branched rays. Mouth oblique; upper jaw slightly protrusile, with 2 series of teeth: outer teeth slender, conical, and inner teeth minute; 1 or 2 small canines on each side of symphysis, and 1 or 2 canines projecting posteriorly on inner side near symphysis; lower jaw slightly projecting, with 2 series of teeth: inner teeth canine-like, 1 or 2 near symphysis directed forward and laterally, and 1 or 2 larger teeth on inner side of front third of jaw; triangular patch of villiform teeth on vomer, and similar teeth in narrow band on palatines; tongue smooth. Preopercle rear edge finely

serrate, lower edge and angle with enlarged serrae; subopercle and interopercle strongly serrate. Lateral line complete; head (including maxilla) covered with scales, but lips, preorbitals and lower jaw naked; no supramaxilla or ridge along upper edge of maxilla. Vertebrae 10 + 16; supraneural bones 2: 00/2/1/1. Four species: 3 in western Pacific and 1 in WIO.

*Sacura boulengeri* (Heemstra 1973)

Flower seaperch

PLATES 27 & 35

*Anthias formosus* Boulenger 1889: 238 (Muscat, Oman, Gulf of Oman) [objectively invalid; name preoccupied].

*Anthias boulengeri* Heemstra 1973: 206, Fig. 2 (Muscat, Oman, Gulf of Oman) [replacement name for *Anthias formosus* Boulenger 1889, preoccupied by *Anthias formosus* Bloch 1792].

*Sacura boulengeri*: Heemstra & Randall 1979; Randall 1995\*.

Body oval, depth subequal to HL. Dorsal fin with 3rd spine elongated (occasionally 2nd and 3rd spines both elongated) and with dark fleshy sheath at tip, 14 rays, rays 3–6 also elongated, but fin margin not notched between spinous and soft-rayed parts; anal fin subangular to pointed. GR 14–16/30–33. LL scales 28–31.

Head and body yellow-brown, with 2 zigzag, longitudinal, pinkish purple stripes from head to peduncle, and similar zigzag markings below dorsal fin, along belly and above anal fin; anal fin lavender; dorsal, caudal and pelvic fins yellow; dark saddle blotch at caudal-fin base. Attains 19 cm TL.



*Sacura boulengeri*, 10 cm SL, male paralectotype (Oman).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Oman and southwestern India.

**REMARKS** Known to ~49 m deep.

## FAMILY CALLANTHIIDAE

### Seaperches

Phillip C Heemstra

Body oblong, slightly compressed or subcylindrical, with moderately ctenoid scales; lateral line incomplete, running close to dorsal-fin base to its rear end. Eyes large, diameter greater than snout length; nasal organ with rudimentary lamellae. Opercle with 1 or 2 spines on rear edge; edge of preopercle, subopercle and interopercle smooth. Dorsal fin continuous, with 10 or 11 spines, 9–12 rays; anal fin 3 spines, 9–12 rays; last dorsal- and anal-fin rays split to base but counted as single ray; soft dorsal and anal fins pointed, reaching past caudal-fin base; pectoral fins 17–23 rays; pelvic fins 1 spine, 5 rays; caudal fin lunate or lanceolate, with 13 (*Grammatonotus*) or 15 (*Callanthias*) branched rays. Maxilla exposed when mouth closed; no supramaxilla; small canines at front of jaws, smaller conical teeth posteriorly; villiform teeth usually present on vomer and palatines. Branchiostegal rays 6. Head scaly except for lips and throat. Vertebrae 10 + 14.

Two genera and at least 11 species (one of these undescribed); both genera and 3 species in WIO.

#### KEY TO GENERA

- 1a Opercle with 2 spines; LL pored scales 28–33; caudal fin lunate, with 15 branched rays; body slightly compressed ..... *Callanthias*  
 1b Opercle with 1 pungent spine at tip of inner ridge; LL pored scales 14–18; caudal fin with 13 branched rays; body subcylindrical ..... *Grammatonotus*

### GENUS *Callanthias* Lowe 1839

Body oblong, slightly compressed, depth greater than HL. Genus reviewed by Anderson *et al.* 2015. Seven species, 1 in WIO.

#### *Callanthias legras* Smith 1948

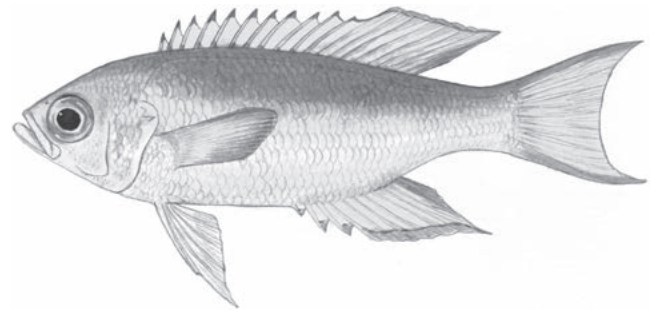
African splendid seaperch or African goldie PLATE 35

*Callanthias legras* Smith 1948: 335, Fig. 1 (Algoa Bay, South Africa); SSF No. 168.1\*; Anderson *et al.* 2015\*.

Body depth 3–3.3 in SL; HL 3.3–3.5 in SL. Dorsal fin 10 or 11 spines (spines progressively longer posteriorly), 9–11 rays; anal fin 3 spines, 10 rays, fin length appears

sexually dimorphic (males with longer fins); pectoral fins 18–20 rays. GR 18/20–23. LL scales 28–33; LSS 36–43.

Head and body reddish orange dorsally, white below; pelvic fins white, other fins yellow with narrow mauve margins. Attains 25 cm SL.



*Callanthias legras*, 22 cm TL, holotype (South Africa). Source: SFSA

**DISTRIBUTION** Southern Africa: Namibia in southeastern Atlantic, to South Africa (KwaZulu-Natal) in WIO.

**REMARKS** Planktivorous. Common off Cape south coast; trawled from 50–431 m.

### GENUS *Grammatonotus* Gilbert 1905

Body oblong, subcylindrical; peduncle slightly compressed; membranes of spinous dorsal fin distinctly incised, middle spines longest; anterior nostrils tubular, well apart from rear nostrils. Seven species, 2 in WIO (one undescribed).

#### KEY TO SPECIES

- 1a Caudal fin lanceolate, middle rays longest; GR 22 on lower limb ..... *G. lanceolatus*  
 1b Caudal fin middle and outer rays exerted and filamentous; GR 20 on lower limb ..... *Grammatonotus* sp.

#### *Grammatonotus lanceolatus* (Kotthaus 1976)

Lanceolate perchlet

PLATE 35

*Parabarossia lanceolata* Kotthaus 1976: 60, Fig. 388 (southwest of Socotra) [incorrectly in family Plesiopidae].

Body depth 3.1–3.2 in SL; HL 3.2–3.5 in SL. Dorsal fin 11 spines (4th or 5th spine longest), 9 rays; anal fin 3 spines, 9 rays; pectoral fins 19 rays; caudal fin lanceolate. GR 18/20–23. LL scales mostly missing; LSS 24–43.

Head and body scarlet dorsally, pinkish yellow below; dorsal, caudal and pectoral fins yellowish with bright yellow spots; pelvic fins and anal fin pale pink; iris red above and below, yellow in between. Attains 8 cm SL.

**DISTRIBUTION** WIO: Socotra, Mozambique and South Africa (Eastern Cape).

**REMARKS** South African specimen recovered from the stomach of a grouper. Found in 151–337 m.

## *Grammatonotus* sp.

Filament perchlet

PLATE 35

Body depth ~4.9 in SL; HL ~3 in SL. Dorsal fin 11 spines, 9 rays; anal fin 3 spines, 9 rays; pectoral fins 18–20 rays; caudal fin truncate to slightly convex, with outer and middle rays filamentous, exerted. GR 7/20. LL scales ~14.

Head and body reddish pink dorsally, paler pink to yellow below; dorsal fin pink, becoming yellowish posteriorly, with 2 rows of yellow spots; caudal fin pink, with yellow spots, becoming yellow distally on larger specimens, the middle exerted ray pinkish; pelvic fins and anal fin pink; iris red above and below, yellow in between. Attains 11 cm SL.

**DISTRIBUTION** WIO: Saya de Malha Bank, Nazareth Bank and St Brandon Shoals.

**REMARKS** Known from 159–288 m.

### GLOSSARY

**exerted** – elongate; protruding.

## FAMILY PSEUDOCROMIDAE

### Annies, dottybacks and snakelets

Anthony C Gill and Richard Winterbottom, with contributions from Francesco Santini

Perch-like to eel-like body; dorsal fin 0–3 spines, 20–79 rays; anal fin 0–3 spines, 10–66 rays; pelvic fins 1 spine, 5 rays,

or fins absent. Branchiostegal rays 6. Lateral line modified: disjunct, posteriorly truncated, or present as multiple lines.

Tiny to moderately small-sized (~2.5–50 cm TL, usually <10 cm TL). Occur throughout the Indo-Pacific, from intertidal zones to ~140 m deep, usually on reefs. Six subfamilies, with 24 genera and ~150 species; 11 genera and 63 species in WIO.

### KEY TO SUBFAMILIES

- 1a Body elongate and eel-like, body depth at anal-fin origin <16% SL; dorsal fin 32–79 rays; anal fin no spines, 26–66 rays..... **Congrogadinae**
- 1b Body oblong to moderately elongate, body depth at anal-fin origin >17% SL; dorsal fin 20–38 rays; anal fin 1–3 spines (sometimes small and difficult to detect), 10–21 rays..... 2
- 2a Single tubed LL scale at shoulder..... **Pseudoplesiopininae**
- 2b Series of tubed LL scales extending from shoulder along sides just below dorsal-fin base..... 3
- 3a Dorsal fin 1 weak spine, 25–27 rays; anal fin 1 weak spine, 17–19 rays; pectoral fins 13–15 rays; pelvic fins 1 spine, 4 rays, inner ray tiny and unbranched (other rays branched); lateral line on peduncle represented by centrally pitted scales; head naked..... **Anisochrominae**
- 3b Dorsal fin 2 or 3 weak to strong spines, 20–38 rays; anal fin 2 or 3 weak to strong spines, 10–21 rays; pectoral fins 14–20 (usually 16–19) rays; pelvic fins 1 spine, 5 rays, all rays branched; lateral line on peduncle represented by tubed scales (sometimes absent in juveniles); head scaly..... 4
- 4a Last dorsal-fin ray bound by membrane to upper edge of caudal fin, membrane interrupting circumpeduncular scales (no median scale or row of scales along dorsal edge of peduncle); peduncle length 5–8% SL; total caudal-fin rays 23–25 (rarely 25)..... **Assiculoidinae** [not in WIO]
- 4b Last dorsal-fin ray not bound to caudal fin by membrane; circumpeduncular scales not interrupted; peduncle length 8–20% SL; total caudal-fin rays 25–34 (rarely 25)..... 5
- 5a Opercle with 1–5 distinct serrations ventral to junction with subopercle; total caudal-fin rays 25–27 (usually 26)..... **Assiculinae** [not in WIO]
- 5b Opercle with at most indistinct serrations ventral to junction with subopercle; total caudal fin rays 26–34 (rarely 26)..... **Pseudochrominae**

## SUBFAMILY ANISOCHROMINAE

### Annies

Anthony C Gill

Tiny, perch-like; lateral line consisting of series of tubed scales on front of body (extending along upper part of body from gill opening to beneath end of dorsal fin) and series of centrally pitted scales on rear of body (extending along midsides from above front of anal fin to caudal-fin base); head naked; pelvic fins 1 spine, 3 branched segmented rays, plus tiny inner unbranched segmented ray. Revised by Gill & Fricke (2001). One genus and 3 species, all in WIO.

### GENUS *Anisochromis* Smith 1954

Diagnosis as for subfamily. Three sexually dimorphic species: females olive to brown, with darker bars on body and black ocellated spot on subopercle, and often with broad orange-yellow area on sides of body; males generally dark grey to black, with red head, and other differing colouration details. Species appear to be protogynous hermaphrodites.

#### KEY TO SPECIES

- 1a Dorsal fin 1 spine, 25 or 26 (usually 25) rays; anal fin 1 spine, 17 or 18 (usually 17) rays; LL scales 37–44 (usually 38–41) ..... *A. kenyae*
- 1b Dorsal fin 1 spine, 25–27 (usually 26) rays; anal fin 1 spine, 17–19 (usually 18) rays; LL scales 40–45 (usually 41–44) ..... 2
- 2a Rear interorbital pores 3 or 4; total parietal pores 23–44 (usually >30); preserved male specimens with conspicuous large dark spot distally on anterior part of dorsal fin, basal part of pelvic fins broadly pale (sometimes slightly darker or dappled with darker spots on fin base) and abruptly dark distally, sometimes with pale distal margin ..... *A. mascarenensis*
- 2b Rear interorbital pores 1 or 2; total parietal pores 14–30; preserved male specimens generally with dusky dorsal fin, without large dark spot anteriorly, and pelvic fins mostly dusky but sometimes with narrow pale basal area, and with pale distal margin ..... *A. straussi*

### *Anisochromis kenyae* Smith 1954

African annie

PLATE 36

*Anisochromis kenyae* Smith 1954: 300, Fig. 1, Pl. 6 (Malindi, Kenya); Gill & Fricke 2001.

Dorsal fin 1 spine, 25 or 26 rays; anal fin 1 spine, 17 or 18 rays; pectoral fins 13–15 rays; pelvic fins 1 spine, 4 rays; caudal fin 24–27 rays. LSS 37–44; anterior LL scales 28–35; circumpeduncular scales 12 or 13. GR 1 or 2 + 2 or 3 = 3–5. Vertebrae 10 + 22–24.

Colour sexually dimorphic. *Males* with head bright reddish orange to bright red, with black and white markings; body black, with scattered small white spots, sometimes aligning to form vague bars on upper part of body; dorsal fin with large dark grey to black spot extending from 1st ray to 4th or 5th ray, and black spot bordered anteriorly with yellow, basally with yellow to orange, and sometimes posteriorly with yellow to orange; basal portion of dorsal fin behind black spot bright red, with small black spot or streak at base of each of fin ray, these sometimes edged anteriorly with white; remainder of dorsal fin pinkish hyaline to bright red, with grey distal margin; basal portion of anal fin bright red, with small black spot or streak at base of each fin ray, these sometimes edged anteriorly with white; remainder of anal fin pinkish hyaline to red, with greyish hyaline to grey distal margin; pectoral fins black with irregular white spots basally, remainder of fins greyish hyaline; pelvic fins yellow on base, remainder of fins black, sometimes with distal margin pale grey to hyaline; caudal fin black basally, remainder of fin greyish hyaline to black. *Females* with head olive-brown to brown dorsally, becoming pale green ventrally, with 2 pale olive bars on nape; large dark grey to black spot on subopercle, bordered irregularly with white, sometimes with additional, smaller, white-edged black spot on lower part of subopercle; brown-edged diffuse pale olive stripe extending from posterodorsal rim of eye, above upper part of preopercle to upper margin of opercle; 2 white spots or clusters of white to mauve spots on posteroventral rim of eye (at ~3 and 5 o'clock positions); head and nape scattered with small white to mauve or pale olive spots; narrow dark brown to grey bar extending from ventral part of orbital rim to rear edge of maxilla; body with olive-brown bars, alternating with pale olive bars, and broad orange-yellow area sometimes present on sides of body; barring on body sometimes extending slightly onto fin bases; upper and lower edges of peduncle sometimes with black spots; dorsal and anal fins dusky green to dusky orange or greenish hyaline, often with irregular, small, pale olive to mauve or white spots; fleshy pectoral-fin bases maroon to dark brown, with scattered white to mauve spots; pelvic fins olive, bases sometimes pale yellow. Attains 3 cm TL.

**DISTRIBUTION** WIO: Kenya to northern Mozambique, northern Madagascar and Comoros.

**REMARKS** Found in tidepools and on shallow reefs, to ~9 m deep.



*Anisochromis mascarenensis* Gill & Fricke 2001

## Mascarene annie

*Anisochromis kenya* (non Smith 1954): Fricke 1999.*Anisochromis mascarenensis* Gill & Fricke 2001: 197, Figs. 1, 9–11 (reef lagoon SW of St Paul, Réunion, Mascarenes).

Dorsal fin 1 spine, 25 or 26 rays; anal fin 1 spine, 17 or 18 rays; pectoral fins 13 or 14 rays; pelvic fins 1 spine, 4 rays; caudal fin 25 or 26 rays. LSS 40–45; anterior LL scales 32–39; circumpeduncular scales 12. GR 1 or 2/2 = 3 or 4. Vertebrae 10 + 23 or 24.

Colour sexually dimorphic; males and females similar to *A. kenya*. Attains 3 cm TL.

**DISTRIBUTION** WIO: endemic to western Mascarenes (Mauritius and Réunion).

**REMARKS** Found in shallow lagoonal reefs, to ~18 m deep. Associated mainly with live *Acropora* branched corals.

*Anisochromis straussi* Springer, Smith & Fraser 1977

## St Brandon's annie

PLATE 36

*Anisochromis straussi* Springer, Smith & Fraser 1977: 2, Figs. 1–2 (Raphael L, St Brandon Shoals); Gill & Fricke 2001.

Dorsal fin 1 spine, 25–27 rays; anal fin 1 spine, 17–19 rays; pectoral fins 13–15 rays; pelvic fins 1 spine, 4 rays; caudal fin 23–26 rays. LSS 41–45; anterior LL scales 32–39; circumpeduncular scales 12–14. GR 2/2 or 3. Vertebrae 10 or 11 + 23–25.

Colour sexually dimorphic. *Males* with head bright reddish orange, with black-edged white stripe extending from upper rear rim of eye, above upper part of preopercle to upper edge of opercle; 2 white spots on lower rear rim of eyes (at ~3 and 5 o'clock positions); narrow dark grey bar extending from lower part of orbital rim to rear edge of maxilla; iris yellow, red centrally, with radiating brown bars; reddish orange coloration extending slightly onto anterior part of body, rapidly grading to uniform black; dorsal, anal and caudal fins black basally, becoming grey to greyish hyaline on distal margins; dorsal-fin base with small, intermittent, pale grey spots; pectoral fins dark grey to black basally, remainder of fins greyish hyaline, rays dark grey; pelvic fins black, margin pale grey to hyaline. *Females* with head olive-brown to brown dorsally, becoming pale green to lime green ventrally, with 2 pale olive bars on nape; large dark grey to black spot on subopercle, bordered irregularly with white; black-edged white stripe extending from

posterodorsal rim of eye, above upper part of preopercle to upper edge of opercle; 2 white spots or clusters of white spots on posteroventral rim of eye (at ~3 and 5 o'clock positions); narrow dark brown to grey bar extending from ventral part of orbital rim to rear edge of maxilla; iris red, with radiating brown bars; body generally orange-brown, becoming olive to dusky green posteriorly; dorsal part of body with short, indistinct, olive-brown bars, alternating with pale olive to orange-brown bars; pale olive to orange-brown bars sometimes extending onto lower part of body, becoming pale pink ventrally; broad orange-yellow area often present on sides of body; dorsal and anal fins dusky green to dusky orange, and barring on upper part of body extending slightly onto dorsal-fin base; dark bars on posterior part of dorsal-fin base sometimes bearing dark grey to black punctate spots; margins of dorsal and anal fins abruptly pale grey to hyaline; fleshy pectoral-fin bases dusky orange to dusky olive, with scattered small white spots; pectoral fins lime green basally, becoming greenish to orangish hyaline distally; pelvic fins olive to grey basally, remainder of fins dark olive to dark grey, with pale grey to hyaline margin; caudal fin olive to lime green basally, remainder of fin dusky olive to dusky orange. Attains 3.5 cm TL.

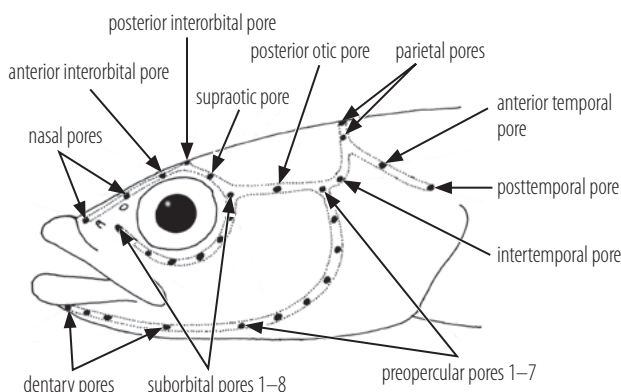
**DISTRIBUTION** WIO: endemic to St Brandon Shoals.

**REMARKS** Occurs on shallow reefs, to ~11 m deep, especially near areas exposed at low tide; apparently inhabits small branching coral heads.

## SUBFAMILY CONGROGADINAE

## Snakelets

Richard Winterbottom and Francesco Santini

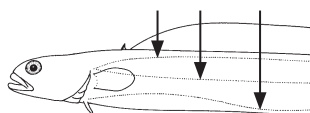


Congrogadinae cephalic pores.

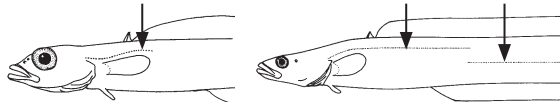
Body eel-like, moderately small (to ~50 cm TL). Dorsal fin 1 or 2 spines (spines absent in 1 Pacific species); dorsal and anal fins long, with 32–79 rays and 26–66 rays, respectively; no anal-fin spines; pectoral fins 9–14 rays; pelvic fins with 1 spine, 2–4 rays, or fins absent; caudal fin 10 branched rays. Teeth conical. Branchiostegal rays 6; gill membranes united, fused or free from isthmus; gill rakers poorly developed. One spine on opercle. Lateral line variable: consisting of 1 short and incomplete lateral line to as many as 3 separate lateral lines on each side. Scales cycloid, small, covering body; head, cheek and opercle scaly or naked. Found in intertidal areas to ~140 m deep. Widely distributed in coastal waters of Indo-Pacific (Winterbottom 1986). Eight genera and 24 species; 6 genera and 16 species in WIO.

#### KEY TO GENERA

- 1a Three lateral lines (dorsal, middle and ventral) along length of body ..... *Halidesmus*



- 1b Usually 1 short lateral line from shoulder to below anterior part of dorsal fin; some species with an additional (usually intermittent) lateral line along midlateral septum, beginning below end of first lateral line ..... 2



- 2a Pelvic fins present ..... 3  
2b No pelvic fins ..... 5

- 3a Pelvic fins 1 spine, 4 rays; 4 suborbital pores ..... *Rusichthys*  
3b Pelvic fins 1 spine, 2 or 3 rays; ≥6 suborbital pores; gill membranes fused together but free of isthmus ..... 4

- 4a Lateral line with anterodorsal and posterolateral segments; pectoral fins 12 rays; pelvic fins 1 spine, 3 rays; posterior otic pore present ..... *Halimuraenoides*

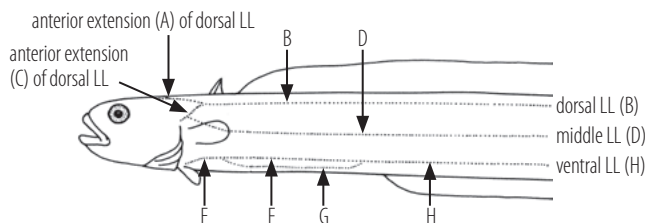
- 4b Lateral line with short anterodorsal section only; pectoral fins 9 or 10 rays; pelvic fins 1 spine, 2 rays; no posterior otic pore ..... *Natalichthys*

- 5a Gill membranes fused to isthmus; dorsal fin 2 spines (2nd spine very small), and 2 epurals (both usually detectable only with X-ray) ..... *Haliophis*

- 5b Gill membranes fused together but free from isthmus; dorsal fin 1 spine; 1 epural ..... *Halimuraena*

#### GENUS *Halidesmus* Günther 1872

Unique among congrogadins in having 3 lateral lines along at least the rear part of body. Lateral-line terminology from Winterbottom (1982). Five species, all in WIO.



*Halidesmus* lateral lines.

#### KEY TO SPECIES

- 1a LL pores opening to either dorsal or ventral margins of LL scales; ventral LL with 3 sections anteriorly ..... 2  
1b LL pores opening on rear margin at centre of LL scales; anterior part of ventral LL single and continuous ..... 4
- 2a Pelvic fins present; vomerine teeth visible; middle LL (D) joining anterior portion of section C of dorsal LL ..... *H. scapularis*  
2b No pelvic fins; vomerine teeth not visible; middle LL (D) not connected to section C of dorsal LL ..... 3
- 3a Anterodorsal extension (A) of dorsal LL (B) absent; scales present on cheek, nape and opercle; 7 preopercular pores; 8 or 9 suborbital pores ..... *H. socotraensis*  
3b Anterior extension (A) of dorsal LL (B) present; no scales on nape and opercle; 9 preopercular pores; 11–13 suborbital pores ..... *H. polytretus*
- 4a Profile of crest on snout concave; anal fin 45–50 rays; pectoral fins ≤9 rays; cheek, opercle and nape scaly ..... *H. thomaseni*  
4b Profile of crest on snout convex; anal fin 52–55 rays; pectoral fins usually ≥10 rays; cheek, opercle and nape naked ..... *H. coccus*

#### *Halidesmus coccus* Winterbottom & Randall 1994

Rooster snakelet

PLATE 36

*Halidesmus coccus* Winterbottom & Randall 1994: 753, Figs. 4–5 (Rahah Bay, Oman); Randall 1995\*.

Dorsal fin 1 spine, 64–68 rays; anal fin 52–55 rays; pectoral fins 9–12 rays. Lateral line with 3 lines, not connected, and 1 row of pored scales with single rear opening in each LL scale; number of pores in lateral lines: dorsal LL (B+C) 178–192, middle LL (D) 173–194, ventral LL (F+H) 188–204. GR 2 or 3/5 or 6. HL 12–13% SL; body depth 58–67% HL.

Body dark brown, scattered with pale flecks; head paler with 2 thin vertical dark bars on cheek (below eye and across

angle of preopercle); eye-sized black ocellated spot on shoulder above gill opening. Attains at least 10 cm SL.

**DISTRIBUTION** WIO: southwestern Oman and Socotra.

**REMARKS** Found in tidepools.

### *Halidesmus polytretus* Winterbottom 1982

*Halidesmus polytretus* Winterbottom 1982: 755, Figs. 2b, 3, 6 (north of Malindi, Kenya); Winterbottom 1986; Winterbottom & Randall 1994.

Dorsal fin 1 spine, 57 or 58 rays; anal fin 45 or 46 rays; pectoral fins 9 or 10 rays. Lateral line with 3 lines behind anal-fin origin, pores opening on dorsal or ventral margin of scales; number of pores in lateral line: A 12–17, B 194–202, C 8–16, D 204–216, E 2–3, F 83–86, G 40–45, H 143–152. GR 1 or 2/4. HL 13.5–13.7% SL; body depth 54.6–57.7% HL.

Body pale brown, with irregular, wavy, pale bars; short horizontal stripe from rear margin of eyes; ocellated eye-sized dark spot on shoulder above pectoral-fin base; pectoral fins hyaline, other fins pale brown. Attains at least 5.5 cm SL.

**DISTRIBUTION** Known only from two type specimens from Kenya.

### *Halidesmus scapularis* Günther 1872

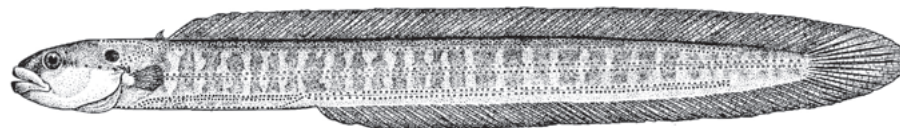
Snakelet

PLATE 36

*Halidesmus scapularis* Günther 1872: 668, Pl. 67b (Port Elizabeth, Eastern Cape, South Africa); Smith 1952; Smith & Smith 1966; Heemstra & Heemstra 2004\*.

*Porogrammus capensis* Gilchrist & Thompson 1916: 57, Fig. (Simons Bay and False Bay, South Africa).

Dorsal fin 1 spine, 58–63 rays; anal fin 48–52 rays; pectoral fins 8–10 rays. Lateral line variable, but always 3 lines (dorsal, middle and ventral) behind anal-fin origin, pores opening on dorsal or ventral margins of scales; number of pores in lateral lines:



*Halidesmus polytretus*, holotype (Kenya). Source: Winterbottom 1982 (by A Odum)



*Halidesmus scapularis*, 15 cm TL (South Africa). Source: SSF

A 9–19, B 134–173, C 6–14, D 157–179, E 1–7, F 42–57, G 33–50. GR 3/6. HL 10.3–13.2% SL; body depth 42–50% HL.

Colour variable, body usually pale to dark brown, sometimes with dusky crossbars; ocellated dark spot on shoulder above opercle. Attains 20 cm SL.

**DISTRIBUTION** WIO: endemic to South Africa, from Coffee Bay to False Bay.

**REMARKS** Common in intertidal pools and marginal subtidal areas.

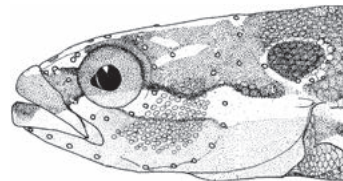
### *Halidesmus socotraensis* Gill & Zajonz 2003

Socotran snakelet

*Halidesmus socotraensis* Gill & Zajonz 2003: 54, Figs. 2–4 (Abd al-Kuri I., Socotra Archipelago); Gill & Zajonz 2011.

Dorsal fin 1 spine, 58–61 rays; anal fin 45–48 rays; pectoral fins 9 or 10 rays. Lateral line variable, but always 3 lines (dorsal, middle and ventral) behind anal-fin origin, pores opening on dorsal or ventral margins of scales; number of pores in lateral lines: A 0, B + C 186–210, D 177–205, E 6–12, F 78–90, G (= G1 + G2 of Gill & Zajonz 2003) 69–77. GR 2/6 or 7. HL 13–15% SL; body depth 57–65% HL.

Body dark brown, with diffuse or distinct paler mottling sometimes forming vertical bars; ocellated dark spot on shoulder above opercle. Attains 7 cm SL.



*Halidesmus socotraensis*, 6 cm SL, holotype, head (Socotra).

Source: Gill & Zajonz 2003; © Proc. Biol. Soc. Wash., Allen Press Publ. Services

**DISTRIBUTION** Known only from the type specimens collected at Socotra.

**REMARKS** Taken at 6–15 m.

## *Halidesmus thomasseni* (Nielsen 1961)

Thomassen's snakelet

PLATE 36

*Pholioides thomasseni* Nielsen 1961: 253, Fig. 1 (rockpools at Karachi, Pakistan); Winterbottom 1980.

*Haliophis guttatus* (non Forsskål 1775): Klausewitz 1961.

*Tentaculus waltairiensis* Rao & Dutt 1965: 455, Figs. 1–2 (rockpool at Visakhapatnam, Bay of Bengal); Lal Mohan 1967.

*Halidesmus thomasseni*: Winterbottom 1986; Randall 1995\*.

Dorsal fin 1 spine, 58–64 rays; anal fin 45–50 rays. Lateral line with 3 lines not connected to each other, with pores opening on rear margins of scales; number of pores in dorsal line (B + C) 155–186, middle line (D) 160–198, ventral line (F + H) 153–200. GR 1 or 2/7 or 8. HL 12–17% SL; body depth 50–68% HL.

Body and fins brown, irregularly scattered with paler spot-like markings; 2 bars radiating from eyes (one below and one behind); prominent ocellated dark spot on shoulder above pectoral-fin base. Attains 13.5 cm SL.

**DISTRIBUTION** Indian Ocean. WIO: Oman, Pakistan and India; elsewhere to Bay of Bengal.

## GENUS *Halimuraena* Smith 1952

Monophyly of genus not certain, but currently defined by the following combination of characters: no pelvic fins; pectoral fins 8–10 rays; dorsal fin 45–50 rays; anal fin 36–40 rays; gill membranes fused together ventrally but free from isthmus; ocellated dark spot on shoulder present or absent. Three species, all confined to WIO.

### KEY TO SPECIES

- |    |  |                      |
|----|--|----------------------|
| 1a | Cheek, opercle and nape scaly; suborbital canal pores 8.....   | <i>H. lepopareia</i> |
| 1b | Cheek, opercle and nape naked; suborbital canal pores 7.....   | 2                    |
| 2a | Ocellated dark spot on shoulder above opercle; lateral line comprised of short anterior section and longer rear section along midlateral part of body..... | <i>H. hexagonata</i> |
| 2b | No dark spot on shoulder above opercle; lateral line single, ending below anterior part of dorsal fin.....   | <i>H. shakai</i>     |

## *Halimuraena hexagonata* Smith 1952

PLATE 37

*Halimuraena hexagonata* Smith 1952: 92, Fig. 2a, Pl. 6 (Pinda, Mozambique); Winterbottom 1978, 1980, 1982, 1986; Godkin & Winterbottom 1985.

Dorsal fin 1 spine, 45–48 rays; anal fin 36–38 rays; pectoral fins 8 or 9 rays. Two lateral lines: upper line with 31–56 pored scales, medial line with 55–80 pored scales. GR 2/6. HL 17–18% SL; body depth ~10% SL.

Colour variable, from uniformly pale brown-yellow anteriorly and darkening posteriorly, or with whole rear portion of body dusky to black; body sometimes uniformly pale grey with median fins slightly dusky; most common form with dark hexagonal blotches on silvery body, with smaller spots on head and trunk, larger spots on caudal fin, and spots mostly in 3 or 4 longitudinal series; median fins dusky. Attains 6 cm SL.

**DISTRIBUTION** WIO: Kenya, Mozambique, Mozambique Channel and southwestern Madagascar.

## *Halimuraena lepopareia* Winterbottom 1980

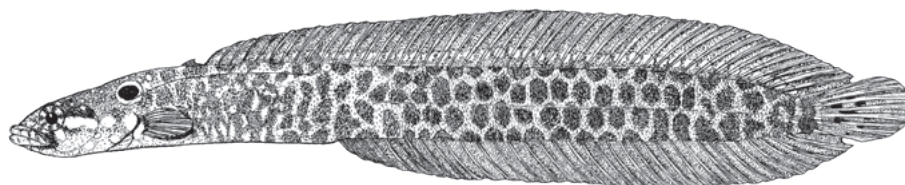
*Halimuraena lepopareia* Winterbottom 1980: 400, Fig. 2 (Pamanzi I., Mayotte, Comoros); Winterbottom 1982, 1986; Godkin & Winterbottom 1985.

*Halimuraena hexagonata* (non Smith 1952): Smith 1952 [in part]; Fourmanoir 1957.

Dorsal fin 1 spine, 47–50 rays; anal fin 37–40 rays; pectoral fins 8–10 rays. Two lateral lines: upper line with 31–39 pored scales, medial line with 18–56 pored scales, interspersed with unpored scales from midbody to peduncle. GR 1 or 2/6 or 7. HL 13.9–19.3% SL; body depth 50–55.8% HL.

Body yellow-brown, median fins darker; some specimens with irregular dark spots (~½ eye diameter) on body, and pale spots on head; 2 dark bands radiating from eyes (anteriorly and posteriorly); prominent dark-centred ocellus on shoulder above lateral line. Attains 7.5 cm SL.

**DISTRIBUTION** WIO: Mayotte I., Comoros and northern Madagascar.



*Halimuraena hexagonata*, 7 cm TL, female holotype (N Mozambique). Source: Smith 1952

*Halimuraena shakai* (Winterbottom 1978)

Zulu snakelet

PLATE 37

*Halimuraena shakai* Winterbottom 1978: 49, Figs. 1–2 (off Sodwana Bay, South Africa); Winterbottom 1980, 1982, 1986; Godkin & Winterbottom 1985; Heemstra *et al.* 2004; Heemstra & Heemstra 2004.

Dorsal fin 1 spine, 47–49 rays; anal fin 36–38 rays; pectoral fins 9 rays. LL scales 7–22 pored scales. GR 2 or 3/7 or 8. HL 14.9–17.7% SL; body depth 7.6–9.6% SL.

Body variously uniformly pale brown to covered with unevenly rounded, dark, eye-sized blotches. Attains 6 cm SL.

**DISTRIBUTION** WIO: South Africa (Sodwana Bay), Mozambique, Comoros (Anjouan) and Mauritius.

**REMARKS** Relatively common, at 12–15 m, on limestone/coral reefs off Sodwana Bay, South Africa.

**GENUS** *Halimuraenoides*

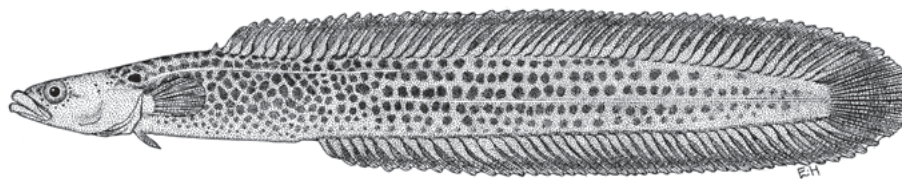
Maugé &amp; Bardach 1985

Unique among congrogadins in having caudal fin with 6 branched rays in upper portion, pectoral fins 12 rays, and pelvic fins 1 spine, 3 rays (occasionally found in *Blennodesmus* as well). Other characteristics are the presence of anterodorsal and posterolateral sections of lateral line,  $\geq 51$  dorsal-fin rays,  $\geq 43$  anal-fin rays, and posterior otic pore present. One species.

*Halimuraenoides isostigma* Maugé & Bardach 1985

*Halimuraenoides isostigma* Maugé & Bardach 1985: 382, Fig. 4 (Toliara, western coast of Madagascar); Winterbottom 1986. 'Halimuraenoid': Godkin & Winterbottom 1985.

Diagnosis as for genus. Dorsal fin 1 spine, 51–53 rays; anal fin 43 or 44 rays; pectoral fins 12 rays. Two lateral lines: dorsal line on front half of body, with 70–83 pored scales; ventral line on rear half of body, with 102–115 pored scales. GR 2/14. HL 15.2–19.6% SL; body depth 60–73% HL.



*Halimuraenoides isostigma*, 12 cm SL (Madagascar).

Preserved specimens dark brown to black, with spots on front part of body; dorsal and anal fins pale. Attains 12 cm SL.

**DISTRIBUTION** WIO: Madagascar.

**GENUS** *Haliophis* Rüppell 1828

Genus defined by dorsal fin with 2 spines (2nd very small and not visible externally) and 2 epurals; gill membranes fused to isthmus; no pelvic fins; area above anterior and posterior temporal canal pores darkly pigmented. Three species, 2 in WIO.

**KEY TO SPECIES**

- 1a Front third of head and body with black stripes on pale background; rear two-thirds of body with 5 regular longitudinal rows of dark spots; no ocellated dark spot on shoulder ..... *H. diademus*
- 1b No stripes on front third of body; ocellated dark spot present on shoulder ..... *H. guttatus*

*Haliophis diademus* Winterbottom & Randall 1994

Stars-and-stripes snakelet

PLATE 37

*Haliophis diademus* Winterbottom & Randall 1994: 751, Figs. 1–2 (Mhalah, south coast of Oman); Manilo & Bogorodsky 2003.

Dorsal fin 2 spines, 47 rays; anal fin 39 rays; pectoral fins 11 rays. LL single, short, 20–22 pored scales, curved, ending below 3rd or 4th dorsal-fin ray. GR 2/8 or 9. HL 16–17% SL; body depth 47–57% HL.

Body white, with dark stripe from tip of lower jaw to anterodorsal half of eyes, where it then splits into a dorsal stripe and similar ventral stripe; both stripes on head split into other stripes posteriorly, and then each stripe gives origin to row of dark spots. Attains at least 10 cm TL.

**DISTRIBUTION** WIO: southwestern Oman.

**REMARKS** Known from 8–12 m.

## *Haliophis guttatus* (Forsskål 1775)

Spotted snakelet

PLATES 37 & 38

*Muraena guttata* Forsskål in Niebuhr 1775: x, 22 (Jeddah, Saudi Arabia, Red Sea).

*Haliophis guttatus*: Rüppell 1828; Smith 1952; Godkin & Winterbottom 1985; Winterbottom 1985.

*Haliophis maculatus*: ?Regan 1912.

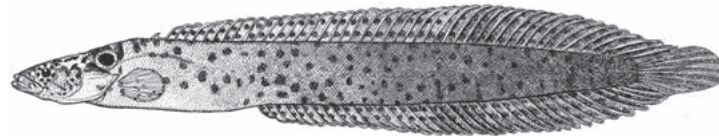
Dorsal fin 2 spines, 41–47 rays; anal fin 33–39 rays; pectoral fins 10 or 11 rays. Lateral line highly variable: short section originating at shoulder, arching dorsally, and then ventrally to midlateral septum, where it continues posteriorly as intermittent line along midlateral septum,

with 4–10 pored scales in dorsal section, and 0–51 pored scales in midlateral section. GR 2 or 3/8–10. HL 15–23% SL; body depth 41–60% HL.

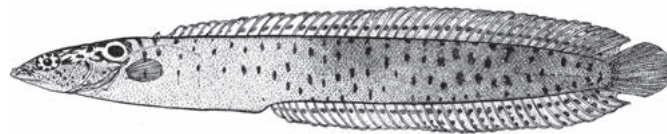
Head and body pale brown; cheeks pale; bars or vertically aligned spots on body dark brown; anal fin, caudal fin and rear half of dorsal fin very dark, front half of dorsal fin yellow; black spot on shoulder above pectoral-fin base. Attains 15.5 cm TL.

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden, southern Oman, Socotra, Somalia to Mozambique, western Madagascar, Comoros, Réunion and Mauritius.

**REMARKS** Exhibits step-clinal (discontinuous) distribution in Red Sea. Found on reefs, to ~15 m deep. Known to lay clusters of eggs in empty mussel shells guarded by the male.



*Haliophis guttatus*, 10 cm TL, male (Mozambique). Source: Smith 1952



*Haliophis guttatus*, 7 cm TL, female (Mozambique). Source: Smith 1952

## GENUS *Natalichthys* Winterbottom 1980

Monophyly of genus not certain. Pelvic fins 1 spine, 2 rays; gill membranes united, but free from isthmus; single short anterior lateral line. Three species, all endemic to South Africa (KwaZulu-Natal) in WIO.

### KEY TO SPECIES

- |    |  |                  |
|----|--|------------------|
| 1a | Cheeks scaly; caudal fin 1 dorsal procurrent ray.....                        | <i>N. leptus</i> |
| 1b | Cheeks not scaly; caudal fin 2 dorsal procurrent rays.....                   | 2                |
| 2a | Dorsal fin 1 spine, 52 or 53 rays; caudal fin 2 ventral procurrent rays..... | <i>N. ori</i>    |
| 2b | Dorsal fin 1 spine, 41–44 rays; caudal fin 1 ventral procurrent ray.....     | <i>N. sam</i>    |

## *Natalichthys leptus* Winterbottom 1980

Pencil snakelet

*Natalichthys leptus* Winterbottom 1980: 8, Fig. 3 (Umhlangankulu River, KwaZulu-Natal, South Africa); Godkin & Winterbottom 1985; Heemstra & Heemstra 2004.

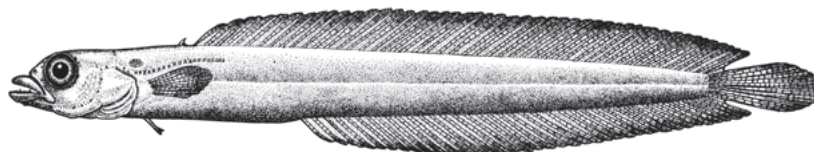
*Halidesmus scapularis* (non Günther 1872): Barnard 1927 [in part], 1947 [in part].

Dorsal fin 1 spine, 48 rays; anal fin 39 rays; pectoral fins 9 rays. LL scales 20–24. GR 2/6 or 7. HL 16.9–17.55% SL; body depth 8.6–9.2% SL.

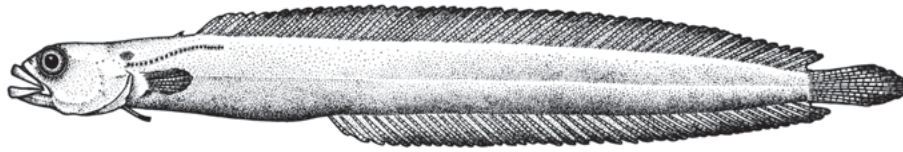
Preserved specimens pale brown; dark blotch on shoulder above opercle. Attains 7 cm TL.

**DISTRIBUTION** Known only from two type specimens from KwaZulu-Natal, South Africa.

**REMARKS** Probably collected at ~90 m.



*Natalichthys leptus*, 6 cm SL (South Africa). Source: Winterbottom 1980 (by A Odum)



*Natalichthys ori*, 6 cm SL, holotype (South Africa). Source: Winterbottom 1980 (by A Odum)

### *Natalichthys ori* Winterbottom 1980

#### Natal snakelet

*Natalichthys ori* Winterbottom 1980: 3, Fig. 1 (off Umhlangankulu River, KwaZulu-Natal, South Africa); Godkin & Winterbottom 1985; Heemstra & Heemstra 2004.

*Halidesmus scapularis* (non Günther 1872): Barnard 1927 [in part], 1947 [in part].

Dorsal fin 1 spine, 52 or 53 rays; anal fin 42 or 43 rays; pectoral fins 9 rays. LL scales 22 or 23. GR 2 or 3/8 or 9. HL 15–15.6% SL; body depth 7.5–8% SL.

Preserved specimens pale brown; dark blotch on shoulder above opercle. Attains 7 cm TL.

**DISTRIBUTION** Known only from two type specimens from South Africa.

**REMARKS** Probably collected at ~90 m.

### *Natalichthys sam* Winterbottom 1980

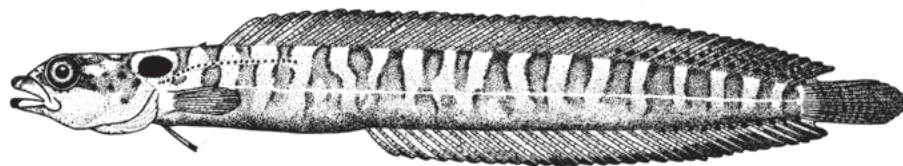
#### Nail snakelet

PLATE 38

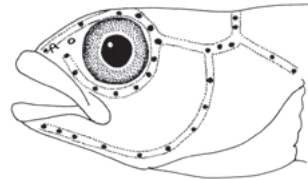
*Natalichthys sam* Winterbottom 1980: 6, Fig. 2 (off Port Shepstone, South Africa). Godkin & Winterbottom 1985; Heemstra & Heemstra 2004.

Dorsal fin 1 spine, 41–44 rays; anal fin 32–34 rays; pectoral fins 8–11 rays. LL scales 22–28. GR 1–3/5–8. HL 16–21% SL; body depth 10–13% SL.

Preserved specimens pale brown; dark brown blotch on shoulder above opercle. Attains 6.5 cm TL.



*Natalichthys sam*, 4 cm SL (South Africa). Composite



*Natalichthys sam*, 4 cm SL, holotype, head showing sensory canal openings (South Africa).

**DISTRIBUTION** WIO: South Africa (southern KwaZulu-Natal).

**REMARKS** Relatively common; found to ~44 m deep.

### GENUS *Rusichthys* Winterbottom 1979

Differs from all other congrogadins in several meristic characters, including higher pectoral- and pelvic-fin ray counts, in the presence of only 4 suborbital sensory canal pores, and in the absence of the medial pair of parietal pores; pelvic fins 1 spine, 4 rays; no pores in LL scales. Two species, both in WIO.

#### KEY TO SPECIES

- |    |  |                         |
|----|--|-------------------------|
| 1a | Dorsal fin 32 or 33 rays; anal fin 26 or 27 rays; GR 2/5 on 1st arch ..... | <i>R. plesiomorphus</i> |
| 1b | Dorsal fin 46–48 rays; anal fin 36–38 rays; GR 4/10 on 1st arch .....      | <i>R. explicitus</i>    |

*Rusichthys explicitus* Winterbottom 1996

Orangestriped snakelet

PLATE 38

*Rusichthys explicitus* Winterbottom 1996: 582, Fig. 1 (northeast of Hoon's Bay, Oman); Manilo & Bogorodsky 2003.

Dorsal fin 2 spines, 46–48 rays; anal fin 36–38 rays; pectoral fins 14 or 15 rays. GR 4/10. HL 22–24% SL; body depth 41–54% HL.

Fresh fish with tan body, grading to grey on head; orange stripe on head dorsolaterally, ending at midpoint of dorsal fin; similar stripe across cheek and opercle at level of ventral half of pupil; basal quarter of dorsal and anal fins diffusely black; dusky dark colouration of distal margin of rear third of dorsal fin continues onto caudal-fin base; pectoral and pelvic fins hyaline. Attains at least 5 cm SL.

**DISTRIBUTION** WIO: Oman.

**REMARKS** Types collected at ~27 m.

*Rusichthys plesiomorphus* Winterbottom 1979

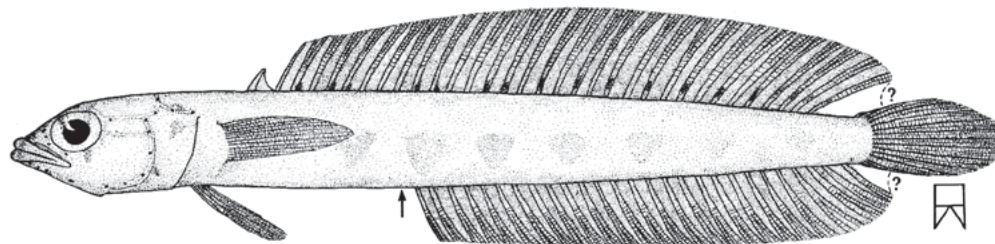
*Rusichthys plesiomorphus* Winterbottom 1979: 299, Figs. 1–2 (off Kenya); Godkin & Winterbottom 1985; Winterbottom 1996.

Dorsal fin 1 spine, 32–33 rays; anal fin 26 or 27 rays; pectoral fins 14 rays. GR 2/5. HL 21–22% SL; body depth 47–48% HL.

Preserved specimens pale yellow-brown; lips with faint vertical stripe anteriorly; 4 dusky bars radiating from eyes (2 dorsally, 1 ventrally and 1 posteriorly), reaching upper margin of preopercle; 8–10 triangular blotches on sides of body. Attains at least 4 cm SL.

**DISTRIBUTION** Known only from the types collected from Kenya.

**REMARKS** Taken at ~140 m.



*Rusichthys plesiomorphus*, 4 cm SL, holotype (Kenya). Source: Winterbottom 1979

**SUBFAMILY PSEUDOPLESIOPIINAE**

**Dottybacks**

Anthony C Gill

Small, perch-like; lateral line represented by single tubed scale at shoulder, followed by series of pitted scales which terminate beneath rear part of dorsal fin, and 2nd series of pitted scales on midsides extending onto caudal fin; dorsal fin 1 or 2 weak spines; pelvic fins 1 weak spine, 3 or 4 segmented rays. Five genera and 27 species; 3 genera and 16 species in WIO.

**KEY TO GENERA**

- 1a Dorsal-fin origin at vertical through margin of preopercle; GR 9–11/18–20 = 28–31 ..... *Pectinochromis*
- 1b Dorsal-fin origin above or behind vertical through margin of opercle; GR 3–6/9–14 = 12–20 ..... **2**
- 2a Lower lip complete, forming free fold; preopercular pores usually 7 (rarely 6 or 8); suborbital pores usually 8 (rarely 7 or 9); total caudal-fin rays usually 24 or 25 (rarely 23 or 26)..... *Pseudoplesiops*
- 2b Lower lip incomplete (interrupted at symphysis), not forming free fold; preopercular pores usually 6 (rarely 5 or 7); suborbital pores usually 6 or 7 (rarely 8); total caudal-fin rays 25–29..... *Chlidichthys*

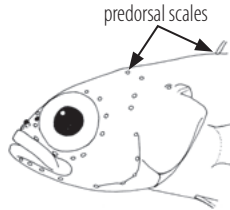
**GENUS *Chlidichthys* Smith 1953**

Dorsal fin 2 spines, 21–24 rays, fin origin over margin of opercle; anal fin 2 or 3 spines, 12–15 rays; pelvic fins 1 spine, 4 unbranched rays; total caudal-fin rays 25–29; suborbital pores 6–8 (rarely 8); preopercular pores 5–7 (usually 6); lower lip incomplete (interrupted at symphysis), not forming free fold. GR 3–6/9–14 = 12–20. Genus endemic to WIO, with 13 species.

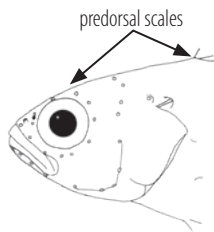


## KEY TO SPECIES

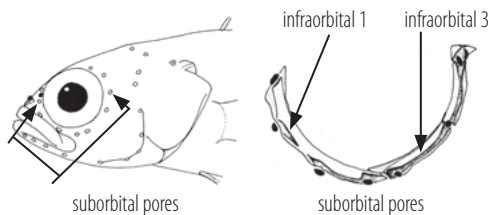
- 1a Predorsal scales extending anteriorly only to supratemporal commissure..... 2



- 1b Predorsal scales extending anteriorly beyond supratemporal commissure..... 5



- 2a Suborbital pores 6–8 (usually 7); sensory canal of anteriormost infraorbital bone (infraorbital 1) usually not communicating with adjacent infraorbital (infraorbital 3), and usually with pore at terminus of each bone..... *C. chagosensis*



- 2b Suborbital pores 6 or 7 (usually 6); sensory canal of anteriormost infraorbital bone (infraorbital 1) communicating with adjacent infraorbital (infraorbital 3), with single pore at junction of the two bones..... 3

- 3a Ctenoid scales begin at 17th–20th transverse scale row behind gill opening; length of 1st dorsal-fin ray 31–39% SL..... *C. cacatuoides*

- 3b Ctenoid scales begin at 8th–17th (rarely beyond 15th) scale row behind gill opening; length of 1st dorsal-fin ray 9–21% SL..... 4

- 4a Dorsal fin 21 or (usually) 22 rays; anal fin 13 or 14 (usually 13) rays; vertebrae 10 + 16 or 17 (usually 10 + 17)..... *C. inornatus*

- 4b Dorsal fin 22–24 (usually 23) rays; anal fin 13–15 (usually 14) rays; vertebrae 10 + 18..... *C. rubiceps*

- 5a LSS 47–52 (usually 48–51); lower procurent caudal-fin rays 5 or 6 (usually 6); circumpeduncular scales 22–25 (usually 23 or 24); head and body of preserved specimens pale yellow to pale brown (cerise pink to magenta in life), with scales behind pectoral-fin base each with brown to greyish brown basal spot (purple to dark grey in life), forming weak reticulated pattern; dorsal and anal fins dusky grey to dark grey (in life, dark grey with greenish iridescence basally, followed distally by bright red or magenta, then pinkish hyaline, then bluish grey with pale pink distal margins); caudal fin pale yellow to pale brown basally, becoming dark grey dorsally, ventrally and posteriorly (in life, scales magenta, with basal three-quarters of fin deep purplish blue, and rear, upper and lower margins magenta)..... *C. johnvoelckeri*

- 5b LSS 37–49; lower procurent caudal-fin rays 4 or 5; circumpeduncular scales 18–23; colour not as above..... 6

- 6a Dorsal fin 22–24 (usually 23) rays; anal fin 13–15 (usually 14) rays..... 7

- 6b Dorsal fin 21–23 (usually 22) rays; anal fin 12–14 (usually 13) rays..... 9

- 7a Circumpeduncular scales 20–23; head and body of preserved specimens pale yellow to pale brown (in life pinkish white to blue or olive-green, pink on head and chest in small juveniles, with snout, chin, lips, interorbital area and occiput abruptly dusky orange to bright reddish orange), with 3 dark brown to dark greyish brown stripes (dusky orange to dark grey or black in life) (1 stripe from posterodorsal part of orbit beneath dorsal-fin base to upper edge of caudal fin; 1 from upper part of opercle, above pectoral-fin base along midside to middle of caudal-fin base; and 1 from pectoral-fin base along anal-fin base to lower part of caudal fin); dorsal and anal fins dark brown to dark greyish brown basally (dusky grey to black in life), pale brown to hyaline on remainder of fin (in life, greenish to pinkish hyaline, with distal edge and fin rays pink to mauve or magenta); caudal fin pale yellow to pale brown on base (white to pinkish green in life), with middle dark stripe from body ending abruptly in spot on fin base, this encircled posteriorly around rear edge of scale sheath by converging upper and lower dark stripes from body; rear part of caudal fin pale brown to hyaline (pink to pinkish hyaline in life)..... *C. bibulus*

- 7b Circumpeduncular scales usually 20; colour not as above..... 8

- 8a Pectoral fins 15–17 (usually 16) rays; ctenoid scales begin at 6th–15th scale row behind gill opening; head and body of preserved specimens generally brown (golden yellow to orange in life), with 4 or 5 pale yellow to pale brown stripes (bright orange to bright red in life) on head and anterior part of body; dorsal and anal fins greyish brown to pale brown (reddish to orangish hyaline in life); and caudal fin greyish brown basally (bright orange to bright red in life), with remainder of fin pale brown to hyaline (orangish hyaline in life)..... *C. auratus*

Continued...

**KEY TO SPECIES**

- 8b Pectoral fins 16–18 (usually 17 or 18) rays; ctenoid scales begin at 1st–3rd scale row behind gill opening; head and body of preserved specimens pale brown to brown (in life, pale green to olive or bright green, with yellow to bright orange or bright red stripes on head and front part of body, and snout and anteroventral part of head reddish grey to bright red), with bases of scales edged with dark brown (dark olive-grey in life), giving reticulate pattern; dorsal and anal fins dark brown to dark grey basally (bluish grey to olive in life), greyish to brownish hyaline distally; scale sheath of caudal fin similar to body colour, edged posteriorly with dark brown to grey (olive-grey in life), remainder of fin greyish to brownish hyaline ..... *C. cibanarius*
- 9a Ctenoid scales begin at 2nd–6th scale row behind gill opening; pectoral fins 17–19 (usually 18) rays; LSS 42–50; GR 4–6/11–14 = 16–19 (usually 16–18) ..... **10**

- 9b Ctenoid scales begin at 7th–14th scale row behind gill opening; pectoral fins 15–18 (usually 17) rays; LSS 37–45; GR 3 or 4/9–12 = 12–15, usually 13 or 14 ..... **12**
- 10a Caudal-fin length 21–23.8% SL; total GR 16–18 ..... *C. foudioides*
- 10b Caudal-fin length 18.5–21.4% SL; total GR 16–19 (usually 17 or 18) ..... **11**
- 11a Orbital rim whitish grey in preservative, pale mauve in life ..... *C. randallii*
- 11b Orbital rim brown in preservative, orange to olive in life ..... *C. abruptus*
- 12a LSS 37–42 (usually 38–41); anal fin usually 2 spines ..... *C. pembae*
- 12b LSS 40–45 (usually 41–43); anal fin usually 3 spines ..... *C. smithae*

***Chlidichthys abruptus*** Lubbock 1977

St Brandon’s dottyback

*Chlidichthys abruptus* Lubbock 1977: 17, Pl. 5c–d (Raphael I., St Brandon Shoals); Gill & Edwards 2004\*.

Dorsal fin 2 spines, 21 or 22 rays; anal fin 2 or 3 spines, 12 or 13 rays; pectoral fins 17–19 rays; caudal fin 26–28 rays, fin length 18–21% SL. LSS 42–48; circumpeduncular scales 19 or 20; ctenoid scales begin at 2nd–6th scale row behind gill opening. Suborbital pores 7. GR 4–6/11–14 = 16–19. Vertebrae 10 + 17.

Body generally olive-green to olive-brown; snout and most of head below eyes abruptly bright orange; orbital rim orange to olive. Attains 5.5 cm SL.

**DISTRIBUTION** WIO: endemic to St Brandon Shoals.

**REMARKS** Found on drop-offs, in surge channels, and on rocky and coral reefs, to ~21 m deep.

***Chlidichthys auratus*** Lubbock 1975

Golden dottyback

PLATE 38

*Chlidichthys auratus* Lubbock 1975: 152, Pl. 3b (Port Sudan Harbour, Sudan, Red Sea); Goren & Dor 1994; Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 or 23 rays; anal fin 3 spines, 13–15 rays; pectoral fins 15–17 rays; caudal fin 25–28 rays. LSS 40–47;

circumpeduncular scales 20 or 21; ctenoid scales begin at 6th–15th scale row behind gill opening. Suborbital pores 7 or 8. GR 4–6/11–14 = 15–20. Vertebrae 10 + 17.

Head and body golden yellow to orange, with 4 or 5 orange or red stripes on head and anterior part of body; caudal fin bright orange to red basally, remainder of fin orangish hyaline; other fins reddish or orangish hyaline. Attains nearly 5 cm SL.



*Chlidichthys auratus*, 3 cm SL (Gulf of Aqaba). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea (including Gulf of Aqaba).

**REMARKS** Found on reefs, at 2–30 m.

***Chlidichthys bibulus*** (Smith 1954)

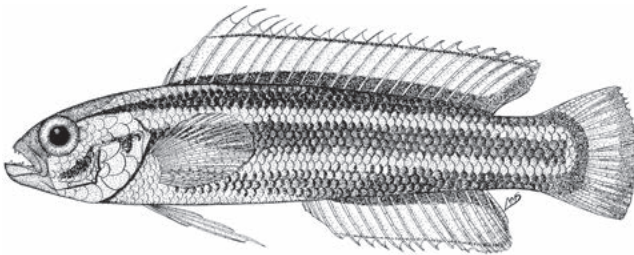
Nosey dottyback

PLATE 39

*Wamizichthys bibulus* Smith 1954: 205, Fig. 3 (Wamizi I., Mozambique). *Chlidichthys bibulus*: SSF No. 169.2\*; Gill & Edwards 2004\*; Gill & Zajonz 2011\*.

Dorsal fin 2 spines, 23 rays; anal fin 2 or 3 spines, 13–15 rays; pectoral fins 16–18 rays; caudal fin 26–28 rays. LSS 45–48; circumpeduncular scales 20–23; ctenoid scales begin at 1st–3rd scale row behind gill opening. Suborbital pores 7. GR 4 or 5/10–12 = 14–17. Vertebrae 10 + 17.

Body pinkish white to blue or olive-green, pink on head and breast in small juveniles, with snout, chin, lips, interorbital area and occiput abruptly orange; 3 dusky orange to black stripes on body (1 from upper rear margin of eye to upper edge of caudal fin; 1 from upper edge of opercle, ending in round spot on middle of caudal-fin base; and 1 from pectoral-fin base to lower edge of caudal fin), upper and lower stripes joining to form arc behind round spot on caudal fin. Attains 6 cm SL.



*Chlidichthys bibulus*, 5 cm SL, type (N Mozambique). Source: SSF

**DISTRIBUTION** WIO: Socotra, Kenya to Mozambique and Aldabra.

**REMARKS** Occurs on shallow reefs, to ~25 m deep.

### *Chlidichthys cacatuoides* Gill & Randall 1994

Cockatoo dottyback

PLATE 39

*Chlidichthys cacatuoides* Gill & Randall 1994: 13, Figs. 2–3 (Al Hallaniyah I., Oman); Gill & Edwards 2004\*; Gill & Zajonz 2011.

Dorsal fin 2 spines, 23 or 24 rays, anterior 4 or 5 segmented rays elongate, 1st ray 16–39% SL; anal fin 3 spines, 14 or 15 rays; pectoral fins 17 or 18 rays; caudal fin 25–27 rays. LSS 37–40; circumpeduncular scales 18–20; predorsal scales extend anteriorly only to supratemporal commissure; ctenoid scales begin at 17th–20th scale row behind gill opening. Suborbital pores 6. GR 3/9 or 10. Vertebrae 10 + 18 or 19.

Head and body brown to bright orange-yellow; each body scale with small brown spot. Attains 4.5 cm SL.

**DISTRIBUTION** WIO: endemic to southern Oman and Socotra.

**REMARKS** Known from reefs, at 15–29 m.

### *Chlidichthys chagosensis* Gill & Edwards 2004

Chagos dottyback

PLATE 39

*Chlidichthys chagosensis* Gill & Edwards 2004: 14, Figs. 1b, 2b, 5, Pls. 1f, 2a (Peros Banhos Atoll, Chagos Archipelago).

Dorsal fin 2 spines, 22 rays; anal fin 3 spines, 13 rays; pectoral fins 16–18 rays; caudal fin 25–27 rays. LSS 35–43; circumpeduncular scales 18–20; predorsal scales extend anteriorly only to supratemporal commissure; ctenoid scales begin at 8th–14th scale row behind gill opening. Suborbital pores 6–8. GR 3 or 4/9–11 = 12–15. Vertebrae 10 + 17.

Body generally brown, becoming orange to yellow on breast, snout and lower part of head; scattered small brown spots on body, and rear part of body with darker chevrons; dorsal and anal fins brown, pinkish or yellow. Attains ~4 cm SL.

**DISTRIBUTION** WIO: endemic to Chagos.

**REMARKS** Occurs in a wide range of reef habitats: lagoons, drop-offs, reef-tops, reef flats and tidepools, to ~40 m deep.

### *Chlidichthys clibanarius* Gill & Edwards 2004

Chainmail dottyback

PLATE 39

*Chlidichthys clibanarius* Gill & Edwards 2004: 15, Fig. 4, Pl. 2b (Nosy Be, Madagascar).

Dorsal fin 2 spines, 22–24 rays; anal fin 3 spines, 13 or 14 rays; pectoral fins 16–18 rays; caudal fin 25–28 rays. LSS 43–49; circumpeduncular scales 20–23. Predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 1st–3rd scale row behind gill opening. Suborbital pores 7 or 8. GR 4–6/10–13 = 15–19. Vertebrae 10 + 17.

Head and body pale green or olive to bright green; bases of scales edged with dark olive-grey, giving reticulate pattern (indistinct or absent on lower head and abdomen, but pattern extending onto scaly sheath on caudal fin); bright yellow to bright red stripes on head and anterior part of body: median stripe from interorbital area to dorsal-fin origin, another stripe from posterodorsal part of orbital rim to beneath anterior part of dorsal fin, and third stripe in an arc from beneath eye to posterodorsal part of opercle or above pectoral-fin base; additional yellow to orange markings sometimes present on subopercle and pectoral-fin bases, sometimes united to form a stripe; snout and lower part of head anterior to vertical through middle of eye abruptly reddish grey to bright red. Attains 5 cm SL.

**DISTRIBUTION** WIO: northern Madagascar, Comoros and Aldabra.

**REMARKS** Occurs on patch reefs, bommies (coral reef outcrops often resembling a column) and caves in drop-offs, to ~18 m deep.

### *Chlidichthys foudioides* Gill & Edwards 2004

Fody dottyback PLATE 39

*Chlidichthys foudioides* Gill & Edwards 2004: 17, Fig. 3, Pl. 2c–d (Baladirou, Rodrigues, Mascarenes).

Dorsal fin 2 spines, 22 or 23 rays; anal fin 2 or 3 spines, 12–14 rays; pectoral fins 17–19 rays; caudal fin 26 or 27 rays. LSS 44–50 rays; circumpeduncular scales 19 or 20; predorsal scales extend anteriorly to point ranging from vertical through anterior supraotic pores to just short of anterior interorbital pores; ctenoid scales begin at 2nd–5th scale row behind gill opening. Suborbital pores 7. GR 4–6/12 or 13 = 16–18. Vertebrae 10 + 17 (rarely 18).

Head and body grey to olive; snout, lips and lower part of head greyish red to bright orange; orange or red stripe from posterodorsal rim of eye to just above gill opening; another more diffuse stripe from upper part of preopercle to upper part of opercle; irregular red spot or short stripe on lower third of opercle. Attains 5 cm SL.

**DISTRIBUTION** WIO: endemic to Rodrigues.

**REMARKS** Types collected from coral reef, at 18–20 m.

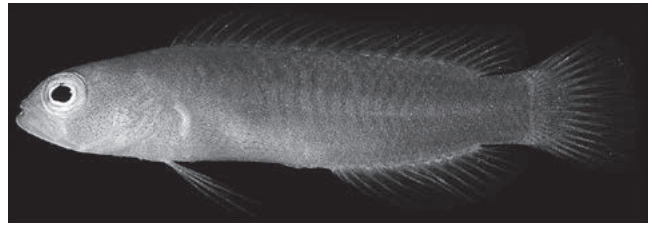
### *Chlidichthys inornatus* Lubbock 1976

Inornate dottyback PLATE 39

*Chlidichthys inornatus* Lubbock 1976: 169, Fig. 1 (Trincomalee, Sri Lanka); Winterbottom *et al.* 1989\*; Gill & Edwards 2004\*.

Dorsal fin 2 spines, 21 or 22 rays; anal fin 2 or 3 spines, 13 or 14 rays; pectoral fins 16–19 rays; caudal fin 25–28 rays. LSS 38–43; circumpeduncular scales 17–20; predorsal scales extend anteriorly only to supratemporal commissure; ctenoid scales begin at 8th–15th scale row behind gill opening. Suborbital pores 6 or 7. GR 3 or 4/10–12 = 13–16. Vertebrae 10 + 17 (rarely 16).

Head and body pale greenish yellow to brown, sometimes becoming yellow to orange or red on lower part of abdomen and head; sides sometimes indistinctly spotted with red; median fins olive to bright yellow. Attains 4.5 cm SL.



*Chlidichthys inornatus*, 3 cm SL (Maldives). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Maldives and Sri Lanka.

**REMARKS** Found around coral heads, rocks, under reef ledges and in caves, at 2–35 m. Records from Chagos are erroneous as a result of confusion with *C. chagosensis*.

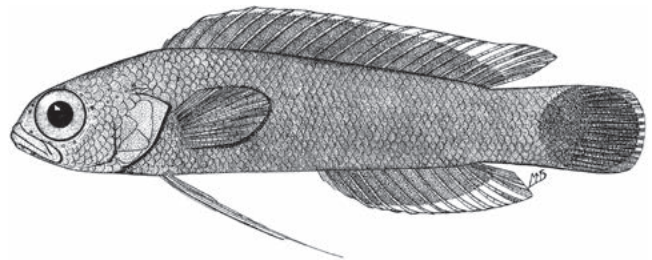
### *Chlidichthys johnvoelckeri* Smith 1953

Cerise dottyback PLATE 39

*Chlidichthys johnvoelckeri* Smith 1953: 518, Pl. 107, Fig. 408a (Pemba I., Tanzania); SSF No. 169.3\*; Goren & Dor 1994; Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 or 23 rays; anal fin 2 or 3 spines, 13 rays; pectoral fins 16–18 rays; caudal fin 28–30 rays. LSS 47–52; circumpeduncular scales 22–25; predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 3rd–8th scale row behind gill opening. Suborbital pores 6 or 7. GR 4–6/11–13 = 16–19. Vertebrae 10 + 17.

Head and body cerise pink to magenta in life (pale yellow or pale brown in preservative), with scales behind pectoral-fin bases each with purple to dark grey basal spot (spots brown to greyish brown in preservative), forming weak reticulated pattern; dorsal and anal fins dark grey with greenish iridescence basally, followed distally by bright red or magenta, then pinkish hyaline, then bluish grey with pale pink distal margins (fins dusky grey to dark grey in preservative); caudal fin scales magenta, with basal three-quarters of fin deep purplish blue, and rear, upper and lower margins magenta (in preservative, fin pale yellow to pale brown basally, becoming dark grey distally on all margins). Attains 6 cm SL.



*Chlidichthys johnvoelckeri*, 4 cm TL, type (N Mozambique). Source: Smith 1953

**DISTRIBUTION** WIO: Tanzania (Pemba I.) to Mozambique (Bazaruto I.) and Comoros.

**REMARKS** Found on reefs, at 6–75 m. Records from the Red Sea are misidentifications of *Pseudochromis fridmani*.

### *Chlidichthys pembae* Smith 1954

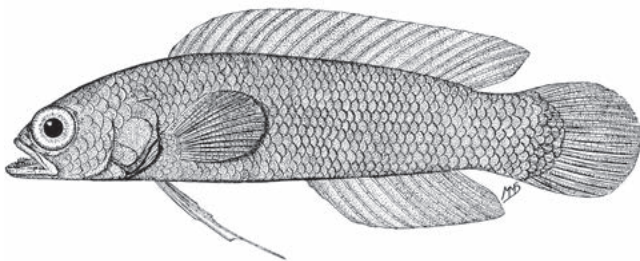
Pemba dottyback

PLATE 40

*Chlidichthys pembae* Smith 1954: 200, Fig. 1 (Pemba I., Tanzania); Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 or 23 rays; anal fin 2 or 3 spines, 12 or 13 rays; pectoral fins 15–18 rays; caudal fin 26–28 rays. LSS 37–42; circumpeduncular scales 18–20; predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 7th–14th scale row behind gill opening. Suborbital pores 7. GR 3/9–12 = 12–15. Vertebrae 10 + 17.

Head and body yellowish green to brown, becoming orange to bright yellow on lower part of head; dorsal and anal fins either hyaline with basal third pale blue, or else fins uniformly hyaline, yellow or dark brown; caudal fin yellowish olive to dark brown basally, remainder of fin brownish hyaline to bright yellow. Attains 4.5 cm SL.



*Chlidichthys pembae*, 3 cm TL, holotype (N Mozambique). Source: Smith 1954

**DISTRIBUTION** WIO: Tanzania (Pemba I.) to South Africa (Aliwal Shoal, KwaZulu-Natal) and Comoros.

**REMARKS** Found on reefs, at 3–27 m.

### *Chlidichthys randallii* Lubbock 1977

Randall's dottyback

PLATE 40

*Chlidichthys randallii* Lubbock 1977: 18, Pls. 2c, 3h (lagoon side of Flaman I., Mauritius); Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 rays; anal fin 3 spines, 13 rays; pectoral fins 18 rays; caudal fin 27 rays. LSS 45–47; circumpeduncular scales 20 or 21; predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 3rd–5th scale row behind gill opening. Suborbital pores 7. GR 4/13. Vertebrae 10 + 17.

Head reddish to greyish brown, pale mauve to bluish grey ventrally and on snout; orbital rim pale mauve; short pale mauve stripe from behind mid-rear edge of eye to just above lateral-line scales, and another pale mauve stripe extending around lower and rear edges of preopercle to upper part of opercle; areas immediately above, below and between mauve stripes bright orange-red; body reddish to greyish brown, paler ventrally on abdomen, with indistinct dusky grey to brown barring following myomeres on flanks; dorsal and anal fins mauve to bluish olive basally, pinkish hyaline distally; caudal fin reddish olive basally, pinkish hyaline distally. Attains 5 cm SL.

**DISTRIBUTION** Known only from two specimens from Mauritius.

**REMARKS** Collected around coral heads in 7–18 m.

### *Chlidichthys rubiceps* Lubbock 1975

Redhead dottyback

PLATE 40

*Chlidichthys rubiceps* Lubbock 1975: 150, Pl. 3a (Al Korae, Jeddah, Saudi Arabia, Red Sea); Goren & Dor 1994; Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22–24 rays; anal fin 2 or 3 spines, 13–15 rays; pectoral fins 16 or 17 rays; pelvic fins 1 spine, 4 rays; caudal fin 25–28 rays. LSS 40–45; circumpeduncular scales 19–21; predorsal scales extend forward only to supratemporal commissure; ctenoid scales begin at 9th–17th scale row behind gill opening. Suborbital pores 6 or 7. GR 3–6/11–13 = 14–19. Vertebrae 10 + 18.

Head and anterior part of body reddish brown, becoming olive on rear part of body; snout red; dorsal and anal fins reddish grey to olive basally, reddish hyaline to pale green distally; caudal fin olive basally, pale green distally. Attains 4.5 cm SL.

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba to Kamaran I.

**REMARKS** Found around reefs, at 4.5–40 m.

## *Chlidichthys smithae* Lubbock 1977

Smith's dottyback

PLATE 40

*Chlidichthys smithae* Lubbock 1977: 16, Pls. 2d, 3g–h (coral slope to silt bottom, Trou d'Eau Douce, Mauritius); Fricke 1999; Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 or 23 rays; anal fin 2 or 3 spines, 13 or 14 rays; pectoral fins 16–18 rays; caudal fin 26 or 27 rays. LSS 40–45; circumpeduncular scales 19 or 20; predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 8th–14th scale row behind gill opening. Suborbital pores 7 or 8. GR 3 or 4/10 or 11 = 13–15. Vertebrae 10 + 17 or 18.

Head and body pale brown to reddish brown, orangish brown or orange, sometimes paler ventrally on head; scales on cheek, opercle and body sometimes with reddish brown to orange or red basal spot; snout, lips and interorbital area sometimes greyish brown to dark grey; rear part of orbital rim sometimes dusky brown to dark grey; sides of body sometimes with dusky brown markings following myomeres; dorsal fin yellowish to reddish hyaline, sometimes bluish grey basally, with several rows of yellow to dark brown spots, and sometimes with blue distal margin; anal fin bluish grey basally, sometimes with row of yellow spots, followed by red to bright yellow stripe, distal part of fin yellowish to reddish hyaline, sometimes with blue margin; caudal fin brown to red or orange basally, becoming reddish hyaline to dusky yellow posteriorly. Attains 5 cm SL.

**DISTRIBUTION** WIO: endemic to Mauritius.

**REMARKS** Found around reefs, at 6–30 m.

## GENUS *Pectinochromis* Gill & Edwards 1999

Dorsal fin 2 spines, 22 or 23 rays, last 15–20 rays branched; anal fin 2 spines, 12 or 13 rays, last 7–13 rays branched; pelvic fins 1 spine, 4 unbranched rays; total caudal-fin rays 24–26. Lower lip complete, forming free fold at symphysis. Dorsal-fin origin over preopercle. Suborbital pores 7; preopercular pores 6; single tubed lateral-line scale at shoulder. GR 9–11/18–20 = 28–31. One species.

## *Pectinochromis lubbocki* (Edwards & Randall 1983)

Lubbock's dottyback

PLATE 40

*Pseudoplesiops lubbocki* Edwards & Randall 1983: 112, Fig. 1 (Ras Abu Galum, Egypt, Sinai Peninsula, Gulf of Aqaba, Red Sea); Goren & Dor 1994.

*Pectinochromis lubbocki*: Gill & Edwards 2004\*.

Dorsal fin 2 spines, 22 or 23 rays; anal fin 2 spines, 12 or 13 rays; pectoral fins 16 or 17 rays; caudal fin 24–26 rays. LSS 33–39; circumpeduncular scales 20; predorsal scales extend anteriorly to interorbital commissure; ctenoid scales begin at 5th–8th scale row behind gill opening. Suborbital pores 7. GR 9–11/18–20 = 28–31. Vertebrae 10 + 16 or 17.

Head dull pink, becoming pinkish to bluish grey on nape, and yellowish brown over lower part of opercle; mauve to white streak on side of upper jaw; orbital rim brownish yellow to dark purple, with 2 small purple to mauve spots on interorbital region above middle of eyes; body pale pink to pale yellowish brown, shading to pale pinkish grey anterodorsally, yellowish green posteriorly, and pale brown to white on abdomen; rear of body with yellow spots and lines following myosepta; front half of dorsal fin pale pink basally, pale blue to hyaline distally, with 1 or 2 dark grey to black elongate spots along margin between tip of 1st spine and 2nd ray; rear part of dorsal fin pale pinkish yellow to yellow basally, remainder of fin pale blue to hyaline with several indistinct rows of yellow spots and stripes; anal fin pale yellow to yellowish hyaline, with several pale blue irregular stripes; caudal fin dull yellowish green to bright yellow basally, yellowish or pinkish hyaline to hyaline posteriorly, with several pale blue to blue oblique stripes which converge distally on central rays. Attains 5 cm SL.

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba to Port Sudan.

**REMARKS** Known from reef drop-offs, at 52–70 m.

## GENUS *Pseudoplesiops* Bleeker 1858

Dorsal fin 1 or 2 spines, 22–29 rays; anal fin 1–3 spines, 13–18 rays; pelvic fins 1 spine, 3 or 4 unbranched rays; total caudal-fin rays 23–26. Dorsal-fin origin over rear edge of opercle. Lower lip complete, forming free fold at symphysis. Suborbital pores usually 8 (rarely 7 or 9); preopercular pores usually 7 (rarely 6 or 8). GR 1–4/6–13 = 7–17. Indo-Pacific, with at least 9 species, 2 in WIO.

## KEY TO SPECIES

- 1a Dorsal fin 1 spine, 26–28 (usually 27) rays; anal fin 1 or 2 spines, 16–18 (usually 17) rays; prominent intermandibular flap present; LL scales 32–39; body scales with radii in anterior field only ..... *P. immaculatus*
- 1b Dorsal fin 2 spines, 23 rays; anal fin 2 spines, 14 rays; no intermandibular flap (although weak ridge sometimes present); LL scales 26–28; body scales with radii in all fields ..... *P. occidentalis*

*Pseudoplesiops immaculatus* Gill & Edwards 2002

Immaculate dottyback

PLATE 41

*Pseudoplesiops immaculatus* Gill & Edwards 2002: 20, Figs. 1–2  
(coral gutter at Raine I., Great Barrier Reef).

Dorsal fin 1 spine, 26–28 rays; anal fin 1 or 2 spines, 16–18 rays; pectoral fins 15–18 rays; pelvic fins 1 spine, 3 or 4 rays, all rays unbranched. Prominent intermandibular flap. LSS 32–39; LL scales 32–39; circumpeduncular scales 16 or 17; predorsal scales extend anteriorly to supratemporal commissure; scales with radii in anterior field only. GR 1–4/6–10 = 7–12. Vertebrae 12 + 20–22.

Head and body pinkish or yellowish brown to olive or bright green, sometimes becoming pinkish to orangish brown on snout, lips and intermandibular flap; dorsal and anal fins yellowish, pinkish or orangish brown to olive or bright green, paler distally, with bluish grey to bright blue margin, sometimes with broad pale orange to yellow stripe submarginally; bluish grey to pale blue spot or streak at bases of alternate dorsal- and anal-fin rays; caudal fin yellowish or pinkish brown to olive or bright green. Attains 4 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Malé Atoll, Maldives (2 specimens); elsewhere to Christmas I., New Guinea, Palau and Great Barrier Reef.

**REMARKS** Occurs in a variety of reef habitats, from shallow patch reefs to reef walls, to at least 20 m (possibly ~40 m deep).

*Pseudoplesiops occidentalis* Gill & Edwards 2002

Maldives dottyback

PLATE 41

*Pseudoplesiops* sp.: Randall & Anderson 1993\*.

*Pseudoplesiops* sp. 1: Kuitert 1998\*.

*Pseudoplesiops occidentalis* Gill & Edwards 2002: 23, Figs. 3–4 (reef at Maaniyafushi I., South Malé Atoll, Maldives).

Dorsal fin 2 spines, 23 rays; anal fin 2 spines, 14 rays; pectoral fins 15 or 16 rays; pelvic fins 1 spine, 3 rays, all rays unbranched. No prominent intermandibular flap (weak ridge sometimes present). LSS 26–28; LL scales 26–28; circumpeduncular scales 16; predorsal scales extend anteriorly to interorbital area; scales with radii in all fields. GR 2–4/8–11 = 10–15. Vertebrae 10 + 17.

Head and body bright pinkish red to orange-red, becoming pink ventrally and olive-red to orangish brown posteriorly; orbital margin orange posteriorly, pale blue ventrally; posttemporal, intertemporal, upper preopercular and upper suborbital pores indistinctly edged with grey; pectoral-fin bases pale pink to pinkish red; dorsal and anal fins bright orange-red basally, reddish hyaline distally, with pale blue margin; caudal fin greyish yellow to pale greyish red basally, remainder of fin reddish to yellowish hyaline with pale blue margin. Attains 3.5 cm SL.

**DISTRIBUTION** WIO: endemic to Maldives.

**REMARKS** Known from reefs, at 20–72 m.

## SUBFAMILY PSEUDOCHROMINAE

## Dottybacks

Anthony C Gill

Small, perch-like; lateral line represented by anterodorsal series of tubed scales extending from shoulder to beneath middle or rear part of dorsal fin, and 2nd series of tubed scales on midsides extending onto caudal fin. Dorsal fin 2 or 3 spines, last dorsal-fin ray not bound to caudal fin by membrane; pelvic fins 1 spine, 5 segmented rays; total caudal-fin rays 26–34 (rarely 26). Opercle with at most indistinct serrations ventral to junction with subopercle. Head scaly; circumpeduncular scales not interrupted. Eight genera and 95 species; 1 genus represented in WIO.

GENUS *Pseudochromis* Rüppell 1835

Currently a catch-all genus that effectively includes all pseudochromine species that are not assigned to the remaining 7 genera. However, since it is the only pseudochromine genus represented in WIO, the above subfamily characters must suffice to distinguish it from other pseudochromid genera. Sixty-nine species, 28 in WIO.

## KEY TO SPECIES

- |    |  |                        |     |  |                         |
|----|--|------------------------|-----|--|-------------------------|
| 1a | Caudal fin forked.....   | <i>P. dixurus</i>      | 10a | Prominent dark grey to black spot on opercle flap.....   | 11                      |
| 1b | Caudal fin rounded, truncate, emarginate or pointed.....   | 2                      | 10b | No prominent dark spot on opercle flap.....  | 19                      |
| 2a | Gill rakers 6–8/15–17 = 21–25; dorsal-fin origin to pelvic-fin origin 21–25% SL.....   | 3                      | 11a | Predorsal scales 26–40; dorsal-fin origin to pelvic-fin origin 31–35% SL.....  | 12                      |
| 2b | Character combination not as above.....  | 4                      | 11b | Predorsal scales 12–28; dorsal-fin origin to pelvic-fin origin 21–31% SL.....  | 13                      |
| 3a | Head and body magenta (pinkish brown in preservative) with vertically elongate, dark blue (dark grey to dark brown in preservative) mark on each body scale; scales below anterior LL 11–13; circumpeduncular scales 16–18.....  | <i>P. fridmani</i>     | 12a | Caudal fin rounded to truncate, rarely weakly emarginate; sides of body either without dark markings or with rounded or vertically elongate dark spots.....  | <i>P. linda</i>         |
| 3b | Head and body pale pinkish brown to white, and dark olive to dark olive-brown on dorsal contour, with broad black stripe on midside of head and body, and broad black stripe on ventral part of head and body; scales below anterior LL 14–16; circumpeduncular scales 19 or (usually) 20..... | <i>P. sankeyi</i>      | 12b | Caudal fin usually weakly to strongly emarginate, sometimes rounded to truncate; sides of body with few to many dark blue crescentic marks (dark grey to black in preservative).....   | <i>P. olivaceus</i>     |
| 4a | Circumpeduncular scales 16–23 (rarely <18).....  | 5                      | 13a | Anal fin 14–16 (usually 15) segmented rays; dorsal fin 25–27 (usually 26) segmented rays; dorsal contour of head and body abruptly darker than remainder of head and body, or with entire head and body more-or-less uniformly dark greyish brown..... | 14                      |
| 4b | Circumpeduncular scales 14–17 (usually 16).....  | <i>P. coccinicauda</i> | 13b | Anal fin 15–20 (rarely 15) segmented rays; dorsal fin 26–32 (rarely 26) segmented rays; colour not as above.....   | 17                      |
| 5a | Upper infraorbital, supraotic, upper preopercular and posttemporal pores surrounded by prominent dark grey to black spots (dark brown or black in preservative).....   | 6                      | 14a | Caudal fin emarginate to strongly emarginate; no dark spots on dorsal fin.....   | <i>P. aureolineatus</i> |
| 5b | No prominent dark spots surrounding head pores.....  | 8                      | 14b | Caudal fin rounded to truncate; small dark spots present on dorsal fin.....  | 15                      |
| 6a | LSS 41–47; anterior LL scales 29–36; circumorbital pores 15–76; preopercular pores 9–30.....   | 7                      | 15a | Pectoral fins 18–20 (rarely 18 or 20) rays; head and body sometimes uniformly dark greyish brown.....  | <i>P. melas</i>         |
| 6b | LSS 35–42; anterior LL scales 15–25; circumorbital pores 12–15; preopercular pores 7–10.....   | <i>P. springeri</i>    | 15b | Pectoral fins 17–19 (usually 18) rays; colour not as above.....  | 16                      |
| 7a | Body brown, becoming yellowish brown to orange-yellow ventrally and posteriorly (brown to yellow-brown in preservative).....   | <i>P. dutoiti</i>      | 16a | No dark spots on anal fin; middle dorsal-fin ray to anal-fin origin 26–28% SL.....   | <i>P. pesi</i>          |
| 7b | Body dark grey (dark grey-brown in preservative).....  | <i>P. socotraensis</i> | 16b | Anal fin with dark spots; middle dorsal-fin ray to anal-fin origin 23–25% SL.....  | <i>P. punctatus</i>     |
| 8a | Dorsal fin 29–31 (usually 30) segmented rays; LSS 51–67 (usually ≥53).....   | 9                      | 17a | Sides of body with small, scattered, dark blue spots (brown to black in preservative); dorsal fin 26–28 (usually 27) rays; anal fin 15–17 rays.....  | <i>P. nigrovittatus</i> |
| 8b | Character combination not as above.....  | 10                     | 17b | No small dark spots scattered on sides of body; dorsal fin 27–32 (rarely 27) rays; anal fin 16–20 (rarely 16) rays.....  | 18                      |
| 9a | In preservative, no dark punctate spots on sides of body; circumpeduncular scales 20–22 (usually 20); 3 scales between lateral lines.....  | <i>P. omanensis</i>    |     |  |                         |
| 9b | In preservative, sides of body with scattered dark grey to black (bright blue in life) punctate spots; circumpeduncular scales 20–25 (rarely 20); usually 4 (rarely 3 or 5) scales between lateral lines.....  | <i>P. persicus</i>     |     |  |                         |

Continued...



## KEY TO SPECIES

- 18a Head and body generally pale brown, with darker brown edging on body scales ..... *P. leucorhynchus*
- 18b Head and body yellowish brown to bright orange-yellow (pale brown in preservative), with 2 bright blue stripes (purplish grey to grey in preservative), one from snout tip above eye to dorsal edge of peduncle, other from middle of upper lip to dark spot on opercle flap ..... *P. aldabraensis*
- 19a Dorsal fin usually 24 (rarely 23 or 25) rays ..... *P. magnificus*
- 19b Dorsal fin 25–31 (usually 26–30) rays ..... 20
- 20a Well-developed teeth on outer rakers of ceratobranchial 1 arranged in 2 rows running most of raker lengths ..... 21
- 20b Well-developed teeth on outer rakers of ceratobranchial 1 mainly confined to raker tips ..... 22
- 21a Dorsal and anal fins without scaly sheaths; dorsal-fin origin to pelvic-fin origin 26–31% SL ..... *P. flavivertex*
- 21b Dorsal and anal fins with weakly to well-developed scaly sheaths on at least rear part of fins; dorsal-fin origin to pelvic-fin origin 30–36% SL ..... *P. fuscus*
- 22a Dorsal and anal fins with well-developed scaly sheaths ..... *P. dilectus*
- 22b Dorsal and anal fins without well-developed scaly sheaths ..... 23
- 23a LSS 41–52 (usually ≥44); anterior LL scales 34–44; dorsal-fin origin to pelvic-fin origin 23–28% SL ..... 24
- 23b LSS 38–45; anterior LL scales 28–37; dorsal-fin origin to pelvic-fin origin 26–32% SL ..... 26
- 24a Upper sides of body with prominent dark purplish grey spots (dark grey-brown in preservative), noticeably darker than on rear of body; dorsal fin usually 28–30 (rarely 31) rays; anal fin 18 or (usually) 19 rays ..... *P. chrysoptilus*
- 24b Dark spots, if present on upper sides of body, not noticeably darker than those on rear part of body; dorsal fin usually 27–29 (rarely 26) rays; anal fin 16–19 (usually 17 or 18) rays ..... 25
- 25a LSS 45–52 (usually 47–50); dentary pores 4–6 (usually 5 or 6) in specimens >5 cm SL; caudal fin (in specimens >5 cm SL) with 2 prominent dark grey to black stripes (near ventral and dorsal edges of fin) ..... *P. caudalis*
- 25b LSS 41–50 (usually 44–46); dentary pores 4 or (rarely) 5; caudal fin without prominent dark stripes, although weak dusky stripes sometimes present ..... *P. natalensis*
- 26a Dorsal fin 28–30 (usually 29) rays; no dark spot on anterior part of opercle; 0–1 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship with interneural spaces immediately behind neural spine 4 ..... *P. tauberæ*
- 26b Dorsal fin 25–27 rays; dark blue spot posteriorly edged with black (dark grey to dark brown spot in preservative) usually present on anterior part of opercle (in specimens >4 cm SL); 3–5 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship with interneural spaces immediately behind neural spine 4 ..... 27
- 27a Anal fin 14–16 (usually 15) rays; total caudal-fin rays 30–33 (usually 31) ..... *P. kristinae*
- 27b Anal fin 16 or 17 rays; total caudal-fin rays 32–34 ..... *P. madagascariensis*

*Pseudochromis aldabraensis* Bauchot-Boutin 1958

Neon dottyback

PLATE 41

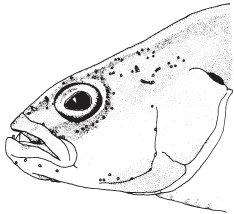
*Pseudochromis aldabraensis* Bauchot-Boutin in Arnoult *et al.* 1958: 80, Fig. 6 (Aldabra I. [likely erroneous]); Manilo & Bogorodsky 2003; Gill 2004\*; Heemstra & Heemstra 2004; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 27–31 rays; anal fin 3 spines, 16–19 rays; pectoral fins 16–19 rays; caudal fin 29–33 rays. LSS 36–45; anterior LL scales 24–33; predorsal scales 17–27; circumpeduncular scales 19–21 (usually 20). Dorsal-fin origin to pelvic-fin origin 21–28% SL. Caudal fin usually weakly rounded to truncate posteriorly, often with upper and/or lower lobes produced. GR 3–6/11–13 = 15–18. Vertebrae 10 + 16.

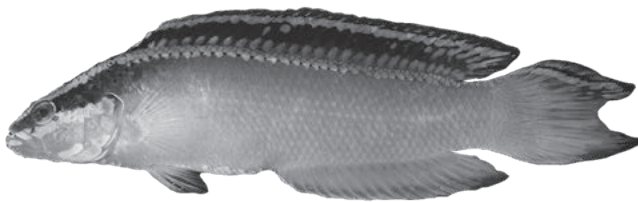
Head and body brown to bright orange-yellow; bright blue stripe extending from snout tip above eye and along anterior

LL to upper edge of peduncle; 2nd bright blue stripe extending beneath eye from middle of upper lip to dark grey spot on opercle flap, stripe contiguous anteriorly to bright blue patch on middle of lower lip; gold-edged dark grey to black spot on opercle flap; lower part of nape and area behind eyes between stripes dark grey; dorsal contour of head and area in front of eyes between stripes reddish brown to orange; upper part of head and dorsal angle of preopercle with indistinct grey spots; ventral contour of head, lower opercular region and sometimes preanal contour marked with irregular bright blue patches; anterior LL scales each with dark grey to black basal spot; dorsal fin dark grey to black, with series of ovals and bright blue spots on soft-rayed part of fin, and distal third of fin with irregular bright blue stripe, followed distally by narrow black stripe, thin reddish grey stripe, and indistinct bright blue marginal stripe (dark grey to black portions of fin often

irregularly marked with bright blue spots and streaks); anal fin bright orange, with distal third of fin greyish orange to pale blue, margin bright blue, and basal portion and distal third of fin usually with intermittent mauve to bright blue spots; bright blue stripe on peduncle continued submarginally onto upper lobe of caudal fin, followed distally by narrow black stripe and thin bright blue margin; caudal fin bright orange-yellow to bright orange-red, and lower lobe sometimes edged in bright blue. Attains 8 cm SL.



*Pseudochromis aldbaensis*, 7 cm SL, head (Persian/Arabian Gulf). Source: Gill 2004



*Pseudochromis aldbaensis*, 7 cm TL (Persian/Arabian Gulf). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: northern coast of Gulf of Aden to Oman, Persian/Arabian Gulf and Pakistan, India and Sri Lanka.

**REMARKS** Occurs in tidepools and on rocky and coral reefs around crevices, boulders and coralline algae, to ~40 m deep; frequently found in association with *Diadema* sea urchins. The type locality (Aldabra) is almost certainly erroneous, as this species has often been confused with *P. dutoiti* from East Africa.

### *Pseudochromis aureolineatus* Gill 2004

Goldlined dottyback

PLATE 41

*Pseudochromis aureolineatus* Gill 2004: 80, Fig. 31, Pl. 4h (Mohéli I., Comoros); Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 26–27 rays; anal fin 3 spines, 15 or 16 rays; pectoral fins 19 rays; caudal fin 31 or 32 rays, fin emarginate. Dorsal-fin origin to pelvic-fin origin 27–30% SL. LSS 41–43; anterior LL scales 32–35; predorsal scales 19 or 20; circumpeduncular scales 20. GR 5–7/12 or 13 = 17–20. Vertebrae 10 + 16.

Head and body pale pink, becoming white ventrally on head, and pinkish grey posteriorly; bright yellow stripe from posterodorsal edge of eye, above gill opening, and along upper part of body beneath dorsal fin to upper edge of peduncle; dorsal contour of head and body above yellow stripe dark bluish grey; opercle flap with yellow-edged, dark bluish grey spot; anterior few scales of horizontal scale rows immediately beneath yellow stripe each with dark bluish grey basal spot; sides of body behind pectoral-fin bases with series of narrow pinkish grey oblique lines following myosepta positions; dorsal fin greyish hyaline on spinous portion and on basal  $\frac{1}{2}$ – $\frac{2}{3}$  of soft-rayed part of fin, remainder of fin pinkish hyaline to hyaline; anal fin greyish to pinkish hyaline; caudal fin pinkish grey basally, becoming greyish hyaline proximally, with short blue-grey stripe extending submarginally from upper part of caudal-fin base, and upper edge of caudal fin yellowish grey to yellow. Attains at least 9 cm SL.

**DISTRIBUTION** Known only from three specimens collected from Comoros.

**REMARKS** Taken from reefs and reef slopes, at 15–30 m.

### *Pseudochromis caudalis* Boulenger 1898

Stripe-tailed dottyback

PLATE 41

*Pseudochromis caudalis* Boulenger 1898: 134 (Karachi, Pakistan); Gill 2004\*.

*Pseudochromis spencei* Fowler 1928: 112, Pl. 1 (pools in Back Bay, Mumbai, India).

*Pseudochromis ranjhai* Klausewitz 1961: 427, Fig. 1 (coast near Karachi, Pakistan).

Dorsal fin 3 spines, 28–29 rays; anal fin 3 spines, 17–19 rays; pectoral fins 18–20 rays; caudal fin 31–33 rays. LSS 45–52; anterior LL scales 36–44; predorsal scales 18–25; circumpeduncular scales 20–23. Dorsal-fin origin to pelvic-fin origin 25–28% SL. Caudal fin rounded with truncate margin, but becoming emarginate in specimens >3 cm SL, sometimes with upper lobe strongly produced. GR 4–6/10–13 = 15–18. Vertebrae 10 + 16.

Head and body pale yellowish to orangish brown, darker dorsally; edge of opercle behind upper part of preopercle with bright blue oval spot, edged posteriorly with dark grey to black; lower part of head with several horizontal rows of pale blue spots and streaks; ventro-posterior rim of eyes pale blue; broad dark brown stripe from snout or edge of upper lip to eyes; scales of nape and upper part of body each with dark blue to dark purple basal spot, these much paler and obliquely elongate on scales of lower part of body (spots indistinct or

absent in small specimens); dorsal fin yellowish to reddish brown, becoming olive basally, with 3–5 rows of elongate dark blue to purple spots, these curving proximally at rear of fin to form broken oblique lines; dorsal-fin margin narrowly bright blue; anal fin pinkish hyaline, pale yellow to grey basally, with 3–5 rows of pale blue to purple spots and blue distal margin; caudal fin pale brown to yellow, becoming yellowish orange dorsally and ventrally, and greyish hyaline posteriorly, with horizontal dark grey to black stripe near upper border and another stripe near lower border of fin (stripes absent or inconspicuous in small specimens). Attains 10 cm SL.

**DISTRIBUTION** Indian Ocean. WIO: Straits of Hormuz and Gulf of Oman to Pakistan, India and Sri Lanka; elsewhere to Myanmar.

**REMARKS** Found commonly in tidepools, and around rocks and coral rubble, to ~30 m deep.

### *Pseudochromis chrysopilus* Gill & Zajonz 2011

Gold-spotted dottyback

PLATE 41

*Pseudochromis chrysopilus* Gill & Zajonz 2011: 7, Figs. 4–5  
(Ras Qatanin Bay, Socotra I.).

Dorsal fin 3 spines, 28–31 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 17–19 rays; caudal fin 31–34 rays. LSS 47–52; anterior LL scales 36–43; predorsal scales 19–24; circumpeduncular scales 19–22. Dorsal-fin origin to pelvic-fin origin 22–25% SL. Caudal fin truncate to emarginate. GR 3–5/10–12 = 14–17. Vertebrae 10 + 16.

Head and body yellowish to orangish brown, darker dorsally, becoming purplish blue behind anal-fin origin; upper part of opercle and head with dark purplish blue spots; two or three slightly oblique, dark blue stripes on cheeks beneath eye; snout and lips dark grey; scales of nape and upper flanks (immediately behind and above pectoral-fin base) each with dark blue to dark purple basal spot; scales of remainder of body each with orange-brown to bright golden yellow basal spot; dorsal fin yellowish to reddish brown, with 3–6 rows of elongate dark blue to purple spots, these curving proximally posteriorly to form broken oblique lines; anal fin blue to bluish hyaline, with several rows of yellow spots, these strongest on basal part of fin; caudal fin dark purplish grey, becoming greyish hyaline posteriorly; each scale of caudal-fin base with orange-brown basal spot; pectoral fins yellowish hyaline, brown basally pelvic fins greyish hyaline to hyaline. Attains 8 cm SL.

**DISTRIBUTION** Known only from the type specimens collected from Socotra.

**REMARKS** Taken from reef at 3–11 m.

### *Pseudochromis coccinicauda* (Tickell 1888)

Yellow-breasted dottyback

PLATES 41 & 42

*Malacocanthus coccinicauda* Tickell in Day 1888: 791 (Saddle I., Myanmar).  
*Malacocanthus bicolor* Tickell 1888: 791 (Saddle I., Myanmar).  
*Pseudochromis coccinicauda*: Gill 1999\*, 2004\*.

Dorsal fin 3 spines, 22 or 23 rays; anal fin 3 spines, 12 or 13 rays; pectoral fins 17–19 rays; caudal fin 30–33 rays. LSS 33–40; anterior LL scales 28–34; predorsal scales 12–17; circumpeduncular scales 16 or 17. Dorsal-fin origin to pelvic-fin origin 25–28% SL. Caudal fin rounded, often almost truncate. GR 3–6/10 or 11 = 13–16. Vertebrae 10 + 16.

Females and juveniles with head and body brown to greenish grey, paler ventrally, becoming reddish to orange-brown on head and peduncle; dorsal fin brown, pinkish hyaline distally and reddish brown posteriorly; anal fin pale pink basally, pinkish to bluish hyaline distally; caudal fin bright orange-red, margin broadly bluish hyaline to hyaline. Males with body and dorsal contour of head dark bluish grey to black, with scattered blue flecks; lips and lower part of head below level of mid-eye yellowish grey to yellowish brown; breast and anterior part of body below anterior LL and forward from middle of anal fin abruptly yellowish brown to bright yellow; anterior LL scales sometimes bright blue; upper contour of peduncle and body behind dorsal-fin origin with small, scattered, pale to bright blue spots; sides of peduncle and rear part of body with series of bright blue bars within dark bluish grey to black region, these bars more distinct anteriorly, sometimes extending anteriorly onto yellowish brown to bright yellow abdomen; scales of lower part of dark region on peduncle and rear part of body each with mauve to pinkish grey central spot; basal half of dorsal fin dark bluish to black, remainder of fin abruptly pale blue to greyish hyaline, with blue distal margin; anal fin pale pinkish grey to pale grey basally, becoming greyish hyaline to hyaline distally, with blue distal margin; basal two-thirds of caudal fin dark bluish grey to black, remainder of fin abruptly pale blue to greyish hyaline. Attains 5.5 cm SL.

**DISTRIBUTION** Indian Ocean. WIO: Maldives and Lakshadweep; elsewhere to Andaman Sea and Indonesia (Java and Bali).

**REMARKS** Occurs mainly in surge areas on rocky and coral reefs, to ~9 m deep.

## *Pseudochromis dilectus* Lubbock 1976

Sri Lankan dottyback

PLATE 42

*Pseudochromis dilectus* Lubbock 1976: 172, Fig. 2 (Trincomalee, Sri Lanka); Gill 2004\*.

Dorsal fin 3 spines, 29–31; anal fin 3 spines, 15 or 16 rays; pectoral fins 17–19 rays; caudal fin 29–31 rays. LSS 41–47; anterior LL scales 34–39; predorsal scales 18–26; circumpeduncular scales 20 or 21. Dorsal-fin origin to pelvic-fin origin 26–32% SL. Caudal fin rounded or often truncate, but weakly emarginate in small specimens (<3 cm SL). GR 4–7/11 or 12 = 15–19. Vertebrae 10 + 16.

Head and anterior third of body either bright greenish yellow to bright orange, or dark grey-brown to black, remainder of body bluish grey to dark grey-brown or black; blue curved line extending anteroventrally around rear rim of orbit to upper lip; opercle with series of fine horizontally aligned vermiculate gold lines; scales of anterodorsal part of body each with dark bluish grey to black central spot, these becoming less distinct below rear part of dorsal fin; dorsal fin either black with blue distal margin, or blue-grey basally, sometimes red distally, with blue distal margin, blue-grey basal area indistinctly with several rows of small yellow to red spots and streaks; anal fin similar to dorsal fin except without rows of yellow to red spots; caudal fin dark bluish grey to black, sometimes reddish hyaline distally, with blue margin. Attains ~9 cm SL.

**DISTRIBUTION** WIO: endemic to Sri Lanka.

**REMARKS** Occurs around boulders and coral rocks, as well as among hard and segmented corals or sponges, at 7.5–20 m.

## *Pseudochromis dixurus* Lubbock 1975

Forktail dottyback

PLATE 42

*Pseudochromis dixurus* Lubbock 1975: 130, Pl. 1a (Port Sudan Harbour, Red Sea); Goren & Dor 1994; Gill 2004\*.

Dorsal fin 3 spines, 25–28 rays; anal fin 3 spines, 13–15 rays; pectoral fins 16–18 rays; caudal fin 31–33 rays. LSS 42–47; anterior LL scales 26–34; predorsal scales 20–25; circumpeduncular scales 20. Dorsal-fin origin to pelvic-fin origin 26–31% SL. Caudal fin deeply forked to lunate. GR 7–9/16 or 17 = 23–26. Vertebrae 10 + 16.

Two colour forms (striped and dark), apparently related to size (although there is considerable size overlap). Striped form (smaller specimens) with head and body pale grey to white, dorsal contour of head and body dark grey; pale-edged dark

grey to black stripe extending from snout tip to eyes, bisected by narrow pale blue to blue median stripe; dark grey to black stripe continuing from behind eyes to upper lobe of caudal fin, stripe becoming yellowish brown to bright yellow posteriorly; 2nd yellow to red stripe extending from midposterior part of upper lip below eyes to lower lobe of caudal fin; dark grey to black spot on opercle flap, this edged posteriorly with yellow; dorsal fin bluish hyaline to hyaline, sometimes with dusky blue to grey basal stripe; anal fin bluish hyaline to hyaline, sometimes with 1 or 2 basal yellow to orange stripes or rows of spots; caudal fin white or yellowish hyaline to bluish hyaline or hyaline between bright yellow to bright orange-yellow stripes, upper and lower edges of fin sometimes bright blue. Dark form (larger specimens) with head and body dark pinkish or orangish brown to dark olive-grey, becoming pale grey to yellowish grey ventrally and posteriorly; dorsal contour of head and body and ventral contour of body dark grey behind a point varying from anal-fin origin to pelvic-fin origin; dusky grey spot on opercle flap, this edged posteriorly with yellow; bright blue-edged orange-brown stripe from middle of upper lip to eyes, stripe bisected by bright blue median stripe; rear edge of upper lip sometimes orange-brown; dorsal fin bluish or orangish hyaline to hyaline with dark grey basal stripe and blue distal margin; distal part of anterior portion of fin sometimes bright yellow to bright orange; anal fin bluish hyaline to hyaline, usually with 1 or 2 yellow to orange basal stripes or rows of spots; caudal-fin lobes dark grey to black, with blue upper and lower margins, and central area pale grey basally, becoming hyaline posteriorly. Attains 11 cm SL.



*Pseudochromis dixurus*, striped form (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba to Farasan Is.

**REMARKS** Found around rocks and in small reef caves, at 4–60 m; more abundant in the deeper part of this range.

*Pseudochromis dutoiti* Smith 1955

Dutoiti

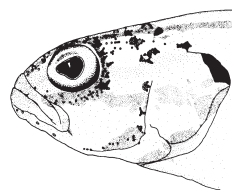
PLATE 42

*Pseudochromis dutoiti* Smith 1955: 145, Fig. 1 (Bazaruto I., Mozambique);  
SSF No. 169.4\*; Gill & Mee 1993; Gill & Randall 1994; Gill 2004\*;  
Heemstra & Heemstra 2004\*; Gill & Zajonz 2011\*.

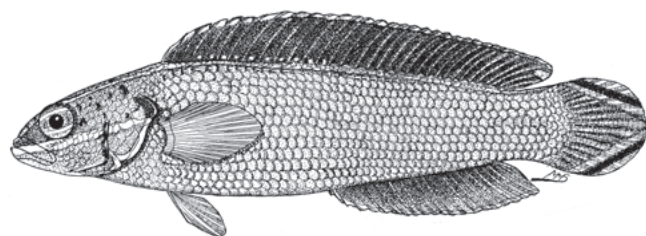
*Pseudochromis aldabraensis* (non Bauchot-Boutin 1958).

Dorsal fin 3 spines, 29–32 rays; anal fin 3 spines, 18–20 rays;  
pectoral fins 15–19 rays; caudal fin 29–33 rays. LSS 41–47; anterior  
LL scales 29–34; predorsal scales 20–28; circumpeduncular scales  
19 or 20. Dorsal-fin origin to pelvic-fin origin 26–31% SL. Caudal  
fin rounded, sometimes weakly rounded to truncate, often with  
lower lobe produced. GR 4–6/11–13 = 15–18. Vertebrae 10 + 16.

Head dark grey, sometimes greyish orange ventrally;  
opercle flap with large gold-edged, dark grey to black spot;  
bright blue stripe from snout tip, above eye, and along anterior  
LL to upper edge of peduncle; 2nd blue stripe extending  
from middle of lower lip beneath eye to rear edge of opercle  
immediately below gold-edged dark opercle flap spot; lower  
part of preopercle and opercle edged with irregular bright blue  
markings; upper infraorbital, posterior otic, upper preopercle,  
lower supratemporal and posttemporal pores surrounded by  
black pigmentation; body brown, becoming yellowish brown to  
orange-yellow ventrally and posteriorly; area around pectoral-  
fin bases with irregular bright blue markings; dorsal fin dark  
grey to black, becoming reddish brown to bright orange-red  
posteriorly, fin base with series of bright blue oval spots, and  
dark grey portion of fin with 2 rows of vertically elongate black  
spots, distal margin of fin bright blue; anal fin yellowish brown  
to olive, with bright blue margin; caudal fin reddish brown to  
orange-red basally, dark grey posteriorly, fin rays dark grey to  
black, and upper and lower lobes each with broad, bright blue,  
oblique subdistal stripe, these followed distally by black stripe  
and bright blue marginal stripe, proximal bright blue stripes  
sometimes converging on rear edge of fin. Attains 8.5 cm SL.



*Pseudochromis dutoiti*, 7 cm SL, head  
(S Mozambique). Source: Gill 2004



*Pseudochromis dutoiti*, 6 cm TL, holotype (Mozambique). Source: SFSA

**DISTRIBUTION** WIO: Kenya (Shimoni) to South Africa  
(Landers Reef).

**REMARKS** Found in tidepools and on rocky and coral  
reefs, to ~15 m deep. Records of this species in the northern  
Indian Ocean and at Aldabra are likely based on the related  
*P. aldabraensis* (although the type locality of the latter is  
probably in error).

*Pseudochromis flavivertex* Rüppell 1835

Sunrise dottyback

PLATE 42

*Pseudochromis flavivertex* Rüppell 1835: 9, Pl. 2, Fig. 4 (Massawa, Eritrea,  
Red Sea); Goren & Dor 1994; Manilo & Bogorodsky 2003; Gill 2004\*.

Dorsal fin 3 spines, 25–28 rays; anal fin 3 spines, 14–16  
rays; pectoral fins 16–18 rays; caudal fin 29–33 rays.  
LSS 39–46; anterior LL scales 23–33; predorsal scales 16–22;  
circumpeduncular scales 19 or 20. Dorsal-fin origin to pelvic-  
fin origin 26–31% SL. Caudal fin truncate to emarginate.  
GR 5–7/11–15 = 17–22. Vertebrae 10 + 16.

Head and body either uniformly yellowish brown to bright  
yellow, sometimes with small bluish area on flanks behind  
pectoral-fin bases, or greyish blue to bright blue, sometimes  
becoming greyish yellow to bright yellow posteriorly, and  
lower part of head and body either abruptly or gradually pale  
bluish grey to white; dorsal contour of head and body usually  
with bright yellow to bright orange-yellow narrow median  
stripe from snout tip to caudal-fin base, this sometimes present  
only on dorsal contour of peduncle and rear part of dorsal-  
fin base; posteroventral rim of orbit bright yellow to bright  
orange-red, this bordered proximally with pale blue or grey  
to bright blue narrow curved line; each scale of flanks within  
greyish blue to bright blue region usually with blue to dark  
blue central spot; dorsal fin either bright yellow to bright  
orange-yellow basally, becoming bluish to bright yellowish  
hyaline distally, sometimes with bright blue margin (yellow-  
topped and xanthic individuals), or bluish grey to blue basally,  
becoming yellowish hyaline distally with bright blue margin  
(blue-topped individuals); anal fin either pale grey to pale blue,  
with blue margin (yellow-topped and blue-topped individuals),  
or bright yellow to yellowish hyaline (xanthic individuals);  
caudal fin bright yellow to bright orange-yellow, becoming  
yellowish hyaline posteriorly, usually with greyish blue to  
bright blue body colouration extending onto midbasal section,  
blue area sometimes extensive and leaving only upper edge of  
fin yellow. Attains 8 cm SL.

**DISTRIBUTION** WIO: Red Sea, from Gulf of Aqaba to Kamaran I., Yemen, and vicinity of Massawa, Eritrea; records from Gulf of Aden need verification.

**REMARKS** Occurs on coral and rocky reefs, at 1–30 m.

### *Pseudochromis fridmani* Klausewitz 1968

Orchid dottyback

PLATE 43

*Pseudochromis fridmani* Klausewitz 1968: 444, Figs. 1–3 (coral reef south of Eilat, Israel, Gulf of Aqaba, Red Sea); Dor 1984; Goren & Dor 1994; Gill 2004.

Dorsal fin 3 spines, 25–27 rays; anal fin 3 spines, 14 or 15 rays; pectoral fins 15–17 rays; caudal fin 30–33 rays. LSS 38–45; anterior LL scales 23–28; predorsal scales 17–25; circumpeduncular scales 16–18. Dorsal-fin origin to pelvic-fin origin 21–25% SL. Caudal fin rounded with lower lobe produced, sometimes with upper lobe also produced. GR 6–8/15–17 = 21–25. Vertebrae 10 + 16.

Head and body magenta; dark grey stripe from snout tip through eye to upper part of preopercle; small dusky to dark grey spot on opercle flap; each body scale with vertically elongate dark blue mark; dorsal-fin rays magenta, membranes magenta basally and hyaline distally; anal fin magenta; caudal fin magenta, upper portion of fin hyaline distally. Attains 6.5 cm SL.

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba and Gulf of Suez to Farasan Is.

**REMARKS** Occurs mainly on vertical reef faces and overhangs, at 1–60 m.

### *Pseudochromis fuscus* Müller & Troschel 1849

Brown dottyback

PLATE 43

*Pseudochromis fuscus* Müller & Troschel 1849: 23, Pl. 4, Fig. 2 (Sulawesi, Indonesia); Gill 2004\*.

Dorsal fin 3 spines, 25–29 rays; anal fin 3 spines, 13–15 rays; pectoral fins 16–20 rays; caudal fin 27–31 rays. LSS 33–43; anterior LL scales 17–36; predorsal scales 20–35; circumpeduncular scales 16–23. Dorsal-fin origin to pelvic-fin origin 30–36% SL. Caudal fin rounded to truncate or emarginate. GR 5–9/11–15 = 16–21. Vertebrae 10 + 16.

Head and body varying from bright yellow through bluish grey to dark grey or black, sometimes with dorsal contour of body below dorsal-fin base abruptly bright yellow;

posteroventral rim of orbit bright yellow or bright red to reddish or bluish grey, this edged posteriorly by short, grey to dark blue or dark grey, vertical streak; scales of body each with indistinct to distinct mauve to dark blue basal spot, spots often aligned to form stripes; pectoral-fin bases either matching adjacent body colouration or abruptly dark blue to black; dorsal and anal fins matching adjacent body colouration, usually with blue margin and ~3–10 horizontal rows of blue spots and short streaks; pelvic fins bright yellow to dark blue or black, usually with blue leading edge of fins and sometimes edges of rays; caudal fin white or bright yellow through bluish grey to black, either matching adjacent body colouration or abruptly paler, and fin either immaculate or with blue distal margin and several vertical to convex rows of blue spots; dark-tailed specimens often with narrow dark grey to black submarginal line, this bordered proximally on upper and lower part of fin by broad reddish grey or bright yellow to bright red stripes. Attains 9 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Indonesia, Ryukyu Is., Caroline Is., Australia, New Caledonia and Vanuatu.

**REMARKS** Occurs on rocky and coral reefs in lagoons, on reefs flats and on reef slopes, to ~30 m deep, usually in association with branching corals (*Acropora* and *Pocillopora*).

### *Pseudochromis kristinae* Gill 2004

Lipstick dottyback

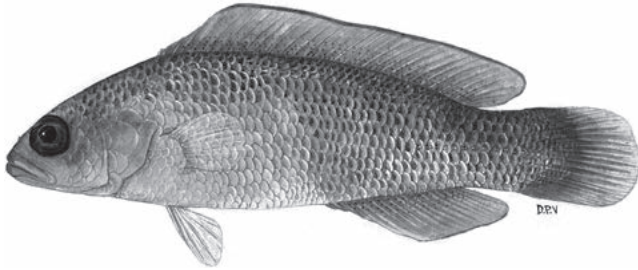
PLATE 43

*Pseudochromis kristinae* Gill 2004: 126, Fig. 47, Pl. 8e (Mombasa, Kenya); Heemstra & Heemstra 2004.

Dorsal fin 3 spines, 25–27 rays; anal fin 3 spines, 14–16 rays; pectoral fins 16–19 rays; caudal fin 30–33 rays. LSS 39–44; anterior LL scales 29–35; predorsal scales 16–24; circumpeduncular scales 18–20. Dorsal-fin origin to pelvic-fin origin 27–32% SL. Caudal fin rounded to truncate or emarginate. GR 4–7/11–13 = 15–18. Vertebrae 10 + 16.

Head and body olive to greyish pink, paler ventrally, sometimes becoming yellow on anterior part of body and head; specimens >4 cm SL usually with dark blue spot on anterior part of opercle immediately behind upper edge of preopercle, this edged posteriorly with black; opercle and cheeks usually with faint blue spots and irregular markings; rear margin of eye dark grey; dark grey stripe from snout to anterior rim of orbit present in large specimens; lips and snout sometimes pinkish grey to bright red; body scales each with blue basal spot, these sometimes indistinct (particularly in small specimens) and confined to anterodorsal part of flanks; dorsal fin reddish pink or pinkish hyaline to bluish or yellowish hyaline, bluish

olive basally in large specimens, usually with rows of red or yellow spots and lines and blue to grey margin; anal fin reddish pink to olive hyaline or olive, with rows of red or blue spots and lines and blue to grey margin; caudal fin reddish pink or greenish yellow to olive basally, remainder of fin reddish pink or greenish yellow. Attains 9 cm SL.



*Pseudochromis kristinae*, 7 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Kenya (vicinity of Mombasa) to South Africa (Aliwal Shoal), Madagascar and Comoros.

**REMARKS** Found on coral and rocky reefs, at 0.3–25 m.

### *Pseudochromis leucorhynchus* Lubbock 1977

White-nosed dottyback PLATE 43

*Pseudochromis leucorhynchus* Lubbock 1977: 6, Pls. 2b, 3b (Shela, Lamu I., Kenya); Gill & Randall 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Gill 2004\*; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 28–32 rays; anal fin 3 spines, 17–20 rays; pectoral fins 17–19 rays; caudal fin 30–33 rays. LSS 41–47; anterior LL scales 29–36; predorsal scales 17–22; circumpeduncular scales 16–20. Dorsal-fin origin to pelvic-fin origin 23–27% SL. Caudal fin rounded or only slightly rounded, to truncate. GR 4–7/10–12 = 14–18. Vertebrae 10 + 16.

Head and body either yellowish brown to dark olive, paler ventrally and paler to reddish brown posteriorly, or bright yellow; dark grey stripe extending from middle of upper lip to eyes, this bordered dorsally by thin pale grey to white median stripe; indistinct dusky stripe from behind eye to upper edge of preopercle; large dark grey to dark blue spot on opercle flap, bordered posteriorly with gold; edges of body scales pale bluish grey to olive, these forming indistinct reticulated pattern; dorsal and anal fins bright yellow to reddish brown basally, becoming bright yellow to olive-hyaline distally, with several

rows of pale blue spots and streaks on basal portions and narrow blue distal margins; caudal fin olive to bright yellow, sometimes with narrow blue margin. Attains 10 cm SL.

**DISTRIBUTION** WIO: central Oman to Kenya (Lamu).

**REMARKS** Found around live and dead corals, to ~8 m deep.

### *Pseudochromis linda* Randall & Stanaland 1989

False olive dottyback

PLATE 43

*Pseudochromis linda* Randall & Stanaland 1989: 107, Figs. 1–4 (Jana I., Saudi Arabia, Persian/Arabian Gulf); Randall 1995\*; Manilo & Bogorodsky 2003; Gill 2004\*; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 26–29 rays; anal fin 3 spines, 14–16 rays; pectoral fins 17–19 rays; caudal fin 28–32 rays. LSS 38–46; anterior LL scales 31–38; predorsal scales 26–36; circumpeduncular scales 19–22. Dorsal-fin origin to pelvic-fin origin 32–35% SL. Caudal fin rounded, sometimes weakly rounded to truncate, rarely weakly emarginate. GR 4–7/11–14 = 15–20. Vertebrae 10 + 16.

Head and body dark olive-brown to black, sometimes becoming pinkish to yellowish brown ventrally on head and abdomen and/or posteriorly on peduncle; large dark blue to black spot on opercle flap, sometimes edged with bright blue or bright red; dark blue curved line extending around posteroventral rim of orbit to upper lip, then ascending along anterior edge of 1st infraorbital, descending portion of line sometimes edged dorsally with reddish brown; dorsal and anal fins either uniformly dark grey to black, or dark grey to black on basal third of fins with remainder dusky hyaline, or fins sometimes pale orange to bright red subdistally with dark grey distal margins (latter broadest on spinous portion of fins); dusky hyaline portion of dorsal and anal fins sometimes with several horizontal to oblique rows of short dark grey streaks; pelvic fins greyish hyaline to dark grey or black; caudal fin either uniformly dark grey to black, or yellowish brown basally with remainder of fin bright yellow, becoming yellowish hyaline distally, with bluish grey distal margin. Attains 9 cm SL.

**DISTRIBUTION** WIO: Socotra, Gulf of Aden, Oman, Persian/Arabian Gulf and Pakistan.

**REMARKS** Found in tidepools and on coral and rocky reefs, to ~15 m deep; associated with *Acropora* and other branching corals.

## *Pseudochromis madagascariensis* Gill 2004

### Madagascan dottyback

*Pseudochromis madagascariensis* Gill 2004: 136, Figs. 47, 50 (Diego Suarez [Antsiranana], Madagascar).

Dorsal fin 3 spines, 26 or 27 rays; anal fin 3 spines, 16 or 17 rays; pectoral fins 18 rays; caudal fin 32–34 rays. LSS 41–45; anterior LL scales 32–36; predorsal scales 21–24; circumpeduncular scales 20 or 21. Caudal fin emarginate. Dorsal-fin origin to pelvic-fin origin 26–31% SL. GR 5 or 6/11 or 12 = 16 or 17. Vertebrae 10 + 16.

Preserved specimens with head and body brown to dark brown, paler ventrally; anterodorsal corner of opercle just behind upper margin of preopercle with dark grey-brown spot; short dark grey-brown bar at midposterior rim of orbit, this sometimes continuing ventrally as indistinct curved streak along ventral edge of infraorbital bones to corner of mouth; short dark grey-brown stripe extending from anteroventral rim of orbit to mid-upper part of upper lip; scales of body and peduncle each with small basal dark brown spot; dorsal and anal fins dark brown basally, becoming brownish hyaline distally; caudal fin brown basally, becoming brownish hyaline posteriorly, with upper and lower edges slightly paler. Attains at least 6.5 cm SL.



*Pseudochromis madagascariensis*, 5 cm SL (NE Madagascar). Source: Gill 2004

**DISTRIBUTION** Known only from the type specimens from Madagascar.

## *Pseudochromis magnificus* Lubbock 1977

### Magnificent dottyback

PLATE 43

*Pseudochromis magnificus* Lubbock 1977: 3, Pls. 1a–b, 5a–b (Raphael I., St Brandon Shoals); Gill 2004\*.

Dorsal fin 3 spines, 23 or 24 rays; anal fin 3 spines, 13–15 rays; pectoral fins 16–20 rays; caudal fin 29–31 rays. LSS 40–44; anterior LL scales 30–36; predorsal scales 12–18; circumpeduncular scales 19 or 20. Dorsal-fin origin to pelvic-fin origin 28–30% SL. Caudal fin usually rounded, sometimes weakly rounded to truncate. GR 4–7/12 or 13 = 16–20. Vertebrae 10 + 16.

Females with head brown, becoming pale pink ventrally; rear edge of infraorbitals with dark brown curved stripe; body dark grey-brown, becoming pale pink ventrally on abdomen and breast; dorsal and anal fins dark grey-brown, each with narrow red submarginal and narrow blue distal stripe; caudal fin bright yellow, dark grey-brown basally, with dark grey-brown submarginal stripe and hyaline distal stripe. Males with dorsal part of head dark olive, becoming yellowish brown to bright yellow ventrally and bright orange anteriorly on snout and lips; rear edge of infraorbitals with olive to dark olive curved line; body dark reddish purple, becoming black on peduncle; breast and pectoral-fin bases yellowish brown to bright olive-yellow; abdomen bright olive-yellow to bright red, grading dorsally and posteriorly to reddish purple or reddish grey; scales of reddish purple area above abdominal region each with dark spot; dorsal fin bright orange-red with blue margin, narrow dark reddish brown basal stripe on anterior part of fin, stripe becoming black posteriorly and expanding to two-thirds of fin height; anal fin bright yellow to bright orange, becoming dark reddish brown basally, with blue margin and 3 or 4 horizontal rows of blue spots; caudal fin black, bright yellow to bright orange submarginally, with dark blue distal margin. Attains 6.5 cm SL.

**DISTRIBUTION** WIO: endemic to St Brandon Shoals.

**REMARKS** Occurs in a variety of rocky and coral reef habitats, including surge channels and patch reefs around ledges, coral heads and rubble, at 1–20 m.

## *Pseudochromis melas* Lubbock 1977

### Dark dottyback

PLATES 43 & 44

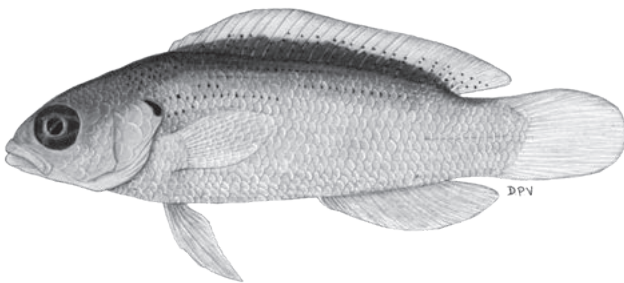
*Pseudochromis melas* Lubbock 1977: 8, Pls. 1d, 3a (bottom of reef slope, Wasini I., Shimoni, Kenya); SSF No. 169.5\*; Gill 2004; Heemstra & Heemstra 2004; Gill & Zajonz 2011.

Dorsal fin 3 spines, 25–27 rays; anal fin 3 spines, 14–16 rays; pectoral fins 18–20 rays; caudal fin 29–33 rays. LSS 39–45; anterior LL scales 28–37; predorsal scales 18–23; circumpeduncular scales 19–22. Dorsal-fin origin to pelvic-fin origin 26–31% SL. Caudal fin rounded, sometimes slightly rounded to truncate. GR 5–7/11–14 = 16–20. Vertebrae 10 + 16.

Pale and dark colour forms. Pale form with dorsal contour of head and body brown to dark brown; remainder of body yellowish brown, becoming pinkish on lower part of abdomen; lower part of head yellowish brown to grey; opercle flap with large gold-edged black spot; several rows of small dark brown to black spots present anteriorly on body within brown to dark brown area; pale yellowish brown oblique stripe extending



above gill opening from mid-posterior edge of eye to base of last few dorsal-fin rays sometimes present; dorsal fin yellowish grey to brown, with 2 or 3 rows of black spots along middle and distal part of fin, and brown to black spot at base of each ray; anal fin bright yellow basally, hyaline distally, with blue-grey streak or spot at base of each ray, and rear part of fin sometimes with several black spots or streaks; pectoral fins hyaline; pelvic fins pale yellow to hyaline; caudal fin bright yellow, usually with several vertical or convex rows of small black spots. Dark form with head and body uniformly dark bluish to brownish grey, paler ventrally; large gold-edged dark blue to black spot on opercle flap; indistinct dark bluish grey spots present anteriorly below anterior LL; dorsal, anal and caudal fins dark bluish grey, with bright blue margins, and sometimes scattered with a few indistinct dark grey spots. Attains 10 cm SL.



*Pseudochromis melas*, 5 cm TL, pale form (South Africa). Source: SSF

**DISTRIBUTION** WIO: Kenya (Shimoni) to South Africa (Aliwal Shoal, KwaZulu-Natal).

**REMARKS** Known from coral and rocky reefs and reef slopes, at 15–20 m.

### *Pseudochromis natalensis* Regan 1916

Natal dottyback

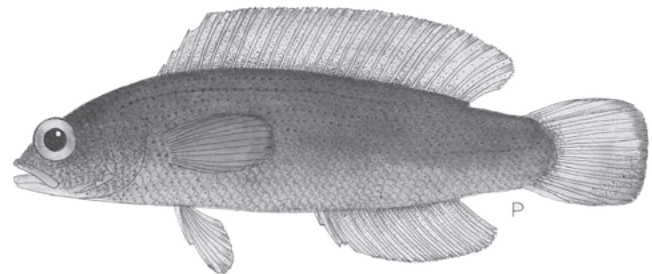
PLATE 44

*Pseudochromis natalensis* Regan 1916: 167 (Durban, KwaZulu-Natal, South Africa); SSF No. 169.6\*; Gill 2004\*; Heemstra & Heemstra 2004.

Dorsal fin 3 spines, 26–28 rays; anal fin 3 spines, 16–18 rays; pectoral fins 17–19 rays; caudal fin 29–32 rays. LSS 41–50; anterior LL scales 34–41; predorsal scales 16–21; circumpeduncular scales 19–22. Dorsal-fin origin to pelvic-fin origin 25–27% SL. Caudal fin rounded to truncate or emarginate. GR 3–6/10–12 = 13–16. Vertebrae 10 + 16.

Head and body grey-brown, paler ventrally, becoming orangish brown on ventral part of head; dark bluish grey to black spot at anterodorsal corner of opercle, just behind dorsal tip of preopercle; short dark bluish grey bar on posterodorsal

rim of orbit; irregular bluish grey to mauve spots and bars on lower part of head, forming series of short curved bars on cheek; scales of nape and upper part of flanks each with dark bluish grey basal spot, and edges of scales on remainder of body yellowish brown to red, this most distinct on peduncle; basal third of dorsal fin yellowish brown to bright yellow, remainder of fin pinkish to yellowish hyaline; 1 or 2 rows of dark bluish grey to blue spots on yellowish brown to bright yellow portion of dorsal fin, remainder of fin marked with diffuse bluish grey spots and stripes; anal fin brown to brownish hyaline, with several rows of small yellow spots, these most intense on basal part of fin; caudal fin yellowish to orangish brown, becoming bright yellow to pale grey posteriorly, and with 2 short greyish yellow to dark grey stripes: one from upper and other from lower edge of fin to middle of upper and lower rays, with area outside the stripes pale grey to bright yellow. Attains 9 cm SL.



*Pseudochromis natalensis*, 8 cm TL (N Mozambique). Source: SFSA

**DISTRIBUTION** WIO: Mozambique (Tecomaji I.) to South Africa (Umkomaas, KwaZulu-Natal).

**REMARKS** Found around coral and rocky reefs and boulders, at 20–42 m. Records from Madagascar, Tanzania and Kenya are likely the result of confusion with *P. kristinae* and *P. madagascariensis*.

### *Pseudochromis nigrovittatus* Boulenger 1897

Blackstripe dottyback

PLATE 44

*Pseudochromis nigrovittatus* Boulenger 1897: 421 (Makran coast, Iran, Persian/Arabian Gulf); Randall 1995\*; Manilo & Bogorodsky 2003; Gill 2004\*; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 26–28 rays; anal fin 3 spines, 15–17 rays; pectoral fins 16–19 rays; caudal fin 30–32 rays. LSS 41–49; anterior LL scales 32–40; predorsal scales 12–28; circumpeduncular scales 19 or 20. Dorsal-fin origin to pelvic-fin origin 22–27% SL. Caudal fin either emarginate or rounded with rear margin truncate. GR 3–5/10 or 11 = 14–16. Vertebrae 10 + 16.

Non-striped and striped colour forms. Non-striped form with head and body dark greyish brown, becoming pale pinkish brown ventrally on abdomen and yellow on rear part of peduncle; head below level of eyes orange with scattered pale blue spots; large gold-edged dark blue spot on opercle flap; body and upper part of opercle with scattered dark blue spots; basal two-thirds of dorsal fin pinkish grey with scattered small dark blue spots, remainder of fin bright red with bright blue margin; anal fin pinkish grey basally, becoming pinkish hyaline distally, with scattered small blue spots and bright blue margin; caudal fin bright yellow, becoming yellowish hyaline posteriorly, with upper and lower edges of fin mauve. Striped form with broad dark greyish brown to black stripe on head and body, extending from snout tip through eye and upper edge of opercle to midcaudal-fin base, edges of stripe becoming pinkish brown; area of head and body above dark stripe yellowish brown, and area below stripe pale pink to cream; large gold-edged dark blue to black spot on opercle flap; sides of body within and immediately above and below dark stripe with scattered dark blue spots; dorsal and anal fins pale yellow to yellowish hyaline; caudal fin pale yellow to yellowish hyaline with broad greyish brown to black stripe from body extending onto basal halves of middle caudal-fin rays, stripe narrowing posteriorly to pointed tip. Attains 8.5 cm SL.



*Pseudochromis nigrovittatus*, 4 cm SL, striped form (Oman).  
© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: southern Red Sea (Kamran I.) to Makran Coast (Iran) and Strait of Hormuz, and to northern coast of Gulf of Aden and Socotra.

**REMARKS** Occurs in tidepools, around boulders, in rock crevices, and around rocky and coral reefs, to ~12 m deep; sometimes shelters among the spines of *Diadema* sea urchins.

### *Pseudochromis olivaceus* Rüppell 1835

Olive dottyback

PLATE 44

*Pseudochromis olivaceus* Rüppell 1835: 8, Pl. 2, Fig. 3 (Red Sea);  
Goren & Dor 1994; Gill 2004\*; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 26–28 rays; anal fin 3 spines, 14–16 rays; pectoral fins 17–19 rays; caudal fin 29–32 rays. LSS 39–47; anterior LL scales 28–37; predorsal scales 27–40; circumpeduncular scales 19–23. Dorsal-fin origin to pelvic-fin origin 31–34% SL. Caudal fin usually weakly to strongly emarginate, but often rounded, or rounded with truncate margin. GR 4–8/11–13 = 15–21. Vertebrae 10 + 16.

Head and body dark olive to dark grey (almost black), usually becoming yellowish olive ventrally on head and breast and sometimes on rear part of peduncle; large gold- or red-edged dark blue spot on opercle flap; dark grey line extending around posteroventral rim of orbit to upper lip, then ascending along anterior edge of 1st interorbital bone; several to many scales on flanks each with dark blue crescent-shaped mark; dorsal fin olive to almost black, darker basally, with red margin, this sometimes edged in bright blue; anal fin yellowish brown to olive or dark grey, usually darker basally; caudal fin yellowish brown to olive or dark grey, darker basally, sometimes edged dorsally, ventrally and occasionally posteriorly with yellow to bright red, yellow to bright red edges sometimes with dusky grey to bright blue distal margin. Attains 8.5 cm SL.



*Pseudochromis olivaceus*, 5 cm SL (Gulf of Aqaba). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Suez and Gulf of Aqaba to Kamran I. and vicinity of Massawa, Eritrea.

**REMARKS** Occurs in a variety of reef habitats, but is mainly associated with branching and leaf corals (such as *Montipora*, *Pocillopora*, *Stylophora*, *Acropora* and *Seriatopora*) and fire corals. Ranges from tidepools to ~40 m deep, but appears to be more abundant in shallower depths. Records of this species from Djibouti, the Gulf of Aden, Gulf of Oman, Persian/Arabian Gulf and Pakistan are based on the closely related *P. linda*.

### *Pseudochromis omanensis* Gill & Mee 1993

Oman dottyback

PLATE 44

*Pseudochromis omanensis* Gill & Mee 1993: 57, Fig. 8 (Barr al Hikman, Oman); Randall 1995; Manilo & Bogorodsky 2003; Gill 2004\*.

Dorsal fin 3 spines, 29–31 rays; anal fin 3 spines, 19 or 20 rays; pectoral fins 18–20 rays; caudal fin 31–34 rays. LSS 54–67; anterior LL scales 49–60; predorsal scales 22–28; circumpeduncular scales 20–22. Dorsal-fin origin to pelvic-fin origin 24–28% SL. Caudal fin rounded to truncate, with upper and sometimes lower lobes slightly produced. GR 4 or 5/10 or 11 = 14–16. Vertebrae 10 + 16.

Pale and dark colour forms. Pale form with head and body orangish brown to brown, paler on breast and lower part of head; brown or grey to dark grey stripe from middle of upper lip to anteroventral edge of eye, then from posterodorsal corner of eye to anterior LL origin, and along dorsal part of body to upper edge of peduncle (this stripe sometimes diffuse, particularly posteriorly); large black spot on opercle immediately behind dorsal part of preopercle, spot edged anteriorly with blue to bright blue; lower part of head sometimes with indistinct to distinct grey to bright blue lines and spots; posterodorsal rim of eyes dark grey to black; each scale on flanks within and around dark stripe with bluish grey basal spot, and each scale on flanks above anal fin and on peduncle with pale brown to bright red spot centrally; dorsal fin brownish orange to brownish or yellowish hyaline, with blue margin, this sometimes edged proximally with bright red; dark grey spot at base of each segmented dorsal-fin ray, and ~3–9 oblique rows of blue to grey spots and streaks on remainder of fin; anal fin brownish orange to brownish hyaline or pale brown, with 3–5 rows of blue spots and blue margin, distal margin sometimes edged proximally with bright red; caudal fin brownish orange to pale brown, with dark body stripe extending onto fin, and narrow brown stripe on lower part of fin, but upper and lower margins of fin outside dark stripes usually abruptly paler, sometimes with alternating bright red and bright blue narrow stripes. Dark form with head and body dark grey to black, sometimes with reddish tinge; dark spot on opercle (as in pale form); rear part of body and peduncle scattered with small bright blue to turquoise spots; dorsal, anal, caudal and pelvic fins dark reddish grey to black, scattered with small bright blue to turquoise spots and bright blue to turquoise distal margins. Attains 15.5 cm SL.

**DISTRIBUTION** WIO: endemic to central and southern Oman.

**REMARKS** Known from shallow reefs, at 2–15 m.

### *Pseudochromis persicus* Murray 1887

Persian dottyback PLATES 44 & 45

*Pseudochromis persicus* Murray 1887: 49 (Persian/Arabian Gulf).

*Pseudochromis persicus*: Gill 2004\*.

Dorsal fin 3 spines, 29–31 rays; anal fin 3 spines, 19–21 rays; pectoral fins 18–20 rays; caudal fin 31–33 rays. LSS 51–62; anterior LL scales 42–56; predorsal scales 21–29; circumpeduncular scales 20–25. Dorsal-fin origin to pelvic-fin origin 23–28% SL. Caudal fin rounded to truncate, with upper lobe weakly to strongly produced, sometimes with lower lobe also produced. GR 4–7/10–13 = 15–19. Vertebrae 10 + 16.

Pale and dark colour forms. Pale form with head and body pale grey, becoming pale pinkish to orangish grey ventrally on head and breast; grey to dark grey stripe extending from middle of upper lip through eyes to upper edge of peduncle, area above stripe grey to greyish brown; cheeks with blue oblique stripes; opercle with irregular blue spots and streaks; large dark grey to black spot on opercle behind upper edge of preopercle, anterior margin of spot with blue bar; body scattered with small bright blue spots; dorsal and anal fins orangish brown to brown or brownish hyaline with bright blue margin; bright blue spot at base of each dorsal- and anal-fin ray, remainder of each fin with bright blue spots and streaks arranged in closely spaced oblique to horizontal lines; caudal fin brown to brownish hyaline, darker on upper margin, with scattered bright blue spots, sometimes with bright blue distal margin. Dark form similar to pale form except background colour of head and body dark greyish brown to dark grey or black, sometimes becoming orangish ventrally, with ventral part of head and breast orange to pale grey; background colour of dorsal, anal and caudal fins orangish brown basally, becoming dark grey to black distally. Attains 15 cm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf and northern Arabian Sea, from Kuwait to Karachi, Pakistan.

**REMARKS** Found around coralline algae, on coral and rocky reefs, and in rubble areas, at 1–25 m.

### *Pseudochromis pesi* Lubbock 1975

Pale dottyback PLATE 45

*Pseudochromis pesi* Lubbock 1975: 136, Pl. 1d (Jordan–Saudi Arabia border, Gulf of Aqaba, Red Sea); SSF No. 169.7; Goren & Dor 1994; Gill 2004\*.

Dorsal fin 3 spines, 26 or 27 rays; anal fin 3 spines, 14 or 15 rays; pectoral fins 17 or 18 rays; caudal fin 30–32 rays. LSS 39–44; anterior LL scales 29–33; predorsal scales 17–21; circumpeduncular scales 19 or 20. Dorsal-fin origin to pelvic-fin origin 25–30% SL. Caudal fin rounded, sometimes with rear margin weakly rounded to truncate. GR 5 or 6/12 or 13 = 17–19. Vertebrae 10 + 16.

Head and body pale pinkish white to pearly grey; dorsal contour of head and body grey to black (above line from snout tip to rear part of dorsal fin); large gold-edged, dark blue to black spot on opercle flap; pale yellow line extending around ventral rim of orbit to edge of middle of upper lip; opercle and cheek scales with irregular pale yellow markings; several to many scales on nape and anterior part of body within grey region each with small dark grey to black central spot; sides of body with series of pale pink lines following myosepta positions; dorsal fin grey to greyish hyaline, usually broadly grey to black basally, with 2–4 roughly horizontal rows of black dots, distal margin of fin blue, sometimes bordered proximally with reddish hyaline to reddish grey; anal fin pale yellow to pale grey, with blue margin; caudal fin pale grey to yellow with bright yellow to bright orange margin, usually with short submarginal grey stripe on upper part of fin. Attains 9.5 cm SL.



*Pseudochromis pesi*, 6 cm SL (Gulf of Aqaba). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba to vicinity of Hurghada, Egypt.

**REMARKS** Found around small isolated rocky and coral patches over sand, at 10–45 m. Records from South Africa are based on the pale colour form of the closely related *P. melas*.

### *Pseudochromis punctatus* Kotthaus 1970

Blackback dotyback

PLATE 45

*Pseudochromis punctatus* Kotthaus 1970: 52, Fig. 225 (Somalia); Randall 1995\*; Manilo & Bogorodsky 2003; Gill 2004\*; Gill & Zajonz 2011.

*Pseudochromis melanotus* Lubbock 1975: 157 (Somalia)

[replacement name, but considered unnecessary].

Dorsal fin 3 spines, 26 rays; anal fin 3 spines, 15 rays; pectoral fins 17–19 rays; caudal fin 29–32 rays. LSS 40–43; anterior LL scales 30–35; predorsal scales 16–20; circumpeduncular scales 20. Dorsal-fin origin to pelvic-fin origin 25–27% SL. Caudal fin rounded to truncate, sometimes with upper lobe

slightly produced. GR 4 or 5/11 or 12 = 16 or 17. Vertebrae 10 + 16.

Head and body pale pinkish white to white or brownish yellow, sometimes with bright yellow spot centrally on each scale; dorsal contour of head and body dark grey to black (above line extending from snout tip to rear part of dorsal fin); blue spot on opercle flap, becoming black posteriorly with bright yellow rear border; several to many scales on nape and anterior part of body within dark grey to black region each with small dark grey to black or blue central spot; bright yellow oblique stripe on mid-upper part of body, separating dark grey to black area from pale area; sides of body with series of pale pink to brown lines following myosepta positions; dorsal fin grey to greyish hyaline, usually broadly grey to black basally, with 2–4 roughly horizontal rows of small black dots, and distal margin blue, at least anteriorly on spinous portion of fin; anal fin pale blue, with 2–4 roughly horizontal rows of small black spots; caudal fin pale grey to yellow with bright yellow margin, and with short submarginal grey stripe on upper part of fin. Attains 10 cm SL.

**DISTRIBUTION** WIO: southern Oman to northern Somalia.

**REMARKS** Found on reefs, at 10–65 m.

### *Pseudochromis sankeyi* Lubbock 1975

Schooling dotyback

PLATE 45

*Pseudochromis sankeyi* Lubbock 1975: 145, Pl. 2d (Massawa, Eritrea, Red Sea); Goren & Dor 1994; Manilo & Bogorodsky 2003; Gill 2004; Gill & Zajonz 2011\*.

Dorsal fin 3 spines, 26–28 rays; anal fin 3 spines, 14–16 rays; pectoral fins 16 or 17 rays; caudal fin 30–33 rays. LSS 38–46; anterior LL scales 25–31; predorsal scales 17–23; circumpeduncular scales 19 or 20. Dorsal-fin origin to pelvic-fin origin 22–25% SL. Caudal fin rounded, with upper rays of lower lobe strongly produced. GR 6–8/15 or 16 = 21–24. Vertebrae 10 + 16.

Dorsal contour of head and body dark olive to dark grey-brown; large vertically elongate dark blue spot on opercle flap; broad black stripe extending from snout tip through eyes to tips of lower caudal-fin rays on upper hypural plate, this bordered dorsally and sometimes ventrally by narrow pale pink to mauve stripe; 2nd median black stripe extending ventrally from rear edge of lower jaw to mid-upper caudal-fin rays on lower hypural plate; area between black stripes pale pinkish brown to white; dorsal fin dark olive to dark grey-brown basally, remainder of fin greyish hyaline to hyaline, with

olive rays, and narrow yellow distal margin; anal fin broadly black, with narrow hyaline margin (hyaline area broadest anteriorly); caudal fin with black body stripes tapering to points posteriorly, area between stripes pale pinkish brown to white basally, becoming white posteriorly; area above upper caudal-fin stripe pinkish hyaline to hyaline, becoming yellowish hyaline to hyaline distally, and area below lower stripe hyaline. Attains 7.5 cm SL.



*Pseudochromis sankeyi* (Red Sea). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: southern Red Sea to Gulf of Aden and Socotra.

**REMARKS** Occurs in loose schools (sometimes up to a hundred individuals), under ledges and in small caves on coral and rocky reefs, at 2–10 m.

### *Pseudochromis socotraensis* Gill & Zajonz 2011

Socotra dottyback

PLATE 45

*Pseudochromis socotraensis* Gill & Zajonz 2011: 14, Figs. 10–12 (Abd al-Kuri I., Socotra).

Dorsal fin 3 spines, 29–31 rays; anal fin 3 spines, 18–20 rays; pectoral fins 17–19 rays; caudal fin 29–32 rays. LSS 41–47; anterior LL scales 29–36; predorsal scales 20–25; circumpeduncular scales 19–22. Dorsal-fin origin to pelvic-fin origin 21–24% SL. Caudal fin rounded to truncate or emarginate, often with lower lobe produced. GR 4–6/11 or 12 = 15–18. Vertebrae 10 + 16.

Head and body dark grey, and sensory pores on head surrounded by black pigmentation; large dark grey to black vertically elongate spot on opercle flap; bright blue stripe from snout tip above eyes and above horizontal portion of anterior LL to beneath anterior part of dorsal fin; 2nd bright blue stripe extending from middle of lower lip to lower edge of eye or mid-upper part of preopercle; preopercle, subopercle

and opercle (below opercle spot) edged with bright blue; lips, lower part of head, breast, lower abdomen and area concealed by basal third of pectoral fins bright blue; body scales each with paler centres, often with vertically elongate dark spot basally; all but first few scales of anterior lateral line each with prominent dark grey-brown to black basal spot, these becoming less distinct on rear part of body; dorsal fin dark grey, with broad bright blue submarginal stripe along distal third of fin; each dorsal-fin ray with bright blue spot near its base, and black spot immediately behind each base; anal fin dark grey, sometimes with bright blue spot at base of each ray; pectoral fins hyaline, grey basally; pelvic fins pale grey, inner rays grey; caudal fin dark grey, with upper and lower margins narrowly paler. Attains 8 cm SL.

**DISTRIBUTION** WIO: endemic to Socotra.

**REMARKS** Found on reefs, at 3–29 m.

### *Pseudochromis springeri* Lubbock 1975

Springer's dottyback

PLATE 45

*Pseudochromis springeri* Lubbock 1975: 128, Pl. 2a (bay at El Himeira, Sinai, Egypt, Gulf of Aqaba, Red Sea); Goren & Dor 1994; Manilo & Bogorodsky 2003; Gill 2004\*.

Dorsal fin 3 spines, 28–31 rays; anal fin 3 spines, 17–19 rays; pectoral fins 16–18 rays; caudal fin 31–33. LSS 35–42; anterior LL scales 15–25; predorsal scales 21–30; circumpeduncular scales 20 or 21. Caudal fin rounded, usually with lower lobe produced. Dorsal-fin origin to pelvic-fin origin 25–28% SL. GR 4–6/11–14 = 17–20. Vertebrae 10 + 16.

Head and body dark grey-brown to dark grey; black pigmentation surrounding sensory pores of head (including upper infraorbital, posterior otic, posterior preopercular, intertemporal, anterior temporal, lower supratemporal and posttemporal pores); large gold-edged, black, vertically elongate spot on opercle flap; bright blue stripe extending from snout tip above eyes and along horizontal portion of anterior lateral line to beneath anterior part of dorsal fin; 2nd bright blue stripe from middle of lower lip below eye and below spot on opercle flap to pectoral-fin base; several to many body scales basally with dark grey to black vertically elongate spots; dorsal fin dark greyish brown to black, with reddish brown subdistal and bright blue distal margin, anterior part of fin sometimes with row of bright blue spots along middle of fin; anal fin dark greyish brown to black, with reddish brown subdistal and bright blue distal margin; caudal fin dark greyish brown to black, with bright blue upper and lower margins. Attains 5.5 cm SL.



*Pseudochromis springeri* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: endemic to Red Sea, from Gulf of Aqaba to Jeddah and Port Sudan.

**REMARKS** Found among branching corals (such as *Pocillopora*, *Seriatopora* and *Acropora*), at 2–60 m.

### *Pseudochromis tauberæ* Lubbock 1977

African dottedback

PLATE 45

*Pseudochromis tauberæ* Lubbock 1977: 9, Pls. 2–3 (inside fringing reef at Shanzu, Kenya); SSF No. 169.8\*; Gill 2004\*.

Dorsal fin 3 spines, 28–30 rays; anal fin 3 spines, 15–17 rays; pectoral fins 18 or 19 rays; caudal fin 30–33 rays. LSS 37–44; anterior LL scales 28–37; predorsal scales 16–22; circumpeduncular scales 18–21. Dorsal-fin origin to pelvic-fin origin 26–31% SL. Caudal fin rounded, usually with rear margin weakly rounded to truncate. GR 4–6/11–13 = 15–18. Vertebrae 10 + 16.

Head and body dark olive to reddish grey, darker dorsally, becoming red to yellow ventrally on abdomen and lower part of head; posteroventral part of orbital rim dark grey to bright red, this edged posteriorly with bright blue; scales of upper and sometimes lower part of flanks each with dark olive to dark blue central spot, sometimes replaced ventrally by red spots; dorsal and anal fins pale bluish or pinkish grey to dark reddish grey, with blue distal margins and sometimes red subdistal margins, basal part of fins usually darker than remainder of fins, and both fins with ~3–6 horizontal rows of bright red spots; caudal fin reddish purple to dark bluish grey or dark grey, becoming pale grey or hyaline to bright yellow posteriorly, sometimes with vertical rows of small red spots on rear part of fin, and upper and lower margins of fin abruptly pale grey to hyaline. Attains 8 cm SL.

**DISTRIBUTION** WIO: Kenya to Mozambique, Madagascar and Comoros.

**REMARKS** Known from shallow lagoonal and fringing reefs, to ~6 m deep. Records from South Africa are based on *P. kristinae*.

#### GLOSSARY

**bommie** – a large mound of corals some distance from the shore.  
**ceratobranchial** – longest bones or cartilages of the branchial arches, situated immediately below the angle of the arch, between the epibranchials and the hypobranchials.  
**monophyly of genus** – all species sharing a common ancestor.  
**myomere** – a segment of the body (trunk) muscles, seen as V- or W-shaped muscle fibres.  
**myosepta** – the layer of connective tissue between myomeres.  
**protogynous hermaphrodite** – an individual that functions first as a female and then changes to a male.  
**supratemporal commissure** – the lateral-line canal that crosses the back of the cranium.  
**xanthic** – yellowish.

## FAMILY PLESIOPIDAE

### Longfins, comets and spiny basslets

Randall D Mooi

Body elongate to oblong, somewhat compressed; head usually blunt and rounded. Dorsal fin single, with 9–69 spines, 1–11 rays; anal fin 3–43 spines, 1–11 rays; pelvic fins 1 spine, 2–4 rays (1st ray usually elongate, often thickened); caudal fin usually rounded, with 11–17 branched rays. Mouth slightly oblique, maxilla reaching to vertical at mid-eye or well beyond; teeth generally small, conical, in several rows in jaws. Gill rakers well-developed to absent. Lateral line truncated as a single scale, a few scales or running only along dorsal-fin base, or else disjunct in 2 or 3 segments (along dorsal-fin base, midlaterally on peduncle, and ventrally in some species). Vertebrae usually 10 + 15, except in elongate species to total of 75.

Tiny to small-sized (~2–30 cm TL); generally quite dark with brightly coloured tips to the dorsal- and anal-fin spines and pelvic-fin rays. Most species are cryptic and rarely venture away from the substrate or rock and coral crevices, often propping themselves up with thickened pelvic-fin rays, and many species only come out of hiding places at night. Feed mainly on small crustaceans, gastropods, probably polychaetes, and fishes in some larger species. Exhibit parental care of eggs, either by attaching them to rocks (*Plesiops*: Mito 1955) or egg-guarding in small holes or caves (probably most genera), sometimes even mouthbrooding (known only in *Assessor*: Allen & Kuitert 1976). Eggs with unusual surface structures and long filaments that help attach them to the substrate or maintain them in an egg mass (Mooi 1990; Gill & Mooi 1993); larvae planktonic (Leis & Trnski 1989; Neira *et al.* 1998). Of no commercial importance, although some species are popular in the aquarium trade.

The relationships within the Plesiopidae have been examined by Mooi (1993) and Mooi & Gill (2004). Occur in Indo-Pacific. Twelve genera and ~50 species; 3 genera and 9 species in WIO.

## KEY TO GENERA

- 1a Dorsal fin 18–20 spines, 3 or 4 rays; anal fin 7–10 spines, 3 or 4 rays; pelvic fins 1 spine, 2 rays..... *Acanthoplesiops*
- 1b Dorsal fin 9–13 spines, 6–10 rays; anal fin 3 spines, 7–9 rays; pelvic fins 1 spine, 4 rays ..... 2
- 2a Dorsal fin 9 spines, 8–10 rays; head and body black with white spots; pectoral fins yellowish, all other fins black with white or bluish spots; dorsal fin with eye-sized ocellus at base of last few rays; dorsal-fin membranes between spines only weakly incised; caudal fin somewhat lanceolate and much longer than head length..... *Callopleiops*
- 2b Dorsal fin 10–13 spines, 6–8 rays; most species without white spots on body or fins; no ocellus on dorsal fin; dorsal-fin membranes incised between spines; caudal fin rounded and subequal to or shorter than head length..... *Plesiops*

GENUS *Acanthoplesiops* Regan 1912

Tiny and elongate (up to ~5 cm TL); dorsal fin 18–20 spines, 3–6 rays; anal fin 7–10 spines, 3–6 rays; pelvic fins 1 spine, 2 elongate rays. Lateral line single, short, along dorsal-fin base; LL tubed scales up to 13. Head naked. Previously included in the family Acanthoclinidae, which was included as a subfamily of the Plesiopidae by Mooi (1993). Six species, 2 in WIO; species reviewed by Smith-Vaniz & Johnson (1990), Mooi & Gill (2004) and Gill *et al.* (2013).

## KEY TO SPECIES

- 1a Dorsal fin 18 spines; anal fin 7 spines; LL pored scales 2; 3 sensory pores in each dentary; last dorsal- and anal-fin rays without membranous attachment to caudal fin; body mostly brownish, with yellowish dorsomedian stripe from snout tip to dorsal-fin origin, broad yellowish midlateral stripe from upper jaw to beneath end of spinous portion of dorsal fin, peduncle and caudal-fin base yellowish, and remainder of caudal fin brown but margin broadly yellow ..... *A. cappuccino*

Continued ...

## KEY TO SPECIES

- 1b Dorsal fin 19 or 20 spines; anal fin 9 or 10 spines; LL pored scales 8–12; 4 sensory pores in each dentary; last dorsal- and anal-fin rays with broad membranous attachment to caudal fin; body mostly black, with white or pale stripe from snout tip to dorsal-fin origin, no lateral stripe, white spot on pectoral-fin bases, broad white bar on peduncle continuing onto posterior ends of dorsal and anal fins, bar bisected by narrow reddish bar, and caudal fin black with white margin ..... *A. indicus*

*Acanthoplesiops cappuccino*

Gill, Bogorodsky & Mal 2013

Coffee basslet

PLATE 45

*Acanthoplesiops cappuccino* Gill, Bogorodsky & Mal 2013: 217, Figs. 2–3 (Sharm Obhur, Jeddah, Saudi Arabia, Red Sea).

Dorsal fin 18 spines, 4 rays; anal fin 7 spines, 4 rays; pectoral fins 18 rays. Last dorsal- and anal-fin rays without membranous attachment to caudal fin. Lower jaw with 3 sensory pores on each dentary. Lateral line short; LL pored scales 2; LSS ~30–31. Body depth 4 in SL; HL 3.2 in SL; peduncle moderately deep, 8.2 in SL. Scales on body ctenoid posteriorly; belly completely scaly.

Head and body brown; yellowish brown median stripe from upper lip to dorsal-fin origin, and broad pale yellowish brown midlateral stripe from rear of upper jaw to vertical at last dorsal-fin spine (edges of stripe more irregular beyond pectoral-fin base); scattered pale blue to white spots on body concentrated along edge of pale lateral stripe; peduncle and front half of caudal fin yellowish, remainder of caudal fin dark brown with bright yellow margin narrowly edged with white; dorsal fin and anal fin dark brown, tips of spines narrowly edged with white or pale yellow, and each fin with large white blotch at base of last 2 rays; pelvic fins brownish, with tip of longest (1st) ray white; pectoral fins hyaline. Maximum size unknown, likely <5 cm TL.

**DISTRIBUTION** Known only from the holotype (1.6 cm SL) from Red Sea.

**REMARKS** Collected from a steep coral reef slope, at ~17 m deep.

## *Acanthoplesiops indicus* (Day 1888)

Scottie

PLATE 45

*Acanthoclinus indicus* Day 1888: 264 (Chennai, India); Day 1888\*, 1889\*.

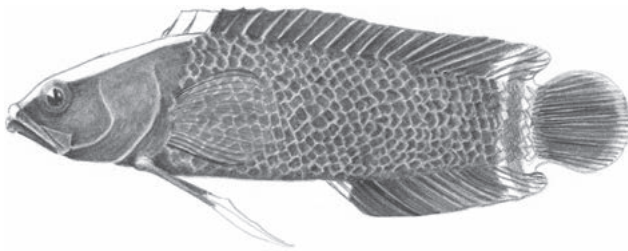
*Acanthoplesiops indicus*: Regan 1912; Barnard 1948\*; Smith 1949;

Hardy 1985\*; SSF No. 170.1\*; Smith-Vaniz & Johnson 1990\*;

Randall 1995\*; Mooi & Gill 2004; Gill *et al.* 2013.

Dorsal fin 19 or 20 spines, 3 or 4 rays; anal fin 9 or 10 spines, 3 or 4 rays; pectoral fins 15–17 rays. Body depth ~4 in SL; HL 3.2–3.4 in SL; peduncle moderately deep, 7.1–9.8 in SL. Last dorsal- and anal-fin rays with broad membranous attachment to caudal fin. Lower jaw with 4 sensory pores on each dentary. Lateral line short; LL pored scales 8–12 along dorsal-fin base; LSS ~33. Scales on body somewhat pyriform, often bilobed or trilobed; belly completely scaly.

Head, body and fins mostly black except for broad whitish dorsomedian stripe from snout tip to and including first few dorsal-fin spines, small white spot on pectoral-fin bases, white pelvic-fin tips, broad white bar on peduncle continuing onto rear ends of dorsal and anal fins, and bisected by narrow reddish bar, and caudal-fin margin white. Attains 5 cm TL.



*Acanthoplesiops indicus*. © R Henderson

**DISTRIBUTION** WIO: Gulf of Oman, Kenya to South Africa (KwaZulu-Natal) and Seychelles; elsewhere, east coast of India.

**REMARKS** Found in shallow coastal waters, including quiet weedy locales, to at least 7 m deep. Eggs are guarded by the male.

**GENUS** *Calloplesiops* Fowler & Bean 1930

Two species, 1 in WIO. *Calloplesiops argus* Fowler & Bean 1930 is known from Indonesia and the Philippines.

## *Calloplesiops altivelis* (Steindachner 1903)

Comet or marine betta

PLATE 46

*Plesiops altivelis* Steindachner 1903: 17 (Pulau Nias, Sumatra, Indonesia).

*Barrosia barrosi* Smith 1952: 149, Fig. 2 (Pinda, Mozambique).

*Calloplesiops abulati* Roux-Estève 1956: 7, Fig. 2 (Al Lith I., Saudi Arabia, Red Sea).

*Barrosia altivelis*: Tyler 1967\*.

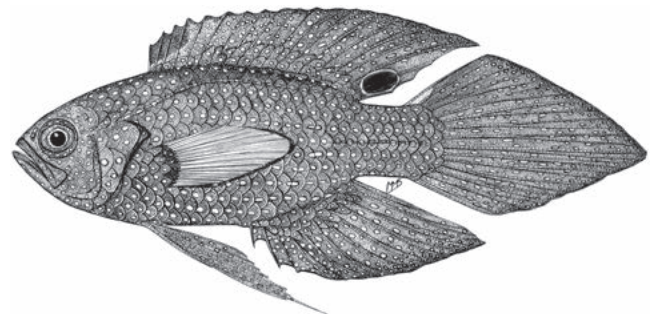
*Calloplesiops altivelis*: McCosker 1978\*; Condé 1983\*; Randall 1983\*;

Dor 1984; SSF No. 172.1\*; Wassink 1988\*; Winterbottom *et al.* 1989\*;

Mooi 1993; Goren & Dor 1994.

Dorsal fin 9 spines, 8–10 rays, fin membranes not incised; anal fin 3 spines, 9 rays; pectoral fins 17–20 rays; pelvic fins 1 spine, 4 rays. Body depth 2.4–2.7 in SL; HL 2.9–3 in SL; dorsal fin and anal fin high, last dorsal- and anal-fin spines ~4.5–6.3 in SL, last rays 2.4–2.9 in SL; caudal fin much longer than head, 1.4–1.8 in SL. LL scales 19 or 20/9–12.

Head, body and fins dark with prominent white spots (but sometimes bluish on fins); dorsal fin with darker membranes between first 3 or 4 spines, and large black ocellus encircled by bluish white ring on rear part of fin; pectoral-fin rays yellow, membranes transparent; yellow spot on base of upper caudal-fin rays. Attains ~16 cm TL.



*Calloplesiops altivelis*, 14 cm TL, holotype of *Barrosia barrosi* (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania (Zanzibar), East Africa to Mozambique, possibly South Africa (KwaZulu-Natal), Comoros, Seychelles, Chagos and Maldives; elsewhere to Thailand, Indonesia, Philippines, southern Japan, Caroline Is., New Guinea, Australia and Tuamotu Is.

**REMARKS** Found on reefs, hiding in caves and crevices, to ~45 m deep.

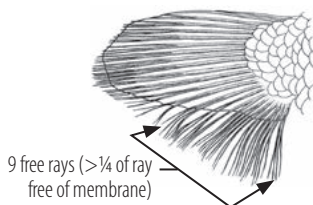


GENUS *Plesiops* Oken 1817

Tiny to small-sized (~5–25 cm TL). Dorsal fin 11 or 12 (rarely 10 or 13) spines, 6–8 rays, membranes between spines deeply incised; anal fin 3 spines, 7–9 rays; pelvic fins 1 spine, 4 rays (1st ray elongate and often thickened); caudal fin 10 + 9 principal rays. Scales relatively large with distinct unmarked centre and emanating radii; cheek and opercle scaly; scales cycloid anterior to pectoral-fin bases and along dorsal- and anal-fin bases, scales elsewhere ctenoid. Two lateral lines: along base of dorsal fin, with 18–30 scales; and midlaterally onto peduncle, with 7–18 scales. Although not yet recorded for all species, most species are capable of changing general colour from dark to a barred pattern. Reviewed by Mooi (1995). Seventeen species, 6 in WIO.

## KEY TO SPECIES

- 1a Dorsal fin usually 11 (rarely 10 or 12) spines, always only 1 supernumerary spine on 1st dorsal-fin pterygiophore; total number of branches on 6 ventralmost pectoral-fin rays <15 (usually 12); dark stripe usually visible on cheek just above maxilla but no dark margin on maxilla or supramaxilla ..... *P. coeruleolineatus*
- 1b Dorsal fin usually 12 (rarely 11 or 13) spines, 2 supernumerary spines on 1st dorsal-fin pterygiophore; total number of branches on 6 ventralmost pectoral-fin rays often >15..... 2
- 2a Upper LL scales (along dorsal-fin base) 26–30; midlateral LL scales (on peduncle) 29–33; circumpeduncular scales 22–24; body and median fins with pale spots ..... *P. multisquamata*
- 2b Upper LL scales 18–21; midlateral LL scales 23–25; circumpeduncular scales 15 or 16; usually no pale spots on body and median fins (except *P. nigricans*) ..... 3
- 3a Median fins with pale spots; body scales with central pale crescent-shaped spot, and smaller circular spots on scales of nape, cheek and opercle; predorsal scale rows 9 or 10 ..... *P. nigricans*
- 3b No pale spots on median fins or at centre of body scales; predorsal scale rows 6–8 ..... 4
- 4a Pectoral fins 25–27 rays, with 10–14 rays free of membrane distally for >¼ ray length ..... *P. auritus*
- 4b Pectoral fins 19–24 rays, with 7–10 rays free of membrane distally for >¼ ray length ..... 5



Continued...

## KEY TO SPECIES

- 5a Maxilla and supramaxilla with dark dorsal margin, no dark stripe on lower portion of cheek just above maxilla; dorsal fin spines with red tips ..... *P. mystaxus*
- 5b Maxilla and supramaxilla without dark dorsal margin; dorsal-fin spines without obviously paler tips ..... *P. malalaxus*

*Plesiops auritus* Mooi 1995

Earspot longfin

PLATE 46

*Plesiops auritus* Mooi 1995: 12, Fig. 8 (Weligami, Sri Lanka); Mooi 1999\*.

Dorsal fin 12 spines, 7 rays; anal fin 3 spines, 8 rays; pectoral fins 25–27 rays; caudal fin 18 or 19 rays. Body relatively elongate, depth 3.2–4 in SL, slightly compressed; HL 2.4–2.8 in SL; eye diameter 3–4 in HL; mouth large, oblique, and reaching beyond eyes. LL scales 18–20 + 10–16.

Body brownish grey with scattered darker scales; dark eyesized smudge at upper tip of preopercle; dorsal fin dark, spine tips pale yellow, blue stripe to ~4th ray and shorter red stripe above this; anal fin similarly coloured. Attains at least 10 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Sri Lanka; elsewhere, Andaman Sea to western Indonesia (Sumatra and Java).

**REMARKS** Found on coral heads and rocky areas of reefs, to ~15 m deep.

*Plesiops coeruleolineatus* Rüppell 1835

Redtip longfin

PLATE 46

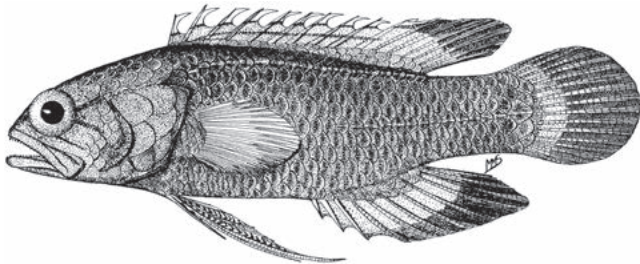
*Plesiops coeruleolineatus* Rüppell 1835: 5, Pl. 2, Fig. 5 (Massawa, Eritrea, Red Sea); Smith 1952; Inger 1955\*; Jones & Kumaran 1980; Dor 1984 [as *caeruleolineatus*]; SSF No. 172.2\*; Mooi 1990, 1995\*, 1999\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009.

*Plesiops melas* Bleeker 1849: 9 (Boleling, Bali, Indonesia); Smith 1949\*; Schultz *in Schultz et al.* 1953.

Dorsal fin usually 11 (rarely 10 or 12) spines, 7 rays; anal fin 3 spines, 8 rays; pectoral fins 19–24 rays; caudal fin 18 or 19 rays. Body relatively elongate, depth 2.8–3.7 in SL, slightly compressed; HL 2.4–2.9 in SL; eye diameter 2.1–3.8 in HL; mouth large, oblique, and reaching beyond eyes. LL scales 18–21 + 7–14.

Body dark brown, but capable of changing to pale with dark bars; head often with white dots, particularly on preopercle and opercle, and with yellow branchiostegal rays and opercle when breeding; dorsal fin dark, with bright red-orange spine

tips bordered by narrow pale stripe, and with thin bright blue stripe to ~4th ray; anal-fin spines and rays with pale tips and blue stripe; caudal fin generally dark, with pale yellowish submarginal band. Attains 10 cm TL.



*Plesiops coeruleolineatus*, 6 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Aden, Kenya to Mozambique (Inhaca I.), Madagascar, Comoros, Aldabra, Seychelles, Mauritius, Rodrigues, St Brandon Shoals, Maldives, Lakshadweep and Sri Lanka; elsewhere to Cocos (Keeling) Is., Thailand, Indonesia, Japan, Caroline Is., Great Barrier Reef, New Caledonia, Tonga and Samoa.

**REMARKS** Found on reef flats or slopes, to ~25 m deep.

### *Plesiops malalaxus* Mooi 1995

Loosejaw longfin

*Plesiops malalaxus* Mooi 1995: 40 (Toliara, Madagascar).

Dorsal fin 12 spines, 7 rays; anal fin 3 spines, 8 rays; pectoral fins 22–24 rays; caudal fin 19 rays. Body relatively elongate, depth 3.2–3.6 in SL; HL 2.4–2.6 in SL; eye diameter 3.6–3.8 in HL; mouth large, oblique, and reaching beyond eyes. LL scales 20 + 13 or 14.

Preserved specimens with brown body, paler on belly, darkest on rear of peduncle; head with 2 dark blotches behind eye; dark line running from lower edge of eye to just beyond maxilla; branchiostegal rays dark; dorsal and anal fins dark, spines with slightly paler tips, rays with pale margin; pectoral and pelvic fins dark; caudal fin generally dark with pale margin. Attains at least 13 cm TL.

**DISTRIBUTION** WIO: Madagascar.

**REMARKS** Found on reefs, and in tidepools and surge channels, to ~12 m deep.

### *Plesiops multisquamata* Inger 1955

Bluespotted longfin

PLATE 46

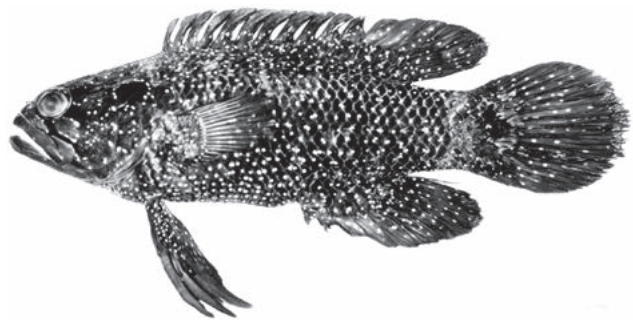
*Plesiops nigricans* (*non* Rüppell 1828): Gilchrist & Thompson 1911; Barnard 1927\*, 1947\*; SFSA No. 410\*; Smith 1952\*.

*Plesiops multisquamata* Inger 1955: 264 (KwaZulu-Natal, South Africa); Mooi 1995\*.

*Plesiops multisquamatus*: SSF No. 172.3\*; Heemstra & Heemstra 2004\*.

Dorsal fin 12 (rarely 13) spines, 6 or 7 rays; anal fin 3 spines, 8 rays; pectoral fins 21–23 rays; caudal fin 19 rays. Body depth 2.9–3.7 in SL, slightly compressed; HL 2.6–2.9 in SL; eye diameter 3.3–4.7 in HL; mouth large, oblique, and reaching beyond eyes. LL scales 26–30 + 13–18.

Head, body and all fins dark brown to blackish and covered with small blue spots (usually one spot but sometimes more per scale); head sometimes with dark spot on upper part of opercle. Attains 25 cm TL.



*Plesiops multisquamata*, 11 cm SL (South Africa). © RE Stobbs

**DISTRIBUTION** WIO: endemic to South Africa, from KwaZulu-Natal to possibly Eastern Cape (Port St Johns).

**REMARKS** Found on shallow rocky reefs, to ~3 m deep.

### *Plesiops mystaxus* Mooi 1995

Moustache longfin

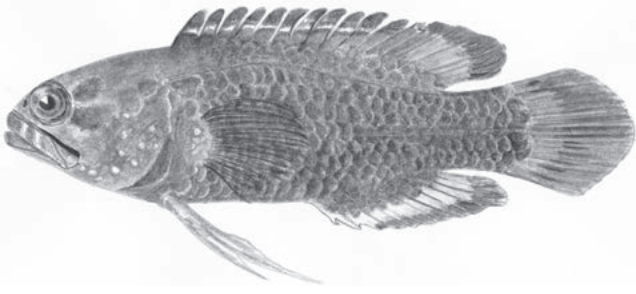
PLATE 46

*Plesiops mystaxus* Mooi 1995: 44, Fig. 26 (Ouenefou I., Mohéli, Comoros); Randall 1995\*.

Dorsal fin 12 spines, 7 rays; anal fin 3 spines, 8 rays; pectoral fins 19–23 rays; caudal fin 17–19 rays. Body relatively elongate, depth 3.1–3.7 in SL, slightly compressed; HL 2.2–2.7 in SL; eye diameter 2.7–3.4 in HL; mouth oblique, reaching beyond eyes. LL scales 18 or 19 + 11–15.

Body dark brown, rear margin of scales sometimes darker than anterior portion giving a spotted appearance; head somewhat paler than body, with scattered bluish white spots,

2 dark bars behind eye, and maxilla with dark upper margin (the 'moustache'); dorsal-fin spines with orange-red tips, bordered by pale stripe and then darker stripe, and remainder of fin dark with indistinct pale bluish stripe; anal fin mostly dark, with pale bluish middle section; caudal fin dark, rear third yellowish brown. Attains 9 cm TL.



*Plesiops mystaxus*. © R Henderson

**DISTRIBUTION** WIO: Red Sea (including Gulf of Aqaba), Gulf of Aden, Oman, Comoros and Madagascar.

**REMARKS** Found on coral reefs and rubble, to ~8 m deep.

### *Plesiops nigricans* (Rüppell 1828)

Whitespotted longfin

PLATE 47

*Pharopteryx nigricans* Rüppell 1828: 15, Pl. 4, Fig. 2 (Al-Muwaylih, Saudi Arabia, Red Sea); Rüppell 1830 [as *Pharopteryx nigricans*].

*Plesiops nigricans*: Rüppell 1835; Günther 1861; Klunzinger 1871; Bleeker 1876 [in part]; Inger 1955; Randall 1983\*, 1995\*; Dor 1984; Goren & Dor 1994; Mooi 1995\*.

Dorsal fin 12 spines, 7 or 8 rays; anal fin 3 spines, 7–9 rays; pectoral fins 19–22 rays; caudal fin 18 or 19 rays. Body relatively elongate, depth 2.9–4 in SL, slightly compressed; HL 2.3–2.7 in SL; eye diameter 3.1–4.3 in HL; mouth oblique, reaching to or just beyond eyes. LL scales 19–21 + 10–16.

Body dark brown or blackish, capable of changing to pale with ~6 dark bars; scales with crescent-shaped bluish white or white marks dorsally, bluish white or white spots ventrally; head, belly, median fins and pelvic fins black, with small bluish white or white spots; dorsal fin with thin blue median stripe. Attains 17 cm TL.

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden and Oman.

**REMARKS** Found in tidepools and on rocky and coral reefs, hiding in crevices and among coral rubble, to ~30 m deep. Captured for the aquarium trade.

#### GLOSSARY

**pterygiophore** – the three bones (distal, medial and proximal), some sometimes fused together, that support and articulate with the fin spines and rays.

**pyriform (scales)** – pear-shaped, with an extended middle posterior margin.

**supernumerary spine** – an additional spine (or spines); more than the normal single spine supported by a pterygiophore.

## FAMILY TERAPONTIDAE

### Thornfishes or terapons

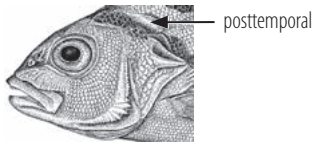
Richard P Vari

Body perch-like, oblong to oblong-ovate, and slightly to moderately laterally compressed. Mouth moderate and protrusile; gape slightly oblique; jaws subequal, upper jaw not extending beyond mid-eye. Teeth in jaws usually in villiform bands, teeth of outer row distinctly enlarged, but dentition reduced to 2 or 3 distinct rows in some species; jaw teeth conical, flattened or tricuspid; teeth on vomer and palatines usually only in juveniles (absent in adults of most species). Preopercle rear and ventral margins variably serrate, the serrations more pronounced along vertical margin and more so in juveniles than in adults. Lachrymal (1st suborbital) with serrations along ventral margin, which become less apparent in larger specimens of some species. Opercle with 2 distinct spines posteriorly, lower spine larger, stronger, and extending beyond margin of opercular lobe in some species. Posttemporal covered by skin and scales in some species, or exposed and posteriorly expanded with serrate margin in many other species. Dorsal fin single, arched, with 11–14 spines, 8–14 rays; spines 4–7 longest, and spines decreasing in length posteriorly to penultimate spine, which is much shorter than last spine in some species, thereby resulting in notched spinous portion of dorsal fin. Anal fin 3 strong spines, 7–12 rays. Pectoral fins 12–17 rays. Pelvic fins 1 spine, 5 rays, fins inserted behind vertical through pectoral-fin insertions. Caudal fin usually emarginate (truncate or rounded in some freshwater species outside WIO). Lateral line single and complete. Scales adherent and finely ctenoid (rough to touch); LL scales 29–100. Vertebrae 10 or 11 + 15–17.

Small- to medium-sized (~6.5–80 cm SL), occurring usually in tropical and subtropical (less commonly warm-temperate) inshore marine and brackish waters of the Indo-Pacific and in freshwaters of the Philippines, Indonesia (Sulawesi), Australia and New Guinea. Family revised by Vari (1978). Sixteen genera and ~52 species; 3 genera and 5 species in WIO.

**KEY TO GENERA**

- 1a Posttemporal covered with skin and scales, not posteriorly expanded or with serrate margin ..... *Pelates*
- 1b Posttemporal with little skin and scale covering and posteriorly expanded with serrate margin ..... 2



- 2a Lower opercular spine well-developed and extending beyond margin of opercular lobe; caudal-fin lobes with oblique dark stripes; spinous portion of dorsal fin with large black blotch ..... *Terapon*
- 2b Lower opercular spine not well-developed and falling short of margin of opercular lobe; no oblique dark stripes on caudal-fin lobes; no large black blotch on spinous portion of dorsal fin ..... *Mesopristes*



*Mesopristes elongatus*, 18 cm SL (Madagascar). © T Britt Griswold

**DISTRIBUTION** Known only from estuaries and rivers of eastern Madagascar (former provinces Toamasina and Fianarantsoa).

**REMARKS** Found upriver to elevations of at least 500 m. Exploited in subsistence fisheries. IUCN Red List conservation status Vulnerable.

**GENUS** *Mesopristes* Bleeker 1845

Body deep, compressed; dorsal profile of head and anterior portion of body steep. Dorsal fin 12 spines, 10 or 11 rays, spinous portion of fin strongly arched; anal fin 3 spines, 8 or 9 rays; pectoral fins 12–14 rays; caudal fin emarginate. Teeth in jaws in villiform bands, teeth of outer row enlarged. Preopercle serrate, largest serrations on angle and along rear margin. Cleithrum with rear margin exposed and serrate. Found in marine, brackish and fresh water; 5 species, 1 in WIO.

*Mesopristes elongatus* (Guichenot 1866)

Plain terapon

*Datnia obtusirostris* Guichenot 1866: 132 (Madagascar).

*Datnia elongata* Guichenot 1866: 133 (Madagascar).

*Therapon lambertoni* Fowler 1923: 40 (Antananarivo, Madagascar).

*Mesopristes elongatus*: Vari 1978\*, 1992\*.

Body depth 2.5–3 in SL; HL 2.8–3.1 in SL. Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 13 or 14 rays. Anterodorsal profile of head nearly straight in juveniles, slightly convex (more so anteriorly) in adults. Serrations of preopercle more pronounced in juveniles than in adults. GR 7–9/16 or 17. LL scales 48–52.

Head and body of fish <10 cm SL silvery with series of moderately distinct to obscure stripes, larger individuals lacking stripes but with mottling on dorsal surface of head and to some extent on body; dorsal-fin membranes darker distally, and soft-rayed portion of fin with some mottling. Attains 18 cm SL.

**GENUS** *Pelates* Cuvier 1829

Body moderately elongate, somewhat compressed; dorsal profile of head and predorsal region nearly straight to slightly convex. Dorsal fin 11–13 spines, spinous portion of fin strongly arched, 9–11 rays; anal fin 3 spines, 9–11 rays; pectoral fins 13–16 rays; caudal fin slightly emarginate. Posttemporal covered with skin and scales, rear margin not serrate. Cleithrum with rear margin exposed and serrate.

Two species, 1 in WIO.

*Pelates quadrilineatus* (Bloch 1790)

Trumpeter or fourlined terapon

PLATE 47

*Holocentrus quadrilineatus* Bloch 1790: 82, Pl. 238, Fig. 2 (Indonesia).

*Pelates quadrilineatus*: Vari 1978\*, 2001\*; SSF No. 173.1\*; Talwar & Jhingran 1991; Goren & Dor 1994; Golani 1998; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Body depth 2.6–3.2 in SL; HL 2.3–3.6 in SL. Dorsal fin 12 or 13 spines. Teeth in 2 bands in lower jaw, in band or 3 rows in upper jaw; outer row of teeth in each jaw enlarged. Serrations of preopercle most pronounced in juveniles. GR 16–18/23–28. LL scales 66–75.

Head and body generally silvery, with series of 4 or more brown or blackish stripes: 1st stripe from snout to upper edge of eye and to ventral surface of peduncle, 2nd stripe from snout and through eye and lower opercular spine to top of caudal-fin base, 3rd stripe often under eye and along midbody to caudal-fin base, and 4th and 5th stripes along ventral surface of body; some specimens with round dark blotch of variable intensity

and size on upper sides anteriorly; spinous portion of dorsal fin with variably intense black mark distally between 3rd and 6th spines; soft-rayed portion of dorsal fin with variably developed black margin and dark markings; caudal-fin margin dusky. Juveniles with 6 or 7 vertical bars in addition to striped pattern of adults: 1st bar slightly anterior to dorsal-fin origin, 2nd–4th bars under base of spinous portion of dorsal fin, 5th and 6th bars under soft-rayed portion of dorsal fin, 7th bar usually on peduncle. Attains 30 cm TL (commonly 20 cm TL).



*Pelates quadrilineatus*, 5 cm SL (S Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf to South Africa (Eastern Cape), Madagascar, Mauritius, Seychelles (Aldabra), Pakistan, India and Sri Lanka; Lessepsian migrant to Mediterranean Sea; elsewhere to Indonesia, Philippines, China, Japan, New Guinea and eastern Australia.

**REMARKS** Often present in coastal areas and estuaries, frequently in weedy areas. Produces a croaking sound by vibrating the swimbladder. Feeds on invertebrates and small fishes and usually congregates in schools. Breeds at sea and juveniles inhabit seagrass beds and mangrove bays.

## GENUS *Terapon* Cuvier 1817

Body moderately elongate, somewhat compressed; dorsal profile of head and predorsal region of body ranging from slightly to distinctly convex. Dorsal 11 or 12 spines, spinous portion of fin strongly arched, 9–11 rays; anal fin 3 spines, 7–10 rays; pectoral fins 13–15 rays; caudal fin slightly emarginate. Teeth in jaws in bands with teeth of outer row enlarged. Cleithrum with rear margin exposed and serrate. Posttemporal exposed, with strong serrations along rear margin. Three species, all in WIO.

### KEY TO SPECIES

- |    |  |                   |
|----|--|-------------------|
| 1a | LL scales 46–56; scales above lateral line 6–8 .....   | <i>T. theraps</i> |
| 1b | LL scales 70–100; scales above lateral line 10–17 .....  | 2                 |
| 2a | Sides of body with 2–4 straight longitudinal stripes; GR 19–26 on lower limb of 1st arch .....       | <i>T. puta</i>    |
| 2b | Sides of body with 3 downward curving longitudinal stripes; GR 14–17 on lower limb of 1st arch ..... | <i>T. jarbua</i>  |

## *Terapon jarbua* (Fabricius 1775)

Thornfish

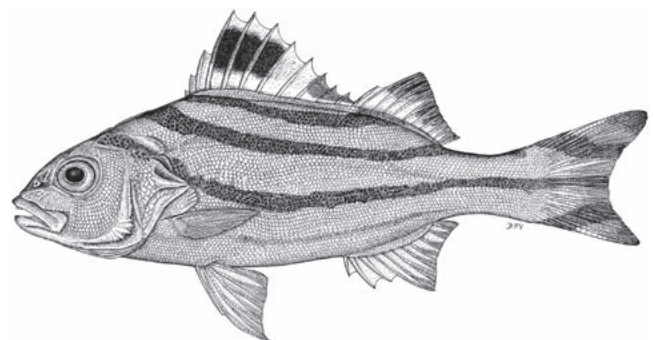
PLATE 47

*Sciaena jarbua* Fabricius in Niebuhr (ex Forsskål) 1775: xii, 44, 55 (Jeddah, Saudi Arabia, Red Sea).

*Terapon jarbua*: Vari 1978\*, 2001\*; SSF No. 173.2\*; Goren & Dor 1994; Carpenter *et al.* 1997; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Randall 2005\*; Fricke *et al.* 2009; Fricke *et al.* 2013; Bogorodsky *et al.* 2014.

Body depth 2.5–3.2 in SL; HL 2.3–3.6 in SL. Dorsal profile of head slightly convex anteriorly and then straight; predorsal region slightly to distinctly convex. Dorsal fin 11 or 12 spines, 9–11 rays, fin deeply notched before last spine; anal fin 3 spines, 7–10 rays; pectoral fins 13 or 14 rays. Teeth in both jaws conical and in bands, those in outer row enlarged; juveniles with teeth on palatines and vomer. Serrations of preopercle most pronounced in juveniles. GR 6–8/14–17. LL scales 75–100.

Head and body silvery, head dusky dorsally; adults with 3 or 4 ventrally curved longitudinal black stripes (not vertically interconnected); large black spot on upper two-thirds of spinous dorsal fin, and some specimens with posteriormost spinous portion of fin dark distally; smaller black marks between dorsal-fin rays 1–3 and 5–7; caudal fin with black stripe across each lobe, and stripe on middle rays continuous with midlateral stripe on body, plus upper lobe dark distally. Juveniles with series of disconnected dark spots on body, the spots irregularly joined forming discontinuous stripes and bars. Attains 35 cm TL (commonly 20–27 cm TL).



*Terapon jarbua*, 11 cm SL (S Mozambique). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf, Oman to South Africa (Transkei region: uncommon), Mozambique Channel, Madagascar, Réunion (reportedly extinct), Pakistan, India and Sri Lanka; Lessepsian migrant to Mediterranean Sea; elsewhere to east coast of India, Indonesia, China, southern Japan, Palau, New Guinea, Australia, New Caledonia, Fiji, Tonga and Samoa.

**REMARKS** Adults and juveniles found in coastal, brackish and fresh waters, but apparently spawns solely in the sea. Feeds on invertebrates, smaller fishes, and selectively on the skin and scales of various larger fishes. Caught with a variety of inshore fishing gear, including gillnets, traps, handlines and bottom trawls. Does well in aquaria and sometimes used in the aquarium trade.

### *Terapon puta* Cuvier 1829

Small-scaled terapon

PLATE 47

*Terapon puta* Cuvier in Cuv. & Val. 1829: 148 (Visakhapatnam, India).  
*Terapon puta*: Vari 1978\*, 2001\*; Talwar & Jhingran 1991; Goren & Dor 1994; Randall 1995\*; Golani 1998; Manilo & Bogorodsky 2003.

Body depth 2.9–4 in SL; HL 2.9–3.6 in SL. Dorsal profile of head and predorsal region of body slightly convex. Teeth in bands in each jaw with outer row of teeth in each jaw enlarged. Preopercle serrate; serrations most pronounced along angle. Dorsal fin 11 or 12 spines, 9–11 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 13–15 rays. LL scales 70–85; GR 7–9/19–25.

Head and body silvery, with 3 or 4 straight, narrow, longitudinal stripes; dorsal fin with black blotch distally between spines 3–4 and 7–8, and anterior soft rays with narrow stripes seemingly continuous with stripes on body; caudal-fin upper and lower lobes each with 2 dark stripes, and dark stripe also through middle rays; pectoral fins, anal fin and caudal-fin lobes may have yellow tinge. Attains 16 cm TL (commonly 11–13 cm TL).



*Terapon puta*, 10 cm SL (Saudi Arabia). SJ Raredon © Smithsonian Institution

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf to South Africa, India and Sri Lanka; elsewhere to east coast of India, Indonesia, Philippines, New Guinea and northern Australia.

**REMARKS** Inhabits inshore waters, sometimes entering brackish and fresh waters and mangrove areas. Feeds on invertebrates and smaller fishes. Caught with a variety of inshore fishing gear, including gillnets, traps, handlines and bottom trawls.

### *Terapon theraps* Cuvier 1829

Large-scaled or straight-lined terapon

PLATE 47

*Terapon theraps* Cuvier (ex Commerson) in Cuv. & Val. 1829: 129, Pl. 53 (Java, Indonesia; Mahé [Seychelles]).

*Terapon theraps*: Vari 1978\*, 2001\*; SSF No. 173.3\*; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Bogorodsky *et al.* 2014.

Body depth 2.4–3.5 in SL; HL 2.8–3.5 in SL. Dorsal fin 11 or 12 spines, 9–11 rays; anal fin 3 spines, 7–9 rays; pectoral fins 14 or 15 rays. Head profile and predorsal region slightly convex in juveniles, more convex in adults. Teeth strong and conical, in bands in both jaws, outer rows enlarged. Preopercle serrations most pronounced in adults; no enlarged spine at angle. GR 6–8/15–18. LL scales 46–56.

Small juveniles with head uniformly dusky and body silvery with 3 horizontal stripes crossed by vertical bars: 1st bar from nape to opercle, 2nd and 3rd under spinous dorsal fin, 4th under soft-rayed dorsal fin, 5th and 6th on peduncle; stripes and bars join at 2.5–3 cm SL to form pattern of distinct white spots on dusky background (bars disappear with growth, with only stripes remaining). Adults silvery, with distinct stripe on head from snout to opercle and 2nd stripe sometimes under eye, and upper body dusky with 3 or 4 straight longitudinal stripes; dorsal-fin membranes between spines 3–7 with black blotch distally in adults; soft-rayed dorsal fin largely black in juveniles, but adults with 2 dark blotches distally; anal fin dark with irregular clear spots in juveniles, transparent with dark band in adults; caudal-fin upper lobe with dark bar and distal blotch, dark stripe through middle rays, and lower lobe with 2 dark stripes; pelvic fins dark in juveniles, transparent in adults. Attains 32 cm TL (commonly 22 cm TL).



*Terapon theraps*, 19 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf to South Africa (KwaZulu-Natal), Madagascar, Seychelles, India and Sri Lanka; Lessepsian migrant to Mediterranean Sea; elsewhere to Indonesia, Philippines, China, southern Japan, New Guinea, Australia and New Caledonia.

**REMARKS** Found inshore and often in brackish waters, with juveniles often in floating weeds, sometimes some distance from shore. Feeds on invertebrates and smaller fishes. Caught with a variety of inshore fishing gear, including traps, handlines and bottom trawls.

## FAMILY PRIACANTHIDAE

### Bigeyes

Phillip C Heemstra

Body oblong or oval, somewhat compressed; dorsal fin single, continuous, with 10 spines, 10–15 rays; anal fin 3 spines, 11–16 rays; last ray of dorsal fin and anal fin usually split to its base, but counted as single ray; pectoral fins much shorter than head, 16–19 rays; pelvic fins 1 spine, 5 branched rays; caudal fin 14 branched rays, margin truncate, convex or concave. Eyes large to huge. Upper jaw slightly protrusile; maxilla exposed when mouth is closed; no supramaxilla; row or narrow band of small conical teeth on jaws; no canines; vomer and palatines with minute teeth. Pair of close-set nostrils on each side. HL measured from tip of upper jaw to tip of opercular spine. Branchiostegal rays 6; gill membranes separate, free from isthmus; gill arches 4, slit behind last arch, pseudobranch present. Lateral line single, complete, not continuing onto caudal fin. Scales spinoid, adherent, covering body and most of head, and maxilla and lower jaw also scaly; scales variously modified among the genera and species. Swimbladder present. Vertebrae 9 or 10 + 13.

Eyes with a *tapetum lucidum* that reflects light back through the retina and lens. Found near the bottom, typically in rocky areas or on coral reefs of tropical to temperate regions in 1–465 m. Eggs, larvae and early juveniles pelagic. Mainly nocturnal, occurring in aggregations over reefs, and hiding in caves by day. Feed on cephalopods, crustaceans, small fishes, pelagic shrimp and polychaetes. Family revised by Starnes (1988). Four genera and ~19 species; all genera and 9 species in WIO.

#### KEY TO GENERA

- 1a Dorsal-fin spines increase regularly in length from first to last, with 10th spine more than twice length of 2nd spine ..... *Cookeolus*  
 1b Dorsal-fin spines 2 and 10 subequal ..... 2

Continued ...

#### KEY TO GENERA

- 2a Preopercle rear margin with ridges, no scales, and distinct spine at angle at all sizes ..... *Heteropriacanthus*  
 2b Preopercle rear margin scaly, and spine at angle present or absent ..... 3  
 3a Body oblong, depth 2.3–2.9 in SL; LL scales 54–73 ..... *Priacanthus*  
 3b Body oval, depth 1.9–2.1 in SL; LL scales 36–38 ..... *Pristigenys*

## GENUS *Cookeolus* Fowler 1929

Body oblong, depth 1.8–2.8 in SL; pelvic fins longer than HL (fish 15–30 cm SL); anal-fin base shorter than HL; dorsal-fin spines increase in length posteriorly; soft-rayed portions of dorsal and anal fins elevated and broadly rounded. One species.

### *Cookeolus japonicus* (Cuvier 1829)

#### Longfin bigeye

PLATE 48

*Priacanthus japonicus* Cuvier (ex Langsdorff) in Cuv. & Val. 1829: 106, Pl. 50 (Japan).

*Priacanthus alticlarrens* Valenciennes 1862: 1168 [4] (Réunion, Mascarenes).

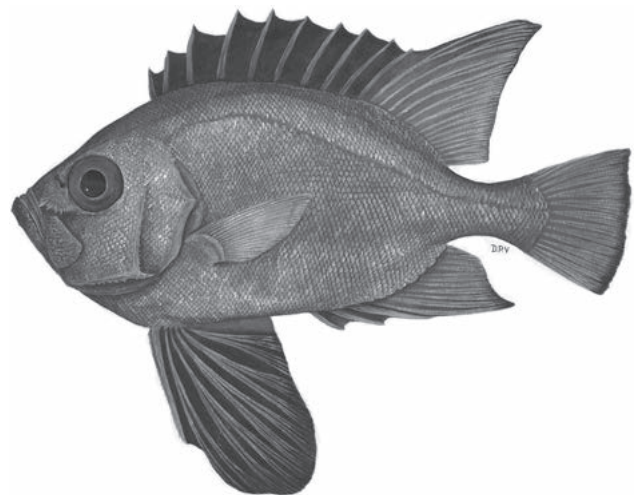
*Priacanthus boops* (non Bloch & Schneider 1801): SFSA No. 404\*.

*Cookeolus boops* (non Bloch & Schneider 1801): SSF No. 174.1\*.

*Cookeolus japonicus*: Starnes 1988\*, 1999\*; SSF No. 174.1\* [1995]; Heemstra *et al.* 2006\*; Fricke *et al.* 2009.

HL 2.6–3 in SL; 3rd spine of anal fin longer than eye diameter; dorsal and anal fins each with 12 or 13 rays; pectoral fins 17–19 rays. GR 5–7/15–20, not counting rudiments. LL scales 54–59.

Head and body reddish silver, paler ventrally; dorsal- and anal-fin membranes dark anteriorly; pelvic-fin membranes blackish, rays pale. Attains 68 cm TL, ~3.2 kg, 9+ years.



*Cookeolus japonicus*, 19 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Circumglobal in tropical and subtropical seas. WIO: Mozambique (Beira) to South Africa (Algoa Bay, Eastern Cape), Madagascar, Comoros, Seychelles, Réunion, Nazareth Bank and Saya de Malha Bank.

**REMARKS** Sometimes associated with rocky holes and ledges, in 40–400 m.

## GENUS *Heteropriacanthus*

Fitch & Crooke 1984

Rear margin of preopercle with ridges and distinct spine, and without scales; adults with well-developed V-shaped gap under preopercle spine at junction of subopercle and interopercle; interorbital width 3.3–3.7 in HL; caudal fin truncate to convex, usually with dark spots. One species.

### *Heteropriacanthus cruentatus* (Lacepède 1801)

Glasseye

PLATE 48

*Labrus cruentatus* Lacepède (ex Plumier) 1801: 452, 522, Pl. 2,

Fig. 3 (Dominica, Lesser Antilles).

*Anthias boops* Bloch in Bloch & Schneider 1801: 308 (near St Helena I.).

*Priacanthus cruentatus*: Fowler 1936; SFSA No. 403\* [in part]; SSF No.

174.2\*; Winterbottom *et al.* 1989\*.

*Heteropriacanthus cruentatus*: Starnes 1988\*; Randall & Anderson 1993;

Heemstra & Heemstra 2004; Fricke *et al.* 2009.

Body oblong, depth 2.4–2.7 in SL; HL 2.8–3.1 in SL; eye diameter 2.3–2.8 in HL; pelvic fins 1.3–1.6 in HL, 20–26% SL. Dorsal fin 13 or 14 rays; anal fin 13–15 rays; pectoral fins 18 or 19 rays; caudal fin convex (juveniles) or truncate (adults). GR 3 or 4/17–19, not counting rudiments (rakers shorter than in conspecific *Priacanthus hamrur* [Fabricius 1775]). LL scales 60–69.

Head and body entirely silvery or reddish, or mottled silvery and red; median fins with small dark spots; pelvic fins uniformly pale or dusky. Attains 25 cm SL.



*Heteropriacanthus cruentatus*, 16 cm SL (South Africa).

PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Tropical and subtropical waters of Atlantic and Indo-Pacific. WIO: Kenya to South Africa (Aliwal Shoal, KwaZulu-Natal; juveniles to Western Cape), Mozambique Channel, Madagascar, Comoros, Aldabra, Seychelles, Réunion, Mauritius, Chagos and Maldives.

**REMARKS** Inhabits lagoons and shallow reefs, in caves and under ledges, and on reef drop-offs, in 3–300 m (usually <60 m). Feeds on small fishes, polychaetes, crabs, pelagic shrimp and stomatopods.

## GENUS *Priacanthus* Oken 1817

Body oblong; rear margin of preopercle scaly; minute spinules on dorsal-, anal- and pelvic-fin spines and on some fin rays. Much work needs to be done on this genus. About 12 species, 6 in WIO.

### KEY TO SPECIES

- |    |  |                       |
|----|--|-----------------------|
| 1a | Soft dorsal-fin margin pointed; several purplish black spots on pelvic-fin membranes; preopercle spine well-developed, reaching to or beyond opercle margin .....  | <i>P. tayenus</i>     |
| 1b | Soft dorsal-fin margin rounded or bluntly angular; with or without single black blotch at pelvic-fin base, but no purplish black spots on membranes; preopercle spine well-developed, very short or absent .....       | 2                     |
| 2a | Caudal fin truncate, emarginate or lunate .....  | 3                     |
| 2b | Caudal-fin margin convex .....   | 5                     |
| 3a | Preopercle spine well-developed at all sizes, usually reaching tip of subopercle; no dark blotch on pelvic-fin bases; dorsal and anal fins pale to white posteriorly; caudal fin truncate to slightly emarginate ..... | <i>P. fitchi</i>      |
| 3b | Preopercle spine very short or lacking; dark blotch on pelvic-fin bases .....  | 4                     |
| 4a | Total GR 24–26; body depth at 6th dorsal-fin spine 2.4–2.7 in SL .....   | <i>P. hamrur</i>      |
| 4b | Total GR 27–31; body depth at 6th dorsal-fin spine at least 3 times in SL .....  | <i>P. proluxus</i>    |
| 5a | Body depth at 6th dorsal-fin spine 2.3–2.6 in SL; first 2 dorsal-fin membranes with black mark at margin; soft dorsal fin bluntly angular, fin height ~1.5 in eye diameter; total GR 21–23 .....                       | <i>P. sagittarius</i> |
| 5b | Body depth at 6th dorsal-fin spine 2.6–2.9 in SL; no black marks on dorsal fin; soft dorsal fin broadly rounded, fin height ~1.2 in eye diameter; total GR 17–22 .....   | <i>P. blochii</i>     |



*Priacanthus blochii* Bleeker 1853

Shortfin bigeye

PLATE 48

*Priacanthus blochii* Bleeker 1853: 456 (Jakarta, Java; Sibolga, western Sumatra; Ambon I., Moluccas, Indonesia); Starnes 1988\*, 1999\*; Kuitert 1998\*; Krupp *et al.* 2000; Manilo & Bogorodsky 2003.

Body oblong, depth 2.9–3.4 in SL; HL 2.9–3.3 in SL; pelvic fins 1.3–1.6 in HL, 20–26% SL. Dorsal fin 12–14 rays, soft-rayed portion bluntly angular; anal fin 13–15 rays; pectoral fins 17–19 rays; anal and caudal fins broadly rounded. Preopercle spine rudimentary or absent. Total GR 17–22 (gill rakers shorter than in conspecific *Priacanthus hamrur*). LL scales 69–77.

Head and body silvery reddish, or mottled silvery and red; median fins with small darker red spots; pelvic fins with black spot at base, otherwise uniformly pale or dusky. Attains 25 cm SL.



*Priacanthus blochii*, 23 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, southern Red Sea, Gulf of Aden, South Africa (Sodwana Bay), Comoros and Seychelles; elsewhere to Indonesia, Philippines, Australia and Samoa.

**REMARKS** Inhabits lagoons, shallow reefs and protected coral reefs, in caves and under ledges, at 3–30 m. Feeds on small fishes, polychaetes, pelagic shrimp and stomatopods.

*Priacanthus fitchi* Starnes 1988

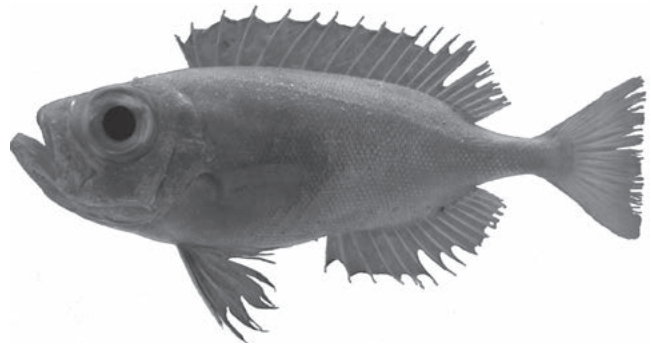
Whitefin bigeye

PLATE 49

*Priacanthus fitchi* Starnes 1988: 164, Pl. 1h, Fig. 3e (Sumatra, Indonesia); Starnes 1999\*.

Body slender, oblong, depth 2.8–3.5 in SL; HL 2.8–3.3 in SL; soft dorsal and anal fins low; caudal fin truncate or slightly concave. Dorsal fin 13 rays; anal fin 13 or 14 rays; pectoral fins 18 or 19 rays. Preopercle spine well-developed. Total GR 22–25. LL scales 74–79.

Head and body silvery red or pink; rear part of soft dorsal and anal fins and lower caudal-fin margin pale to conspicuously white; spinous dorsal-fin membranes and front parts of soft dorsal and anal fins with minute melanophores; no spots on fins. Attains 19 cm SL.



*Priacanthus fitchi*, 16 cm SL (S Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: southern Mozambique and Saya de Malha Bank; elsewhere to Indonesia, Philippines, Japan and Australia.

**REMARKS** Trawled from 150–465 m.

*Priacanthus hamrur* (Fabricius 1775)

Crescent-tail bigeye

PLATE 49

*Sciaena hamrur* Fabricius in Niebuhr (ex Forsskål) 1775: xi, 44, 45 (Jeddah, Saudi Arabia, Red Sea); Klausewitz & Nielsen 1965\*.

*Priacanthus speculum* Valenciennes in Cuv. & Val. 1831: 471 (Mahé, Seychelles).

*Priacanthus fax* Valenciennes in Cuv. & Val. 1831: 473 (Mauritius, Mascarenes).

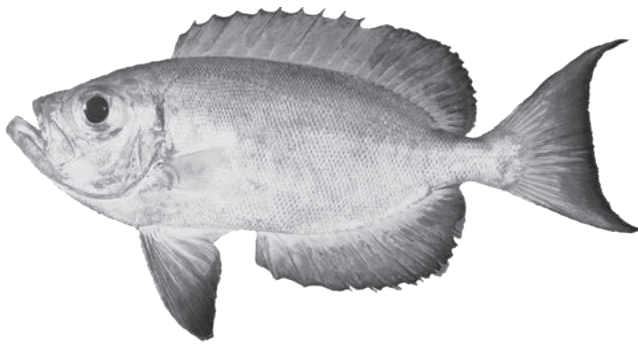
*Boops asper* Gronow in Gray 1854: 58 (Indian Ocean).

*Priacanthus cruentatus* (non Lacepède 1801): SFSA No. 403\* [Pl. 104 only].

*Priacanthus hamrur*: SFSA No. 406\*; SSF No. 174.3\*; Starnes 1988\*, 1999\*; Randall & Anderson 1993; Randall 1995\*, 1999\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Fricke *et al.* 2013.

Body depth 2.4–2.7 in SL; HL 2.9–3.3 in SL; eye diameter 2.4–2.7 in HL; pelvic fins 1–1.2 in HL, 28–33% SL (fins longer than in conspecific *Heteropriacanthus cruentatus*). Dorsal fin 13–15 rays; anal fin 13–16 rays; pectoral fins 17–20 rays. Total GR 24–26. LL scales 64–75. With age, preopercle spine becomes smaller and caudal fin (in fish >25 cm TL) becomes more lunate.

Head and body silvery or coppery-red; median fins dusky, without distinct dark spots; pelvic fins dusky, with black spot at base of first 3 rays. Attains at least 45 cm TL.



*Priacanthus hamrur*, 27 cm SL (Comoros). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Kenya to South Africa (Knysna), Mozambique Channel, Madagascar, Comoros, Seychelles, Mascarenes, Saya de Malha Bank and Maldives; elsewhere to southern Japan, Australia, Lord Howe I., Tonga, Gambier Is. and Marquesas Is.

**REMARKS** Common on coral and rocky reefs, at 5–250 m. Frequently thrown up dead by cold water along Eastern Cape coast of South Africa. Found in or near caves with coelacanth, at ~150 m, at Grand Comore I. Genetics suggest that South African fish are more closely related to the Atlantic *P. arenatus* and to *P. prolixus* (also in WIO) than to populations in the Red Sea (BC Victor, pers. comm.).

### *Priacanthus prolixus* Starnes 1988

Torpedo bigeye

PLATE 49

*Priacanthus prolixus* Starnes 1988: 175, Fig. 23a–b (off Somalia); Starnes 1999\*; Motomura *et al.* 2001; Manilo & Bogorodsky 2003.

Body depth 2.9–3.4 in SL; HL 3.3–3.4 in SL; soft dorsal and anal fins low; caudal fin emarginate to crescentic. Dorsal fin 13 or 14 rays; anal fin 14 or 15 rays; pectoral fins 18–21 rays. Preopercle spine rudimentary in adults. Total GR 27–31. LL scales 75–82.

Head and body red, darker dorsally, bright red ventrally; 7 indistinct darker red spots on lateral line, starting below the 6th dorsal-fin spine; dorsal fin red, with yellowish patches distally on soft dorsal-fin membranes, and small darker red spots may be present on soft dorsal and anal fins; pectoral fins yellowish; pelvic-fin membranes red, spine and rays pale, and fins with black spot basally; anal fin and caudal fin dark red; caudal-fin margin black. Attains 24 cm SL.

**DISTRIBUTION** WIO: Somalia, Gulf of Aden, and Pakistan to southwestern India.

**REMARKS** Known from 35–326 m (usually <65 m). Has been confused with *P. hamrur*.

### *Priacanthus sagittarius* Starnes 1988

Arrowfin bigeye

PLATE 49

*Priacanthus sagittarius* Starnes 1988: 178, Pl. 3, Figs. 3, 5, 8, 12, 18 (south coast of Sumatra, Indonesia); Baranes & Golani 1993; Fricke 1999; Starnes 1999\*; Fricke *et al.* 2009; Bogorodsky *et al.* 2014.

Body oblong, depth 2.3–2.6 in SL; HL 2.5–3.7 in SL; 2nd dorsal-fin spine ~½ length of last spine; pelvic fins reach to or beyond 3rd anal-fin spine; soft dorsal and anal fins elevated and bluntly angular; caudal fin rounded. Dorsal fin 13 or 14 rays; anal fin 13–15 rays; pectoral fins 17–19 rays. Preopercle spine rudimentary in adults. Total GR 19–22. LL scales 62–72.

Head and body reddish silver, or mottled red on silvery white (the latter is possibly a fright or stress pattern); median fins pink with reddish brown spots or red with dark margins; paired fins pale with reddish brown spots or dusky; pelvic fins with black basal spot. Attains 35 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea (including Gulf of Aqaba and Gulf of Suez), Réunion and Sri Lanka; elsewhere to Indonesia, Philippines, southern Japan, Australia, New Caledonia and Samoa.

**REMARKS** Inhabits coral and rocky reefs and also more open bottoms, in 60–100 m.

### *Priacanthus tayenus* Richardson 1846

Purplespotted bigeye

PLATE 49

*Priacanthus tayenus* Richardson 1846: 237 (Guangdong, China); Starnes 1988\*, 1999\*; Randall 1995\*.

Body oblong, depth 2.5–3.1 in SL; dorsal fin 11–13 rays, fin high and acutely pointed posteriorly; anal fin 12–14 rays, fin high and rounded; pectoral fins 17–19 rays; caudal fin rounded (juveniles), truncate (adults), or lunate with upper and lower rays greatly elongated in some large adults (possibly only males, but not all male specimens). Preopercle spine very long in juveniles (beyond pelvic-fin base), well-developed in adults. Total GR 21–24. LL scales 51–67.

Head and body silvery pink; pectoral fins hyaline to yellowish; other fins creamy pink to orangish, and pelvic fins with several dark purple, brown or black spots on membranes (largest on innermost membranes). Attains 25 cm SL.



*Priacanthus tayenus*, 11 cm SL (W Australia). © C Dowling, DPIRD

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf and India; elsewhere to Andaman Sea, Indonesia, Malaysia, Taiwan and Australia.

**REMARKS** Trawled from 20–200 m.

## GENUS *Pristigenys* Agassiz 1835

Body oval, robust, depth longer than HL and about half SL; middle dorsal-fin spines longest; pelvic fins shorter than or subequal to HL; anal-fin base shorter than HL. Scales on head extremely rugose. Five species, 1 in WIO.

### *Pristigenys refulgens* (Valenciennes 1862)

Blackmargin bigeye

PLATE 49

*Myripristis refulgens* Valenciennes 1862: 1169 [5] (Réunion, Mascarenes).

*Pseudopriacanthus nipponius*: Smith 1953 [in part].

*Pristigenys nipponia* [in part]: Smith 1966\*; Masuda *et al.* 1975\*; SSF No. 174.4\*; Fricke *et al.* 2009.

*Pristigenys refulgens*: Starnes 1988 [in part]; Fricke 1999; Iwatsuki *et al.* 2012\*.

Body depth 1.9–2.1 in SL; HL 2.4–2.6 in SL; eye diameter 1.9–2.1 in HL; bony interorbital width 5.9–6.4 in HL. Dorsal fin 10–12 rays; anal fin 10 rays; pectoral fins 18 or 19 rays. Total GR 23–26. LL scales 31–37.

Body and fins scarlet; body with 5 narrow pale vertical bars (5th bar at caudal-fin base); median fins with narrow black margin and white submarginal band. Attains 34 cm SL.



*Pristigenys refulgens*, 34 cm SL (SW India). KV Akhilesh © CMFRI

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Mozambique (Inhambane) to South Africa (Algoa Bay, Eastern Cape), Madagascar, Comoros, Seychelles, Réunion, Mauritius and India; elsewhere to Andaman Sea, Indonesia, South China Sea, Japan and Australia.

**REMARKS** Found on rocky slopes, below 70 m. Photographed at 262 m at Grande Comore I.

## GLOSSARY

**pseudobranch** – a small, gill-like organ on the inner surface of the operculum.

**rugose** – with a rough or wrinkled surface.

## FAMILY ACROPOMATIDAE

### Lanternbellies

Phillip C Heemstra

Body oblong (up to 38 cm TL), moderately compressed to fusiform, depth less than HL, 3.1–4.1 in SL; HL 2.7–3.1 in SL. Dorsal fin divided to base before last spine and separated into spinous and soft-rayed fins, with 8–10 spines + 1 spine, 9 or 10 segmented rays; anal fin 2 or 3 slender spines, 7 or 8 rays; pectoral fins longer than pelvic fins, but shorter than head; pelvic fins 1 spine, 5 rays, fins inserted below or slightly in front of pectoral-fin bases, and without large axillary process of fused scales; caudal fin emarginate or forked, with 15 branched rays, fin lobes shorter than head. Eyes large, diameter 2.7–4.3 in HL, subequal to or more than snout length; preorbital width narrow, 5–7 in eye diameter; interorbital area flat. Mouth terminal and slightly protrusile; maxilla naked, expanded posteriorly,

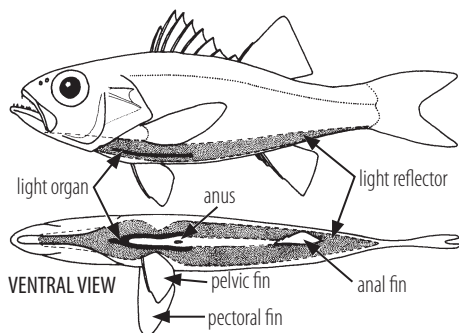
mostly exposed when mouth is closed and reaching below mid-eye; supramaxilla present; upper jaw length greater than eye diameter; pair of large canines at front of both jaws; upper jaw with pair of canines at symphysis, bands of villiform teeth separated at symphysis by wide diastema; lower jaw with 1 or 2 small canines on each side of symphysis, followed by distinct concavity, bands of villiform teeth anteriorly, and then 3–6 curved canines; patch of villiform teeth on vomer, and band of similar teeth on palatines; some minute teeth between and behind lateral canines. Nostrils close-set and near front edge of eyes. Preopercle ridge smooth or serrate, lower edge of preopercle with strong serrae; opercle with or without scales, but rear edge with 1 or 2 flat points. Branchiostegal rays 7; gill membranes separate, free from isthmus; GR 3–8/12–18. Lateral line continuous. Scales cycloid or weakly ctenoid, deciduous, and covering body; head mostly naked but cheeks scaly. Colour usually silvery grey, reddish silvery, dark brown or blackish. Vertebrae 10 + 15 or 16.

Occur in loose aggregations, usually near bottom, at 74–2 200 m, but some species migrate to near surface at night. Caught mainly with bottom trawls. Common in some areas, but too small and usually not abundant enough to be of commercial importance.

The composition and definition of the Acropomatidae are problematic. Species here assigned to this ill-defined family were previously placed by some authors in Moronidae or Percichthyidae; *Percichthys* is comprised of 2 species of freshwater fishes from Chile and Argentina, which have 31–36 vertebrae, and are not closely related to the acropomatids. Currently 10 genera and ~33 species; 4 genera and at least 4 species in WIO.

#### KEY TO GENERA

- 1a Anus closer to pelvic-fin origins than to anal-fin origin; light organ (not visible externally) between pelvic fins; light reflector a white opalescent membrane covered with minute melanophores along ventral surface of body from isthmus to caudal-fin base ..... *Acropoma*



Position of light organ and reflector in *Acropoma japonicum*.

Continued...

#### KEY TO GENERA

- 1b Anus closer to anal-fin origin than to pelvic-fin origins; no light organ or light reflector ..... 2
- 2a Anal fin 2 spines, 7–9 rays; gap between spinous and soft-rayed dorsal fins greater than eye diameter; lateral side of maxilla with longitudinal ridge ..... 3
- 2b Anal fin 3 spines, 7 rays; gap between spinous and soft-rayed dorsal fins less than eye diameter; no longitudinal ridge on maxilla ..... *Neoscombrops*
- 3a Pelvic-fin spine sharply serrated ..... *Parascombrops*
- 3b Pelvic-fin spine smooth ..... *Synagrops*

#### GENUS *Acropoma* Temminck & Schlegel 1843

Anus closer to pelvic-fin origins than to anal-fin origin. Dorsal fin with 8 or 9 spines + 1 spine, 10 segmented rays. Scales ctenoid, deciduous. Light organ located between pelvic fins, and light reflector along ventral surface of body. Swimbladder bifurcate anteriorly, with 2 bulbous branches connected to occipital fossa at rear of cranium. Nine species, 1 species shallower than 200 m in WIO.

#### *Acropoma heemstrai* Okamoto & Golani 2017

African lanternbelly

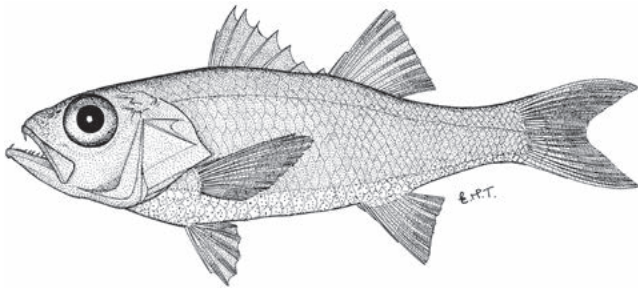
PLATE 50

*Acropoma japonicum* (non Günther 1859): SFSA No. 499\*; SSF No. 176.1\*; Baranes & Golani 1993 [as *japonicus*].

*Acropoma heemstrai* Okamoto & Golani 2017: [2], Figs. 1, 2a, 3a (off Dokodweni, South Africa).

Body oblong, depth less than HL. Dorsal fin 7 + 1 + 1 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. Light organ a Y-shaped gland between pelvic fins straddling anus (not visible externally); light reflector a white opalescent membrane along ventral surface from isthmus to caudal fin. Mouth terminal; small bony knob on underside of chin; pair of large canines at front of upper jaw, between which fit a pair of smaller canines at front of lower jaw; sides of lower jaw also with row of tiny teeth and 6 or 7 small and widely spaced canines; row of minute sharp teeth along chevron-shaped edge of vomer and along edge of palatines. GR 5–8/14–17. LL scales 44–48.

Head and body reddish dorsally, sides and ventral body silvery; back of mouth black. Attains 20 cm TL.



*Acropoma heemstrai*, 10 cm SL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Mozambique (Quelimane) to South Africa (Kenton-on-Sea, Eastern Cape).

**REMARKS** Occurs on outer continental shelf and upper slope, in 60–300 m.

### GENUS *Neoscombrops* Gilchrist 1922

Anus closer to anal-fin origin than to pelvic-fin origins. Swimbladder not bifurcate anteriorly, nor attached to cranium. No light organ. Three species, 1 in WIO.

#### *Neoscombrops cynodon* (Regan 1921)

Sombre splitfin

PLATE 50

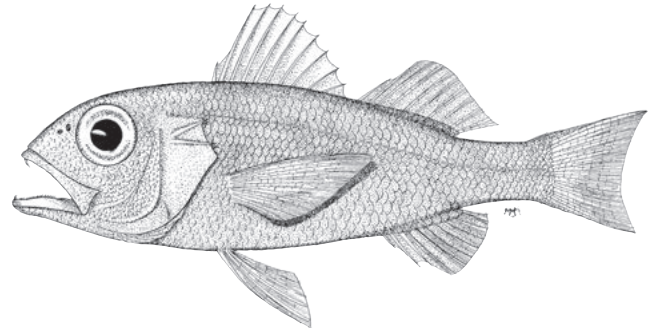
*Acropoma cynodon* Regan 1921: 415 (off Umvoti River, KwaZulu-Natal, South Africa); SFSA No. 212.

*Neoscombrops annectens* Gilchrist 1922: 68, Pl. 11, Fig. 2 (KwaZulu-Natal, South Africa); SSF No. 176.3\*.

*Neoscombrops cynodon*: SFSA No. 497\*; SSF No. 176.4; Yamanoue & Matsuura 2003.

Dorsal fin 9 or 10 spines + 1 spine, 9 or 10 rays; anal fin 3 spines, 7 rays; pectoral fins 15–17 rays. Body depth subequal to HL. Upper jaw with pair of widely spaced canines at symphysis, followed by broad band of granular teeth on each side; lower jaw with 2 or 3 large canines on each side of symphysis, followed by row of small, slender, conical teeth. GR 5–7/15–17. Scales cycloid, covering body and most of head; LL scales 36–41.

Head and body dusky silvery. Attains 25 cm TL.



*Neoscombrops cynodon*, 15 cm TL (South Africa). Source: SFSA

**DISTRIBUTION** WIO: northern Mozambique to South Africa (Algoa Bay, Eastern Cape) and Madagascar.

**REMARKS** Occurs on outer continental shelf and upper slope, in ~100–550 m.

### GENUS *Parascombrops* Alcock 1889

Body fusiform, depth less than HL. Dorsal fin with 9 spines + 1 spine, 9 or 10 rays; anal fin 2 spines, 7 rays; pectoral fins 16–19 rays; pelvic fin spine serrated. Scales cycloid, deciduous. Anterior swimbladder not reaching cranium. No light organ. About 13 species, 1 in shallower water in WIO; genus reviewed by Schwarzhans & Prokofiev (2017).

#### *Parascombrops adeni* (Kotthaus 1970)

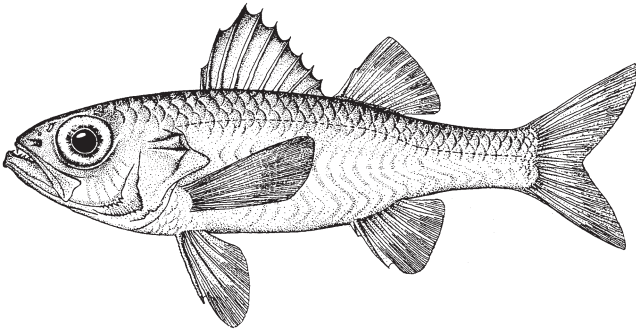
Aden splitfin

*Synagrops adeni* Kotthaus 1970: 74, Figs. 258–259 (SW coast of Arabia).

*Parascombrops pellucidus* (non Alcock 1889): Schwarzhans & Prokofiev 2017\*.

Body oblong, depth less than HL, 3.1–3.9 in SL; HL 2.3–2.6 in SL; eye diameter greater than snout length, ~3 times in HL. Dorsal fin 9 spines (3rd spine longest; 1st spine < ¼ length of 3rd) + 1 spine, 8–10 rays; anal fin 2 spines, 7 rays; pectoral fins 16 or 17 rays; pelvic fins 1 serrated spine, 5 rays. Upper jaw with large canine on each side of symphysis, followed by band of numerous small conical teeth that broadens posteriorly; lower jaw with smaller retrorse canine on each side of symphysis, followed by row of 8 small conical teeth, and then 4 widely separated teeth (3rd tooth longest, and all 4 teeth curved inwards); vomer with V-shaped row of small teeth; palatines with a few small conical teeth in narrow band. Opercle with 2 weak spines posteriorly. GR on lower limb 17–19. LL scales 29–33.

Head and body pale brown to dusky. Attains ~9 cm SL.



*Parascombrops adeni*, ~6 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: Gulf of Aden and Kenya (off Lamu).

**REMARKS** Trawled from 60–260 m. Considered a synonym of *Parascombrops pellucidus* by Schwarzhans & Prokofiev (2017).

**GENUS** *Synagrops* Günther 1887

Body fusiform, depth less than HL. Dorsal fin with 8 or 9 slender spines + 1 spine, 9 or 10 rays; anal fin 2 slender spines, 7–9 rays; pectoral fins 16–19 rays. Maxilla with median ridge on lateral surface. Scales cycloid, deciduous; head covered with perforated black skin. Swimbladder bifurcate anteriorly, connected to rear end of cranium. No light organ. About 5 species, 1 in WIO.

### *Synagrops japonicus* (Döderlein 1883)

Blackmouth splitfin

PLATE 50

*Melanostoma japonicum* Döderlein in Steindachner & Döderlein 1883: 124 (Tokyo, Japan).

*Hypoclydonia bella* Goode & Bean 1896: 236, Pl. 66, Fig. 237 (northeastern Gulf of Mexico).

*Synagrops natalensis* Gilchrist 1922: 69 (KwaZulu-Natal, South Africa).

*Synagrops japonicus*: SSF No. 176.5\*; Adam *et al.* 1998.

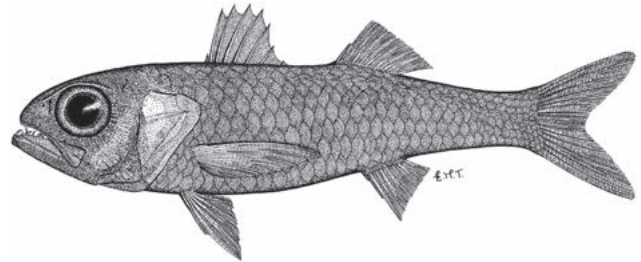
Body depth 3.3–4.1 in SL; HL 3–3.3 in SL. Snout conical; eye diameter greater than snout length. Dorsal fin 8 or 9 spines + 1 spine, 9 or 10 rays, interdorsal distance subequal to eye diameter; anal fin 2 spines, 7 or 8 rays; pectoral fins 15–17 rays, fins reaching vertical at anus; pelvic fins slightly shorter than pectoral fins. All fin spines smooth. Preopercle edge finely serrate, serrae at angle enlarged, and preopercle ridge smooth; opercle rear edge with 2 flat spines (lower and stronger spine being the tip of bony ridge on inner side of opercle); subopercle

and interopercle distinctly serrate. Maxilla with distinct longitudinal ridge on lateral surface; supramaxilla ~ $\frac{1}{3}$  length of maxilla; large canine on each side of symphysis at front of both jaws; upper jaw with broad bands of villiform or granular teeth separated at symphysis; lower jaw with distinct concavity on each side of symphysis, 4–6 strong canines along anterior two-thirds of jaw, and minute teeth between and behind lateral canines; triangular patch of minute teeth on vomer, and band of similar teeth 2–4 rows wide on each palatine. Dorsal surface of head and snout covered with black skin perforated by close-set hollow white papillae, and with widely separated, partly embedded scales. Scales cycloid, large; LL scales 28–30. Swimbladder bifurcate anteriorly, connected to cranium.

Body of adults dark brown or black, head paler; margin of spinous dorsal fin black; inside of mouth and gill cavity black. Attains 35 cm SL.



*Synagrops japonicus*, ~15 cm SL, head (Mozambique).



*Synagrops japonicus*, 16 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Western Atlantic (Canada to southern Brazil, including Gulf of Mexico and Caribbean Sea), eastern Atlantic (Guinea to Angola) and Indo-Pacific. WIO: Oman, Kenya to South Africa (Agulhas Bank), Madagascar, St Brandon Shoals and Maldives; elsewhere to southern Japan, Australia, New Caledonia and Hawaii.

**REMARKS** Found near bottom, in ~50–1 000 m. Feeds on crustaceans, fishes and cephalopods. Caught with trawls.

#### GLOSSARY

**isthmus** – the lower part of the head that separates the two gill chambers.

**occipital fossa** – depression at the rear of the skull.

## FAMILY HOWELLIDAE

## Pricklefishes

Phillip C Heemstra

Small-sized (to 12 cm SL) with fusiform body and 2 separate dorsal fins: 1st with 7 or 8 spines, and 2nd with 1 spine, 8–10 soft rays; distance between dorsal fins subequal to length of spinous dorsal-fin base; anal fin with 3 slender spines, 6–8 soft rays; pectoral fins subequal to HL, reaching past anal-fin spines; pelvic fins inserted below or slightly in front of pectoral-fin bases, with 1 spine, 5 branched rays; caudal fin emarginate or slightly forked, with 15 branched rays. Mouth large, oblique and slightly protrusile; upper jaw length subequal to eye diameter; maxilla expanded posteriorly (distally), mostly exposed when mouth is closed and reaching below middle of eye, maxilla trough-shaped proximally, upper and lower edges curled laterally; no supramaxilla. Teeth villiform, in single series on jaws; vomer edentate or with a few minute teeth; palatines edentate or with 1 row of minute teeth. Two orbital spines on upper edge of orbit, over front and rear edges of eye; interorbital area flat, with pineal organ visible in middle of posterior interorbital area. Posterior nostril at base of front orbital spine and near front edge of eye; anterior nostril halfway between posterior nostril and tip of snout. Opercle with 1–8 sharp spines on rear edge and separate spine slightly above; rear edge of subopercle with 1–4 spines; rear edge of interopercle with large spine; preopercle ridge smooth, edge of vertical limb smooth dorsally but serrate ventrally, and lower edge smooth. Branchiostegal rays 7, gill membranes narrowly joined at anterior end of isthmus; gill rakers long and slender, 6–10 on upper limb, 19–23 on lower limb of 1st arch. Lateral line continuous or interrupted (offset). Scales spinoid and adherent, covering head and body. Body usually dark brown or blackish. Vertebrae 10 + 15 or 16.

Occur in loose aggregations during the day, usually near bottom, at 74–200 m, and migrate to near the surface at night. Herring (1992) found that the pyloric caeca and rear part of the intestine were bioluminescent in specimens identified as *Howella brodiei* from the eastern North Atlantic. Caught mainly with bottom trawls. Common in some areas, but too small and usually not abundant enough to be of commercial importance.

Ogilby (1899) created a new genus and species, *Howella brodiei*, and erected a new family Howellidae for this unusual new species found on the beach at Lord Howe I. in the western Pacific. One genus with ~8 species, possibly 3 in WIO. Recent authors have placed these species in the Acropomatidae, Cheilodipteridae, Moronidae or Percichthyidae. The genus *Percichthys* comprises two freshwater species from Chile and Argentina, with 31–36 vertebrae, but they are not closely related to the Howellidae. The common name basslet is used for various small serranid

fishes, and the English name pricklefishes is here adopted for howellid species in allusion to their distinctive spinoid scales and spiny head bones.

## KEY TO SPECIES

- |    |  |
|----|--|
| 1a | First dorsal-fin spine $> \frac{1}{2}$ length of 2nd spine; 2 separate spines at rear edge of opercle; lateral line continuous or interrupted below 2nd dorsal fin ..... <i>H. simplex</i> |
| 1b | First dorsal-fin spine $< \frac{1}{2}$ length of 2nd spine; 3–8 spines at rear edge of opercle; lateral line interrupted below gap between dorsal fins ..... 2                             |
| 2a | Scale rows 4 or 5 from lateral line to 2nd dorsal-fin origin; 2nd dorsal fin 8 or 9 rays; anal fin 6 or 7 rays; pectoral fins 15–17 rays ..... <i>H. sherborni</i>                         |
| 2b | Scale rows 3 from lateral line to 2nd dorsal-fin origin; 2nd dorsal fin 9–11 rays; anal fin 6–8 rays; pectoral fins 14–16 rays ..... <i>H. atlantica</i>                                   |

*Howella atlantica* Post & Quéro 1991

Atlantic pricklefish

*Howella brodiei atlantica* Post & Quéro 1991: 118 (Atlantic Ocean, 44°12' N, 20°04' W).

Body depth 3.3–3.7 in SL; HL 2.6–3 in SL; eye diameter 2.1–3.4 in HL. First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 9–11 rays; anal fin 3 spines, 6–8 rays; pectoral fins 14–16 rays. GR 7–9/19–23. Rear edge of opercle with 2–8 radiating sharp spines, and separate sharp spine (sometimes bifurcate) slightly above these; lower edge of subopercle with 1 large spine, sometimes with 1–4 smaller accessory spines; rear edge of interopercle with large spine. Head mostly covered with large scales; scale rows 3 from 2nd dorsal-fin origin to lateral line; lateral line interrupted below dorsal-fin gap; LL scales 36–41 (1 or 2 + 7–9 + 25–32).

Body of adults dark brown, head paler, and with greenish gold or bronze sheen ventrally; peritoneum silvery. Attains 11 cm SL.

**DISTRIBUTION** Atlantic Ocean, and likely off south coast of South Africa in WIO. Juveniles known from Madeira, West Africa (Morocco to Senegal), Azores, Canary Is., Cape Verde Is., Ascension I. and St. Helena I., and in tropical western Atlantic (Caribbean and off Brazil). Adults occur from Iceland to Atlantic coast of France.

**REMARKS** Reportedly abundant in some areas. Adults occur near bottom, in 275–200 m, and migrate to near the surface at night; juveniles found in midwater, in 26–300 m. Probably feeds on zooplankton, mainly copepods.

## *Howella sherborni* (Norman 1930)

Smallscale pricklefish

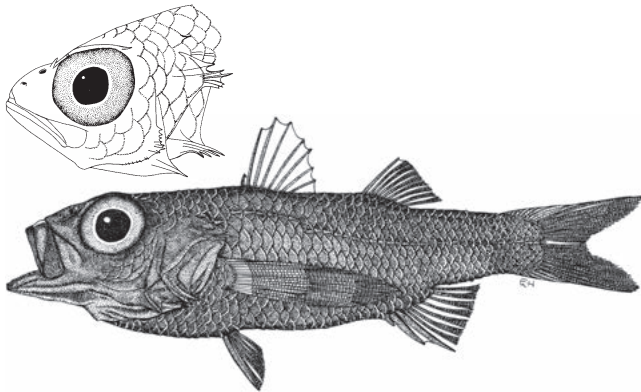
PLATE 50

*Rhctogramma sherborni* Norman 1930: 348, Fig. 39 (west of Cape Town, South Africa).

*Howella sherborni*: Fedoryako 1976\*; SSF No. 176.2\*; Post & Quéro 1991; Adam *et al.* 1998; Prokofiev 2007\*.

Body depth 3.3–3.6 in SL; HL 2.6–3 in SL; eye diameter 2.1–3.4 in HL. First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 8 or 9 rays; anal fin 3 spines, 6 or 7 rays; pectoral fins 15–17 rays. Rear edge of opercle with 3–8 radiating sharp spines and separate sharp spine (sometimes bifurcate) slightly above these; lower edge of subopercle with 1 large spine, and sometimes with 1–4 smaller accessory spines; rear edge of interopercle with large spine. GR 7–9/19–23. Scale rows 4 or 5 from 2nd dorsal-fin origin to lateral line; lateral line interrupted below dorsal-fin gap; LL scales 36–41 (1 or 2 + 7–9 + 25–32).

Body of adults dark brown with silvery reflections, head paler. Attains 11 cm SL.



*Howella sherborni*, 9 cm SL, and head of 7-cm-SL specimen (Atlantic Ocean).

**DISTRIBUTION** Widely distributed in temperate seas. WIO: South Africa (off Cape Agulhas), Melville Bank, Atlantis Seamount and Maldives; also southeastern Atlantic near Vema Seamount, and in southwestern Atlantic, off southern Brazil, Uruguay and Argentina.

**REMARKS** Adults occur near the bottom during the day, in 70–2 350 m, and migrate to near the surface at night; juveniles found in midwater, in 20–300 m. Norman's (1930) original figure of the holotype is inaccurate in showing 3 rows of scales between the 2nd dorsal-fin origin and lateral line; the holotype has 4 scale rows in this area, and the species is characterised by 4 or 5 scale rows.

## *Howella simplex* (Parr 1933)

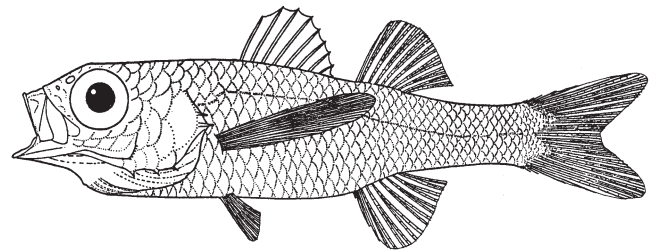
Bigspine pricklefish

*Bathysphyaenops simplex* Parr 1933: 29, Fig. 13 (Caicos Passage, Bahamas); Fedoryako 1976\*; Prokofiev 2007\*.

*Howella simplex*: Heemstra *in* Carpenter & De Angelis 2016.

Body depth 3.3–4.1 in SL; HL 2.8–3.4 in SL; eye diameter 2.1–2.8 in HL. Opercle quadrilateral, upper rear edge with 2 strong spines, lower spine being the tip of horizontal ridge from articular head of bone; lower edge of subopercle with 2 sharp spines, each at end of bony radiating ridge; rear edge of interopercle with 1 large spine. First dorsal fin 8 spines, 1st spine about half length of 2nd spine; 2nd dorsal fin 1 spine, 9 rays; anal fin 3 spines, 7 rays; pectoral fins 13 or 14 rays. GR 6–8/17–21. Scale rows 3 or 4 from 2nd dorsal-fin origin to lateral line; lateral line continuous or interrupted below 2nd dorsal fin; LL scales 30–34.

Body uniformly dark brown, paler ventrally. Attains 10 cm SL.



*Howella simplex*, 9 cm SL, holotype (Bahamas).

Source: Parr 1933; courtesy Peabody Museum of Natural History, Yale University

**DISTRIBUTION** Widely distributed in tropical to subtropical seas, including Caribbean Sea (off Cuba, Bahamas and Puerto Rico), central Atlantic (south and northeast of St Paul's Rocks), western and central Pacific, and likely to be found in WIO off South Africa.

**REMARKS** Adults found in 100–300 m.

## FAMILY SCOMBROPIDAE

### Gnomefishes

Phillip C Heemstra

Body oblong, fusiform. Two separate dorsal fins: 1st dorsal fin with 8 or 9 spines, including a short separate spine between the fins; 2nd dorsal fin with 1 slender spine closely applied to 1st ray, and 13 or 14 segmented rays; anal fin similar to 2nd dorsal fin, with 3 slender spines (1st spine minute), 12 or



13 segmented rays; pectoral fins 15 rays, fin about half HL; caudal fin forked with pointed lobes. Mouth large; maxilla scaly, reaching below mid-eye; supramaxilla large; jaws with large and somewhat compressed canines; 1 or 2 rows of compressed canines on palatines; patch of smaller teeth on vomer; tongue edentate, tip blunt and indented. Preopercle edge smooth and thin. Branchiostegal rays 7; gill membranes separate, free from isthmus. Body and median fins covered with thin, deciduous, ctenoid scales. Vertebrae 10 + 16; supraneural bones 3: 0/0/0+2/1/1/1/.

Occur on outer continental shelf and upper slope. Predatory; good eating. One genus, *Scombrops* Temminck & Schlegel 1845, with 3 species, 1 in WIO.

### *Scombrops boops* (Houttuyn 1782)

Gnomefish

PLATE 51

*Labrus boops* Houttuyn 1782: 326 (Japan).

*Scombrops dubius* Gilchrist 1922: 66, Pl. 11, Fig. 1 (KwaZulu-Natal, South Africa); SFSa No. 496\*.

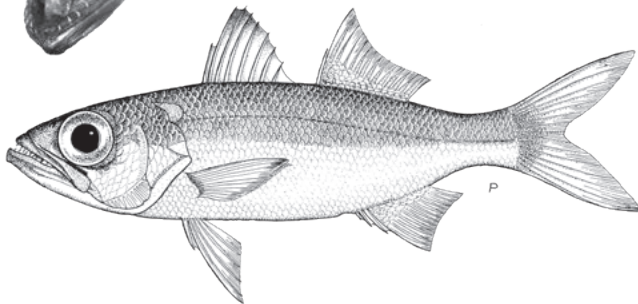
*Scombrops boops*: SSF No. 177.1\*.

Body depth 3.2–3.4 in SL; HL 3 in SL; eye diameter greater than snout length or interorbital width. Lower jaw with 2 or 3 small canines at front, followed by row of 8 or 9 large, spaced, knife-like teeth; upper jaw with 12 or 13 large canines and 2 or 3 fang-like teeth just in front of vomerine tooth patch; 2 elongate patches of cardiform teeth on tongue. GR 2 or 3/12–15. Lateral line continuous; LL scales 51–55.

Adults black. Juveniles greyish, darker dorsally, olive-grey from 1st dorsal fin to caudal fin; 1st dorsal fin blackish distally; dark moustache streak in groove above maxilla. Attains 150 cm TL.



*Scombrops boops*, mouth open to display 2 elongate white tooth patches on tongue (South Africa). © RW Leslie



*Scombrops boops*, 25 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Maputo Bay) to South Africa (False Bay); elsewhere, South China Sea, East China Sea, Korea and Japan.

**REMARKS** Typically deepwater. Caught in trawls on outer continental shelf and upper slope, in 20–400 m; juveniles occur in shallow water. Feeds on fishes, crustaceans and squid.

## FAMILY POMATOMIDAE

### Bluefish or elf

Phillip C Heemstra

Body oblong, compressed, robust, with small, deciduous, cycloid scales over body, cheeks and opercle. Preopercle serrate; opercle with single blunt point on rear edge. Mouth large, terminal; maxilla exposed; lower jaw prominent; sharp compressed teeth in 1 row in both jaws, plus inner series of small depressible teeth in upper jaw; villiform teeth on vomer and palatines. Two dorsal fins: 1st dorsal fin short and low, with 7 or 8 low spines connected by membrane and folding into groove; anal fin with 2 spines, fin slightly shorter than 2nd dorsal fin, both fin bases densely scaly; pectoral fins  $\sim\frac{1}{2}$  HL; pelvic fins thoracic. Branchiostegal rays 7, gill membranes separate and free from isthmus; gill arches 4, a slit medial to 4th arch.

Monotypic genus, *Pomatomus* Lacepède 1802.

### *Pomatomus saltatrix* (Linnaeus 1766)

Bluefish or elf

PLATE 51

*Gasterosteus saltatrix* Linnaeus 1766: 491 ([South] Carolina and Virginia, USA).

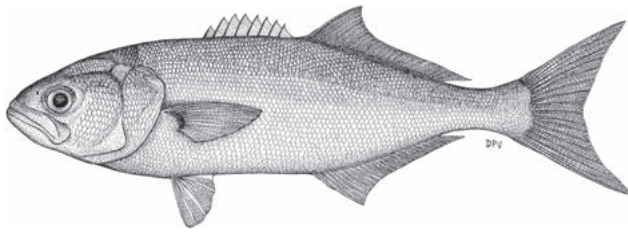
*Temnodon conidens* Castelnau 1861: 41 (Algoa Bay, South Africa).

*Pomatomus saltator*: SFSa No. 547\*; Smith & Smith 1966\*; Van der Elst 1981\*.

*Pomatomus saltatrix*: SSF No. 178.1\*; Whitfield 1998\*; Heemstra & Heemstra 2004\*.

Diagnosis as for family. Dorsal fins 7 or 8 + 1 spines, 23–28 rays; anal fin 2 minute embedded spines, 23–27 rays; pectoral fins 16 rays. LL scales  $\sim$ 90–100; GR 3/10–13.

Head and body green-blue dorsally, silvery below. Attains 130 cm TL (commonly 60 cm TL),  $\sim$ 15 kg (age  $\sim$ 10 years).



*Pomatomus saltatrix*, 24 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Circumglobal in subtropical to temperate continental waters (between ~50° N and 50° S), including Mediterranean Sea and Black Sea but not eastern and northwestern Pacific. WIO: Oman to southwestern India, Mozambique to South Africa (False Bay) and Madagascar.

**REMARKS** Coastal waters, common in surf zone. Matures at ~25 cm SL (~1 year). Feeds on fishes (87% of diet in adults), crustaceans and cephalopods. Off South Africa, migrates from Western Cape northwards to KwaZulu-Natal and spawns there from September to December. The pelagic larvae are carried south by the Agulhas Current; juveniles <4 cm TL spend their first year in estuaries and inshore waters along the south coast. A swift and voracious predator renowned as a strong sport fish. The Latin name *saltatrix* means 'dancing/leaping girl'; this species often leaps from the water in frenzied pursuit of prey or when fighting at the end of a line. They will strike almost any moving lure or bait; when feeding on shoaling prey, they attack the dense shoals in packs, rushing through their prey, biting and ripping fish in a feeding frenzy similar to that of sharks or freshwater piranhas. Excellent eating fresh or smoked, but the flesh softens rapidly and does not keep well; fish should be bled and put on ice immediately after capture. Caught fish should be carefully handled as the razor-sharp teeth can cut a finger to the bone, and the serrated preopercle bone on the cheek can also deliver a severe cut.

## FAMILY LACTARIIDAE

### False trevally

Phillip C Heemstra

Body oblong, strongly compressed; depth subequal to HL, 2.7–3.1 in SL. Two dorsal fins, 1st with 7 or 8 slender spines, and 2nd with 1 slender spine, 19–23 branched rays; anal fin similar in shape to 2nd dorsal fin, with 3 short, slender spines,

25–28 branched rays; pectoral fins shorter than HL; pelvic fins below pectoral-fin bases, with 1 spine, 5 rays; caudal fin forked, with 9 + 8 principal rays; peduncle length subequal to its depth. Head profile slightly convex; eye diameter subequal to snout length. Mouth large and oblique; upper jaw slightly protrusile, maxilla exposed, reaching below mid-eye; no supramaxilla. Teeth small, slender, in bands on jaws, vomer and tongue; 2 or 3 small canines at front of each jaw. Upper rear edge of opercle ends in flat spine. Branchiostegal rays 7; gill membranes separate, narrowly joined to sides of isthmus and to one another. Scales large, cycloid, deciduous. Lateral line complete. Swimbladder large, carrot-shaped in dorsal view; anterior end with 2 appendages connecting base of skull, posterior end extends to end of anal fin. Vertebrae 10 + 14.

Monotypic genus *Lactarius* Valenciennes 1833.

### *Lactarius lactarius* (Bloch & Schneider 1801)

False trevally

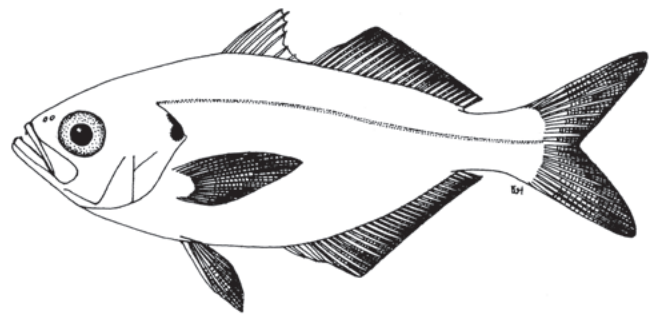
PLATE 52

*Scomber lactarius* Bloch & Schneider 1801: 31 (Tharangambadi, India).

*Lactarius lactarius*: Munro 1955\*; Randall 1995\*.

Diagnosis as for family.

Body silvery, iridescent blue dorsally, with black spot on rear edge of opercle; fins pale yellow. Attains 35 cm TL.



*Lactarius lactarius*, 14 cm SL (SW India).

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman to India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia and possibly Fiji.

**REMARKS** Usually found over soft bottom, in 15–90 m, often in schools. Feeds on sand-dwelling animals. Caught with trawls and gillnets; marketed fresh or dried-salted.

## FAMILY APOGONIDAE

### Cardinalfishes

Thomas H Fraser, Ofer Gon and Manqhai Kraai

Small-sized (to ~25 cm SL); body oblong, slightly compressed. Dorsal fins separate: 1st dorsal fin with either 6 spines (one supernumerary spine) or 7 or 8 spines (two supernumerary spines), and 2nd dorsal fin with 1 spine, 8–14 rays; except *Paxton concilians* (from Australia) with single dorsal fin, with 6 spines, 19 rays. Anal fin with 1 or 2 spines (one supernumerary spine on 1st pterygiophore), 7–18 rays. All dorsal- and anal-fin rays branched, or first ray only unbranched. Pectoral fins 10–20 rays, one or more upper and lower rays may be unbranched. Pelvic fins 1 spine, 5 branched rays, and small axillary scale at base of spine present or absent. Free neuromasts variably present on head, nape, body and caudal fin. Lachrymal with usually 3 pores anteriorly: 1 terminal pore and 2 pores along distal margin (1 pore along distal margin in *Gymnapogon*, *Paxton* and *Pseudamiops*); terminal anterior supraorbital pore at or near edge of snout above the lip. Front of lower jaw with 4 pores: one at tip on each side and one ventrally on each side; smaller pores variably present on snout, interorbital area, suborbitals, nape, cheeks, lower jaw, opercles, posttemporal and LL scales. Branchiostegal rays 7; GR 6–32. Scales usually ctenoid, but may be cycloid, spinoid, or absent (*Gymnapogon*); lateral line with pored scales from posttemporal to caudal-fin base or foreshortened, or pored scales absent. Swimbladder oval, unmodified, with antero- or postero-dorsal position. Vertebrae 24–26.

Most species are diurnally cryptic and nocturnally active; accordingly, most have relatively large eyes, with illumination levels influencing behaviour patterns. Some species show obligatory or loose associations with luminous bacteria, macroalgae, marine spermatophytes, sponges, corals, molluscs, crustaceans, echinoids, and other species of fishes. These associations range from mutualism to mimicry. Many species are brightly coloured, and some exhibit sexual dimorphism, yet only one species *Fibramia lateralis* from the Western Pacific is known to show permanent sexual dichromatism. Meristic and chromatic variation for many species appears very stable over broad geographic ranges. In 4 genera (including *Jaydia*, *Taeniamia* and *Verulux* in WIO), some species have luminescent organs; all species of *Siphamia* utilise luminescent bacterial symbionts in well-developed organs, whereas in other genera part of the biochemical system is scavenged from certain food items (such as *Cypridina* ostracods).

Apogonids are dioecious and most species exhibit male parental care by mouth brooding; however, brooding habits for species of *Amioides*, *Holapogon* and *Paxton* are not known. Depending on species, the eggs measure 0.2–4.5 mm in

diameter, and number 150–22 000, with configurations of larger and fewer eggs or smaller and more numerous eggs occurring in an incubated egg ball. Randall (2004) records that *Pseudamiops diaphanes* carries a ball of eggs *outside* the mouth, and similar behaviour has been observed for an unidentified apogonid in Hawaii. There are almost no reports of pelagic larvae, with larvae as yet collected only close to the habitats of adults (Irisson *et al.* 2010), even though numerous species are widespread. Leis *et al.* (2015) estimated the mean pelagic larval period as 14–37 days.

Widely distributed in mainly tropical to subtropical waters, predominantly in and around reefs, but a few representatives are warm-temperate to temperate; thus, apogonids are restricted to waters warmer than 13 °C, and mostly found in >20 °C. They occur from nearshore to ~300 m deep. Few other teleost groups occupy such diverse major habitats as cardinalfishes, ranging from rocky and coral reefs, vertical walls, marine caves, rubble or sand-mud bottom of continental shelf, to estuaries, bays, lagoons, seagrasses, and lowland freshwater rivers (in New Guinea, Australia, and western Pacific islands).

The molecular phylogenetic study of Mabuchi *et al.* (2014) proposed recognition of 4 apogonid subfamilies, with 14 tribes within the largest subfamily, and at least 358 valid species. Modern revisions of the family began in the 1950s and have continued with the steady addition of new species and generic regroupings. Molecular research is resulting in revised concepts of species relationships, with outcomes that complement the re-examination of morphological characters, especially the colour patterns of larvae, juveniles and adults.

The majority of genera and species are classified in the subfamily Apogoninae, with 14 tribes; the members show a circumtropical distribution, in numerous habitats and reaching all the isolated, warmer oceanic islands. The subfamily Amioidinae is represented by two monotypic genera of relatively deep-dwelling species (one known only from the Indian Ocean, and the other found throughout the Indo-West and central Pacific). The subfamily Pseudamiinae is represented by a single genus with 7 species, found throughout the Indo-West and central Pacific, generally on coral reefs and in atoll lagoons and marine bays; the species are cryptic and seldom seen during the day. The subfamily Paxtoninae is represented by one species, from northern Australia, known from few specimens collected in benthic trawls. Species endemism in the family is known in the Red Sea, Persian/Arabian Gulf, along the coasts of East Africa, Indonesia and Australia, and at isolated islands in the Atlantic and Pacific oceans. Some species have distributions confined to the Atlantic, Indian or Pacific oceans, but most are distributed within the broad Indo-Pacific faunal area. Some species are available in fish markets and sold for food; others are targeted for the aquarium trade, and some are used as bait in tuna fisheries.

Apogonids from the Atlantic Ocean (26 species) and the eastern Pacific Ocean (5 species) have been well-studied. Apogonids have been reported from India by Day (1868, 1875, 1888), Jones (1964), Jones & Kumaran (1965, 1980), Suresh & Thomas (2007) and Koya *et al.* (2011). Some apogonids that are generally thought to be restricted to WIO may occur to the Bay of Bengal or the Andaman and Nicobar islands. Likewise, some species known from the east coast of India, or the Andaman and Nicobar islands, are likely to eventually be captured at Sri Lanka or southwestern India (e.g., *Ostorhinchus nigricans* and *Yarica hyalosoma* [Bleeker 1852]). Several species uncertainly collected or reported from the west coast of India are included here (e.g., *Apogonichthyoides nigripinnis*). Kyushin *et al.* (1977) photographed a species of *Apogon* at the Andaman Is., here identified as *Holapogon maximus*, a rarely collected species from the Arabian Sea recently reported along the southwest coast and southeast coasts of India (Koya *et al.* 2011; Saravanan *et al.* 2014). Of genera represented in WIO, *Ostorhinchus*, *Fowleria*, *Foa* and *Cercamia* have several undescribed species. Some apogonids reported in existing publications and identified only to genus (not to species) are included here in *Ostorhinchus*, *Fowleria* and *Pseudamiops*.

124 species known in WIO, including the Red Sea and Persian/Arabian Gulf, and an additional 205+ species known from the eastern Indian Ocean to the western or central Pacific.

#### KEY TO SUBFAMILIES

- 1a Two dorsal fins: 1st dorsal fin with spines of unequal length, 2nd dorsal fin with 1 spine, 8–13 rays ..... 2
- 1b One dorsal fin, with 6 spines (spines 3–6 of similar length), 19 rays ..... **Paxtoninae** [not in WIO]
  
- 2a Supramaxilla large, small or absent; if supramaxilla large, then 1st dorsal fin with 6 spines, and 2nd dorsal fin with 1 spine, 9 or 10 rays ..... 3
- 2b Supramaxilla large, and 1st dorsal fin with 7 spines, 2nd dorsal fin with 1 spine, 9 or 10 rays, or 1st dorsal fin with 8 spines, 2nd dorsal fin with 1 spine, 9 rays ..... **Amioidinae**
  
- 3a Lateral line single, LL scales present or absent; if no scales, lateral line composed of free neuromasts ..... **Apogoninae**
- 3b Lateral line double, LL scales always present; 1st lateral line from posttemporal and with pored or notched scales, 2nd lateral line abdominal and with notched scales only ..... **Pseudamiinae**

#### KEY TO ALL GENERA

[External characters are used where possible. Where the key is inclusive of all genera in either a subfamily or tribe, that half of the couplet so indicates. Ten genera are not known in WIO.]

- 1a Some pored LL scales present ..... 3
- 1b No LL scales with pores, or body naked ..... 2
  
- 2a Single dorsal fin, with 6 spines ..... [subfamily **Paxtoninae**]  
*Paxton* [not in WIO]
- 2b Two dorsal fins: 1st dorsal fin 6–8 spines, 2nd dorsal fin 1 spine ..... [tribe **Gymnapogonini**] 4
  
- 3a Single lateral line with pored scales, sometimes partially pored, followed by scales with pits or grooves ..... 7
- 3b Two inconspicuous lateral lines: upper line with pored scales and then notched scales, lower line with notched scales only ..... [subfamily **Pseudamiinae**] *Pseudamia*
  
- 4a Scales present on body ..... 5
- 4b Body naked ..... *Gymnapogon*
  
- 5a Second dorsal fin 1 spine, 8 or 9 rays ..... 6
- 5b Second dorsal fin 1 spine, 12 or 13 rays ..... *Lachneratus*
  
- 6a Anal fin 11–13 rays ..... *Cercamia*
- 6b Anal fin 8 or 9 rays ..... *Pseudamiops*
  
- 7a Lower sides with silvery or blackish band (bioluminous in life) from hyal region, along abdomen, and onto peduncle ..... [tribe **Siphamiini**] *Siphamia*
- 7b No bioluminous silvery or blackish band along lower sides ... 8
  
- 8a Longest procurrent caudal-fin rays segmented ..... 10
- 8b Longest procurrent caudal-fin rays spinous, not segmented ... 9
  
- 9a Second dorsal fin and anal fin each with 9 rays ..... *Sphaeramia*
- 9b Second dorsal fin 13–15 rays; anal fin 12–14 rays ..... *Pterapogon* [not in WIO]
  
- 10a Second dorsal fin 8–13 rays ..... 11
- 10b Second dorsal fin 14 or 15 rays; anal fin 13 or 14 rays ..... *Quinca* [not in WIO]
  
- 11a LL scales <29 ..... 12
- 11b LL scales >32 ..... [tribe **Lepidamiini**] *Lepidamia*

Continued ...

## KEY TO ALL GENERA

- 12a Preopercle with lower edge ossified, and serrated, crenulated or smooth ..... 13
- 12b Preopercle with unossified flap on lower edge ..... [tribe Apogonini] 15
- 13a First 3 suborbitals with upper edge smooth to crenulated ... 19
- 13b First 3 suborbitals with upper edge strongly serrated ..... [tribe Pristiapogonini] 14
- 14a First dorsal fin 6 spines; dark spot on body below lateral line and under 1st dorsal fin; dark spot(s) below rear of 2nd dorsal fin; no stripe from snout onto opercle and through eye ..... *Pristicon*
- 14b First dorsal fin 7 spines; no spots on body below dorsal fins; stripe present from snout onto opercle and through eye, sometimes continuing onto body ..... *Pristiapogon*
- 15a Predorsal area scaly ..... 16
- 15b Dorsal midline to 1st dorsal-fin origin not scaly ..... *Astrapogon* [not in WIO]
- 16a Anal fin 8 rays ..... 17
- 16b Anal fin 9 rays ..... *Paroncheilus* [not in WIO]
- 17a Stomach and intestine pale ..... 18
- 17b Stomach and intestine black ..... *Zapogon*
- 18a Preopercular flap not extending past vertical edge of bone ..... *Apogon*
- 18b Preopercular flap extends past vertical edge of bone ..... *Phaeoptyx* [not in WIO]
- 19a Supramaxilla large (easy to detect) ..... 20
- 19b Supramaxilla small (difficult to detect) or absent ..... 23
- 20a First dorsal fin 7 or 8 spines ..... [subfamily Amioiinae] 21
- 20b First dorsal fin 6 spines ..... [tribe Glossamiini] 22
- 21a Anal fin 8 rays; teeth canine-like; dark bar at caudal-fin base ..... *Amioides*
- 21b Anal fin 7 rays; teeth villiform; body with spots ..... *Holapogon*
- 22a Preopercle edge serrate; vertically elongate dark spot at caudal-fin base ..... *Yarica* [not in WIO]
- 22b Preopercle edge smooth; body with many markings ..... *Glossamia* [not in WIO]
- 23a Anal fin 8 or 9 rays ..... 27
- 23b Anal fin 10–19 rays ..... 24
- 24a Preopercle edge serrate ..... [tribe Archamiini] 26
- 24b Preopercle edge smooth ..... [tribe Rhabdamiini] 25
- 25a Anal fin 10 or 11 rays; 1st dorsal fin 7 spines; 2nd dorsal fin 1 spine, 10 or 11 rays; some canine teeth present ..... *Rhabdamia* (*Bentuviaichthys*)
- 25b Anal fin 12 or 13 rays; 1st dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; teeth villiform ..... *Rhabdamia* (*Rhabdamia*)
- 26a Anal fin 15–17 rays; no bars or stripes on head or body, except small black spot at caudal-fin base; 1st spine of dorsal fin 1.1–1.4 in 2nd spine ..... *Archamia*
- 26b Anal fin 12–19 rays; 2 yellow bars on head, or 1–23 bars on body, or darkish or yellowish stripe along midline; 1st spine of dorsal fin 1.3–3.4 in 2nd spine ..... *Taeniamia*
- 27a No canine teeth, but some lateral teeth on lower jaw may be slightly enlarged; 1st dorsal fin 6–8 spines ..... 28
- 27b Canine and canoid teeth present; 1st dorsal fin 6 spines ..... [tribe Cheilodipterini] *Cheilodipterus*
- 28a Stomach and intestine pale ..... 29
- 28b Stomach and intestine with melanophores or completely blackish ..... 30
- 29a First dorsal fin 7 or 8 spines ..... 34
- 29b First dorsal fin 6 spines ..... *Fibramia*
- 30a Head with  $\geq 1$  stripes or with mark on cheeks; body may have longitudinal stripes, irregular marks or vertical bars ..... 33
- 30b No stripes on head; body without stripes but may have bars ..... 31
- 31a First dorsal fin 6 spines; anal fin 9 rays; no mark on cheeks ... 32
- 31b First dorsal fin 7 spines; anal fin 8 rays; narrow or broad mark on cheeks ..... *Nectamia*
- 32a Preopercle edge serrate; peduncle and/or caudal-fin base with small dark spot or large diffuse darkish region; no small dark mark on snout ..... *Zoramia*
- 32b Preopercle edge smooth; no dark mark on peduncle or at caudal-fin base; snout with small dark mark ..... [tribe Veruluxini] *Verulux*

Continued ...

## KEY TO ALL GENERA

- 33a Dorsal fin with 4th spine longer than 3rd spine, and caudal fin emarginate, truncate or rounded (not forked) ..... *Jaydia*
- 33b Dorsal fin with 3rd spine longer than 4th spine, or 4th spine longer than 3rd, and caudal fin forked; no mark on cheeks ..... [tribe *Ostorhinchini*] *Ostorhinchus*
- 34a Preopercle edge serrate ..... 38
- 34b Preopercle edge smooth ..... [tribe *Apogonichthyini*] 35
- 35a No palatine teeth ..... 36
- 35b Teeth present on palatines ..... *Foa*
- 36a LL scales pored from posttemporal to caudal-fin base ..... 37
- 36b LL scales pored usually for short length anteriorly, and then with pits past dorsal fins ..... *Fowleria* [IN PART]
- 37a First dorsal fin usually with 8 spines, or with 7 spines and with dark mark on opercle ..... *Neamia* [with fused hypurals 1+2 and 3+4] or *Fowleria* [IN PART: species with free hypurals]
- 37b No dark mark on opercle ..... *Apogonichthys*
- 38a Posttemporal serrate; basisphenoid present ..... 39
- 38b Posttemporal smooth; basisphenoid absent ..... *Vincenia* [not in WIO]
- 39a Five separate hypurals ..... *Apogonichthyoides*
- 39b Hypurals 1+2 fused ..... *Ozichthys* [not in WIO]

## SUBFAMILY AMIOIDINAE

Fraser & Mabuchi 2014

First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 9 or 10 rays; anal fin 2 spines, 7 or 8 rays; supramaxilla large; posttemporal with 1 or 2 serrations; preopercle ridge smooth, edges serrate; scales ctenoid. Relatively deep-dwelling; mouthbrooding habit unknown. Two monotypic genera, both in WIO.

### GENUS *Amioides* Smith & Radcliffe 1912

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 or 10 rays; anal fin 2 spines, 8 rays; pectoral fins 14 rays. Supramaxilla large; premaxilla with villiform teeth, 2 large canines near

symphysis, and a few outer teeth slightly enlarged; dentary with narrow band of villiform teeth, 1 canine anteriorly, 2 or 3 canines and some other slightly enlarged teeth on sides; vomer and palatines with 1 row of teeth. Anterior nostrils with raised rim, posterior nostrils flat. Preopercle ridge smooth, edges serrate; suborbital edges smooth; posttemporal with one large and one small spine. GR 11 + 2 on upper arch. LL scales 24; median predorsal scales 6; circumpeduncular scales 14; scales present on nape, cheeks, breast and body ctenoid; pelvic fins with small axillary scale. One species.

### *Amioides polyacanthus* (Vaillant 1877)

PLATE 52

*Cheilodipterus polyacanthus* Vaillant 1877: 29 (Réunion, Mascarenes).  
*Coranthus polyacanthus*: Smith 1961\*; Fricke 1999; Fricke *et al.* 2009.  
*Amioides polyacanthus*: Fraser 2013.

Diagnosis as for genus.

Body brown dorsally, silvery ventrally; darkish band on sides not reaching to head or peduncle; stripe present on lower jaw and snout; cheek mark broad; dark vertical mark behind preopercle; faint dark bar at caudal-fin base; no stripes on fins, except dark area between 2nd and 4th dorsal-fin spines; peritoneum blackish, stomach and intestine pale. Attains 22 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Madagascar, Comoros, Réunion, and expected at other islands of Indian Ocean; elsewhere to Indonesia, southern Japan, Palau and Vanuatu.

**REMARKS** Relatively deep-dwelling, in 77–200 m.

### GENUS *Holapogon* Fraser 1973

First dorsal fin 8 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 7 rays; pectoral fins 13 or 14 rays. Supramaxilla large; villiform teeth present on premaxillae, dentaries, vomer and palatines. Preopercle ridge smooth, edges serrate; posttemporal with single serra; suborbitals smooth except for 1 or 2 spines on 2nd suborbital. GR 15–17. Scales on head and body ctenoid; LL scales 23–25, all pored; median predorsal scales 5; scale rows 2 above lateral line; circumpeduncular scales 12. One species.

*Holapogon maximus* (Boulenger 1888)

Titan cardinalfish

PLATE 59

*Apogon maximus* Boulenger 1888: 655 (Muscat, Oman, Gulf of Oman).*Holapogon maximus*: Fraser 1973; Randall 1995\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010; Koya *et al.* 2011\*; Saravanan *et al.* 2014\*.

Diagnosis as for genus.

Body pale golden yellow, with irregular lines formed by dark brown spots; dusky oblique streak from nape to lower edge of opercle (fading in adults), another stripe through eye to lower edge of subopercle; fins uniformly pale yellow, except lower pectoral-fin rays with short white and brown bars; spots on body of juveniles coalesced below 2nd dorsal fin along midline and at caudal-fin base; peritoneum silvery, without darkish spots; stomach and intestine pale. Attains 25 cm SL.

*Holapogon maximus* (SW India). KV Akhilesh © CMFRI

**DISTRIBUTION** Indian Ocean. WIO: Somalia to Gulf of Oman and India; elsewhere, Andaman Is.

**REMARKS** Rare in shallow water off the Arabian Peninsula; found at ~10–100 m, and associated with upwellings of cooler water.

**SUBFAMILY APOGONINAE**

Günther 1859

First dorsal fin 6–8 spines; dorsal fins divided by deep notch or widely separated; epineurals present on all but last 1 or 2 pleurals. Mouthbrooding of eggs. *Gymnapogon* and *Pseudamiops* have traditionally been placed in the Pseudamiinae; however, recent evidence supports moving *Gymnapogon* and *Pseudamiops* (of tribe Gymnapogonini) to the Apogoninae, along with *Cercamia* and *Lachneratus*, and retaining *Pseudamia* as the sole genus of Pseudamiinae (Mabuchi *et al.* 2014). Comprises 34 genera; 26 genera in WIO.

*Tribe Apogonichthyini* Snodgrass & Heller 1905

First dorsal fin 7 or 8 spines; LL scales 22 or 23, pored scales 6–23, and pitted scales 3–17; caudal fin truncate or rounded; body reddish to dark brown. Five genera, 4 represented in WIO.

**GENUS** *Apogonichthys* Bleeker 1854

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–17 rays; caudal fin rounded. Preopercle ridge and edges smooth, horizontal portion narrow with weakly ossified edge. Supramaxilla small. No palatine teeth. Anterior nostrils tubular; posterior nostrils flat. GR usually 5 or 6 (rarely 7), usually rudiments, and none on upper limb (rarely 1). Scales cycloid on cheeks, opercles, nape and predorsal region, becoming ctenoid on body; median predorsal scales 4 or 5; LL scales 22 or 23, all pored; scale rows 2 above lateral line. Body reddish or brownish; pectoral fins with parallel dark and pale spots. Two species, both in WIO.

**KEY TO SPECIES**

- 1a First dorsal fin with ocellated dark spot ..... *A. ocellatus*  
 1b First dorsal fin uniformly coloured ..... *A. perdix*

*Apogonichthys ocellatus* (Weber 1913)

Ocellated cardinalfish

PLATE 56

*Apogon ocellatus* Weber 1913: 231 (Sanguisiapo and North Ubian, Sulu Archipelago, Philippines; Kwandang Bay, Sulawesi; Nusa Laut, Indonesia).

*Apogonichthys ocellatus*: Smith 1961\*; SSF No. 175.28\*; Fricke 1999; Fricke *et al.* 2009.

Pectoral fins 16 or 17 rays; median predorsal scales 4.

Body brownish, sometimes with darkish spots; large oblong darkish mark on cheeks; ocellated spot on rear half of 1st dorsal fin; other fins (except pectoral fins) brownish with tiny blackish spots. Attains 40 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: East Africa to South Africa (Transkei region), Madagascar, Comoros and Mauritius; elsewhere to Indonesia, Philippines, southern Japan, Micronesia, Australia, Great Barrier Reef, Tuamotu Is., Rapa Iti and Marquesas Is.

**REMARKS** Found in shallow water (to ~3 m deep), in sheltered lagoons and harbours, among rocks and rubble or clumps of brown algae. Nocturnal.

## *Apogonichthys perdix* Bleeker 1854

Perdix cardinalfish

PLATE 56

*Apogonichthys perdix* Bleeker 1854: 321 (Larantuka, Flores, Indonesia); Smith 1961\*; SSF No. 175.29\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Gon & Randall 2003\*.

*Apogon (Apogonichthys) infuscus* Fourmanoir in Roux-Estève & Fourmanoir 1955: 197 (Abu Latt/Al Lith I., Saudi Arabia, Red Sea).

Pectoral fins 14 or 15 rays; median predorsal scales 5.

Body, median fins and pelvic fins brownish to reddish, and body may have darkish spots creating semi-obscure striping; no ocellated spot on 1st dorsal fin and no oblong darkish mark on cheeks, but sometimes with 3 other darkish marks on head: from eye onto cheek, behind eye, and from eye to posttemporal above LL origin. Attains 43 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa to South Africa (Sodwana Bay), Comoros, Seychelles, Mauritius and Chagos; elsewhere to Indonesia, southern Japan, Australia, Rapa Iti and Hawaii.

**REMARKS** Found inshore in association with algae or seagrasses on coral rubble, and on reef flats and dead reefs, to ~30 m deep. Secretive and nocturnal.

### GENUS *Foa* Jordan & Evermann 1905

First dorsal fin 7 spines; 2nd dorsal fin 2 spines, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 11 or 12 rays; caudal fin truncate to rounded. Preopercle ventral edge not ossified, vertical edge narrowly smooth and ossified, and ridge smooth; suborbitals and posttemporal smooth. Teeth villiform, in band on dentaries and premaxillae, and in 1 or 2 rows on vomer and palatines. Anterior nostrils tubular. GR 6–9. Scales ctenoid on head and body, and ctenoid or similarly sized cycloid scales in 1 row between lateral line and dorsal fin; scales on peduncle sheathing base of caudal-fin rays; LL pored scales 3–14, and scales posteriorly to caudal-fin base each with single pit. Two colour patterns: body brownish to reddish (no ocelli or ocellus-like spots on head, body or fins); pelvic fins with outer rays whitish, middle rays darkish, and inner rays with narrow paler margin. Or, body almost uniformly dark brownish to reddish, and often variably marked with whitish or brownish spots; first 4 interspinous dorsal-fin membranes variably marked with narrow whitish marks, or with pale zone bordered by blackish

membranes distally and proximally; other median fins with pale membranes and rays, or with short, narrow, brownish to reddish marks on rays interrupting pale regions and forming radiating bars on caudal fin or forming stripes on the soft-rayed portion of the dorsal and anal fins. At least 7 species, 2 in WIO (plus at least 2 others undescribed).

#### KEY TO SPECIES

- |    |   |       |                            |
|----|---|-------|----------------------------|
| 1a | Body and peduncle with irregular darkish bars | ..... | <i>F. fo</i>               |
| 1b | Body with darkish spots                       | ..... | <i>F. madagascariensis</i> |

## *Foa fo* Jordan & Seale 1905

Weedy cardinalfish

PLATE 57

*Foa fo* Jordan & Seale 1905: 799 [not Fig. 5] (Negros and Cavite, Philippines); Gon & Randall 2003\*; Heemstra *et al.* 2004; Fraser & Randall 2011\*.

*Apogonichthys zuluensis* Fowler 1934: 424, Fig. 10 (Lake St Lucia, South Africa).

Median predorsal scales 4; LL scales 23 (14 pored scales followed by 9 scales with partial pores or pits); transverse scale rows 1 above lateral line, and 4 below lateral line; circumpeduncular scales 12. GR 8.

Body brownish, with 5 irregular darker vertical bars (1st in front of 1st dorsal fin, 2nd from rear half of 1st dorsal fin through rear half of pelvic fin, 3rd narrow bar between soft-rayed dorsal and anal fins, 4th on peduncle, and 5th at caudal-fin base); body scales uniformly coloured or with pale edges; whitish spot on rear of 1st dorsal fin and on pectoral-fin axils, and 3 whitish spots at caudal-fin base set partially in a darkish bar; other median fins pale with darkish banding. Attains 52 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya, Mozambique, South Africa, Comoros, Mascarenes, Chagos and Maldives; not known from Seychelles; elsewhere to Philippines, southern Japan, New Guinea, Australia and Society Is.

**REMARKS** Found inshore and enters estuaries and calm coastal bays, usually on mud or silty substrate with algae-covered rock outcrops or isolated soft corals, to ~82 m deep. Nocturnal. Often misidentified as *F. brachygramma*, which is endemic to Hawaii.



*Foa madagascariensis* Petit 1931

PLATE 58

*Foa madagascariensis* Petit 1931: 91 (Sarodrano, Madagascar); Smith 1961; Fraser & Randall 2011.

*Foa brachygramma* (non Jenkins 1903): Smith 1961, 1965; SSF No. 175.38\*.

Lateral-line scales 22 (7–9 pored scales followed by 13–15 pitted scales); transverse scale rows 1 above lateral line, and 5 below lateral line.

Head and body brownish, belly paler; body with brownish spots in lines, and scales of belly with larger and wider-spaced spots; pelvic-fin outer rays pale, inner rays blackish, and base mostly pale; pectoral-fin membranes hyaline; 1st dorsal-fin membranes darkish, other median fins with banding. Attains 41 mm SL.

**DISTRIBUTION** WIO: Tanzania, South Africa (St Lucia) and Madagascar, and possibly elsewhere in Indian Ocean.

**REMARKS** Found in shallow water among *Cymodacea* seagrasses, near mouths of streams, and in tidal streams.

**GENUS** *Fowleria* Jordan & Evermann 1903

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 13 or 14 rays; caudal fin rounded. Preopercle ridge and edges smooth, horizontal flap narrow and unossified; suborbitals and posttemporal smooth. Supramaxilla small. Teeth villiform on both jaws and on vomer; no teeth on palatines. GR 4 or 5 (0 or 1 on upper limb). Scales ctenoid on head and body; median predorsal scales 4–6; LL scales 23 (6–12 pored scales followed by 11–17 pitted scales). Body brownish to reddish; variable marks on cheeks extending to preopercle; opercle often with ocellus-like dark spot with pale outline; peritoneum, stomach and intestine pale. At least 8 species, 6 in WIO (1 undescribed).

**KEY TO SPECIES**

- |    |  |                     |
|----|--|---------------------|
| 1a | Lateral line with $\leq 12$ pored scales, the rest pitted .....                            | 2                   |
| 1b | LL scales all pored .....  | <i>Fowleria</i> sp. |
| 2a | No dark spot on opercle; pectoral fins 13 rays .....                                       | <i>F. vaiulae</i>   |
| 2b | Opercle with dark spot, with or without dark outer ring; pectoral fins 13 or 14 rays ..... | 3                   |

Continued ...

**KEY TO SPECIES**

- |    |  |                     |
|----|--|---------------------|
| 3a | Body with discrete dark spots (one per scale) forming parallel lines; pectoral fins 13 or 14 rays .....                    | <i>F. isostigma</i> |
| 3b | Body without dark spots forming lines, but may have small, varied, dark marks or darkish bars; pectoral fins 14 rays ..... | 4                   |
| 4a | Opercle spot nearly round, without dark outline; sides of body and peduncle with regularly spaced darkish bars .....       | <i>F. marmorata</i> |
| 4b | Opercle spot an irregular circle, with or without dark outline; if present, bars on body faint .....                       | 5                   |
| 5a | Cheeks with pale mark with narrow darkish edges; body uniformly coloured or with a few small darkish spots ...             | <i>F. aurita</i>    |
| 5b | Cheek mark without darkish edges; body and fins mottled .....  | <i>F. variegata</i> |

*Fowleria aurita* (Valenciennes 1831)

Crosseyed cardinalfish

PLATE 58

*Apogon auritus* Valenciennes in Cuv. & Val. 1831: 443 (Mauritius, Mascarenes).

*Papillapogon auritus*: SFSA No. 491\*.

*Fowleria aurita*: Smith 1961\*; SSF No. 175.39\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Krishnan & Mishra 1994; Randall 1995\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Al-Jufaili *et al.* 2010; Gon & Bogorodsky 2010.

Diagnosis as for genus. Pectoral fins 14 rays.

Head and body uniformly reddish brown, without darker blotches, but may have tiny dots; cheeks with pale mark, edged with dark line below and fainter darkish area above; spot on opercle partly rounded, with anterior edge semi-parallel to preopercle edge, and outlined by pale area and darkish line above (but not behind); dorsal, anal and pelvic fins usually uniformly pale (see Remarks); caudal fin uniformly darkish with pale edges. Attains 92 mm SL.



*Fowleria aurita* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Oman to South Africa (KwaZulu-Natal), Madagascar, Comoros, Aldabra, Seychelles, St Brandon Shoals, Mascarenes, Chagos, India and Sri Lanka; elsewhere to Ryukyu Is., Australia, Lord Howe I., Samoa and Mangareva I. (Gambier Is.).

**REMARKS** Found in tidepools, usually among weeds, and inshore reef areas, from near surface to ~30 m deep. One of the two colour forms shown in Gon & Bogorodsky (2010: Fig. 1c) as *Fowleria variegata* is *F. aurita*, and the same colour form is identified as *F. aurita* in Randall (1995: Fig. 403). There are two colour forms of *F. aurita*: one uniformly reddish on all fins, including the pelvic-fin spine and rays; and the other with alternating whitish and reddish marks on the fin rays, most prominently on the pelvic-fin spine and rays.

### *Fowleria isostigma* (Jordan & Seale 1906)

Dotted cardinalfish

PLATE 58

*Apogonichthys isostigma* Jordan & Seale 1906: 251, Fig. 45 (Apia, Upolu I., Samoa).

*Fowleria isostigma*: Goren & Dor 1994; Gon & Bogorodsky 2010.

Diagnosis as for genus. Pectoral fins 13 or 14 rays.

Head uniformly coloured; body with small dark spots on paler background (spots smaller than scales, roughly in ~6 or 7 rows, and extending onto nape in Red Sea population); cheeks with pale mark, edged in darkish lines above and below; spot on opercle outlined by pale area, with narrow darkish line above but not behind it, and anteriorly squared off parallel to preopercle edge, rounded posteriorly and not reaching below upper edge of pectoral-fin base; dorsal, anal and pelvic fins uniformly coloured; caudal fin uniformly darkish. Attains 84 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, western coast of India; elsewhere, Sri Lanka, Indonesia, southern Japan, northern Australia, New Caledonia, Samoa and Rapa Iti.

**REMARKS** Found on muddy bottom and near rocky areas, from near surface to ~17 m deep.

### *Fowleria marmorata* (Alleyne & Macleay 1877)

Marbled cardinalfish

PLATE 58

*Apogonichthys marmoratus* Alleyne & Macleay 1877: 268, Pl. 5, Fig. 2 (Cape Grenville, Australia).

*Fowleria marmorata*: Goren & Dor 1994; Gon & Randall 2003\*; Gon & Bogorodsky 2010.

Diagnosis as for genus. Pectoral fins 14 rays.

Head with irregular dark marks behind eye and above preopercle; snout and lips with melanophores (but no alternating markings, bars or spots); sides of body and peduncle with  $\leq 9$  bars, and small darkish spots often present; cheeks with pale mark, edged with darkish straight line below and paler line above; large dark rounded spot on opercle reaching to or below level of pectoral-fin base, with pale outline and small darkish mark above but not behind; dorsal, anal and pelvic fins uniformly pale or with some mottling. Attains 51 mm SL.



*Fowleria marmorata*, 45 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa to northern Mozambique and Comoros; elsewhere to Australia, Line Is., Society Is., Marquesas Is. and Solomon Is.

**REMARKS** Found inshore over rocky bottom and on outer reefs over coral and algal rubble slopes, from near surface to ~30 m deep. Nocturnal.

### *Fowleria vaiulae* (Jordan & Seale 1906)

Mottled cardinalfish

PLATE 58

*Foa vaiulae* Jordan & Seale 1906: 249, Fig. 43 (Apia, Upolu I., Samoa).

*Fowleria abocellata* Goren & Karplus 1980: 232, Pl. 1, Fig. 1 (Eilat, Israel, Gulf of Aqaba, Red Sea); Winterbottom *et al.* 1989\*; Goren & Dor 1994; Heemstra *et al.* 2004; Al-Jufaili *et al.* 2010.

*Fowleria vaiulae*: Anderson *et al.* 1998; Gon & Randall 2003\*; Gon & Bogorodsky 2010.

Diagnosis as for genus. Pectoral fins 13 rays.

Body with ~7 reddish bars with pale interspaces; snout, lips and cheeks with alternating pale and reddish markings; reddish mark behind eye to upper opercle (no discrete dark spot on opercle); median fins and pelvic fins mottled with alternating reddish and whitish marks. Attains 42 mm SL.



*Fowleria vaiulae*, 12 mm SL, juvenile pattern (Dahlak Archipelago).  
Source: Gon & Randall 2003

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Comoros, Seychelles, Mauritius, Rodrigues, Chagos, Maldives and Sri Lanka; elsewhere widespread to Philippines, Marshall Is., Australia, New Caledonia, Fiji, Samoa, Tonga, Line Is. and Loyalty Is.

**REMARKS** Occurs inshore, often among *Acropora* corals, from near surface to ~35 m deep.

### *Fowleria variegata* (Valenciennes 1832)

Variegated cardinalfish

PLATE 58

*Apogon variegatus* Valenciennes 1832: 55 (Mauritius, Mascarenes).  
*Apogon punctulatus* Rüppell 1838: 88, Pl. 22, Fig. 4 (Massawa, Eritrea, Red Sea).  
*Apogon variegatus* Fourmanoir & Crosnier 1964: 5, Fig. 2 (Nosy Be, Madagascar) [name preoccupied, homonym also a synonym].  
*Fowleria variegata*: Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Al-Jufaili *et al.* 2010; Gon & Bogorodsky 2010.

Diagnosis as for genus. Pectoral fins 14 rays.

Head and body with small, varied, dark marks not forming lines; cheek mark pale and irregular, edged in darkish blotches above and below, sometimes curving downwards; large dark spot on opercle with pale ring and then comma-like narrow dark outline, front of spot squared off parallel to edge of preopercle, rounded posteriorly; fins mottled, with dark and pale areas generally connected to appear semi-linear, except pectoral fins transparent. Attains 75 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Kenya, Tanzania, Madagascar, Comoros, Aldabra, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere widespread to Philippines, southern Japan, Australia and New Caledonia.

**REMARKS** Found on coral reefs, dead reefs and rubble, and in seagrass beds of inner bays and shallow lagoons, from near surface to ~32 m deep. Nocturnal.

### *Fowleria* sp.

PLATE 58

Lateral-line scales all pored. Head, body and fins uniformly reddish brown, without darkish blotches; body scales with darker edges; cheek mark with dark lines above and below, upper line curving downwards; spot on opercle ringed by pale area, with thin faint darkish outline above but not behind, and spot partly rounded, with anterior edge semi-parallel to preopercle edge; dorsal, anal and pelvic fins uniformly pale; caudal fin darkish with pale margin. Attains at least 82 mm SL.

**DISTRIBUTION** WIO: Indo-Pacific. Persian/Arabian Gulf, Red Sea, Kenya, Rodrigues, Maldives and India; elsewhere to southern India (Musal Tivu), Indonesia, southern Japan, Australia and Solomon Is.

**REMARKS** Kuitert & Kozawa (1999) misidentified this species as *Fowleria dammermani*. Loren Woods of the Field Museum (Chicago, USA) collected this species in India, in 1963, and allocated it a manuscript name but never described it. The first author has noted variation in the completeness of the pored LL scales for smaller specimens. It is likely that small specimens of this species, with incomplete pored LL scales, have been confused with *Fowleria aurita*.

### GENUS *Neamia* Smith & Radcliffe 1912

First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–21 rays; caudal fin rounded, with 3 hypurals (1+2 fused; 3+4 fused to urostylar centrum). Preopercle ridge and edges smooth. No palatine teeth. Scales ctenoid; LL pored scales extend from posttemporal to caudal-fin base. Peritoneum, stomach and intestine pale. Four species, 2 in WIO.

#### KEY TO SPECIES

- |    |   |                     |
|----|---|---------------------|
| 1a | First dorsal fin with 8 visible spines; pectoral fins 17–21 rays..... | <i>N. octospina</i> |
|    | .....   |                     |
| 1b | First dorsal fin with 7 visible spines; pectoral fins 14 rays.....    | <i>N. notula</i>    |
|    | .....   |                     |

***Neamia notula*** Fraser & Allen 2001

Gillspot cardinalfish

PLATE 61

*Neamia notula* Fraser & Allen 2001: 160, Fig. 1a (Baie de la Petite Riviere, Mauritius, Mascarenes); Fraser 2010; Mabuchi *et al.* 2014.

First dorsal fin 7 spines; pectoral fins 14 rays. Percentage SL: body depth 35–40%, eye diameter 12–13%. Median predorsal scales 4.

Head, body and fins reddish orange; dark ocellus on opercle. Attains at least 34 mm SL.

**DISTRIBUTION** WIO: Mauritius (type locality). Elsewhere known only from Bali, Indonesia (Allen & Erdmann 2012).

**REMARKS** Type specimens collected in 24–36 m. Bali specimen from 70 m.

***Neamia octospina*** Smith & Radcliffe 1912

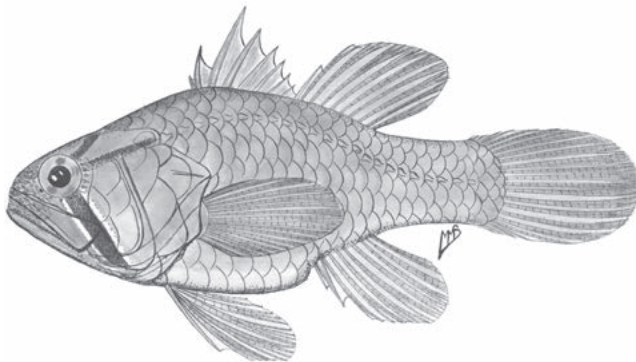
Eightspine cardinalfish

PLATE 61

*Neamia octospina* Smith & Radcliffe in Radcliffe 1912: 441, Pl. 36, Fig. 2 (Rasa I., Palawan, Philippines); Smith 1961\*; SSF No. 175.40\*; Winterbottom *et al.* 1989\*; Fraser & Allen 2001; Goren & Dor 1994; Gon & Randall 2003; Manilo & Bogorodsky 2003.  
*Apogon sphenurus* Klunzinger 1884: 20 (Massawa, Eritrea, Red Sea).

First dorsal fin 8 spines; pectoral fins 17–21 rays. Percentage SL: body depth 40–45%, eye diameter 8.6–10%. Median predorsal scales 6.

Body pale to pale reddish, with 3 reddish marks radiating from eyes; fins with faint mottling. Attains 45 mm SL.



*Neamia octospina*, 48 mm TL (Tanzania). Source: Smith 1961

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania, Mozambique, Comoros, Aldabra, Seychelles, St Brandon Shoals and Chagos; elsewhere to Philippines, Japan (Yaeyama Is.), Australia and New Caledonia.

**REMARKS** Found at 1–22 m. Indian Ocean specimens have a consistently lower pectoral-fin ray count than western Pacific specimens, perhaps indicative of a cryptic species.

**Tribe Apogonini** Günther 1859

First dorsal fin 6 spines; lower edge of preopercle unossified; LL scales 24. Five genera, 2 represented in WIO: all species of *Apogon* have a pale stomach and intestine; both species of *Zapogon* have a black stomach and intestine.

**GENUS** *Apogon* Lacepède 1801

First dorsal fin 6 spines (2nd spine thickest); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 11–14 rays; caudal fin forked. Preopercle ventral edge unossified and flap-like. Nostrils with asymmetrical flap on edge. LL scales 24. Head and body reddish, with blackish and whitish markings on some species; snout with or without darkish mark. Molecular evidence suggests that Indo-Pacific species of *Apogon* may be recognised as a monophyletic branch, perhaps as a subgenus or related genus (*Asperapogon* Smith 1961 is available should convincing data be forthcoming). About 50 species, 10 in WIO.

**KEY TO SPECIES**

1a	Body with dark longitudinal stripes <u>or</u> snout with dark stripe <u>or</u> peduncle with broad bar	9
1b	Body generally uniformly coloured, although scales maybe outlined, or faint stripe present from peduncle onto caudal fin	2
2a	Circumpeduncular scales 12	3
2b	Circumpeduncular scales 16	<i>A. dammermani</i>
3a	Developed GR $\leq 10$	4
3b	Developed GR $\geq 11-23$	5
4a	Notch present on snout below anterior nostrils	<i>A. doryssa</i>
4b	No notch on snout	<i>A. indicus</i>
5a	Pectoral fins 12 rays	6
5b	Pectoral fins 13 or 14 rays	7
6a	Well-developed GR 2 on upper limb	<i>A. erythrosoma</i>
6b	Well-developed GR 4–5 on upper limb	<i>A. dianthus</i>
7a	Well-developed GR 1–3	8
7b	Well-developed GR 5 on upper limb	<i>A. talboti</i>

Continued ...

## KEY TO SPECIES

- 8a Pectoral fins usually 14 rays; well-developed GR 1 on upper limb ..... *A. campbelli*
- 8b Pectoral fins usually 13 rays; well-developed GR 2 on upper limb ..... *A. coccineus*
- 9a Body with 3 partial longitudinal stripes ..... *A. semiornatus*
- 9b Peduncle broadly dusky ..... *A. caudicinctus*

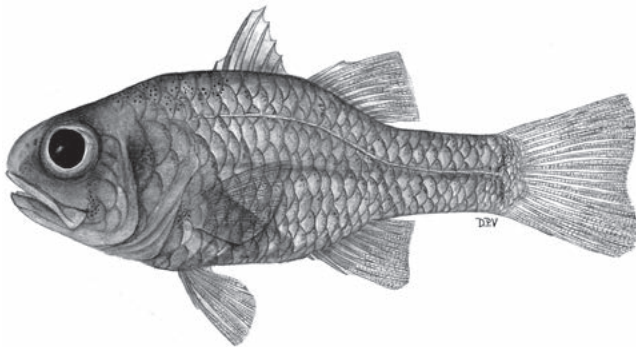
*Apogon campbelli* Smith 1949

PLATE 52

*Apogon campbelli* Smith 1949: 100 (Maputo Bay, Mozambique); SFSa No. 479a\*; Gon & Randall 2003\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004.

Pectoral fins 13 or 14 rays; GR 3 or 4/11–13; 1 large scale above lateral line below 1st dorsal fin, and 1 small scale nearest dorsal-fin base.

Body uniformly translucent reddish (no dark stripes); scale edges darkish post-mortem. Attains at least 60 mm SL.



*Apogon campbelli*, 60 mm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Red Sea to South Africa.

**REMARKS** Full extent of the distribution is uncertain as a result of confusion with the *A. coccineus* species group.

*Apogon caudicinctus* Randall & Smith 1988

Little tailband cardinalfish

PLATE 52

*Apogon caudicinctus* Randall & Smith 1988: 2, Fig. 1 (Rapa Iti); Fricke *et al.* 2009.

Pectoral fins 12–14 rays; GR 3 or 4/12 or 13; 2 similarly sized scales above lateral line below 1st dorsal fin.

Body translucent reddish, with blackish scale edges, broad blackish bar on rear half of peduncle, and scales within the bar with centres paler than the edges. Attains 64 mm SL.

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Réunion; elsewhere to southern Japan, Pitcairn Is. and Rapa Iti.

*Apogon coccineus* Rüppell 1838

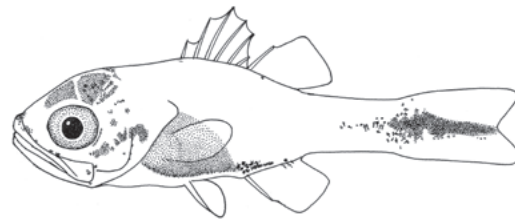
Ruby cardinalfish

PLATE 52

*Apogon coccineus* Rüppell 1838: 88, Pl. 22, Fig. 5 (Massawa, Eritrea, Red Sea); Smith 1961\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

Pectoral fins 12–14 rays; GR 3–5/12–15; 1 large scale below 1st dorsal fin and above lateral line, and 1 small scale nearest dorsal-fin base.

Body translucent, and scales reddish with darkish edges, most prominently dorsally; darkish mark on sides of peduncle. Attains 41 mm SL.



*Apogon coccineus*, 11 mm SL, juvenile pigmentation (Red Sea). Source: Gon & Randall 2003



*Apogon coccineus*, 36 mm SL (Red Sea). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Red Sea, Gulf of Oman and Persian/Arabian Gulf.

## *Apogon dammermani* Weber & De Beaufort 1929

PLATE 52

*Apogon dammermani* Weber & De Beaufort 1929: 338 (New Guinea); Mabuchi *et al.* 2014.

*Asperapogon rubellus* Smith 1961: 384, Pls. 47h, 49d (Matemo I., Mozambique).

*Apogon rubellus*: Mabuchi *et al.* 2014.

Pectoral fins 13 rays; GR 4/13 or 14; circumpeduncular scales 16.

Body reddish, scales with darkish centres and paler edges. Attains 70 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania, Mozambique, Seychelles and Chagos; elsewhere, New Guinea.

**REMARKS** The only consistent difference between *Apogon dammermani* and *A. rubellus* appears to be the presence of an additional scale row between base of 3rd spine of dorsal fin and the lateral line in *A. rubellus*. Treated here as the same species until additional material (depicting geographic coverage) and more information about the scale-row character and living colour patterns become available.

## *Apogon dianthus* Fraser & Randall 2002

PLATE 53

*Apogon dianthus* Fraser & Randall 2002: 27, Fig. 1 (Malakal Pass, Palau); Greenfield 2007.

Pectoral fins 12 rays; GR 4 or 5/14–16; circumpeduncular scales 12.

Body reddish, without dark markings on scales. Attains 49 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Comoros (probably elsewhere); elsewhere to Palau, New Guinea and Fiji.

**REMARKS** Collected at 12–27 m, along drop-off walls; reported from the western Pacific in deep spur and groove habitats. Greenfield (2007) described geographical variation in the number of gill rakers.

## *Apogon doryssa* (Jordan & Seale 1906)

Longspine cardinalfish

PLATE 53

*Amia doryssa* Jordan & Seale 1906: 245, Fig. 39 (Apia, Upolu I., Samoa).

*Apogon doryssa*: Fricke 1999; Greenfield 2001; Heemstra *et al.* 2004.

Pectoral fins 12 or 13 rays; GR 9 (1 on upper arch); 1 large scale above lateral line below 1st dorsal fin, and 1 small scale nearest dorsal-fin base; 2nd spine of 1st dorsal fin extends to or beyond 5th ray of 2nd dorsal fin.

Body translucent reddish, without darkish scale edges or marks on body. Attains 35 mm SL.



*Apogon doryssa* (Japan). H Senou © KPM-NR 51347

**DISTRIBUTION** Indo-Pacific. WIO: Rodrigues, Maldives and Sri Lanka; elsewhere to Christmas I., Indonesia, Ryukyu Is., Marshall Is., Australia, Samoa, Tuamotu Is. and Rapa Iti.

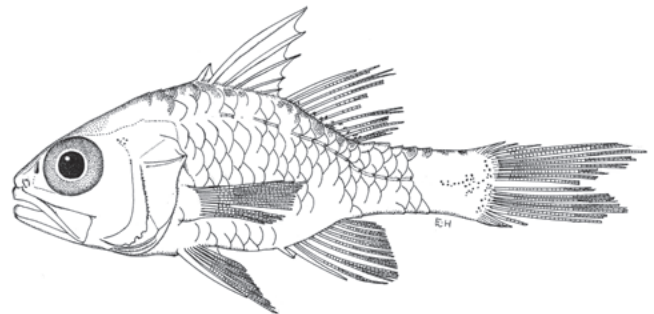
## *Apogon erythrosoma* Gon & Randall 2003

PLATE 53

*Apogon erythrosoma* Gon & Randall 2003: 12, Fig. 5, Pl. 1g (Marsa Ktana, Egypt, Gulf of Aqaba, Red Sea).

Pectoral fins 11–13 rays; GR 11–14 (2 on upper limb); 1 large scale above lateral line below 1st dorsal fin, and 1 small scale nearest dorsal-fin base.

Body translucent reddish, dorsally with variable darkish edges to scales. Attains 38 mm SL.



*Apogon erythrosoma*, 30 mm SL (Red Sea). Source: Gon & Randall 2003

**DISTRIBUTION** WIO: Red Sea and Maldives.

***Apogon indicus*** Greenfield 2001

Indian cardinalfish

PLATE 53

*Apogon indicus* Greenfield 2001: 465, Fig. 2b–c (Mauritius, Mascarenes);  
Fricke *et al.* 2009.

Pectoral fins 13 rays; GR 7–9 (1 on upper limb); 2 large scales above lateral line below 1st dorsal fin, and 1 small scale nearest dorsal-fin base; circumpeduncular scales 14.

Body translucent reddish, without darkish markings on scales above lateral line or on peduncle. Attains 38 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania, South Africa, Mauritius (Agaléga Is.), Chagos and expected elsewhere in Indian Ocean; elsewhere to Philippines, southern Japan, Palau, Line Is., New Caledonia and Tonga.

**REMARKS** Type specimens collected at 6–8 m.

***Apogon semiornatus*** Peters 1876

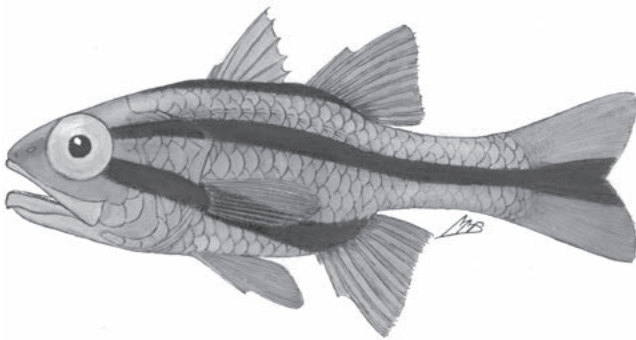
Oblique-banded cardinalfish

PLATE 53

*Apogon semiornatus* Peters 1876: 436 (Mauritius, Mascarenes);  
Smith 1961\*; SSF No. 175.23\*; Randall 1995\*; Winterbottom *et al.*  
1989\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003;  
Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Al-Jufaili *et al.* 2010.  
*Apogon warreni* Regan 1908: 251, Pl. 42, Fig. 1 (Kosi Bay, KwaZulu-Natal,  
South Africa); SFSA No. 477.

Pectoral fins 12 rays; GR 8 or 9; 2 large scales above lateral line below 1st dorsal fin, and 1 small scale nearest dorsal-fin base; circumpeduncular scales 16 or 17.

Body semi-translucent, with 3 blackish stripes: one below 1st dorsal-fin base extending to under 2nd dorsal fin, one along and above lateral line extending onto caudal fin, and one from behind eye to about anal-fin origin; dorsal-fin spines and rays and anal-fin rays pinkish. Attains 75 mm SL.



*Apogon semiornatus*, 65 mm TL (S Mozambique). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Oman to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mauritius, Chagos and Sri Lanka; elsewhere to southern Japan, Australia and Society Is.

**REMARKS** Found at 5–30 m.

***Apogon talboti*** Smith 1961

Flame cardinalfish

PLATE 53

*Apogon talboti* Smith 1961: 387, Pl. 47, Fig. A (Zanzibar, Tanzania);  
Winterbottom *et al.* 1989\*; Gon & Randall 2003\*.

Pectoral fins 13 rays; GR 5/15 or 16; circumpeduncular scales 12.

Body reddish, scales with darkish edges. Attains 140 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania (Zanzibar) (and probably coast of East Africa), Mauritius and Chagos; elsewhere reportedly to Taiwan, Australia and Society Is.

**REMARKS** Common in caves and under ledges, to ~37 m deep.

**GENUS** *Zapogon* Fraser 1972

First dorsal fin 6 spines (2nd spine thickest); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 11–14 rays; caudal fin forked. Nostrils with asymmetrical flap or low rim. Preopercle ventral edge flap-like and not ossified. LL scales 24. Head and body reddish, with blackish and whitish markings on some species; snout with or without darkish mark; stomach and intestine black. Two species, both in WIO.

**KEY TO SPECIES**

- |    |   |                     |
|----|---|---------------------|
| 1a | Scales on body smaller above and below LL scales..... | <i>Z. evermanni</i> |
| 1b | Scales on body all similarly sized .....              | <i>Z. isus</i>      |

## *Zapogon evermanni* (Jordan & Snyder 1904)

Evermann's cardinalfish

PLATES 55 & 68

*Apogon evermanni* Jordan & Snyder 1904: 123 (Oahu I., Hawaii); Winterbottom *et al.* 1989\*; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.  
*Zapogon evermanni*: Mabuchi *et al.* 2014.

Pectoral fins 12 rays; GR 19–23; circumpeduncular scales 25–35.

Head, body and fin rays reddish; snout with reddish brown stripe extending onto opercle; blackish spot below rear third of dorsal-fin rays, followed by whitish spot; faint bars may be present on midbody, below whitish spot, and on peduncle. Attains 122 mm SL.

**DISTRIBUTION** Circumglobal in tropical and subtropical waters of Atlantic and Indo-Pacific. WIO: South Africa, Comoros and Mauritius; not known from Gulf of Aden and Red Sea.

**REMARKS** Found in caves, at 9–45 m. The nearly identical *Zapogon isus* differs only in the size of the LL scales.

## *Zapogon isus* (Randall & Böhlke 1981)

PLATES 55 & 68

*Apogon isus* Randall & Böhlke 1981: 136, Pl. 1, Fig. D (Port Sudan harbour, Sudan, Red Sea); Goren & Dor 1994; Gon & Randall 2003\*.  
*Zapogon isus*: Mabuchi *et al.* 2014.

Pectoral fins 12 rays; GR 19–22; circumpeduncular scales 14–16.

Head, body and fin rays reddish; snout with dark stripe extending onto opercle; blackish spot below rear rays of 2nd dorsal fin, followed by whitish spot; faint bars on midbody, below whitish spot, and on peduncle. Attains 80 mm SL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Found in caves, at 9–45 m. *Zapogon evermanni* is almost identical, differing only in the size of the LL scales.

## *Tribe Archamiini* Fraser & Mabuchi 2014

Body narrow and deep; 1st dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 12–19 rays. Two genera, both represented in WIO.

## GENUS *Archamia* Gill 1863

Body depth 2.6–3.2 in SL; body width 2.2–2.8 in body depth; peduncle length 4.5–5.4 in SL; eye diameter 2.7–4.4 in HL; 1st spine of dorsal fin 1.1–1.4 in 2nd spine. First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 15–17 rays; pectoral fins 13–15 rays. Preopercle with serrations on rear half of lower edge and at angle, ridge smooth. Total GR 5–7/15–18 = 20–23; ceratobranchial GR 10–12. Median predorsal scales 6; scaly sheath along anal-fin base poorly developed. Caudal skeleton fused; ribs laterally expanded (unlike species of *Taeniamia*). One species.

## *Archamia bleekeri* (Günther 1859)

Golden capped cardinalfish

PLATE 56

*Apogon bleekeri* Günther 1859: 245 (Ambon I., Moluccas; Jakarta, Java; and Padang, Indonesia) [based on *Apogon macropterus* Bleeker 1851].  
*Apogon notata* Day 1868: 936 (Chennai, India).  
*Archamia goni* Chen & Shao 1993: 782, Fig. 1 (off Yungan, Taiwan).  
*Archamia bleekeri*: Gon & Randall 2003; Fraser 2013.

Diagnosis as for genus.

Body translucent silvery grey, with variable amount of bright yellow pigment on head and body, mostly on snout, jaws and throat; sides of snout sometimes with tiny dark dots; diffuse orange stripe above anal-fin base; black basicaudal spot smaller than pupil. Attains 60 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, Gulf of Oman, East Africa to South Africa (KwaZulu-Natal), India and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan and Australia.

**REMARKS** Found on coral reefs and over silty sand–mud bottom, in 3–21 m. Feeds on fish eggs and larvae, shrimps and pelagic polychaetes (Chen & Shao 1993).

## GENUS *Taeniamia* Fraser 2013

Body depth 2.3–3.2 in SL; body width 2–2.8 in body depth; pectoral fins long, 3.3–4.4 in SL, extending to bases of anal-fin rays 4–7. First dorsal fin 6 or 7 spines (6 spines in WIO species); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 12–19 rays; pectoral fins 12–16 rays. Preopercle edge serrate at least around angle; preopercle ridge smooth, usually ending in flat, blunt spine at angle. Total GR 19–26; ceratobranchial GR 9–12. Median predorsal scales 1–7; several species with low scaly



sheath along anal-fin base. Peduncle typically with small to large dark spot at caudal-fin base. Light organs associated with the intestine in 3 species (Haneda *et al.* 1969). Inhabit coral reefs and seagrass beds (Gon & Randall 2003). Fifteen species (Fraser 2013), at least 7 in WIO. Suresh & Thomas (2007) also reported *Taeniamia zosterophora* (Bleeker 1856) from the southwestern coast of India.

## KEY TO SPECIES

- 1a Body with 7–23 bars or vertical curved lines ..... 2  
 1b Body with 1 or 2 longitudinal stripes, midlateral stripe sometimes a series of small spots or short bars ..... 4
- 2a Anal fin 15–18 rays; body with 20–23 narrow, curved, vertical orange lines (brown and sometimes faded in preserved specimens); no basilingual teeth ..... *T. sansibaricus*  
 2b Anal fin 12–14 rays; body with 7–14 dusky yellow or dark brown bars; basilingual teeth usually present ..... 3
- 3a Body with ~7 dusky yellow bars, equal to or wider than interspaces; basicaudal spot dark, 2.7–4.4 in peduncle depth ..... *T. flavofasciata*  
 3b Body with 12–14 dark brown bars, narrower than interspaces; basicaudal spot dusky, 1.4–1.7 in peduncle depth ..... *T. lineolata*
- 4a Total GR 19–20, ceratobranchial GR 9; body with single midlateral stripe of series of small dark brown spots ... *T. pallida*  
 4b Total GR 21–24, ceratobranchial GR usually 11 or 12 (rarely 10); body with 2 longitudinal stripes ..... 5
- 5a Stripes dark brown; black basicaudal medium to large, 1.6–3.7 in peduncle depth ..... 6  
 5b Stripes dusky yellow (preserved specimens retain only one dusky stripe on snout); basicaudal spot small, 3–5.4 in peduncle depth; 1st spine of dorsal fin 2.4–3.3 in 2nd spine ..... *T. mozambiquensis*
- 6a Pectoral fins usually 13 (13 or 14) rays; posttemporal smooth; basicaudal spot large, 1.6–2 in peduncle depth ..... *T. bilineata*  
 6b Pectoral fins usually 14 (13–15) rays; posttemporal serrate; basicaudal spot medium, 2.6–3.7 in peduncle depth ..... *T. buruensis*

*Taeniamia bilineata* (Gon & Randall 1995)

PLATE 66

*Archamia bilineata* Gon & Randall 1995: 546, Fig. 3 (El Himeira, Egypt, Gulf of Aqaba, Red Sea); Gon & Randall 2003\*; Golani & Bogorodsky 2010; Gon *et al.* 2013\*.

*Taeniamia bilineata*: Fraser 2013.

Anal fin 2 spines, 12–14 rays; pectoral fins 13 or 14 rays. Body depth 3.1–3.3 in SL; body width 2–2.2 in body depth; eye diameter 2.8–3.1 in HL; 1st spine of dorsal fin 1.3–2.1 in 2nd spine; peduncle length 4.3–4.8 in SL. Preopercle ventral edge and angle serrate; posttemporal smooth. Total GR 5 or 6/15–17 = 21–23; ceratobranchial GR 10 or 11.

Body translucent, with 2 dark longitudinal stripes from snout to peduncle on upper body, fainter posteriorly; snout and peduncle sometimes with yellow pigment; dark line present on underside of peduncle and along anal-fin base (retained in preserved specimens); small black basicaudal spot. Attains 37 mm SL.

**DISTRIBUTION** WIO: endemic to Red Sea (including Gulf of Aqaba) and Gulf of Aden.

**REMARKS** Known from coral and rocky reefs and isolated knolls, at 1–38 m.

*Taeniamia buruensis* (Bleeker 1856)

Buru cardinalfish

PLATE 67

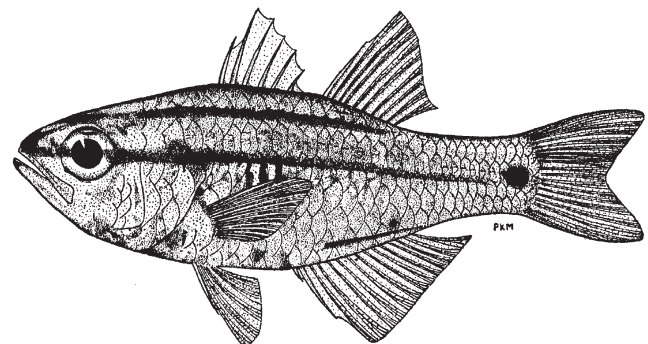
*Apogon buruensis* Bleeker 1856: 394 (Buru I., Moluccas, Indonesia).

*Archamia buruensis*: Gon & Randall 2003\*.

*Taeniamia buruensis*: Fraser 2013.

Anal fin 2 spines, 12–14 rays; pectoral fins 13–15 rays. Body depth 2.6–2.9 in SL; body width 2–2.3 in body depth; eye diameter 3–3.7 in HL; 1st spine of dorsal fin 1.5–1.9 in 2nd spine; peduncle length 4.2–4.7 in SL. Preopercle posterior and ventral edges fully serrate or nearly so. Total GR 5–7/15–17.

Body semi-translucent, with 2 dark longitudinal stripes (upper stripe from snout, over eye and fainter below dorsal fins; midlateral stripe from snout, through iris, fading on peduncle); tip of lower lip darkish; dark line along anal-fin base to ventral surface of peduncle, and anal-fin base yellowish; black basicaudal spot. Attains 75 mm SL.



*Taeniamia buruensis* (Lakshadweep). Source: Jones 1964

**DISTRIBUTION** Indo-Pacific. WIO: Lakshadweep (based on figure in Jones [1964]); elsewhere, Philippines, Indonesia, Taiwan, New Guinea and Fiji.

**REMARKS** Usually found in estuarine conditions and also reported from tidal freshwater.

### *Taeniamia flavofasciata* (Gon & Randall 2003)

PLATE 67

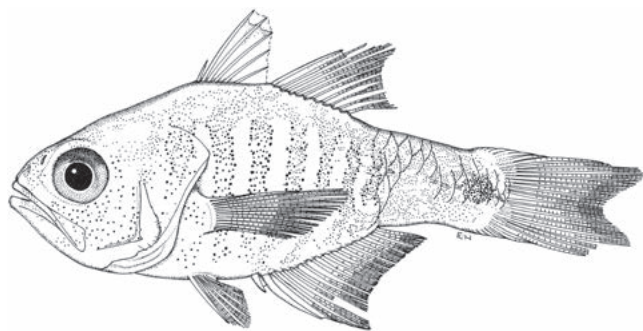
*Archamia flavofasciata* Gon & Randall 2003: 24, Pl. 2a, Fig. 8 (Durban, KwaZulu-Natal, South Africa).

*Archamia lineolata* (non Cuvier 1828): Smith 1949; Fourmanoir 1957; SSF No. 175.31\*.

*Taeniamia flavofasciata*: Fraser 2013.

Anal fin 2 spines, 12–14 rays; pectoral fins 14 or 15 rays. Body depth 2.3–2.6 in SL; body width 2.3–2.7 in body depth; eye diameter 2.5–3.3 in HL; 1st dorsal-fin spine 2.6–3.4 in 2nd spine; peduncle length 4.5–5.2 in SL. Preopercle posterior edge usually fully serrate. Usually 1–6 small basilingual teeth present. Total GR 5–7/15 or 16. Scaly sheath along anal-fin base at most moderately developed.

Body pinkish grey, with ~7 dusky, dark-edged yellow bars; large dusky basicaudal spot. Attains 78 mm SL.



*Taeniamia flavofasciata*, 49 mm SL, male holotype (South Africa).  
Source: Gon & Randall 2003

**DISTRIBUTION** WIO: Kenya (Mombasa) to South Africa (KwaZulu-Natal) and Madagascar.

**REMARKS** Inhabits seagrass beds in shallow water (Smith 1949); collected by trawl in 3–13 m.

### *Taeniamia lineolata* (Cuvier 1828)

Shimmering cardinalfish

PLATE 67

*Apogon lineolatus* Cuvier in Cuv. & Val. 1828: 160 (Red Sea).

*Archamia lineolata*: Smith 1961\*; Dor 1984; Goren & Dor 1994;

Gon & Randall 2003\*; Golani & Bogorodsky 2010.

*Taeniamia lineolata*: Fraser 2013.

Anal fin 2 spines, 12–14 rays; pectoral fins 13–15 rays. Body depth 2.4–2.9 in SL; body width 2.3–2.4 in body depth; eye diameter 2.7–2.8 in HL; 1st spine of dorsal fin 1.9–2.4 in 2nd spine; peduncle length 5–5.4 in SL. Preopercle posterior edge completely serrate, or nearly so, and ventral edge serrate on rear half. Usually 1–4 small teeth on median basilingual ridge. Total GR 6 or 7/15–17. Scaly sheath along anal-fin base well-developed.

Body translucent pale brown, lower part of head and abdomen sometimes yellowish; 12–14 narrow dark brown vertical bars on body, mixed with variable amount of orange; anterior 2 bars continuing onto opercle, becoming orange and diffuse; dark brown stripe edged with iridescent blue lines from tip of jaws to eyes, and iridescent lines continuing onto eyes; cheeks and opercles frequently with conspicuous stellate dark dots; large dusky basicaudal spot. Attains 53 mm SL.



*Taeniamia lineolata* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: endemic to Red Sea.

**REMARKS** Secretive, hiding in dark crevices and caves of reef during daytime; found at 1–20 m.

### *Taeniamia mozambiquensis* (Smith 1961)

Mozambique cardinalfish

PLATE 67

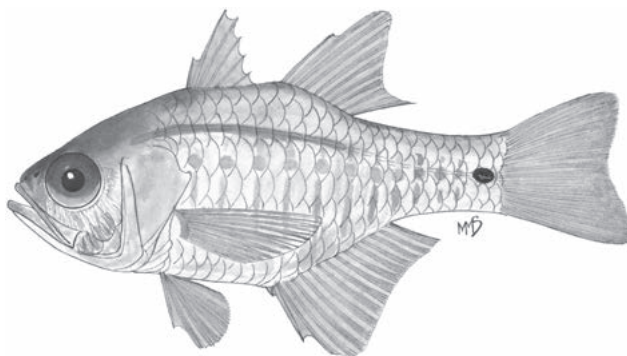
*Archamia mozambiquensis* Smith 1961: 380, Pl. 46a (Mozambique);

SSF No. 175.32\*; Gon & Randall 2003\*; Gon *et al.* 2013\*.

*Taeniamia mozambiquensis*: Fraser 2013.

Anal fin 2 spines, 13–15 rays; pectoral fins 14 or 15 rays. Body depth 2.5–2.7 in SL; body width 2.2–2.6 in body depth; eye diameter 2.8–3.2 in HL; 1st spine of dorsal fin 2.5–3.3 in 2nd spine; peduncle length 4.1–5.1 in SL. Preopercle posterior edge serrate on lower half, and ventral edge serrate on rear half. Total GR 5 or 6/16–18. Scaly sheath along anal-fin base well-developed.

Body silvery grey, sometimes pinkish, with dark dots (usually denser on upper body); tip of jaws and chin sometimes yellow; 2 yellow to orange longitudinal stripes on upper body, but dusky on head; midlateral stripe sometimes with series of enlarged areas appearing as spots, with diffuse narrow orange to dusky orange bars below them; dark basicaudal spot. Attains ~90 mm SL.



*Taeniamia mozambiquensis*, 84 mm TL, holotype (Mozambique).  
Source: Smith 1961

**DISTRIBUTION** WIO: Kenya to South Africa (KwaZulu-Natal) and associated islands.

**REMARKS** Occurs in loose aggregations, between branching corals and among coral rocks, and among seaweeds in protected waters, to ~15 m deep.

### *Taeniamia pallida* (Gon & Randall 1995)

PLATE 67

*Archamia pallida* Gon & Randall 1995: 540, Fig. 1 (Masirah I., Oman); Randall 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003, 2010; Al-Jufaili *et al.* 2010; Gon *et al.* 2013\*.  
*Taeniamia pallida*: Fraser 2013.

Anal fin 2 spines, 13 or 14 rays; pectoral fins 14 or 15 rays. Body depth 3–3.1 in SL; body width 2.2–2.4 in body depth; eye diameter 3.2–3.5 in HL; 1st spine of dorsal fin 1.6–1.9 in 2nd spine; peduncle length 4.1–4.9 in SL. Preopercle posterior edge serrate on lower half; ventral edge serrate on rear half. Total GR 5 or 6/13–15. Scaly sheath along anal-fin base poorly developed or absent.

Body translucent white, with midlateral row of darkish dots from head to caudal fin, and 3 or 4 rows of melanophores on upper body, and tip of snout and jaws with blackish spots (all dark-dotted areas, excluding basicaudal spot, usually with yellow tinge); irregular dark line above eyes; small blackish basicaudal spot. Attains at least 57 mm SL.



*Taeniamia pallida*, 57 mm SL (Kenya). G Gouws © NRF-SAIAB

**DISTRIBUTION** WIO: Oman (Masirah I.) and Kenya (Diani Beach).

**REMARKS** Known from coral reefs and seagrass beds, at 1–12 m.

### *Taeniamia sansibaricus* (Pfeffer 1893)

Orangelined cardinalfish

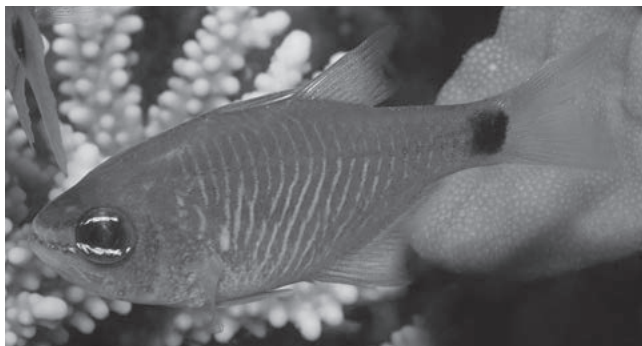
PLATE 67

*Apogon sansibaricus* Pfeffer 1893: 135 [7], Pl. 3, Fig. 5 (Zanzibar, Tanzania).  
*Archamia fucata* (*non* Cantor 1849): Smith 1961\*; SSF No. 175.30\*; Dor 1984; Carpenter *et al.* 1997\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.  
*Archamia irida* Gon & Randall 1995: 543, Fig. 2 (El Tur, Sinai Peninsula, Gulf of Suez, Red Sea).  
*Taeniamia fucata* (*non* Cantor 1849): Fraser 2013.  
*Taeniamia sansibaricus*: Mabuchi *et al.* 2014.

Anal fin 2 spines, 15–18 rays; pectoral fins 13–15 rays. Body depth 2.3–3.1 in SL; body width 2.1–2.8 in body depth; eye diameter 2.7–3.7 in HL; 1st spine of dorsal fin 1.5–2.7 in 2nd spine; peduncle length 4.7–6.8 in SL. Preopercle rear edge variable: usually with few or no serrations above angle, and two-thirds of ventral edge serrate. Total GR 3–8/14–18 = 19–25. Scaly sheath along anal-fin base moderately developed.

Body silvery, sometimes with yellow to orange tinge; 20–23 narrow curved orange lines (first 2 behind opercle sometimes unite to form diffuse vertically elongate orange mark between pectoral-fin base and lateral line); yellow stripe from snout tip to rear edge of eye, narrowly edged with iridescent blue; cheeks

with dark dots, sometimes forming wide dark mark; dark spot on peduncle (frequently large and diffuse in large adults; smaller, about pupil-sized in juveniles). Attains 70 mm SL.



*Taeniamia sansibaricus* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Gulf of Oman, Red Sea, Kenya to South Africa (Sodwana Bay), Madagascar, Comoros, Seychelles, Chagos and Maldives.

**REMARKS** Found on coral and rocky reefs and patch reefs, in sheltered bays and lagoons, and mangroves with muddy, sandy, silty or coral-rubble bottom, to ~35 m deep. Forms dense aggregations among branching corals and at the entrance to caves. Recent molecular evidence supports recognition of *Taeniamia sansibaricus* in WIO, and 2 additional species elsewhere (Mabuchi *et al.* 2014); this distinction is supported by the variation of some morphological characters, such as gill-raker counts, across the Indo-Pacific.

### Tribe *Cheilodipterini* Bleeker 1856

Body elongate; 1st dorsal fin with 6 spines; jaws with canines and enlarged teeth. One genus, widespread throughout Indo-Pacific.

### GENUS *Cheilodipterus* Lacepède 1801

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 or 10 rays; anal fin 2 spines, usually 8 (rarely 9) rays; pectoral fins usually 11–14 (rarely 10 or 15) rays. Body elongate, body depth 2.8–4.6 in SL; pectoral fins relatively short, 4.4–7.6 in SL. Preopercle edge usually serrate; preopercle ridge usually smooth. Supramaxilla present but reduced. Enlarged teeth or canines always present. GR 6–17 (the number of developed gill rakers decreasing with growth as a result of degeneration of the anteriormost 1–3 rakers on 1st epibranchial and hypobranchial); ceratobranchial GR (developed + rudimentary) 6–10. Body with ≥1 dark longitudinal stripes,

and many species with dark basicaudal spot or bar. Occur on coral and rocky reefs throughout Indo-Pacific region, except not known from Hawaii and Johnston Atoll; two of the western Pacific species mimic sabretooth blennies (Allen *et al.* 1975; Russell *et al.* 1976; Smith-Vaniz 1987). Seventeen species, 4 restricted to the WIO, and 4 in the WIO and Pacific.

### KEY TO SPECIES

- 1a Lower jaw with large canines at symphysis; pectoral fins 13 or 14 rays; adults and subadults with 7–16 dark stripes (fewer in juveniles) ..... 2
- 1b No large canines at lower jaw symphysis; pectoral fins 10–12 rays; 4 or 5 dark stripes on body (fewer in small juveniles) .... 6
  
- 2a Pectoral fins usually 13 rays; adults with 7–10 stripes on body ..... 3
- 2b Pectoral fins usually 14 rays; adults with 9–16 stripes on body ..... 4
  
- 3a Total developed GR 7–10 (rarely 11 in fish <45 mm SL); ceratobranchial GR (developed + rudiments) 6 or 7; if present, dark basicaudal spot large, <2 in peduncle depth ... *C. macrodon*
- 3b Total developed GR 11–17 (rarely 10 in fish >85 mm SL); ceratobranchial GR (developed + rudiments) 8 or 9; if present, dark basicaudal spot small, 2.1–4 in peduncle depth ... *C. artus*
  
- 4a Adults with 13–16 dark stripes on body; dark basicaudal spot 3.5–4.7 in peduncle depth; upper jaw length 1.8–2 in HL ..... *C. arabicus*
- 4b Adults with 9–13 dark stripes on body; dark basicaudal spot 1.3–3.6 in peduncle depth; upper jaw length 1.9–2.2 in HL ... 5
  
- 5a Ceratobranchial GR (developed + rudiments) usually 8 (rarely 9); dark caudal spot 1.3–2.8 in peduncle depth ..... *C. lachneri*
- 5b Ceratobranchial GR (developed + rudiments) usually 9 (rarely 8); dark caudal spot 2.5–3.6 in peduncle depth ..... *C. persicus*
  
- 6a Diameter of dark basicaudal spot 1.6–2.9 in peduncle depth; small dark spot present on dorsal surface of peduncle (and sometimes also on ventral surface) ..... 7
- 6b Diameter of dark basicaudal spot 2.9–5.3 in peduncle depth; no dark spot on dorsal or ventral surface of peduncle ..... *C. quinquelineatus*
  
- 7a Lowermost dark stripe on body bending upwards near pelvic-fin insertions; pectoral fins 12 rays ..... *C. novemstriatus*
- 7b Lowermost dark stripe on body a straight line between isthmus and anal-fin base; pectoral fins 11 rays ..... *C. pygmaios*

*Cheilodipterus arabicus* (Gmelin 1789)

Tiger cardinalfish

PLATE 56

*Perca lineata* Forsskål 1775: 42 (Jeddah, Saudi Arabia, Red Sea) [preoccupied by *Perca lineata* Linnaeus 1758]; Gon 1993.

*Perca arabica* Gmelin 1789: 1312 [replacement name for *Perca lineata* Forsskål 1775].

*Cheilodipterus caninus* Smith 1949: 205, Pl. 22, Fig. 472 (Inhaca I., Mozambique); SFSA No. 472\*; SSF No. 175.34\*.

*Cheilodipterus lachneri australis* Smith 1961: 408 (Inhaca I., Mozambique) [in part: some paratypes].

*Cheilodipterus lineatus*: Gon 1993\*; Gon & Randall 2003\*.

*Cheilodipterus arabicus*: Randall 1995\*; Golani & Bogorodsky 2003; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

Pectoral fins usually 14 (rarely 13) rays. Preopercle ridge smooth; preopercle edge with small to minute serrations, uppermost third sometimes smooth. Both jaws with large canines; lower jaw with 1 or 2 large canines on each side of symphysis. Basicaudal spot or bar small, its vertical diameter 3.4–4.6 in peduncle depth. Developed GR 2/8–11; ceratobranchial GR 7 or 8.

Body pale brown, with 13–16 darker brown longitudinal stripes (upper stripes sometimes irregular in large fish); 1st dorsal fin dusky to dark brown, other fins pale (in young) to dusky (in adults); dark basicaudal spot encircled by yellow area, and sometimes covered by dark brown bar around peduncle, and distinct white bar sometimes present in front of spot or bar. Attains 180 mm SL.

**DISTRIBUTION** WIO: Pakistan, Gulf of Oman, Arabian Sea, Red Sea, Tanzania, Mozambique, Seychelles and India; not known from Gulf of Aqaba, Persian/Arabian Gulf and Maldives.

**REMARKS** Common, in small aggregations around corals and on rocky reefs, in 3–25 m. Juveniles (<40 mm SL) resemble *C. novemstriatus* in having only 3 or 4 dark stripes on body and a small dark spot on dorsal surface of peduncle. Adults may be confused with *C. lachneri*, which has fewer dark stripes and a larger basicaudal spot.

*Cheilodipterus artus* Smith 1961

Wolf cardinalfish

PLATE 56

*Cheilodipterus artus* Smith 1961: 409, Pl. 50, Fig. F (Mahé, Seychelles); SSF No. 175.33\*; Gon 1993\*; Winterbottom & Anderson 1997; Manilo & Bogorodsky 2003.

*Cheilodipterus lachneri australis* Smith 1961: 408 (Inhaca I., Mozambique) [in part: holotype and some paratypes].

Pectoral fins 12–14 rays. Preopercle edge smooth to slightly serrated around angle and on ventral edge, and minute

serrations sometimes present in middle of rear edge. Both jaws with large canines; lower jaw with 1 or 2 large canines on each side of symphysis. Basicaudal spot (vertical diameter) 2.1–4 in peduncle depth. Developed GR 2–4/9–14 = 11–17; ceratobranchial GR 8 or 10.

Body with 7–10 longitudinal brown stripes, and pale interspaces of equal width; snout, eyes and interorbital area sometimes with yellow pigment; small dark basicaudal spot encircled by yellow, or spot may be covered by diffuse dark bar without yellow in large adults; fin membranes hyaline with reddish tinge. Attains 187 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Tanzania (Zanzibar) to northern Mozambique (Nacala), Comoros, Seychelles and Maldives; elsewhere to Ryukyu Is., Guam, Great Barrier Reef, Line Is., Tuamotu Is. and Marquesas Is.

**REMARKS** Found in sheltered lagoons as well as on outer reefs, in caves or above branches of certain corals, at 3–20 m. Solitary or in small groups. Feeds on small fishes. Frequently confused with *C. macrodon*.

*Cheilodipterus lachneri* Klausewitz 1959

Arrowtooth cardinalfish

PLATES 56 &amp; 57

*Cheilodipterus lachneri* Klausewitz 1959: 260, Fig. 11 (Hurghada, Egypt, Red Sea); Smith 1961\*; SSF No. 175.35\*; Goren & Dor 1994; Gon & Randall 2003\*; Golani & Bogorodsky 2010.

Pectoral fins 13 or 14 rays. Preopercle ridge smooth, edge serrated (usually weakly serrated in specimens >90 mm SL). Both jaws with large canines; lower jaw with 1 or 2 large canines on each side of symphysis. Basicaudal spot (vertical diameter) 1.3–2.8 in peduncle depth. Developed GR 2 or 3/9–11; ceratobranchial GR 8 or 9.

Body with 9–13 dark brown longitudinal stripes of alternating width and intensity; snout with yellow tinge (except in large adults); basicaudal spot dark brown, larger than pupil and encircled with yellow in juveniles, and sometimes expanded to form a bar around peduncle in large fish; distinct white area sometimes present immediately in front of basicaudal spot or bar; uppermost and lowermost caudal-fin rays dusky; other fins pale with reddish hue. Attains 120 mm SL.

**DISTRIBUTION** WIO: endemic to Red Sea.

**REMARKS** Found to at least 15 m deep, under ledges, in crevices and dark areas of coral reefs. Frequently confused with *C. arabicus*.

## *Cheilodipterus macrodon* (Lacepède 1801)

Large-toothed cardinalfish

PLATE 57

*Cheilodipterus lineatus* Lacepède (ex Commerson) 1801: 540, 543, Pl. 34, Fig. 1 (Mauritius, Mascarenes) [name unavailable, secondary homonym of *Perca lineata* Forsskål 1775]; Smith 1961\*; SFSA No. 471\*; SSF No. 175.36\*; Goren & Dor 1994; Fricke 1999; Fricke *et al.* 2009.

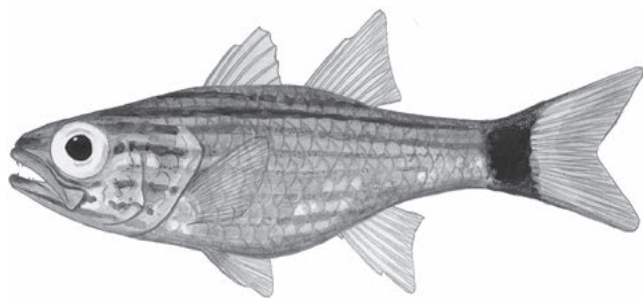
*Centropomus macrodon* Lacepède (ex Commerson) 1802: 252, 273 (Mauritius, Mascarenes).

*Cheilodipterus octovittatus* Cuvier in Cuv. & Val. 1828: 163 (Mauritius, Mascarenes).

*Cheilodipterus macrodon*: Dor 1984; Winterbottom *et al.* 1989\*; Gon 1993\*; Goren & Dor 1994; Randall 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Al-Jufaili *et al.* 2010; Golani & Bogorodsky 2010.

Pectoral fins 12–14 (usually 13) rays. Preopercle ridge smooth, edge serrated (serrations relatively smaller with increasing body length, and edge may be nearly smooth in large individuals). Both jaws with large canines; lower jaw with 1 or 2 large canines on each side of symphysis. Basicaudal spot (vertical diameter) 1.3–1.6 in peduncle depth. Developed GR 1 or 2/6–9; ceratobranchial GR 6 or 7.

Body with 7–10 dark brown longitudinal stripes, broader than pale interspaces; snout, eyes, interorbital space, and occiput of juveniles and young adults usually with yellow tinge; 1st dorsal fin dusky to dark brown and darker distally; pelvic fins and uppermost and lowermost caudal-fin rays coloured as dark as body stripes; pelvic fins frequently with darker tips and white leading edge; rays of other fins reddish brown to brown, membranes transparent with reddish hue; either a large dark brown basicaudal spot or brown bar around peduncle, and distinct white area separating spot or bar from rear of body stripes (in large adults, bar may be faded and white area sometimes mottled with brown spots). Attains 20 cm SL.



*Cheilodipterus macrodon*, 11 cm TL (Comoros). Source: CFSA

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Gulf of Oman, Red Sea, Kenya to South Africa (Aliwal Shoal), Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Ryukyu Is., Australia, Lord Howe I. and Rapa Iti.

**REMARKS** Common on outer-reef slopes, in 4–30 m, hiding under ledges and in caves. Adults usually in pairs or small groups; juveniles solitary or in small groups. Feeds primarily on small fishes.

## *Cheilodipterus novemstriatus* (Rüppell 1838)

Indian Ocean twospot cardinalfish

PLATE 57

*Pogon novemstriatus* Rüppell 1838: 85, Pl. 22, Fig. 1 (Massawa, Eritrea, Red Sea).

*Paramia bipunctata* Lachner 1951: 604, Pl. 18, Fig. D (Tarut Bay, R'as Tannūrah, Saudi Arabia, Persian/Arabian Gulf); Smith 1961\*.

*Cheilodipterus bipunctatus*: Dor 1984; Goren & Dor 1994.

*Cheilodipterus novemstriatus*: Gon 1993\*; Randall 1995\*; Carpenter *et al.* 1997\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010; Golani & Bogorodsky 2010.

Pectoral fins 11–13 rays. Preopercle ridge smooth; vertical edge and angle serrate, ventral edge smooth. Both jaws with small canines, but not at symphysis of lower jaw. Basicaudal spot (vertical diameter) 2.1–2.9 in peduncle depth. Developed GR 2 or 3/9–12; ceratobranchial GR 8 or 9.

Body with 5 longitudinal black stripes, lowest stripe short and curving upwards in front of pectoral-fin base (and often indistinct anterior to anal-fin base); black basicaudal spot oval and surrounded by yellow; peduncle with distinct black spot on dorsal and sometimes on ventral surface, and with white area between yellow pigment and dorsal dark spot; fins pale, except dusky at leading edges of 1st dorsal fin and pelvic fins. (Colour pattern closely resembles that of *C. quinquelineatus* and *C. pygmaios*.) Attains 80 mm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman and Red Sea; Lessepsian migrant to eastern Mediterranean Sea.

**REMARKS** Common in shallow protected waters, at 1–10 m; often found in front of holes and under ledges on coral or rocky reefs, and frequently shelters among spines of *Diadema* sea urchins.

## *Cheilodipterus persicus* Gon 1993

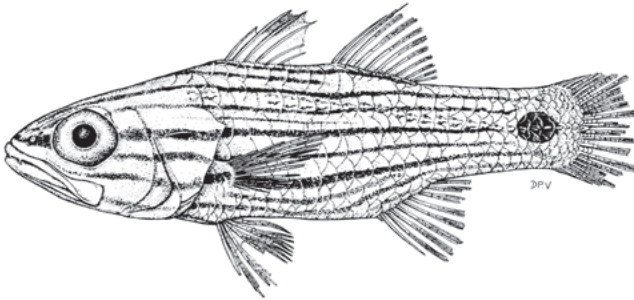
Persian cardinalfish

PLATE 57

*Cheilodipterus persicus* Gon 1993: 41, Pls. 3a, 5d, Fig. 16 (reef patch at Sidra I., Bahrain, Persian/Arabian Gulf); Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

Pectoral fins 13–15 rays. Preopercle edge serrated, ridge smooth. Both jaws with large canines, including 1 or 2 large canines on each side of lower jaw symphysis. Basicaudal spot (vertical diameter) 2.5–3.6 in peduncle depth. Developed GR 2 or 3/11–14 = 14–17; ceratobranchial GR 8 or 9.

Body with 10–13 dark brown to black longitudinal stripes, narrower than interspaces, and alternating in width and intensity; snout and top of head with yellow tinge; dark basicaudal spot encircled with yellow. Attains 110 mm SL.



*Cheilodipterus persicus*, 80 mm SL, holotype (Persian/Arabian Gulf).  
Source: Gon 1993

**DISTRIBUTION** WIO: Persian/Arabian Gulf and Gulf of Oman.

**REMARKS** Solitary or in small groups, on coral and rocky reefs, often under ledges and in holes and crevices, at 2–18 m.

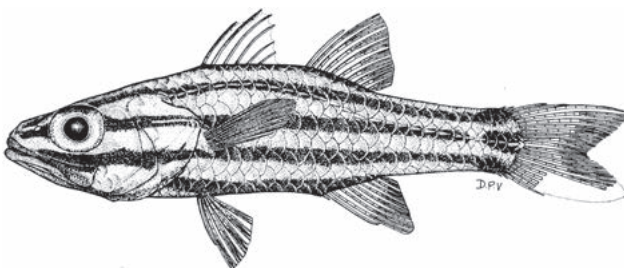
### *Cheilodipterus pygmaios* Gon 1993

PLATE 57

*Cheilodipterus pygmaios* Gon 1993: 45, Pls. 3b, 5e, Fig. 17 (Towartit Reef, Sudan, Red Sea); Gon & Randall 2003\*; Golani & Bogorodsky 2010.

Pectoral fins 10 or 11 rays. Preopercle ridge smooth, edge with a few minute serrations at angle and on middle of vertical part. Both jaws with small canines, but not at lower jaw symphysis. Basicaudal spot (vertical diameter) 1.6–2.5 in peduncle depth, about pupil size or slightly larger. Developed GR 2 or 3/9–12 = 12–15; ceratobranchial GR 8–10.

Body with 5 dark brown to black longitudinal stripes, narrower than interspaces; peduncle with black mark on dorsal surface and less distinctly on ventral surface; basicaudal spot black and encircled by yellow, except for small white area on posterodorsal section of peduncle. Attains 50 mm SL.



*Cheilodipterus pygmaios*, 43 mm SL, holotype (Red Sea). Source: Gon 1993

**DISTRIBUTION** WIO: endemic to Red Sea.

**REMARKS** Found on coral reefs, to at least 30 m deep. Seen sheltering among spines of *Diadema* sea urchins, or frequently found in front of dark holes and under ledges together with *C. novemstriatus* and/or *C. quinquelineatus*, with which it can be confused.

### *Cheilodipterus quinquelineatus* Cuvier 1828

Fivelined cardinalfish

PLATE 57

*Cheilodipterus quinquelineatus* Cuvier in Cuv. & Val. 1828: 167 (Bora Bora, Society Is.); SFSA No. 470; Dor 1984; SSF No. 175.37\*; Winterbottom *et al.* 1989\*; Gon 1993; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009; Al-Jufaili *et al.* 2010; Golani & Bogorodsky 2010. *Paramia quinquelineata*: Smith 1961\*.

Pectoral fins 12 or 13 rays. Preopercle ridge smooth, edge serrated. Both jaws with small canines, but not at lower jaw symphysis. Basicaudal spot (vertical diameter) 2.9–5.3 in peduncle depth. Developed GR 1 or 2/7–12; ceratobranchial GR 7–9.

Body white, with 5 black longitudinal stripes, lowermost stripe sometimes less distinct than others, but continues onto head without curving upwards to pectoral-fin base; small black basicaudal spot encircled by yellow area that may extend to dorsal surface of peduncle; uppermost and lowermost caudal-fin rays dusky. Attains ~100 mm SL.



*Cheilodipterus quinquelineatus*, 10 cm SL (Rodrigues).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to Mozambique (Pinda), Madagascar, Comoros, Seychelles, Mascarenes and Maldives; not known from Persian/Arabian Gulf; elsewhere widespread to southern Japan, Marshall Is., Australia, Lord Howe I., Society Is., Pitcairn Is. and Rapa Iti.

**REMARKS** Common on protected rocky and coral reefs, to ~40 m deep; solitary or in small aggregations, sheltering among branched corals, under ledges, among spines of *Diadema* sea urchins, or in dark crevices.

**Tribe *Gymnapogonini*** Whitley 1941

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8–13 rays; anal fin 2 spines, 8–16 rays; caudal fin forked or rounded. Preopercle ridge smooth, edge with  $\geq 1$  spines at angle. Head and body naked, and lateral line usually a series of free neuromasts to caudal-fin base (may be interrupted midway along lateral line in *Gymnapogon*); other genera with large scales, weakly ctenoid or cycloid, and LL scales 23 or 24. Four genera, all represented in WIO.

**GENUS *Cercamia*** Randall & Smith 1988

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 12 rays; pectoral fins 10 rays. Preopercle ridge with spine at angle; preopercle angle with 2–4 spines; posttemporal with spine. Villiform teeth present on premaxillae, dentaries and vomer; no teeth on palatines. GR 12 or 13. Scales weakly ctenoid; median predorsal scales 5 or 6; LL scales 23, all pored. Two species, 1 in WIO.

***Cercamia eremia*** (Allen 1987)

Glassy cardinalfish

PLATE 56

*Rhabdamia eremia* Allen 1987: 4, Fig. 2 (South Muiron I., Western Australia).

*Cercamia eremia*: Gon & Randall 2003\*; Heemstra *et al.* 2004.

Diagnosis as for genus.

Body translucent pinkish, with small red dots on head and body; peritoneum darkish, swimbladder silvery. Attains 52 mm SL.



*Cercamia eremia*, 32 mm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, South Africa, Comoros, Seychelles, Mauritius, Rodrigues and Chagos; elsewhere, records from Christmas I., Australia, Japan, New Guinea, Solomon Is., Tonga, and Wallis and Futuna Is.

**REMARKS** Found in 2–26 m. A complex of species, with two in the western Pacific to the Society Is., and an undescribed species in the Red Sea. The Indian Ocean species, *Cercamia eremia*, is treated as the current, widespread form.

**GENUS *Gymnapogon*** Regan 1905

Slender-bodied; head and body translucent, naked, and with free neuromasts in adults; larval fish and juveniles with long pelvic fins, and free neuromasts reduced on head and body or absent. First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 or 10 rays; anal fin 2 spines, 8–10 rays; pectoral fins 13–15 rays. Preopercle with single spine at angle. Teeth villiform, in narrow band or in 1 row on both jaws, with some caninoid teeth near upper and lower jaw symphysis and along median portion of dentary; vomer with a few villiform teeth or  $\geq 1$  caninoid teeth; palatines with 1 row of teeth. Mabuchi *et al.* (2014) hypothesises that *Gymnapogon* may nest within the Apogoninae related to *Cercamia* and *Lachneratus*. Currently 8 species, possibly 3 in WIO.

**KEY TO SPECIES**

- 1a Second dorsal fin 9 rays; anal fin 8 rays ..... 2
- 1b Second dorsal fin 10 rays; anal fin 9 or 10 rays .....  
..... *Gymnapogon cf. vanderbilti*
  
- 2a Pelvic fins and (internal) stomach pale ..... *G. africanus*
- 2b Pelvic fins and (internal) stomach dark ..... *G. melanogaster*

***Gymnapogon africanus*** Smith 1954

Crystal cardinalfish

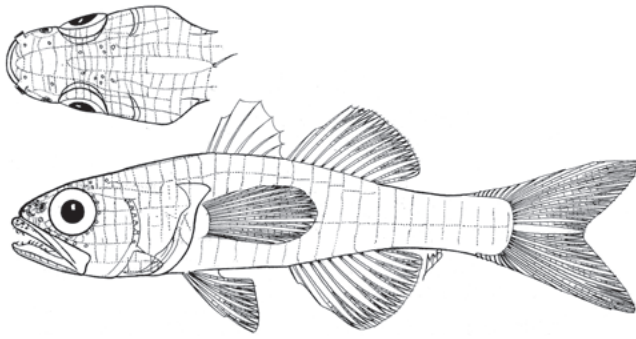
PLATE 59

*Gymnapogon africanus* Smith 1954: 791, Fig. 3, Pl. 13f (Shimoni, Kenya); SSF No. 175.51\*.

Second dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14 or 15 rays. GR (0)1/9 or 10.

Body translucent, head and abdomen iridescent; orange mark on nape; all fins pinkish and without stripes; orange spot at base of each dorsal- and anal-fin spine and ray, and at base of each pectoral-fin ray; orange basicaudal bar. Attains 50 mm SL.





*Gymnapogon africanus*, 38 mm SL, 50 mm TL, holotype (Kenya).  
Source: Smith 1954

**DISTRIBUTION** WIO: Oman, Kenya, Mozambique and Mauritius.

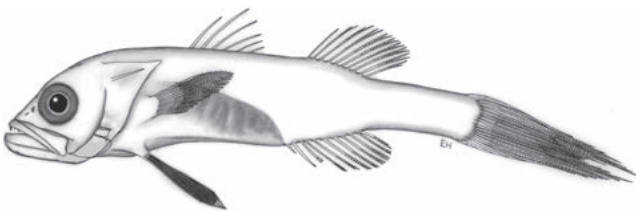
**REMARKS** Known from surface to ~8 m deep.

### *Gymnapogon melanogaster* Gon & Golani 2002

*Gymnapogon melanogaster* Gon & Golani 2002: 347, Figs. 1–2 (Eilat, Israel, Gulf of Aqaba, Red Sea); Golani & Bogorodsky 2010.

Second dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14 or 15 rays. GR 2/11.

Preserved specimens pale, with cluster of small dark brown spots on occiput; pelvic fins black, pale at base; median fins pale; peritoneum with scattered melanophores, stomach black, and intestine pale. Attains at least 23 mm SL.



*Gymnapogon melanogaster*, 23 mm SL, holotype (Red Sea).  
Source: Gon & Golani 2002

**DISTRIBUTION** Known only from two type specimens collected from the northern Red Sea.

**REMARKS** Found in <1.5 m. This species is likely represented by a late larval stage, as elongate pelvic fins are larval characteristics of some *Gymnapogon* species (Leis *et al.* 2015).

### *Gymnapogon cf. vanderbilti* (Fowler 1938)

PLATE 59

?*Acanthapogon vanderbilti* Fowler 1938: 197, Pl. 8, Fig. 18 (Kiritimati, Line Is., Kiribati).

?*Gymnapogon urosilotus* Lachner 1953: 494, Fig. 83 (Kwajalein Atoll, Marshall Is.).

Second dorsal fin 1 spine, 10 rays; anal fin 2 spines, 9 or 10 rays; pectoral fins 13 or 14 rays.

Body of live fish translucent, spinal column with blackish outline; head iridescent, with melanophores on occiput; line of faint melanophores along anal-fin base to underside of peduncle; caudal-fin translucent, except base of rays blackish; all other fins translucent. Attains at least 32 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Comoros and Chagos; elsewhere in western and central Pacific.

**REMARKS** Known to ~20 m deep. Published and unpublished molecular evidence suggests that there are at least four populations or cryptic species. Two names are available from widely different parts of the central Pacific (Marshall Is. and Line Is.), but neither name is likely to be conspecific with WIO material.

### GENUS *Lachneratus* Fraser & Struhsaker 1991

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 12 or 13 rays; anal fin 2 spines, 13–16 rays; pectoral fins 10 spines. Vomer and both jaws with a mix of caninoid and villiform teeth; palatines with villiform teeth. GR 16 or 17. Body scales cycloid and deciduous; LL scale count unknown. One species.

### *Lachneratus phasmaticus* Fraser & Struhsaker 1991

Phantom cardinalfish

PLATE 60

*Lachneratus phasmaticus* Fraser & Struhsaker 1991: 719, Figs. 1–2 (cave at Ka'u Loa Point, Hawaii I., Hawaii); Mabuchi *et al.* 2014.

Diagnosis as for genus.

Body translucent red, fins reddish; intestine and peritoneum blackish. Attains 66 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Comoros; elsewhere, Vanuatu, Marquesas Is. and Hawaii (probably more widespread).

**REMARKS** Found from surface to at least 104 m deep; prefers back end of caves or submerged lava tubes during the day.

**GENUS** *Pseudamiops* Smith 1954

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8 rays; anal fin 1 or 2 spines; caudal fin rounded. Some teeth caninoid on both jaws and sometimes on vomer. Body translucent in life; head and body with free neuromasts; body scales cycloid, including on nape and opercles; no pored LL scales. At least 5 species, 4 in WIO (1 undescribed).

**KEY TO SPECIES**

- |    |  |                        |
|----|--|------------------------|
| 1a | Anal fin 2 spines, 8 or 9 rays .....                     | 2                      |
| 1b | Anal fin 1 spine, 8 rays .....                           | <i>Pseudamiops</i> sp. |
| 2a | Pectoral fins 13 or 14 rays .....                        | 3                      |
| 2b | Pectoral fins 15 or 16 rays .....                        | <i>P. gracilicauda</i> |
| 3a | Anal fin 8 rays; pectoral fins 13 rays .....             | <i>P. springeri</i>    |
| 3b | Anal fin usually 9 rays; pectoral fins usually 14 rays . | <i>P. pellucidus</i>   |

*Pseudamiops gracilicauda* (Lachner 1953)

PLATE 65

*Gymnapogon gracilicauda* Lachner 1953: 497, Fig. 84 (Bikini Atoll, Marshall Is.).

*Pseudamiops gracilicauda*: Winterbottom *et al.* 1989\*.

Anal fin 2 spines, 8 rays; pectoral fins 15 or 16 rays. Upper jaw with 2 rows of villiform teeth on sides becoming a band close to symphysis, and 1–3 caninoid teeth near symphysis; lower jaw with 1 row of villiform teeth becoming caninoid at sides, and single caninoid tooth on each side of symphysis; vomer and palatines each with 1 row of villiform teeth. GR 0/7. Scales deciduous.

Head, body and fins translucent, except abdomen iridescent and blackish; a few melanophores on occiput and inside mouth. Attains 48 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: possibly Chagos; elsewhere, Cocos (Keeling) Is., Christmas I., Ryukyu Is., Marshall Is., northern Australia, New Caledonia and Rapa Iti.

**REMARKS** Specimens collected at Chagos were reported as *Pseudamiops gracilicauda* by Winterbottom *et al.* (1989). We

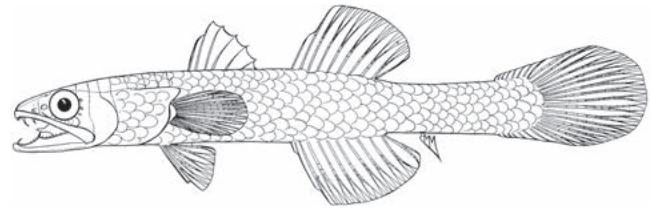
are uncertain about the status of the material based on the authors' discussion of characters: 1st dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8 rays; anal fin 2 spines, 7 or 8 rays; pectoral fins 13 or 14 rays; GR 1/6; teeth on vomer villiform. Thus, the Chagos specimens may represent an undescribed species.

*Pseudamiops pellucidus* Smith 1954

*Pseudamiops pellucidus* Smith 1954: 785, Fig. 2, Pl. 13a–c (Malindi, Kenya); SSF No. 175.53\*; Gon *et al.* 2013.

Anal fin 2 spines, 8 or 9 rays; pectoral fins 13 or 14 rays. Both jaws with row of villiform teeth and caninoid teeth near symphysis, and lower jaw also with caninoid teeth at sides; vomer with 1 or 2 caninoid teeth; palatines with 1 row of villiform teeth. GR 1/5–7. Scales cycloid; median predorsal scales 8; LL absent, scales along body 33.

Head, body and all fins translucent, abdomen iridescent and blackish; a few melanophores on occiput and inside mouth. Attains 36 mm SL.



*Pseudamiops pellucidus*, 47 mm TL, holotype (Kenya). Source: Smith 1954

**DISTRIBUTION** WIO: Red Sea, Kenya to Mozambique, Seychelles and Mauritius.

**REMARKS** Found at 1–27 m. Winterbottom *et al.* (1989) suggest that specimens from Chagos bridge the characters between *Pseudamiops pellucidus* and *P. gracilicauda*; those authors tentatively concluded that the name *P. gracilicauda* should be used pending a more detailed study. We retain Smith's name for the present, however.

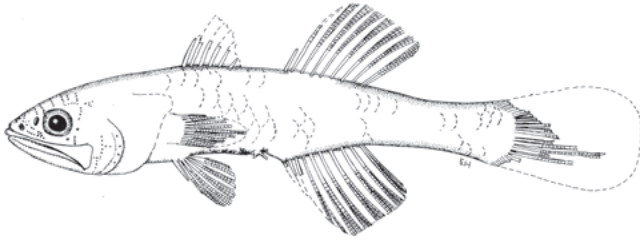
*Pseudamiops springeri* Gon & Bogorodsky 2013

PLATE 65

*Pseudamiops springeri* Gon & Bogorodsky *in* Gon, Bogorodsky & Mal 2013: 94, Figs. 1–2 (Egypt, Gulf of Aqaba, Red Sea).

Anal fin 2 spines, 8 rays; pectoral fins 13 rays. Preopercle edge smooth or with 3 or 4 minute serrae ventrally. No canine teeth on vomer. GR 1/6. LL absent; median predorsal scale 1 (others possibly lost); body scales lost in type material, except largest paratype with cycloid scales, and LSS ~24.

In life, body and head transparent, with red gills, dark vertebral column, large peritoneal melanophores; iris greyish brown. Preserved specimens cream-white to dark yellowish brown; fins pale; peritoneum with large stellate melanophores mostly visible; some type specimens with series of opaque white ovate eggs clearly visible. Attains at least 27 mm SL.



*Pseudamiops springeri*, 25 mm SL, holotype (Red Sea). Source: Gon *et al.* 2013

**DISTRIBUTION** Known only from five type specimens collected in the northern Red Sea.

**REMARKS** Found to 16 m deep.

## *Pseudamiops* sp.

*Pseudamiops* sp.: Winterbottom *et al.* 1989\*.

Known from Chagos from specimens not yet described in detail. Winterbottom *et al.* (1989: Fig. 181) noted that the anal fin has only 1 spine, unlike all other apogonids, except for the monotypic *Paxton* Baldwin & Johnson 1999, which is endemic to northern Australia.

## Tribe *Lepidamiini* Fraser & Mabuchi 2014

First dorsal fin 8 spines; body with small ctenoid scales; LL scales 36–48. One genus.

## GENUS *Lepidamia* Gill 1863

First dorsal fin 8 spines (8th spine small and sometimes concealed under scales); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–17 (rarely 13) rays. Scales relatively small, ctenoid; median predorsal scales 2–8; LL scales 36–48 (counts include scales on caudal fin). In life, adults are reddish to dark red or pale to dark brown, with numerous narrow, dusky or dark brown stripes on body; stripes above

lateral line follow body contour and those below lateral line are straight; juveniles usually paler than adults and typically with 3 dark brown stripes on body (1st from above eye and lateral line to below rear part of 2nd dorsal-fin base, sometimes continuing to peduncle; 2nd from tip of snout, through eye, to middle of body and to peduncle, fading near dark basicaudal spot or bar; 3rd frequently less distinct, from below eye to above rear end of anal-fin base); juveniles and young adults with dark spot at front end of 1st dorsal-fin base and/or at rear end of 2nd dorsal- and anal-fin bases. Interspecific differences in colour pattern within *Lepidamia* are subtle, but more noticeable in juveniles than in adults. All 4 species in WIO.

### KEY TO SPECIES

- |    |   |
|----|---|
| 1a | Pectoral fins usually 14 (rarely 13) rays; developed GR 12–17; LL scales 36–40; intestine dark; juveniles with dark bar across caudal-fin base ..... <i>L. multitaeniatus</i>   |
| 1b | Pectoral fins usually 15–17 (rarely 14) rays; developed GR 8–11; LL scales 39–48; intestine pale; juveniles with dark spot at centre of caudal-fin base ..... 2   |
| 2a | Predorsal scales 6–8; 2nd dorsal, anal, caudal and pelvic fins pink to reddish; juveniles and young adults usually with small dark spot on rear of 2nd dorsal fin and anal fin ..... <i>L. kalosoma</i>   |
| 2b | Predorsal scales 2–5 (rarely 6); pelvic fins dark brown to black; 2nd dorsal, anal and caudal fins red, sometimes with blackish tinge, or dark brown, and tips of fin rays usually blackish; juveniles and young adults with large dark saddle or spot on rear of 2nd dorsal fin and anal fin ..... 3 |
| 3a | Pectoral fins usually 15 (rarely 14 or 16) rays; pectoral-fin bases black; in juveniles and young adults, the dark spot at front end of 1st dorsal fin and on rear of 2nd dorsal fin and anal fin does not extend onto fin rays ..... <i>L. natalensis</i>  |
| 3b | Pectoral fins 16 or 17 rays; pectoral-fin bases same as body colour, or upper part dusky; in juveniles and young adults, the dark spot at front end of 1st dorsal fin and on rear of 2nd dorsal fin and anal fin extends onto proximal third of the respective fin rays ..... <i>L. omanensis</i>     |

## *Lepidamia kalosoma* (Bleeker 1852)

Pinstripe cardinalfish

PLATE 60

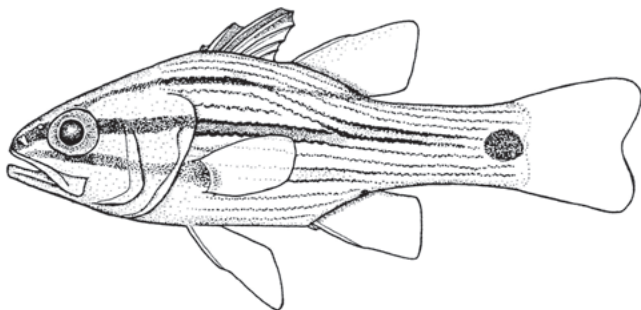
*Apogon kalosoma* Bleeker 1852: 448 (Bangka, Indonesia).

*Apogon multitaeniatus* (non Cuvier 1828): Day 1875\*; Weber & De Beaufort 1929 [in part: not Red Sea and Philippines].

*Lepidamia kalosoma*: Gon 1995\*; Manilo & Bogorodsky 2003.

Pectoral fins 14 or 15 rays. In SL: body depth 2.6–3.4, HL 2.6–2.9. In HL: snout length 4.1–5.2, eye diameter 2.8–3.6, and suborbital width 3.9–4.5. Total GR 4–6/13–15 = 17–21; developed GR 1 or 2/7 or 8 = 9 or 10. Median predorsal scales 6–8; LL scales 39–45.

Adults reddish, with numerous dark red to dusky brown narrow stripes on body. Juveniles usually with small dark spot at bases of first 2 dorsal-fin spines, and on body at rear of 2nd dorsal fin and rear of anal fin. Attains 120 mm SL.



*Lepidamia kalosoma*, 57 mm SL (India). Source: Gon 1995

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to east coast of India and Indonesia.

**REMARKS** Found to ~15 m deep.

### *Lepidamia multitaeniatus* (Cuvier 1828)

Smallscale cardinalfish

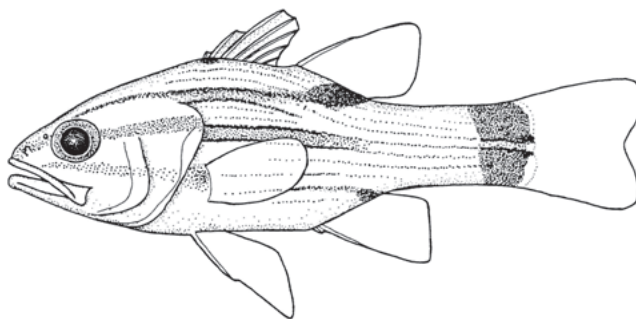
PLATE 60

*Apogon multitaeniatus* Cuvier (ex Ehrenberg) in Cuv. & Val. 1828: 159 (Red Sea); SFSA No. 488\*; Dor 1984; SSF No. 175.16\* [in part]; Goren & Dor 1994; Gon 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

*Lepidamia multitaeniatus*: Mabuchi *et al.* 2014.

Pectoral fins 13 or 14 rays. In SL: body depth 2.6–2.8, HL 2.4–2.8. In HL: snout length 4–4.6, eye diameter 3.2–3.7, and suborbital width 4.4–5.5. Total GR 5 or 6/14–16 = 19–22; developed GR 2 or 3/10–14 = 12–17; ceratobranchial GR 9. Median predorsal scales 3–6; LL scales 36–40.

Body generally red, with darker brownish red narrow stripes; body above lateral line and across entire caudal-fin base blackish; 1st dorsal fin black, all other fins mostly red; base of dorsal and anal fins pale; pale pink stripe on distal third of pelvic fin; juveniles with dark mark or saddle below rear part of 2nd dorsal fin, and wide dark bar on peduncle. Attains 125 mm SL.



*Lepidamia multitaeniatus*, 48 mm SL (Red Sea). Source: Gon 1995

**DISTRIBUTION** WIO: endemic to Red Sea and Gulf of Aden.

**REMARKS** Found in dark holes and crevices of coral reefs, to ~10 m deep.

### *Lepidamia natalensis* (Gilchrist & Thompson 1908)

PLATE 60

*Apogon natalensis* Gilchrist & Thompson 1908: 149 (KwaZulu-Natal, South Africa); Gon 1995\*; Randall 1995\*; Al-Jufaili *et al.* 2010.

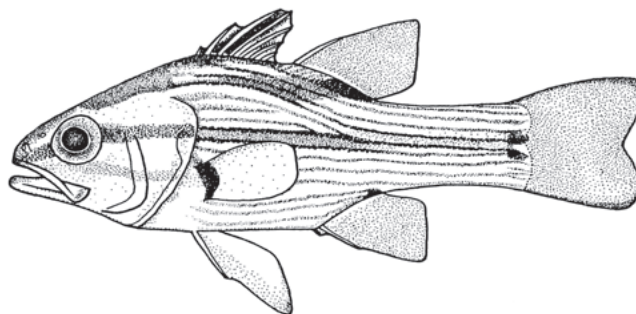
*Apogon polylepis* Regan 1919: 197, Fig. 1 (Durban, KwaZulu-Natal, South Africa; Karachi, Pakistan).

*Apogon multitaeniatus* (*non* Cuvier 1828): SFSA No. 488\*; SSF No. 175.16\* [in part]; Manilo & Bogorodsky 2003.

*Lepidamia multitaeniatus* (*non* Cuvier 1828): Smith 1961 [in part].

Pectoral fins 14–16 rays. Total GR 4–6/13–16; developed GR 1 or 2/6–8 = 8–10. In SL: body depth 2.5–2.9, HL 2.5–3. In HL: snout length 3.7–5.2, eye diameter 2.8–3.7, and suborbital width 3.5–4.4. Median predorsal scales 2–5; LL scales 40–47.

Body pale reddish brown, except pectoral-fin bases black; juveniles with conspicuous blackish mark below rear part of 2nd dorsal fin, and much smaller blackish spot around bases of first 2 dorsal-fin spines and above rear of anal-fin base. Attains 150 mm SL.



*Lepidamia natalensis*, 72 mm SL (South Africa). Source: Gon 1995

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden to Pakistan, and east coast of Africa to South Africa (KwaZulu-Natal).

**REMARKS** Found to ~10 m deep.

### *Lepidamia omanensis* (Gon & Mee 1995)

Oman cardinalfish

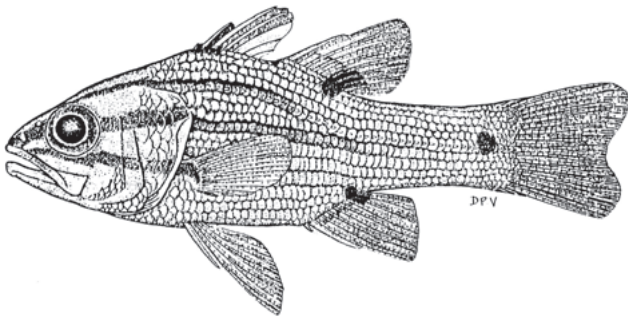
PLATES 60 & 61

*Apogon (Lepidamia) omanensis* Gon & Mee in Gon 1995: 16, Figs. 6–7 (near Shinzi, Masirah I., Oman)

*Apogon omanensis*: Randall 1995\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

Pectoral fins 16 or 17 rays. In SL: body depth 2.5–3.1, HL 2.4–2.7. In HL: snout length 3.9–4.3, eye diameter 3.1–3.9, and suborbital width 3.8–4.9. Total GR 5 or 6/14–16 = 19–21; developed GR 2/8 or 9. Median predorsal scales 3–5; LL scales 43–48.

Adults brown, fins darker brown, except pectoral fins transparent with reddish tinge. Juveniles translucent, with 3 dark longitudinal stripes on sides of body, and short dark stripe medially on top of head which may extend beyond eyes as faint stripe along 1st dorsal-fin base; dark basicaudal spot, and similar dark spots at base of rear of 2nd dorsal and anal fins, and at bases of first 2 or 3 dorsal-fin spines (spots extend onto adjacent fin spines or rays). Attains 125 mm SL.



*Lepidamia omanensis*, 55 mm SL (Oman). Source: Gon 1995

**DISTRIBUTION** WIO: Oman.

**REMARKS** Found to ~12 m deep.

### Tribe *Ostorhinchini* Whitley 1959

First dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 or 9 rays; caudal fin forked. Preopercle ridge smooth or with a few serrae, edges serrate. No supramaxilla. Scales ctenoid on head and body; LL scales 6–26. Head and/or body with  $\geq 1$  pale or dark longitudinal stripes (vertical bars rarely present), and basicaudal spot or broad mark present or absent. One genus: the most speciose in the family and found throughout the Indo-Pacific.

### GENUS *Ostorhinchus* Lacepède 1802

Diagnosis for WIO species only, as some characters are more variable in fish from the western Pacific: 1st dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 8 or 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–16 rays; caudal fin forked. Preopercle ridge smooth; preopercle with serrated posterior and ventral edges; suborbitals with smooth upper edge; posttemporal usually serrate. Villiform teeth on premaxillae, dentaries (some may be slightly enlarged) and vomer; teeth present on palatines. GR 17–31. Scales ctenoid on head and body; LL scales 24 or 25, all pored; circumpeduncular scales 12. Stripes present on head and/or through eyes, and stripes or bars on body; peritoneum pale, stomach and intestine darkish to black. This genus is very likely polyphyletic based on the diversity of colour patterns (cf. Mabuchi *et al.* 2006) and other morphologic characters. The *O. cyanosoma/properuptus* complex contains a number of undescribed species. At least 91 species, at least 23 in WIO (1 undescribed). Jones & Kumaran (1965) reported *Ostorhinchus moluccensis* from the Maldives, but Fraser *et al.* (2002) were unable to confirm that identification.

#### KEY TO SPECIES

1a	Anus near anal-fin origin .....	2
1b	Anus adjacent to pelvic-fin bases .....	<i>O. gularis</i>
2a	Second dorsal fin 9 rays .....	3
2b	Second dorsal fin 8 rays .....	<i>O. nigripes</i>
3a	Stripes present only on head and/or through eyes .....	4
3b	Stripes present on head and body (although may be faint on body) .....	8

Continued ...

## KEY TO SPECIES

- 4a Peduncle with dark mark (present as spot, bar or small saddle) ..... 5
- 4b No dark mark on peduncle ..... 7
- 5a Black basicaudal spot on lateral line or wide black band on peduncle ..... 6
- 5b Small saddle/spot on dorsum of peduncle ..... *O. spilurus*
- 6a GR 19–23; adults with peduncle bar ventrally incomplete, juveniles with basicaudal spot ..... *O. fleurieu*
- 6b GR 22–27; both juveniles and adults with complete (roughly hourglass-shaped) bar across peduncle ..... *O. aureus*
- 7a Total GR 20–23; teeth on dentaries slightly enlarged; snout dark ..... *O. apogonoides*
- 7b Total GR 24 or 25; villiform band of teeth on dentaries; snout pale ..... *O. flagelliferus*
- 8a Body without darkish vertical bars ..... 10
- 8b Body with darkish vertical bars reaching below lateral line .... 9
- 9a Pectoral fins 14 rays; no dark midline stripe from snout to caudal fin; may have a faint yellowish midline stripe ..... *O. oxina*
- 9b Pectoral fins 15 rays; dark midline stripe present from snout to end of caudal fin ..... *O. pleuron*
- 10a First dorsal fin 6 spines ..... *O. bryx*
- 10b First dorsal fin 7 spines ..... 11
- 11a Head and body both with prominent longitudinal stripes ... 12
- 11b Prominent stripes on head only, and body with blurred yellowish stripes ..... *Ostorhinchus* sp.
- 12a Body with brownish or yellowish stripes on sides; dark basicaudal bar present or yellowish brown stripe midway on caudal fin to near fin margin ..... 13
- 12b Body with  $\geq 1$  blackish stripes, which may or may not extend onto caudal fin; no basicaudal bar ..... 16
- 13a Blackish basicaudal bar present, and body with broad yellowish midlateral stripe from eye to basicaudal bar ..... *O. pselion*
- 13b No basicaudal bar ..... 14
- 14a Body with some brownish stripes that fade to yellowish; brownish midlateral stripe extends to caudal-fin margin ..... *O. holotaenia*
- 14b Body with yellowish stripes, and midlateral stripe extends onto caudal fin ..... 15
- 15a Sides of body with 6 narrow yellowish stripes, midlateral stripe extends onto caudal fin ..... *O. cyanosoma*
- 15b Sides of body with 3 yellowish stripes, coalescing as broad stripe on peduncle ..... *Ostorhinchus* cf. *wassinki*
- 16a Pectoral fins usually 13–15 rays; midlateral stripe extends only to base of caudal fin ..... 17
- 16b Pectoral fins usually 16 rays; midlateral stripe extends to caudal-fin margin ..... *O. fasciatus*
- 17a Pectoral fins usually 13 or 14 rays; 1 stripe above midlateral stripe ..... 18
- 17b Pectoral fins usually 15 rays; 4 stripes above midlateral stripe ..... *O. quinquestriatus*
- 18a Stripes on body present at or above midline ..... 19
- 18b Stripes on body present from dorsum to abdomen ..... 20
- 19a Stripe from above eye extends past 2nd dorsal fin; pectoral fins 13 rays ..... *O. fukuii*
- 19b Stripe over eye extends only to near 2nd dorsal-fin origin; pectoral fins 14 rays ..... *O. franssedai*
- 20a Pectoral fins usually 15 rays ..... *O. cookii*
- 20b Pectoral fins usually 14 rays ..... 21
- 21a Last anal-fin ray elongate, distal margin of fin concave; dark stripes on body narrower than pale interspaces .... *O. angustatus*
- 21b Last anal-fin ray short, distal margin of fin straight; dark stripes on body as broad as or broader than pale interspaces ..... 22
- 22a GR 17–19 (including rudiments); upper and lower dark stripes on peduncle extend slightly onto caudal-fin base ..... *O. taeniophorus*
- 22b GR 21–23 (including rudiments); upper and lower dark stripes on peduncle not extending onto caudal-fin base, but may curve slightly towards basicaudal spot ..... *O. nigrofasciatus*

*Ostorhinchus angustatus* (Smith & Radcliffe 1911)

Broadstriped cardinalfish

PLATE 62

*Amia angustata* Smith & Radcliffe in Radcliffe 1911: 253, Fig. 1  
(Malanipa I., Sulu Sea, Philippines).

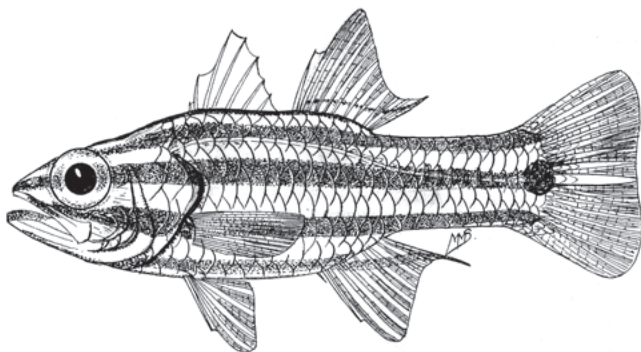
*Ostorhynchus angustatus*: Smith 1961\*.

*Apogon angustatus*: Dor 1984; SSF No. 175.1\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

*Ostorhinchus angustatus*: Randall 2005\*; Fricke & Kulbicki 2006; Fricke *et al.* 2009.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13–15 rays. Last ray of 2nd dorsal fin and anal fin elongate. GR 2 or 3/9–12. Median predorsal scales 3–5.

Head and body with 5 darkish longitudinal stripes (uppermost along base of dorsal fins; 2nd over eye and along nape to upper part of caudal-fin base; 3rd from snout to eye and midlaterally to caudal-fin base, ending as slightly enlarged basicaudal spot; 4th from lower lip and below eye through pectoral-fin base to lower part of caudal-fin base; 5th from lower jaw to pelvic-fin base and abdomen to anal-fin base); 2nd dorsal fin and anal fin each with pale reddish stripe; peritoneum pale, stomach and intestine blackish. Attains 87 mm SL.



*Ostorhinchus angustatus*, ~95 mm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos and Maldives; not known from Red Sea, Gulf of Aden, Gulf of Oman and Persian/Arabian Gulf; elsewhere to Philippines, Taiwan, Australia, Line Is. and Pitcairn Is.

**REMARKS** Common; usually in shallow, clear water of seaward reefs, on reef crests and slopes, and along deep drop-offs, to ~37 m deep. Feeds on polychaetes and other small benthic invertebrates at night; cryptic under ledges or in holes by day.

*Ostorhinchus apogonoides* (Bleeker 1856)

Sharp-tooth cardinalfish

PLATES 55 &amp; 62

*Cheilodipterus apogonoides* Bleeker 1856: 37 (Manado, Sulawesi, Indonesia).

*Ostorhynchus apogonoides*: Smith 1961\*.

*Apogon apogonoides*: SSF No. 172.2\*; Winterbottom *et al.* 1989\*; Gon & Randall 2003\*; Heemstra & Heemstra 2004\*.

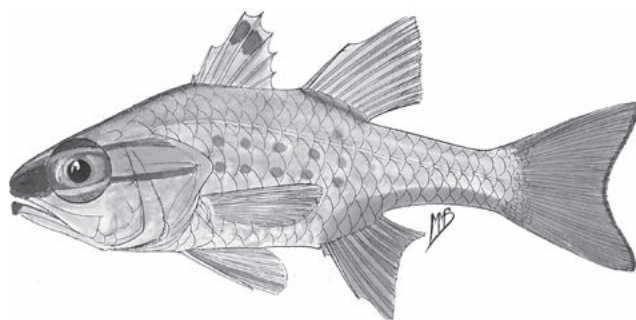
*Apogon apogonoides*: Fricke 1999.

*Ostorhinchus apogonoides*: Randall 2005\*.

*Ostorhinchus apogonoides*: Fricke *et al.* 2009.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13–15 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae, vomer and palatines; sides of dentaries with narrow row of slightly enlarged villiform teeth. GR 3 or 4/11–14. Median predorsal scales 4–6.

Upper body with pale purple tinge, becoming completely purple-grey from anal fin to peduncle; dorsal, anal and caudal fins with uniformly purple tinge; darkish stripe on snout, with thin iridescent bluish lines above and below, extending through eye and onto opercle, and variably as faint lines of bluish spots on body; cheeks yellowish; peritoneum pale, stomach and intestine blackish. Attains 107 mm SL.



*Ostorhinchus apogonoides*, 90 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Kenya to South Africa (Aliwal Shoal), Seychelles, Réunion, Mauritius, Chagos, Maldives and Sri Lanka; not known from Gulf of Aden, Gulf of Oman and Persian/Arabian Gulf; elsewhere widespread to Indonesia, Philippines, southern Japan, Australia, Loyalty Is. and out to the Marquesas Is.

**REMARKS** Inhabits rocky cliffs and sheltered coastal reefs to outer reefs, from shallow flats to at least 50 m deep. Usually in pairs or small aggregations. Frequently misspelled *apogonoides*.

## *Ostorhinchus aureus* (Lacepède 1802)

Ringtailed cardinalfish

PLATES 55 & 62

*Centropomus aureus* Lacepède (ex Commerson) 1802: 253, 273  
(Mauritius, Mascarenes).

*Apogon roseipinnis* Cuvier in Cuv. & Val. 1829: 490 (Trincomalee, Sri Lanka).

*Apogon annularis* var. *roseipinnis* Günther in Tennent 1861: 360  
[not available, name only].

*Apogon aureus*: Randall *et al.* 1990; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Al-Jufaili *et al.* 2010; Sluka 2013.

*Ostorhinchus aureus*: Fricke *et al.* 2009; Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13 or 14 rays. Last anal-fin ray not elongate. Villiform teeth on dentaries, premaxillae, vomer and palatines. GR 6–8/16–20. Median predorsal scales 4 or 5.

Head, body and fins brownish orange; darkish stripe on snout, with thin iridescent bluish lines above and below, extending through eye and onto opercle; small dark marks on pored LL scales; adults and juveniles with hourglass-shaped black bar on peduncle, juveniles with round basicaudal spot; peritoneum pale, stomach and intestine blackish. Attains 121 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Gulf of Aden, Somalia, East Africa, Madagascar, Comoros, Seychelles, Réunion and Mauritius; not known from Red Sea, Persian/Arabian Gulf, Chagos, Maldives and India; elsewhere to southern Japan, Australia, New Caledonia and Society Is.

**REMARKS** Inhabits holes in rocks or under ledges, in shallow water to ~40 m deep. Occurs in mixed aggregations with *Ostorhinchus apogonoides* during summer and autumn, but forms separate aggregations in winter and spring.

## *Ostorhinchus bryx* (Fraser 1998)

Offshore cardinalfish

PLATE 62

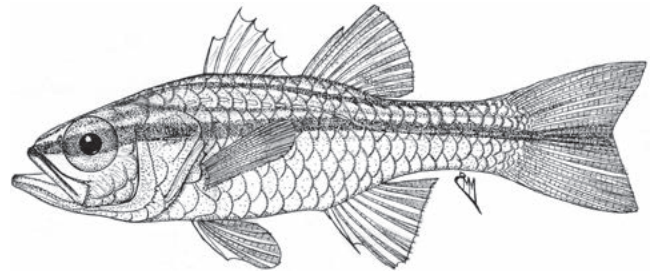
*Apogon bryx* Fraser 1998: 987, Fig. 1 (Balayan Bay, Luzon I., Philippines);  
Gon & Randall 2003\*; Fraser 2005.

*Ostorhinchus bryx*: Mabuchi *et al.* 2014.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 or 15 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on dentaries, premaxillae, palatines and vomer. GR 4–6/12–16. Median predorsal scales 6.

Body silvery white with 3 dark longitudinal stripes: dorsomedian stripe (may be faint) from interorbital region to predorsal area; narrow stripe from interorbital region and over

eye extending along upper body above lateral line to caudal-fin base; broader and darker midlateral stripe (about pupil width) from snout, through eye, to caudal-fin margin (its ventral edge regular along body); no stripe on 2nd dorsal fin or anal fin; stomach black, intestine pale with melanophores more intense and appearing black near the anal opening, and peritoneum silvery with many melanophores. Attains 60 mm SL.



*Ostorhinchus bryx*, 50 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Somalia to southern Mozambique; not known from Madagascar, Seychelles, Mauritius, Chagos and Maldives; elsewhere to Bay of Bengal, Philippines and Taiwan.

**REMARKS** Known mostly from trawls in coastal waters of continental shelf, in 14–155 m.

## *Ostorhinchus cookii* (Macleay 1881)

Cook's cardinalfish

PLATE 62

*Apogon cookii* Macleay 1881: 344 (Endeavour River and Darnley I., Queensland, Australia); SSF No. 175.5\*; Goren & Dor 1994; Randall *et al.* 1994\*; Carpenter *et al.* 1997\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

*Apogon melanotaenia* Regan 1905: 320, Pl. 3c, Fig. 4 (Karachi, Pakistan).

*Ostorhynchus endekataenia* (non Bleeker 1852): Smith 1961\* [in part].

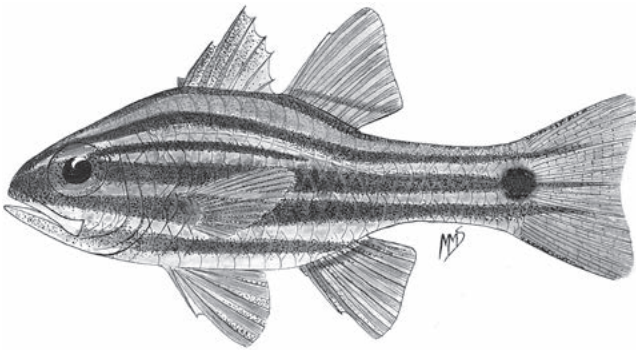
*Ostorhinchus cookii*: Fricke *et al.* 2009; Al-Jufaili *et al.* 2010.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 or 15 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on dentaries, premaxillae, vomer and palatines. GR 2 or 3/8–11. Median predorsal scales 3–5.

Head and body with 6 dark longitudinal stripes of variable width, but wider than pale interspaces (1st stripe from nape to rear of 2nd dorsal-fin base; 2nd stripe from interorbital region along lateral line to caudal-fin base; 3rd stripe faint and short, from above eye and fading beneath 2nd dorsal-fin origin; 4th stripe broad, midlateral, from snout through eye and along body to peduncle, ending as dark, roundish basicaudal spot; 5th stripe broad, from upper lip and beneath eye, through



pectoral-fin base to caudal-fin base; 6th stripe faintest, from rear of jaws and along abdomen to anal-fin base; 2nd dorsal fin and anal fin with proximal stripes (stripe on 2nd dorsal fin much wider in adult males than females and may occupy the entire lower third of fin); leading edge of pelvic fins white; peritoneum pale, stomach and intestine blackish. Attains 90 mm SL.



*Ostorhinchus cookii*, 80 mm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, Gulf of Oman, Red Sea, Kenya to South Africa (Sodwana Bay), Madagascar, Seychelles, Réunion, Mauritius, India and Sri Lanka; elsewhere to Philippines, southern Japan, Australia and New Caledonia.

**REMARKS** Found inshore, from near surface to ~12 m deep, in protected waters of lagoons and lee reefs, and often in tidepools and shallow seagrass beds.

### *Ostorhinchus cyanosoma* (Bleeker 1853)

Yellowstriped cardinalfish

PLATE 62

*Apogon cyanosoma* Bleeker 1853: 71 (Lawajong, Solor I., Indonesia); SSF No. 175.6\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Al-Jufaili *et al.* 2010.

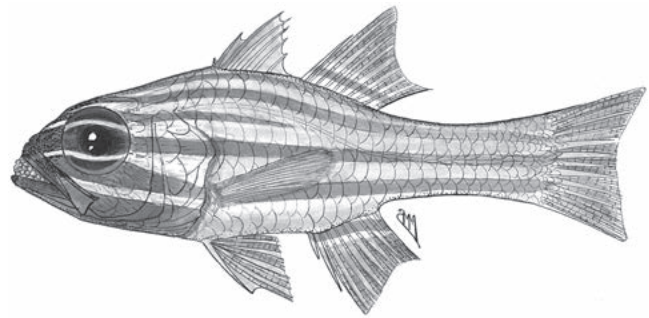
*Ostorhynchus cyanosoma*: Smith 1961\*.

*Ostorhinchus cyanosoma*: Randall 2005; Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13 or 14 rays. Last ray of 2nd dorsal fin and anal fin slightly elongate. Villiform teeth on dentaries, premaxillae, vomer and palatines. GR 3 or 4/13–15. Median predorsal scales 3–5.

Body with yellowish stripes from head to caudal-fin base, except stripes darkish on snout and head, and alternating with bluish white stripes (yellowish uppermost stripe from nape to beneath dorsal-fin bases; 2nd stripe from interorbital region and along lateral line to upper part of caudal-fin base; 3rd stripe short, from above eye to beneath 2nd dorsal-fin origin;

4th stripe brownish on snout and through eye, yellowish midlaterally to caudal-fin base; 5th stripe from lips, below eye, through pectoral-fin base to caudal-fin base; 6th stripe from rear edge of jaws and along abdomen to near rear of anal-fin base); 2nd dorsal fin and anal fin with pale stripes proximally; peritoneum pale, stomach and intestine blackish. Attains 56 mm SL.



*Ostorhinchus cyanosoma*, 60 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa, Madagascar, Comoros, Seychelles, Mauritius, Maldives and Sri Lanka; elsewhere to Indonesia, southern Japan, Wake Atoll, Marshall Is., Australia, New Caledonia, Fiji and Tonga.

**REMARKS** Specimens from the Red Sea, Arabian Sea and East Africa may not represent *Ostorhinchus cyanosoma* as identified here (cf. 'sp. 10' in Kuitert & Kozawa 1999). Inhabits sheltered clear water of lagoons and seaward reefs, in 1–49 m. Found in small or large aggregations, under ledges, in holes, or among the long spines of sea urchins. Feeds on planktonic crustaceans and small invertebrates.

### *Ostorhinchus fasciatus* (Shaw 1790)

Broadbanded cardinalfish

PLATE 62

*Mullus fasciatus* Shaw in White 1790: 268, Pl. 53, Fig. 1 (Port Jackson, New South Wales, Australia).

*Apogon quadrifasciatus* Cuvier in Cuv. & Val. 1828: 153 (Puducherry, India); Dor 1984; SSF No. 175.20\*.

*Ostorhynchus quadrifasciatus*: Smith 1961\*.

*Apogon fasciatus*: Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fraser 2005\*; Al-Jufaili *et al.* 2010.

*Ostorhinchus fasciatus*: Fricke *et al.* 2009; Bogorodsky *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 15 or 16 rays. Villiform teeth on dentaries, premaxillae, vomer and palatines. GR 2–4/11–13. Median predorsal scales 5.

Freshly dead fish with dark stripe from snout and over eye, usually ending beneath middle of 2nd dorsal fin; midlateral stripe from snout and through eye to caudal-fin margin; melanophores on lower lip, and melanophores also appearing as stripe on pelvic-fin rays 1–3 and along anal-fin base to tips of last rays; 2nd dorsal fin with stripe above base to last ray; bases of 2nd dorsal fin and anal fin darker posteriorly; roof of mouth and portion of upper branchial basket pale; peritoneum silvery with tiny melanophores, stomach and intestine blackish. Attains 90 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf (Iran), Red Sea, Oman to Mozambique, Madagascar, Seychelles, Réunion and India; Lessepsian migrant to Mediterranean Sea; elsewhere to east coast of India, Philippines, southern Japan, New Guinea and northern Australia.

**REMARKS** Nocturnal; inhabits coastal waters, on coral reefs or in sandy or weedy areas, in 2–128 m. Juveniles often seen associated with sea anemones.

### *Ostorhinchus flagelliferus* Smith 1961

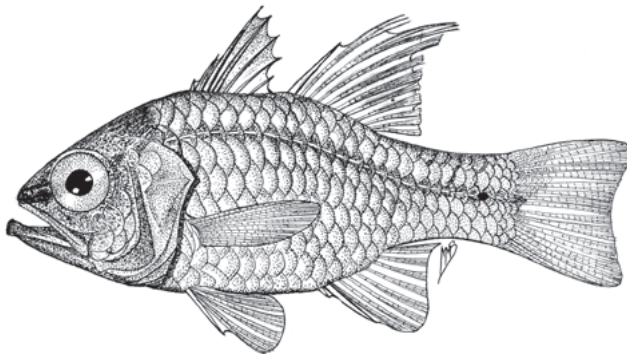
Coachwhip cardinalfish

PLATES 55 & 62

*Ostorhynchus flagelliferus* Smith 1961: 402, Fig. 8 (Mozambique).  
*Apogon flagelliferus*: SSF No. 175.8\*; Manilo & Bogorodsky 2003.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. First 2 or 3 rays of 2nd dorsal fin elongate, last rays of 2nd dorsal fin and anal fin not elongate. GR 3–5/16. Median predorsal scales 5.

Head, body and fins pale orangish; stripe on snout dark orangish, with iridescent bluish lines above and below, lines extending through eye to opercle; first few LL scales with dusky mark; tiny to small black basicaudal spot just above or on lateral line; peritoneum pale, stomach and intestine blackish. Attains 113 mm SL.



*Ostorhinchus flagelliferus*, 135 mm TL, holotype (Mozambique).  
Source: Smith 1961

**DISTRIBUTION** WIO: Mozambique and South Africa (Sodwana Bay).

### *Ostorhinchus fleurieu* Lacepède 1802

Flower cardinalfish

PLATES 55 & 62

*Ostorhinchus fleurieu* Lacepède 1802: 23, 24 (Pacific Ocean).  
*Centropomus aureus* Lacepède (ex Commerson) 1802: 253, 273 (Mauritius; Réunion).

*Apogon roseipinnis* Cuvier in Cuv. & Val. 1829: 490 (Trincomalee, Sri Lanka).

*Ostorhynchus fleurieu*: Smith 1961\*.

*Apogon fleurieu*: Randall *et al.* 1990; Goren & Dor 1994; Gon 1987; Carpenter *et al.* 1997\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

*Apogon aureus* (non Lacepède 1802): Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on dentaries, premaxillae, vomer and palatines. GR 5–7/14–17. Median predorsal scales 4 or 5.

Head, body and fins pale brownish orange; darkish stripe on snout, with iridescent bluish lines above and below, lines extending through eye to opercle and onto body as series of bluish spots; small dark marks on pored LL scales; black basicaudal bar not hourglass-shaped, may connect to other side dorsally but usually not ventrally; juveniles with round basicaudal spot. Attains 122 mm SL.



*Ostorhinchus fleurieu*, 120 mm TL (N Mozambique). Source: Smith 1961

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, Somalia to South Africa, Madagascar, Comoros, Mauritius, Réunion, Seychelles, India and Sri Lanka; not known from Chagos and Maldives; elsewhere to Philippines, Japan, New Guinea, Solomon Is. and Tonga.

**REMARKS** Appears to have a mostly continental distribution. Common in shallow coastal reefs with moderate currents, and also found in tidal channels of estuaries, to ~97 m deep. Adults usually in small schools comprising pairs.

### *Ostorhinchus franssedai*

(Allen, Kuitert & Randall 1994)

Frans's cardinalfish

PLATE 63

*Apogon franssedai* Allen, Kuitert & Randall 1994: 33, Fig. 5 (drop-off at outer Maumere Bay, Flores, Indonesia).

*Ostorhinchus franssedai*: Fraser 2012.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae, dentaries with 2 rows anteriorly and 1 row on sides, vomer with 1–3 teeth, and palatines with 1 row. GR 3 or 4/14–16. Median predorsal scales 5.

Head with 3 irregular brownish stripes, body semi-translucent, and all fins uniformly pale bronzy; stripe in interorbital region fading before 1st dorsal fin; stripe on snout and through eye becoming bronzy midlaterally on body to peduncle; stripe from lower lip to near cheek ending in spots; large blackish basicaudal spot about eye-sized. Attains 53 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Chagos and Maldives; elsewhere, Indonesia to Philippines and Palau.

**REMARKS** Inhabits steep drop-offs, and usually seen in caves or under ledges during the day, in 13–60 m.

### *Ostorhinchus fukuui* (Hayashi 1990)

PLATE 63

*Apogon fukuui* Hayashi 1990: 8, Figs. 1, 2a, 4a (off Ugui, Wakayama Prefecture, Japan).

*Ostorhinchus fukuui*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth in narrow rows on premaxillae and dentaries, and in 1 row on vomer and palatines. GR 2 or 3/12 or 13. Median predorsal scales 5 or 6.

Body semi-translucent, with 3 partial dark brownish stripes: dorsomedian stripe to 1st dorsal-fin origin; 2nd stripe over eye, along and above lateral line to beneath rear of 2nd dorsal fin; 3rd stripe broad on snout, through eye, and tapering

midlaterally to peduncle; blackish peduncle spot about eye-sized in adults, covering entire peduncle in juveniles. Attains 93 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: South Africa, Chagos and Maldives; elsewhere to Ryukyu Is. and Society Is.

**REMARKS** Found in 35–60 m.

### *Ostorhinchus gularis* (Fraser & Lachner 1984)

Gular cardinalfish

PLATE 63

*Apogon gularis* Fraser & Lachner 1984: 632, Figs. 1–2 (Yemen, Red Sea);

Goren & Dor 1994; Gon & Randall 2003\*; Manilo & Bogorodsky 2003.

*Apogon smithvanizi* Allen & Randall 1994: 24, Fig. 1 (Bahrain, Persian/Arabian Gulf); Randall 1995\*.

*Ostorhinchus gularis*: Fraser 2012; Psomadakis *et al.* 2015.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 or 15 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae, in 2 rows on dentaries, and in 1 row on vomer and palatines. GR 4 or 5/16–19. Median predorsal scales 5. Anal opening near rear of pelvic-fin bases.

Body translucent; darkish stripe from tip of lower lip onto snout; darkish spots on cheeks and opercles; one or more faint reddish lines of small dashes on anterior body in line with narrow post-ocular stripe; tip of 1st dorsal fin blackish; 2nd dorsal, anal and caudal fins uniformly reddish; anal area blackish with whitish border; peritoneum pale, stomach and intestine blackish. Attains 57 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf (Bahrain), Pakistan, Oman, Red Sea (Yemen), Mozambique and South Africa; elsewhere, Andaman Sea (Myanmar) and Philippines.

**REMARKS** Known primarily from type specimens trawled from silty or sandy bottom, in 26–290 m.

### *Ostorhinchus holotaenia* (Regan 1905)

Copperstriped cardinalfish

PLATE 63

*Apogon holotaenia* Regan 1905: 319 (Muscat, Oman, Gulf of Oman);

Randall 1995\*; Anderson *et al.* 1998; Manilo & Bogorodsky 2003;

Al-Jufaili *et al.* 2010.

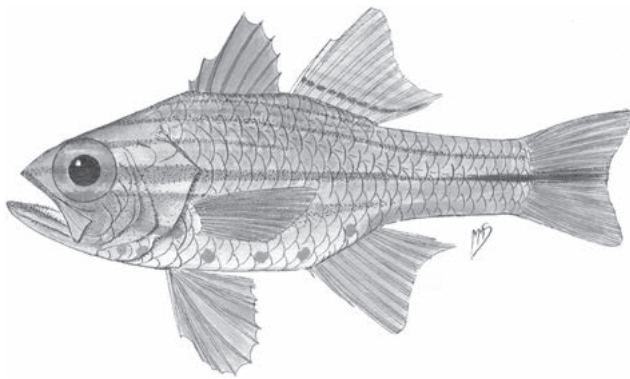
*Ostorhynchus nitidus* Smith 1961: 403, Pl. 48, Fig. J (Inhaca I., Mozambique).

*Apogon nitidus*: SSF No. 175.19\*.

*Ostorhinchus holotaenia*: Fricke *et al.* 2013; Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin slightly elongate, last ray of anal fin elongate. Villiform teeth in 2 rows on sides of premaxillae and dentaries, and in 1 row on vomer and palatines. GR 3/12–14. Median predorsal scales 3.

Head and body with 6 brownish to yellowish brown stripes (1st stripe narrow, from interorbital region and offset from dorsal-fin bases, to beneath rear of 2nd dorsal fin; 2nd stripe broader, from top of snout and over eye to peduncle; 3rd stripe narrow, through upper part of eye to beneath 2nd dorsal fin; 4th stripe on snout, through eye, and midlaterally on body onto caudal fin; 5th stripe from lips, below eye, through pectoral-fin base to peduncle; 6th stripe faintly yellowish, from lower jaw and along abdomen to anal-fin base), and series of pale spots between the lowermost 2 stripes; 2nd dorsal fin and anal fin with faint stripes proximally. Attains 69 mm SL.



*Ostorhinchus holotaenia*, 73 mm TL, holotype of *O. nitidus* (S Mozambique). Source: Smith 1961

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Mozambique, South Africa, Seychelles and Réunion; elsewhere to Indonesia and Taiwan.

**REMARKS** Found in 8–20 m.

## *Ostorhinchus nigripes* (Playfair 1867)

Blackfoot cardinalfish

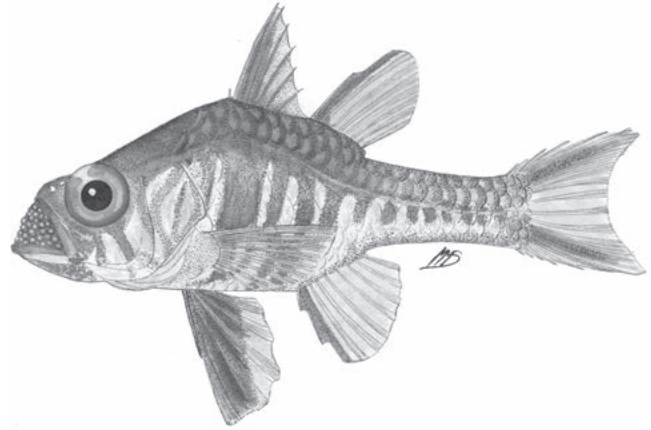
PLATE 63

*Apogon nigripes* Playfair in Playfair & Günther 1867: 19, Pl. 5, Fig. 1 (Zanzibar, Tanzania); Smith 1961\*; SSF No. 175.17\*.

*Ostorhinchus nigripes*: Mabuchi *et al.* 2014.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8 rays; pectoral fins 13 or 14 rays. In SL: body depth 2.1–2.5, HL 2.4–3, pelvic-fin length 2.4–3.7, and pectoral-fin length 3.4–4.2. In HL: 2nd spine of dorsal fin 1–1.6, and 2nd spine of anal fin 2.1–3.1; pelvic-fin spine 1.5–2.2 in pelvic-fin length. Developed GR 4–6/19–25 = 23–30; ceratobranchial GR 12–15.

Head and body olive-green to brown, with irregular pale areas (providing excellent camouflage in seagrasses). Attains 70 mm TL.



*Ostorhinchus nigripes*, ~60 mm TL, brooding male (S Mozambique). Source: SFSA

**DISTRIBUTION** WIO: Kenya to South Africa (Lake St Lucia).

**REMARKS** Inhabits inshore seagrass and algal beds. This species likely does not belong in this genus and may belong in its own genus based on having 6 spines in the 1st dorsal fin and 8 dorsal-fin rays, as well as its number of gill rakers, colour pattern and body shape.

## *Ostorhinchus nigrofasciatus* (Lachner 1953)

Blackstripe cardinalfish

PLATE 63

*Apogon nigrofasciatus* Lachner 1953: 466, Fig. 81, Pl. 37c–d (Bikini Atoll, Marshall Is.); Lachner & Randall 1986; Gon & Randall 2003\*; Heemstra & Heemstra 2004; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

*Ostorhinchus nigrofasciatus*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13 or 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae and dentaries, and in 1 or 2 rows on vomer and palatines. GR 2 or 3/12–16. Median predorsal scales 3–5.

Head and body with 5 dark stripes and pale interspaces of similar width (1st dark stripe from interorbital region to beneath 2nd dorsal fin; 2nd from top of snout, over eye, and dorsolaterally on body to caudal-fin base; 3rd from snout, through eye, above pectoral-fin base and midlaterally to caudal-fin base, with slightly expanded basicaudal spot-like area; 4th from lips, below eye, through part of pectoral-fin bases and abdomen to caudal-fin base; 5th from lower jaw to pelvic-fin base and anal fin); all fins pinkish. Attains 73 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to Mozambique, Comoros, Madagascar and Maldives; elsewhere to east coast of India, Japan, Marshall Is., New Guinea and Tuamotu Is.

**REMARKS** Occurs on reef flats and shallow lagoon reefs, usually seen singly or in pairs under ledges and in crevices, from near surface to ~45 m deep. Feeds on small benthic invertebrates at night.

### *Ostorhinchus oxina* (Fraser 1999)

PLATE 63

*Apogon oxina* Fraser 1999: 41, Fig. 1 (Chennai, India); Fraser *et al.* 2002.  
*Ostorhinchus oxina*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae, in 2 or 3 rows on dentaries, and in 1 row on vomer and palatines. GR 4 or 5/15–17. Median predorsal scales 3 or 4.

Colour in life unknown. Fresh post-mortem photograph from India with reddish fins; a midline faint yellowish stripe with bars extending onto the abdomen, dark brown stripes on head to edge of opercle, dark brown stripe over eye to level of posterior second dorsal fin. Preserved specimens: 5 dark longitudinal stripes on head, 2 of these continuing onto upper body (dorsomedian stripe from interorbital region to 1st dorsal-fin origin; 2nd stripe from interorbital region and over eye to beneath 2nd dorsal-fin origin; 3rd stripe from near upper part of eye to below posttemporal; 4th stripe from snout, through middle of eye, and to edge of opercle; 5th stripe from tip of lower jaw, under eye and onto cheek and near pectoral-fin base); 4 or 5 dark vertical bars on body (from near pelvic-fin origin to lateral line; from mid-abdomen to upper body stripe; from near posterior of pelvic fin to dorsal stripe; from near anal-fin origin to above lateral line; and faint bar from mid-anal fin to above lateral line); faint darkish mark at rear of 2nd dorsal-fin base; faint stripe in mid-caudal fin; peritoneum pale, stomach and intestine black. Attains 71 mm SL.

**DISTRIBUTION** Indian Ocean. WIO: Maldives and Sri Lanka; elsewhere to east coast of India.

**REMARKS** Type specimens collected in 15–22 m.

### *Ostorhinchus pleuron* (Fraser 2005)

Rib-bar cardinalfish

PLATE 64

*Apogon pleuron* Fraser 2005: 6, Figs. 1–2 (Tanguinqui I., Visayan Sea, Philippines).

*Ostorhinchus pleuron*: Fraser 2005.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 15 or 16 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae and dentaries (becoming 1 row at sides of dentaries), in 1 row on vomer, and in 1 or 2 rows on palatines. GR 3 or 4/13–17. Median predorsal scales 5.

Head and body with 2 dark longitudinal stripes (uppermost stripe from snout and over eye to beneath mid-2nd dorsal fin, not beyond; midlateral stripe from snout and through eye to caudal-fin margin), and body with 5–9 dark vertical bars variably extending ventrally from midlateral stripe and beginning behind pectoral-fin base; lower lips with some melanophores; anal-fin rays with melanophores on distal tips, and reddish stripe near base extending to tips of last rays; reddish stripe in 2nd dorsal fin extending to 9th ray; bases of anal-fin rays and 2nd dorsal fin darker posteriorly; roof of mouth and portion of upper gill arches dark; peritoneum silvery with tiny melanophores, stomach and intestine blackish. Attains 103 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: southern India; elsewhere, Philippines, Malaysia, Indonesia, South China Sea and New Guinea.

**REMARKS** The general distribution appears to be mostly continental. Found over open substrate, in 3–91 m. Sold in markets in India and the Philippines as bycatch of trawls.

### *Ostorhinchus pselion* (Randall, Fraser & Lachner 1990)

PLATE 64

*Apogon pselion* Randall, Fraser & Lachner 1990: 57, Figs. 8–9 (El Himeira, Sinai Peninsula, Egypt, Gulf of Aqaba, Red Sea); Goren & Dor 1994; Gon & Randall 2003\*.

*Ostorhinchus pselion*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 13 or 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae in 2 rows at front and in band at sides; on dentaries in 3 rows at front, narrowing to 1 row at sides; and in 1 row on vomer and palatines. GR 5 or 6/14–16. Median predorsal scales 4.

Head with alternating yellowish and narrow whitish/bluish stripes; broad midlateral yellow stripe on body faintly edged with narrow whitish/bluish line; 2nd dorsal fin and anal fin with yellowish and bluish stripes; black peduncle bar with bluish outline; peritoneum pale, stomach and intestine blackish. Attains 41 mm SL.

**DISTRIBUTION** WIO: endemic to Red Sea.

**REMARKS** Found in 10–43 m.

## *Ostorhinchus quinquestriatus* (Regan 1908)

*Apogon quinquestriatus* Regan 1908: 226 (South Nilandu, Maldives); Fraser 2005.  
*Ostorhinchus quinquestriatus*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 15 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth in several rows on premaxillae and dentaries, becoming 1 row on sides of dentaries, in 1 row on vomer, and in 1 or 2 rows on palatines. GR 3/12. Median predorsal scales 5.

Preserved specimens with 4 narrow dark stripes: uppermost along nape and dorsal-fin bases, 2nd and 3rd from eye to peduncle, and 4th from snout to caudal-fin margin. Attains at least 37 mm SL.



*Ostorhinchus quinquestriatus*, 37 mm SL, syntype (Maldives).

© TH Fraser, FLMNH

**DISTRIBUTION** Known only from two type specimens collected in the Maldives.

**REMARKS** Trawled from 55–66 m.

## *Ostorhinchus spilurus* (Regan 1905)

PLATE 64

*Apogon spilurus* Regan 1905: 321, Pl. 3c (Karachi, Pakistan); Gon & Randall 2003\*; Manilo & Bogorodsky 2003.  
*Ostorhynchus micromaculatus* Kotthaus 1970: 70, Fig. 254 (Yemen, Red Sea).  
*Ostorhinchus spilurus*: Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth in 2 rows anteriorly on premaxillae, in 2 rows on sides of dentaries (some slightly enlarged), and in 1 row on vomer and palatines. GR 3 or 4/12 or 13. Median predorsal scales 5.

Freshly dead fish tannish, with scale edges outlined above lateral line; lower jaw tip darkish; fins yellowish to reddish; basicaudal spot blackish; peritoneum pale, stomach and intestine blackish. Attains 80 mm SL.

**DISTRIBUTION** WIO: Pakistan, Red Sea, Somalia, Seychelles and Mauritius.

**REMARKS** Found in 22–200 m; generally caught in trawls.

## *Ostorhinchus taeniophorus* (Regan 1908)

Reef-flat cardinalfish

PLATE 64

*Apogon taeniophorus* Regan 1908: 226 (Maldives); SSF No. 175.25\*; Winterbottom *et al.* 1998\*; Goren & Dor 1994; Fricke 1999; Heemstra *et al.* 2004; Heemstra & Heemstra 2004.  
*Ostorhynchus endekataenia* (*non* Bleeker 1852): Smith 1961\* [in part].  
*Ostorhinchus taeniophorus*: Fricke *et al.* 2009; Mabuchi *et al.* 2014.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae, dentaries, vomer and palatines. GR 2 or 3/9–11. Median predorsal scales 4.

Head with 5 dark stripes on sides, plus short dorsomedian stripe on nape; body with 4 dark stripes on sides, plus dorsomedian stripe from interorbital region to along dorsal-fin bases (midlateral stripe ending on caudal-fin base as slightly ovoid mark thicker than stripe); 1st dorsal fin dusky; 2nd dorsal fin with darkish stripe proximally; peritoneum pale, stomach and intestine blackish. Attains 93 mm SL.



*Ostorhinchus taeniophorus*, 65 mm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa, Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, India and Sri Lanka; elsewhere to southern Japan, Australia, New Caledonia, Rapa Iti, Line Is. and Pitcairn Is.

**REMARKS** Occurs inshore; found in holes or under ledges of outer-reef flats in areas exposed to surge, to ~44 m deep. Nocturnal.

*Ostorhinchus cf. wassinki*

PLATE 64

*Apogon wassinki* Bleeker 1861: 257 (Kupang, Timor, Indonesia).

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last anal-fin ray elongate. Villiform teeth on premaxillae and dentaries, and in 1 row on vomer and palatines. GR 3/14.

Body with yellowish stripes alternating with whitish stripes, the stripes brownish on head, and the central yellowish stripes merging with large yellowish basicaudal spot partly on caudal fin (short dorsomedian brownish stripe from interorbital region to nape; brownish stripe on interorbital region and over eye and along upper sides to upper part of peduncle; short faint stripe from upper part of eye to sides of head, fading beyond opercle; brownish stripe on snout, through eye, becoming yellowish on sides of body; brownish stripe from lower lip becoming yellowish stripe through pectoral-fin base to lower part of peduncle; faint yellowish stripe along lower part of head and body reaching anal-fin base as proximal stripe to last ray); 2nd dorsal fin with faint stripe proximally. Attains 44 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Arabian Sea and Maldives; elsewhere, Indonesia and Australia.

**REMARKS** This identification is based on Randall & Kulbicki (1998) and Kuiter (1998).

*Ostorhinchus sp.*

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae and dentaries (becoming 1 or 2 rows on sides of dentaries), in V-shaped patch on vomer, and in 1 row on palatines. GR 4/16 or 17. Median predorsal scales 4.

Head with alternating brownish and narrower whitish/bluish stripes; body mostly yellowish, with poorly defined stripes (no well-defined whitish/bluish stripes); fins translucent, with faint yellowish stripes in 2nd dorsal fin and anal fin; peritoneum pale, stomach and intestine blackish. Attains 45 mm SL.

**DISTRIBUTION** Known only from Maldives; see photographs in Kuiter (1998) and Kuiter & Kozawa (1999: sp. 13).

*Tribe Pristiapogonini* Fraser & Mabuchi 2014

First dorsal fin 6 or 7 spines, 9 rays; anal fin 2 spines, 8 rays; caudal fin forked. Preopercular ridge serrate; suborbitals serrate. No supramaxilla. Head and body with ctenoid scales; LL scales 23–25. Two genera, both represented in WIO.

**GENUS** *Pristiapogon* Klunzinger 1870

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 13 or 14 rays. Palatine teeth present in 1 row or absent. Preopercle rear and lower edges and ridge serrated; suborbitals with upper edge serrated. GR on 1st arch 16–23, including rudiments. LL scales 24; circumpeduncular scales 12–18. Stomach and intestine pale. Fraser & Lachner (1985) revised *Pristiapogon* as a valid subgenus of *Apogon*. Five species, widespread in Indo-Pacific, including WIO.

**KEY TO SPECIES**

1a	GR 10–13 .....	2
1b	GR 16–19 .....	<i>P. taeniopterus</i>
2a	No basicaudal spot .....	<i>P. abrogramma</i>
2b	Large or small spot present on peduncle at caudal-fin base .....	3
3a	Body depth usually 34–39% SL; circumpeduncular scales usually 14; brownish midlateral stripe same width posteriorly (stripe may be entirely faded); spot on peduncle diffuse in adults .....	<i>P. kallopterus</i>
3b	Body depth usually 29–34% SL; circumpeduncular scales usually 12; midlateral stripe narrowing on peduncle, and well-defined in adults .....	4
4a	Basicaudal spot positioned above LL scales; pectoral fins usually 13 rays .....	<i>P. exostigma</i>
4b	Basicaudal spot centred on LL scales; pectoral fins usually 14 rays .....	<i>P. fraenatus</i>

## *Pristiapogon abrogramma* (Fraser & Lachner 1985)

Lateralstripe cardinalfish

PLATE 64

*Apogon abrogramma* Fraser & Lachner 1985: 5, Fig. 1 (west of northwestern tip of Anonyme I., Seychelles).

*Pristiapogon abrogramma*: Mabuchi *et al.* 2014.

Pectoral fins 13 rays; GR 10–14; median predorsal scales 4 or 5; circumpeduncular scales 12 (5 + 2 + 5).

Body pale grey, with dark stripe midlaterally from snout to midway onto caudal-fin base, widest and darkest through and behind eye, tapering to narrow streak on peduncle; no basicaudal spot. Attains 114 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Madagascar, Comoros, Seychelles, Chagos, Maldives and Sri Lanka; elsewhere to Philippines, New Guinea and Solomon Is.

## *Pristiapogon exostigma* (Jordan & Starks 1906)

Narrowstripe cardinalfish

PLATE 64

*Amia exostigma* Jordan & Starks in Jordan & Seale 1906: 238, Fig. 31 (Apia, Upolu I., Samoa).

*Apogon exostigma*: Fraser & Lachner 1985; Goren & Dor 1994; Randall 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

*Pristiapogon exostigma*: Mabuchi *et al.* 2014.

Pectoral fins 13 rays; GR 10–13; median predorsal scales 4 or 5; circumpeduncular scales 12 (5 + 2 + 5).

Body pale grey, with tapering dark stripe midlaterally from snout to caudal-fin base, and small basicaudal spot positioned above LL scales. Attains 94 mm SL.



*Pristiapogon exostigma* (Red Sea). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman and Comoros; not known from Madagascar, Seychelles, St Brandon Shoals, Chagos, Maldives and Sri Lanka; elsewhere widespread to Ryukyu Is., Marshall Is., Australia, southern Great Barrier Reef, Line Is. and Pitcairn Is.

**REMARKS** Found under ledges or among isolated coral heads in silty inner reef areas, in 1–20 m. Solitary and rather rare. Nocturnal.

## *Pristiapogon fraenatus* (Valenciennes 1832)

Bridled cardinalfish

PLATE 64

*Apogon fraenatus* Valenciennes 1832: 57, Pl. 4, Fig. 4 (New Guinea);

Dor 1984; Fraser & Lachner 1985; SSF No. 175.9\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Carpenter *et al.* 1997\*; Fricke 1999;

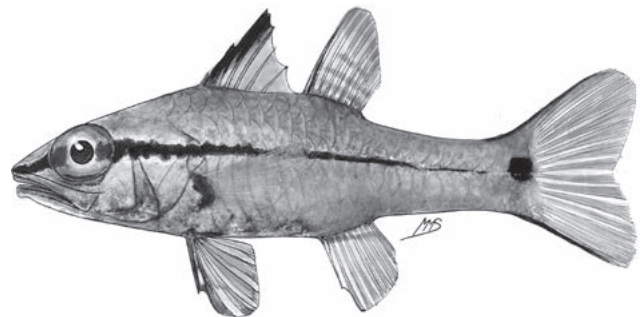
Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Al-Jufaili *et al.* 2010.

*Apogon vittiger* Bennett 1833: 32 (Mauritius, Mascarenes).

*Pristiapogon fraenatus*: Smith 1961\*; Randall 2005; Fricke *et al.* 2009.

Pectoral fins 14 rays; GR 10–15; median predorsal scales 4 or 5; circumpeduncular scales 12 (5 + 2 + 5).

Body pale, with pinkish or yellowish tinge; dark midlateral stripe tapering from snout to caudal-fin base, and basicaudal spot centred on LL scales. Attains 90 mm SL.



*Pristiapogon fraenatus*, 110 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, East Africa to South Africa (KwaZulu-Natal), Madagascar, Chagos and Mascarenes; elsewhere to Ryukyu Is., New Guinea, Australia, New Caledonia, Line Is. and Tuamotu Is.

**REMARKS** Found in relatively clear waters on reef flats and lagoon and seaward reefs, in 1–42 m. Singly or in small groups; cryptic and under ledges by day.



*Pristiapogon kallopterus* (Bleeker 1856)

Iridescent cardinalfish

PLATE 65

*Apogon kallopterus* Bleeker 1856: 33 (Manado, Sulawesi, Indonesia); SSF No. 175.12\*; Fraser & Lachner 1985; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Gon & Randall 2003\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

*Apogon snyderi* Jordan & Evermann 1903: 180 (Honolulu, Oahu I., Hawaii).

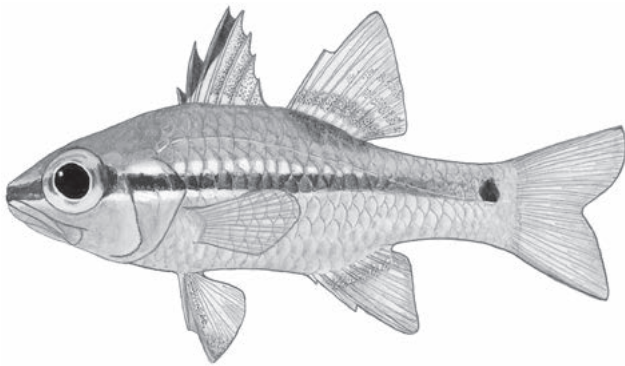
*Apogon frenatus yaeyamaensis* Aoyagi 1943: 79, Fig. 19 (Ishigaki I., Ryukyu Is., Japan).

*Pristiapogon snyderi*: Smith 1961\*.

*Pristiapogon kallopterus*: Fricke *et al.* 2009.

Pectoral fins 13 rays; GR 9–13; median predorsal scales 4 or 5; circumpeduncular scales 14 (5 + 2 + 7).

Body tan to pale red-brown, with uniformly brownish midlateral stripe from snout to near caudal-fin base (may be faded), followed by slightly offset dusky basicaudal spot; 1st dorsal fin often with yellow leading edge. Attains 122 mm SL.



*Pristiapogon kallopterus*, 80 mm TL (South Africa). Source: CFA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Yemen, Kenya to South Africa (Algoa Bay), Madagascar, Comoros, Seychelles, Mascarenes and Chagos; elsewhere widespread to Indonesia, southern Japan, Australia, New Zealand, Line Is., Rapa Iti, Pitcairn Is., Marquesas Is. and Hawaii.

**REMARKS** Occurs on clear-water lagoon patch reefs and seaward reefs, from lower surge zone to ~62 m deep. Generally found singly, in crevices. Feeds at night on small benthic and free-swimming crustaceans.

*Pristiapogon taeniopterus* (Bennett 1836)

Bandfin cardinalfish

PLATE 65

*Apogon taeniopterus* Bennett 1836: 206 (Mauritius, Mascarenes); Fraser & Lachner 1985; Fricke 1999; Heemstra *et al.* 2004.

*Pristiapogon taeniopterus*: Fricke *et al.* 2009.

Pectoral fins 13; GR 15–18; median predorsal scales 4–6; circumpeduncular scales 15–18 (5–7 + 2 + 7–9).

Body pale olive-grey, without dark midlateral stripe; young and juveniles with basicaudal spot, adults with complete dusky vertical bar at caudal-fin base, and black streak through upper and lower edges of lobes. Attains 111 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Mascarenes and St Brandon Shoals; elsewhere to Cocos (Keeling) Is., Christmas I., and islands of the Pacific Plate (Marianas Is., New Caledonia, Pitcairn Is., Line Is. and Hawaii), but not known from Australia and Indonesia to Japan.

**REMARKS** Insular species inhabiting rocky and coralline areas of seaward reefs, at 1–42 m. Found in or near shelter by day; feeds at night on free-swimming crustaceans.

GENUS *Pristicon* Fraser 1972

First dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14 or 15 rays; caudal fin forked. Preopercle rear and lower edges and ridge serrated; suborbitals with upper edge serrated. LL scales 23–25. Body with some darkish spots and/or irregular bars. Three species, 1 in WIO.

*Pristicon rhodopterus* (Bleeker 1852)

Redfin cardinalfish

PLATE 65

*Apogon rhodopterus* Bleeker 1852: 62 (Singapore); Randall & Fraser 1999. *Apogon trimaculatus* (*non* Cuvier 1828): Suresh & Thomas 2007\*. *Pristicon rhodopterus*: Mabuchi *et al.* 2014.

First dorsal fin 6 spines; pectoral fins 14 rays; GR 15–18; median predorsal scales 4 or 5.

Body olive-brown, scale edges darker; no spot on opercle; short vertical bar from 1st dorsal-fin base to lateral line, becoming darkish spot below lateral line, and shorter darkish bar from rear of 2nd dorsal-fin base to lateral line, becoming darkish spot ~1 scale below lateral line; another darkish spot above and behind pectoral fins; adults, juveniles and young with darkish basicaudal spot (smaller than pupil). Attains 120 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: southern India; elsewhere, Indonesia, Philippines, Palau, Yap Is., New Guinea and Solomon Is.

**REMARKS** Generally found on shallow protected reefs in lagoons or harbours, often in <10 m.

**Tribe Rhabdamiini** Fraser & Mabuchi 2014

One genus.

**GENUS** *Rhabdamia* Weber 1909

Body elongate, depth 21–33% SL; 1st dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 9–12 rays; anal fin 10–13 rays; caudal fin usually deeply forked, hypurals fused. Preopercle edges smooth, and ridge smooth or with a few serrae at angle; posttemporal smooth. Dentition reduced (or teeth may be absent): teeth in 1–3 rows on premaxillae, and in 1 row on dentaries, vomer and palatines. Scales cycloid to weakly ctenoid and deciduous; LL pored scales 24 or 25. 6 species, 4 in WIO.

**KEY TO SPECIES**

- 1a First dorsal fin 7 spines; 2nd dorsal fin 10–12 rays ..... *R. nigrimentum*
- 1b First dorsal fin 6 spines; 2nd dorsal fin 9 rays ..... 2
  
- 2a Blackish basicaudal spot positioned slightly below midline; tips of caudal-fin lobes variably with blackish marks; darkish line along anal-fin base and lower edge of peduncle ..... *R. gracilis*
- 2b No basicaudal spot; no dark marks on caudal-fin tips; no darkish line along anal-fin base to peduncle ..... 3
  
- 3a Body with darkish spots anteriorly along midline ..... *R. spilota*
- 3b Body with darkish midlateral stripe ..... *R. nuda*

***Rhabdamia gracilis*** (Bleeker 1856)

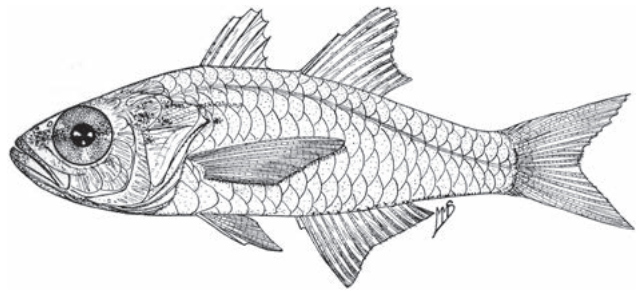
Luminous cardinalfish

PLATE 65

*Apogonichthys gracilis* Bleeker 1856: 371 (Ternate, Moluccas, Indonesia).  
*Rhabdamia gracilis*: Smith 1961\*; SSF No. 175.41\*; Fricke 1999; Manilo & Bogorodsky 2003.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 11 or 12 rays; pectoral fins 12 or 13 rays. Villiform teeth in 1 row on premaxillae, dentaries and vomer, and present in 1 row or absent on palatines. GR 26 or 27. Median predorsal scales 4.

Body translucent, abdomen and most of head iridescent; jaw tips dusky; snout with dusky mark; dusky stripe from interorbital region and along dorsal-fin bases to upper part of peduncle; iridescent bluish midlateral streak from opercle to peduncle, not reaching the ventrally offset black basicaudal spot; dusky line along anal-fin base to lower edge of peduncle; tip of caudal-fin upper lobe black. Attains 50 mm SL.



*Rhabdamia gracilis*, 65 mm TL (N Mozambique). Source: Smith 1961

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Somalia, Mozambique, Comoros, Seychelles, Mauritius and Chagos; elsewhere to Indonesia, southern Japan, Marshall Is., New Guinea, Australia, New Caledonia and Fiji.

**REMARKS** Inhabits lagoon reefs and coastal reefs, among corals and rocks, at 3–55 m. Forms large schools; feeds in currents above the reef.

***Rhabdamia nigrimentum*** (Smith 1961)

PLATE 66

*Bentuviaichthys nigrimentum* Smith 1961: 412, Pl. 50 (off Eritrea, Red Sea).  
*Rhabdamia nigrimentum*: Dor 1984; Goren & Dor 1994; Gon & Randall 2003\*.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 10–12 rays; anal fin 2 spines, 10 or 11 rays; pectoral fins 16 or 17 rays. Lower lip slightly produced. Villiform teeth present on premaxillae plus with canines near symphysis, in 1 row on dentaries plus with canines near symphysis, and in 1 row on vomer and palatines. GR 3 or 4/15–17. Median predorsal scales 2 or 3.

Head and abdomen iridescent, rest of body translucent, with darkish internal line along spinal column above swimbladder and another internal line posteriorly along spinal column from swimbladder to near caudal-fin base; lower lip black, upper lip and area around nostrils thinly blackish; blackish stripe in interorbital/temporal region; nape, dorsum and peduncle yellowish (composed of fine spots); anal-fin base yellowish, becoming darkish stripe along lower part of peduncle; fins uniformly tinted yellowish, without stripes. Attains 56 mm SL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Found in 6–12 m.

*Rhabdamia nuda* (Regan 1905)

*Apogonichthys nudus* Regan 1905: 321, Pl. 3c, Fig. 6 (Karachi, Pakistan).  
*Rhabdamia nuda*: Mabuchi *et al.* 2014.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 11 or 12 rays; pectoral fins 12 or 13 rays. Villiform teeth in 1 or 2 rows on premaxillae, and in 1 row on dentaries, vomer and palatines. GR 6/18.

Live colour unknown, probably translucent; blackish midlateral line from opercle to below rear of 2nd dorsal fin; no marks on fins.

**DISTRIBUTION** Known only from nine type specimens collected in Pakistan.

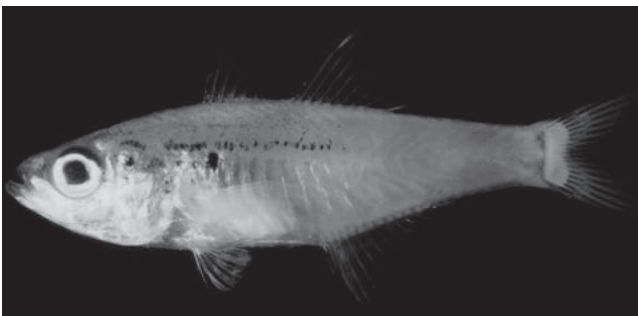
*Rhabdamia spilota* Allen & Kuitert 1994

PLATE 66

*Rhabdamia spilota* Allen & Kuitert 1994: 21, Fig. 2 (drop-off at east end of Tulamben, Bali, Indonesia); Gon & Randall 2003\*.

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 11 or 12 rays; pectoral fins 12 or 13 rays. Villiform teeth in 1 row on premaxillae, dentaries, vomer and palatines. GR 7 or 8/20–24. Median predorsal scales 5 or 6.

Body translucent, abdomen and head iridescent; tips of jaws blackish; several black spots on opercles and body above pectoral fins, a row of fine blackish spots anteriorly on body above spinal column, and faint marks on body at anal-fin base; fins uniformly translucent, without stripes. Attains 52 mm SL.



*Rhabdamia spilota*, 52 mm SL (Red Sea). © JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean: Red Sea and Indonesia (Bali).

**REMARKS** Often swims in pairs and has been observed in large aggregations around rocky outcrops with gorgonian fans and crinoids on steep slopes. Active during the day above isolated coral heads, feeding on zooplankton.

Tribe *Siphamiini* Smith 1955

One genus.

GENUS *Siphamia* Weber 1909

Body short and compressed to relatively slender, its depth 2.2–4.8 in SL. First dorsal fin 6 or 7 spines; 2nd dorsal fin 1 spine, 7–11 rays; anal fin 2 spines, 7–11 rays; pectoral fins 11–16 rays. Preopercle edge smooth to fully serrated, ridge smooth. No basisphenoid; 1 or 2 supraneurals; 2 epurals; no uroneural; hypurals 1+2 and 3+4 fused into 2 plates. Total GR 2–6/7–16; developed GR 0–3/6–16 = 6–18; ceratobranchial GR 6–10. Median predorsal scales 0–6; LL scales 0–24, rarely with 1 or 2 scales beyond hypural plate, and usually with vertical series of free neuromasts on each scale. All species with symbiotic bioluminescent bacteria in at least two light organs: one as silvery area from lower part of pectoral-fin bases and along ventral part of body from pelvic-fin bases to peduncle, and another at tip of tongue (Fishelson *et al.* 2005); colour pattern of the light organs either with dark striations or tiny dark spots. Small-sized; usually associate with sea urchins, corals, crinoids and crown-of-thorns starfishes. Twenty-three species in Indo-Pacific (but apparently absent from Hawaii), 4 in WIO.

## KEY TO SPECIES

- |    |  |
|----|--|
| 1a | Lateral line usually complete, with usually 23 or 24 (rarely 20–22) pored scales; preopercle edge with 23–35 serrae; pelvic-fin spine 1.3–1.7 in pelvic-fin length ..... <i>S. tubifer</i> |
| 1b | Lateral line incomplete, with 2–12 tubed scales anteriorly ..... 2   |
| 2a | LL pored scales 6–12; pectoral fins usually 15 or 16 (rarely 14) rays ..... 3  |
| 2b | LL pored scales 2 or 3; pectoral fins usually 13 or 14 (rarely 15) rays ..... <i>S. goreni</i>   |
| 3a | Developed GR usually 8 (rarely 7 or 9); preopercle edge with 25–35 serrae; length of pelvic-fin spine 1.4–1.7 in pelvic-fin length ..... <i>S. arabica</i>                                 |
| 3b | Developed GR 9; preopercle edge with 3–19 serrae; length of pelvic-fin spine 1.7–1.9 in pelvic-fin length; length of 3rd spine of dorsal fin 2.4–3 in HL ..... <i>S. mossambica</i>        |

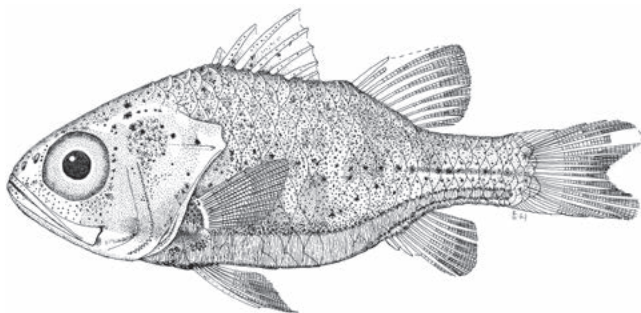
*Siphamia arabica* Gon & Allen 2012

PLATE 66

*Siphamia arabica* Gon & Allen 2012: 17, Fig. 9 (north of Khor Fakkan, United Arab Emirates, Gulf of Oman).

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–16 rays. Pelvic-fin spine 1.4–1.7 in pelvic-fin length. Preopercle edge with 25–35 small serrae along posterior and ventral edge. Total GR 3 or 4/7–9 = 10–12; developed GR 1 + 6–8; ceratobranchial GR 6 or 7. LL scales 6–10.

Freshly dead specimens pale brown with variously sized dark brown dots; jaws, snout and posterior part of peduncle translucent with tiny reddish brown spots; dorsal-fin bases blackish; spines of 1st dorsal fin (except 1st spine) reddish brown; 2nd dorsal- and anal-fin rays reddish brown along fin bases; pelvic-fin base black, spine reddish brown. Attains 34 mm SL.



*Siphamia arabica*, 34 mm SL, holotype (Gulf of Oman). Source: Gon & Allen 2012

**DISTRIBUTION** WIO: Gulf of Oman.

**REMARKS** Associated with sea urchins; known from 3–16 m.

*Siphamia goreni* Gon & Allen 2012

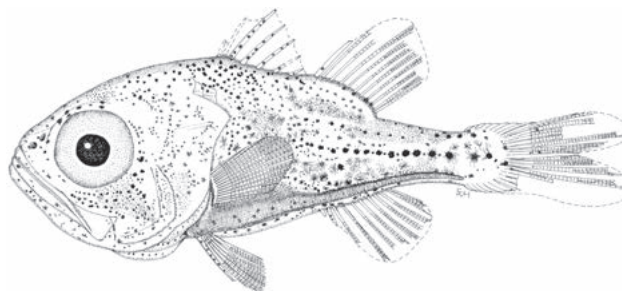
PLATE 66

*Siphamia goreni* Gon & Allen 2012: 45, Figs. 20b, 22 (shipwreck at Dahlak Kebir, Dahlak Archipelago, Eritrea, Red Sea).

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 13–15 rays. Pelvic-fin spine 1.4–1.7 in pelvic-fin length. Preopercle with 17–25 small serrae along rear and ventral edge. Total GR 2 or 3/9–12; developed GR 1/8 or 9; ceratobranchial GR 6 or 7. LL scales 2 or 3.

Freshly dead specimens pale brown, with variable amount of differently sized tiny dark spots becoming darker ventrally; head with orange hue, more enhanced behind upper part of eye and along preopercle ridge, and some orange dots scattered

mostly ventrally; eyes encircled by narrow ring of variably sized orange dots; spines of 1st dorsal fin and pelvic fins with dark marks interspersed with small orange dots; 2nd dorsal, anal and caudal fins as well as soft-rayed portion of pelvic fins with orange-brown dots mostly along margins of rays. Attains 21 mm SL.



*Siphamia goreni*, 16 mm SL, holotype (Red Sea). Source: Gon & Allen 2012

**DISTRIBUTION** WIO: Southern Red Sea.

**REMARKS** Associated with sea urchins; known from 6–11 m.

*Siphamia mossambica* Smith 1955

Sea urchin cardinalfish

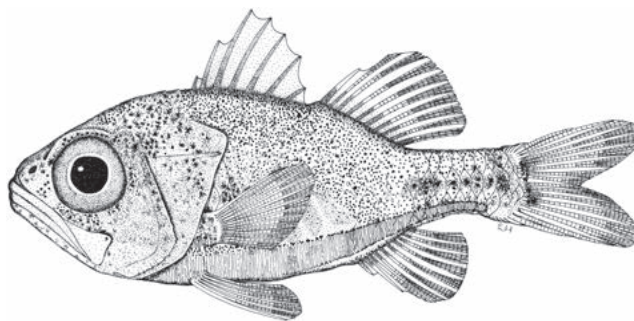
PLATE 66

*Siphamia mossambica* Smith 1955: 63, Pl. 1 (Bazaruto I., Mozambique); Smith 1961\*; SSF No. 175.42\*; Gon & Allen 2012\*.

*Siphamia nigra* Fourmanoir & Crosnier 1964: 7, Fig. 4 (small pools at Ambatoloaka, Nosy Be, Madagascar).

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–16 rays. Pelvic-fin spine 1.7–1.9 in pelvic-fin length. Preopercle edge with 0–19 serrae around angle. Total GR 3 or 4/9 or 10; developed GR 1/8; ceratobranchial GR 6 or 7. LL scales 7–12.

Body brown with purplish tinge (similar to the colour of the sea urchin spines among which it lives); fins transparent with reddish tinge; 1–3 dark stripes may appear on the body when threatened or disturbed. Attains 34 mm SL.



*Siphamia mossambica*, 30 mm SL (South Africa). Source: Gon & Allen 2012

**DISTRIBUTION** WIO: Kenya, Mozambique, South Africa, Madagascar, Seychelles, Réunion and Mauritius (expected elsewhere in WIO).

**REMARKS** Generally associated with the sea urchins *Echinotrix diadema* and *Diadema setosum*, in 5–26 m.

### *Siphamia tubifer* Weber 1909

PLATE 66

*Siphamia tubifer* Weber 1909: 168 (northeastern point of Timor).

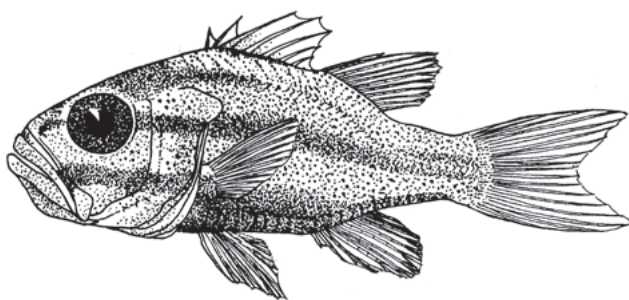
*Apogon tubulatus* Weber 1909: 160 (off west coast of New Guinea, Papua Barat, Indonesia) [in part].

*Beanea trivittata* Steindachner 1902: 337 (near El Tur, Sinai Peninsula, Egypt, Gulf of Suez, Red Sea) [suppressed for priority of *Siphamia permutata*].

*Siphamia permutata* Klausewitz 1966: 217, Figs. 1–3 (coastal reef near Hurghada, Egypt, Red Sea); Dor 1984; Goren & Dor 1994; Gon & Randall 2003\*; Golani & Bogorodsky 2010.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–16 rays. Pelvic-fin spine 1.3–1.7 in pelvic-fin length. Preopercle edge with 23–35 serrae. Total GR 2–4/8–10 = 11–14; developed GR 1/7–9; ceratobranchial GR 7 or 8. LL scales 20–24.

Body dark brown with reddish tinge, but may change to silvery with 1–3 dark stripes when disturbed; fins transparent and reddish. Attains 41 mm SL.



*Siphamia tubifer*, paratype of *S. permutata* (Red Sea). Source: Klausewitz 1966

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea and Sri Lanka; elsewhere widespread to Ryukyu Is., Australia and Vanuatu.

**REMARKS** May be a species-complex. Usually associated with *Diadema* sea urchins, but also found on crown-of-thorns starfish *Acanthaster planci*, in 0.5–100 m.

### Tribe *Sphaeramiini* Fraser & Mabuchi 2014

First dorsal fin 7 spines, 2nd dorsal fin 1 spine, 9 or 10 rays, or 1st dorsal fin 7 + 1 spines, 2nd dorsal fin 1 spine, 9–14 rays, or 1st dorsal fin 8 spines (with 8th spine reduced to tiny visible spine or nubbin hidden under skin supported by a free 6th distal radial), 2nd dorsal fin 1 spine, 9 or 10 rays; anal fin 2 spines, 8–13 rays; caudal fin forked, emarginate or truncate. Two supernumerary dorsal spines. No supramaxilla. Preopercle ridge smooth, edges serrate or crenulate. Scales ctenoid on head and body; LL scales 23–27. Six genera, 4 represented in WIO.

### GENUS *Apogonichthyoides* Smith 1949

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 8 or 9 rays; anal fin 2 spines, 8 rays, fin margin often rounded; pectoral fins 14–17 rays. Preopercle edges serrate or with a few serrae on lower edge only, ridge smooth; suborbital edge smooth; posttemporal edge serrate. Anterior nostrils tubular; posterior nostril openings flat. No supramaxilla. GR 7–16. Scales ctenoid on cheeks, subopercles, opercles, nape and body; 1–3 predorsal cycloid or ctenoid scales; 2 large median cycloid or ctenoid scales on base of pelvic fins, and no visible developed accessory pelvic scale (but may be hidden by large scale in some species); LL scales 24. Head usually with darkish cheek mark and often with darkish markings around eyes, on nape, or associated with posttemporals; no dark or pale midlateral stripe on body contiguous or in line with eyes; body usually with 2 faint to intensely dark bars beneath each dorsal fin, and some species with ocellus or ocellus-like mark in anterior bar (in some species, the bars are obvious only in young or juveniles), but some species with faint or no bars on body or peduncle but with irregular or regular darkish spots; faint to intense darkish basicaudal bar, or intense spot in basicaudal bar, or dark basicaudal spot; 2nd dorsal fin with or without stripe-like darkish mark; anal fin without stripe; pelvic fins with whitish leading edge or with mottled whitish to yellowish area at base; stomach and intestine usually pale, rarely blackish; peritoneum pale.

Inhabit coral and rocky reefs, in seagrasses and algal beds, some species also in mangroves, and several species in deep continental or insular-shelf waters. Several species were reviewed by Gon (2000). Removed from *Apogon* (*sensu* Fraser 1972) by Fraser & Allen (2010). 24 species, at least 10 or 11 in WIO.

**KEY TO SPECIES**

- 1a Body usually with 2 dark bars or saddles, one under each dorsal fin, and 3rd dark bar sometimes present on peduncle, but bars or saddles maybe faint (*A. gardineri* and *A. timorensis*) or absent (adult *A. enigmaticus*), and dusky marks may be present between main bars/saddles ..... 2
- 1b No dark bars or saddles; body with a few scattered dark spots, or dark spots in several lateral series, or single spots at origin and/or end of dorsal fins ..... 9
  
- 2a Ocellated dark spot (pupil-sized or slightly larger) usually present between lateral line and pectoral fin; body sometimes with 5–7 dusky stripes (*A. taeniatus*) ..... 3
- 2b No ocellated dark spot or dusky stripes on body ..... 5
  
- 3a Peduncle with dark basicaudal spot ..... 4
- 3b Peduncle with dark vertical bar ..... *A. nigripinnis*
  
- 4a Total developed GR usually 9–11 (rarely 12), and usually 1 developed GR on upper limb; dusky stripes usually present on body; dark basicaudal spot usually present (no dark bar on peduncle); peritoneum pale ..... *A. taeniatus*
- 4b Total developed GR usually 12–15 (rarely 11), and developed GR on upper limb 2 or 3; no dusky stripes on body; basicaudal spot masked by dark bar across peduncle; peritoneum with dark dots ..... *A. pharaonis*
  
- 5a Dark bar below each dorsal fin 1 or 2 scales wide and confluent with leading edge of fins; no dark or dusky bar on peduncle; dark basicaudal spot usually present (may be faint or absent in adult *A. enigmaticus*) ..... 6
- 5b Dark bar below each dorsal fin usually 3 or 4 scales wide, but frequently indistinct, and posterior bar below rear half of 2nd dorsal fin; dusky to dark bar on peduncle; no dark basicaudal spot ..... 8
  
- 6a Total developed GR 9–11; bars below dorsal fins black, usually 2 scales wide and extending ventrally beyond pectoral-fin bases; scale edges pale ..... 7
- 6b Total developed GR 12–17; when present, bars below dorsal fins dark brown above lateral line, usually 1 scale wide, and fading at level of pectoral-fin bases; scale edges dark ..... *A. enigmaticus*
  
- 7a Intestine and pectoral-fin axils pale ..... *A. pseudotaeniatus*
- 7b Intestine and pectoral-fin axils dark ..... *A. sialis*
  
- 8a Pectoral fins pale, with 15 or 16 (rarely 14) rays; 2nd dorsal, anal and caudal fins dusky to dark brown; iris brown ..... *A. timorensis*
- 8b Pectoral fins pink, with 14 rays; 2nd dorsal, anal and caudal fins orange; iris partly to completely orange ..... *A. gardineri*
  
- 9a Total developed GR 8 or 9, with 1 on upper limb ..... 10
- 9b Total developed GR 10 or 11, with 2 on upper limb; body with 7–9 series of small blackish spots, more or less 1 spot per scale, and no ocellated dark spot between pectoral fin and lateral line ..... *A. regani*
  
- 10a Small ocellated dark spot present between pectoral fin and lateral line; small dark spot at origin of 1st dorsal fin, and at origin and end of 2nd dorsal fin ..... *A. heptastygma*
- 10b No ocellated spot between pectoral fin and lateral line; body with a few tiny dark spots laterally, but otherwise unmarked ..... *A. maculipinnis*

***Apogonichthyoides enigmaticus*** Smith 1961

Short-tooth cardinalfish PLATES 53 & 55

*Apogonichthyoides enigmaticus* Smith 1961: 396, Pl. 50, Fig. 1 (Durban, KwaZulu-Natal, South Africa).

*Apogon enigmaticus*: SSF No. 175.7\*; Manilo & Bogorodsky 2003; Psomadakis *et al.* 2015.

*Apogon dhofar* Mee *in* Randall 1995: 161, Fig. 394 (Eagles Retreat, near Mirbat, Oman); Al-Jufaili *et al.* 2010.

Pectoral fins 14 or 15 rays; median predorsal scales 3; GR 12–16.

Body brown, scale edges and head darker brown, and snout sometimes with yellow tinge; narrow dark brown bar

usually present anteriorly below each dorsal fin, with bars merging with dark leading edge of dorsal fins, but bars may be indistinct below lateral line; pupils usually encircled with narrow white ring; juveniles with 2 narrow darkish bars on body, and small basicaudal spot 5.3–7.4 in peduncle depth (adults may lose basicaudal spot). Attains 80 mm SL.

**DISTRIBUTION** WIO: Pakistan, Oman, Somalia and South Africa (KwaZulu-Natal).

**REMARKS** Inhabits rocky cliffs, but also sheltered coastal and outer reefs, to ~70 m deep. Usually in pairs or small aggregations, but occasionally in schools.

*Apogonichthyoides gardineri* (Regan 1908)

PLATE 53

*Apogon gardineri* Regan 1908: 227 (St Brandon Shoals); Fraser 2000\*.*Apogonichthyoides gardineri*: Fraser & Allen 2010.

Pectoral fins 14 rays; GR 1/7 or 8; median predorsal scales 2.

Freshly dead fish with bar beneath each dorsal fin (anterior bar contiguous with dark portion of 1st dorsal fin), and peduncle with single wide bar; no mark on cheeks; stomach, intestine and peritoneum pale. Attains 44 mm SL.

**DISTRIBUTION** WIO: Mauritius and St Brandon Shoals.**REMARKS** Found in 55–57 m.*Apogonichthyoides heptastigma* (Cuvier 1828)

PLATES 54 &amp; 55

*Apogon heptastigma* Cuvier (ex Ehrenberg) in Cuv. & Val. 1828: 160 (Red Sea); Gon & Randall 2003\*.*Apogon enneastigma* Rüppell 1838: 87, Pl. 22, Fig. 3 (Massawa, Eritrea, Red Sea).*Apogon heptastigma*: Dor 1984; Goren & Dor 1994.*Apogonichthyoides heptastigma*: Fraser & Allen 2010.

Pectoral fins 14 rays; developed GR 1/7 or 8; ceratobranchial GR 7.

Body pale brown, sometime with pinkish hue; small black spot at origin of 1st dorsal fin, and at origin and rear of 2nd dorsal fin; larger weakly ocellated spot on sides of body between lateral line and pectoral-fin base; basicaudal spot minute, 8.4–10.1 in peduncle depth; fins usually pale, but leading edge of 1st dorsal fin dusky to brown, and edged white posteriorly; leading edge of pelvic fins white. Attains 50 mm SL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.**REMARKS** Found in shallow, sheltered areas, to ~10 m deep.*Apogonichthyoides maculipinnis* (Regan 1908)

PLATE 54

*Apogon maculipinnis* Regan 1908: 227, Pl. 27, Fig. 3 (Haddummati Atoll, Maldives).*Apogonichthyoides maculipinnis*: Fraser & Allen 2011; Fraser 2018.

Pectoral fins 14 rays; developed GR 1/8; ceratobranchial GR 7; median predorsal scales 3.

Preserved specimen with blackish area between 3rd and 5th spines of 1st dorsal fin; body with several scattered small dark spots; 2nd dorsal, anal and pelvic fins with dark brown marks in irregular series; faint basicaudal spot may be present. Attains at least 40 mm SL.

*Apogonichthyoides maculipinnis*, 40 mm SL, holotype (Maldives).

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**DISTRIBUTION** Known only from two specimens from the Maldives.**REMARKS** Found at 40–72 m. The species may be more widely distributed.*Apogonichthyoides nigripinnis* (Cuvier 1828)

Bullseye cardinalfish

PLATE 54

*Apogon nigripinnis* Cuvier in Cuv. & Val. 1828: 152 (Puducherry, India; Java, Indonesia); Dor 1984; SSF No. 175.18\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Golani 1998; Gon 2000; Al-Jufaili *et al.* 2010.*Apogon thurstoni* Day 1888: 784 (Chennai, India); Gon 2000.*Apogonichthyoides nigripinnis*: Smith 1961\*; Fraser & Allen 2011.

Pectoral fins 15–17 rays; caudal fin truncate to slightly rounded. Preopercle edge completely serrate, its ridge smooth; posttemporal serrate. GR 2/8–10; ceratobranchial GR 7 or 8. Median predorsal scales 2; LL scales 24.

Body reddish to purplish dark brown, sometimes with narrow bars varying in intensity; narrow mark on cheeks (may be faint); large dark brown to black, yellow-edged ocellus anteriorly between lateral line and pectoral fin; dark basicaudal spot, posteriorly covered by dark bar on peduncle; 1st dorsal, anal and pelvic fins dark brown to black; 2nd dorsal fin and anal fin dark brown, the former with pale to yellowish distal edge of variable width; caudal fin pale to yellow. Attains 77 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman to Mozambique (Maputo Bay), and expected at southern India and Sri Lanka; Lessepsian migrant to Mediterranean Sea; elsewhere to east coast of India, Thailand, Arafura Sea and northern Australia.

**REMARKS** Found on inshore and deep offshore reefs, to ~50 m. Nocturnal, feeding on zooplankton.

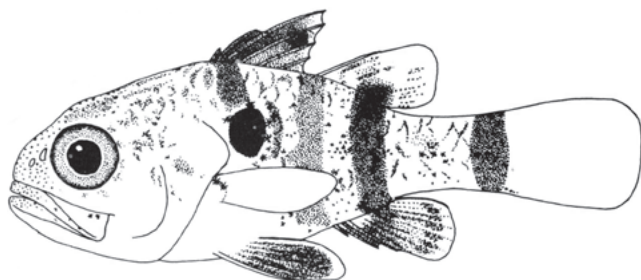
## *Apogonichthyoides pharaonis* (Bellotti 1874)

PLATE 54

*Apogon pharaonis* Bellotti 1874: 264 (Egypt, Gulf of Suez, Red Sea); Gon 2000; Gon & Randall 2003\*; Manilo & Bogorodsky 2003.  
*Apogon suezii* Sauvage 1883: 156 [13] (Suez, Egypt, Gulf of Suez, Red Sea).  
*Amia ocellata* Von Bonde 1923: 14, Pl. 1, Fig. 2 (KwaZulu-Natal, South Africa) [preoccupied by *Apogon ocellatus* Weber 1913].  
*Apogon duops* Barnard 1927: 69 [replacement name for *Amia ocellata* Von Bonde].  
*Apogon thurstoni* (non Day 1888): Norman 1927.  
*Apogonichthyoides uninotatus* (non Smith & Radcliffe 1912): SFSA No. 494\*.  
*Apogonichthyoides nigripinnis* (non Cuvier 1828): Smith 1961.  
*Apogonichthyoides pharaonis*: Fraser & Allen 2011; Psomadakis *et al.* 2015.  
*Apogon nigripinnis* (non Cuvier 1828): Dor 1984; Randall 1995.

Pectoral fins 14–17 rays; developed GR 2 or 3/9–12; ceratobranchial GR 8 or 9.

Body generally bronzy dorsally and silvery ventrally, with 3 dark brown to black bars (1st bar joins dark leading edge of 1st dorsal fin and extends downwards through large ocellated dark spot at level of eye on midside and fades near ventrum; 2nd bar between middle of 2nd dorsal fin and anal fin, extending at least midway onto each fin; 3rd bar across rear of peduncle, covering slightly wider basicaudal spot), and faint bars frequently present between main three dark bars; cheeks with narrow dark mark from eye to angle of preopercle ridge. Attains 80 mm SL.



*Apogonichthyoides pharaonis*, 21 mm SL, juvenile (Red Sea). Source: Gon 2000

**DISTRIBUTION** Indian Ocean. WIO: Pakistan to India, Red Sea, and East Africa to South Africa (KwaZulu-Natal); Lessepsian migrant to Mediterranean Sea.

**REMARKS** Common inshore on silty reefs, in mangroves and in seagrass beds.

## *Apogonichthyoides pseudotaeniatus*

(Gon 1986)

Doublebar cardinalfish

PLATE 54

*Apogon pseudotaeniatus* Gon 1986: 11, Fig. 2 (off Nelson Village, Eilat, Israel, Gulf of Aqaba, Red Sea); Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Suresh & Thomas 2007\*; Al-Jufaili *et al.* 2010; Sluka 2013.  
*Apogon bifasciatus* (non Rüppell 1838): Day 1875; Regan 1905; Randall 1983; Khalaf & Disi 1997.  
*Apogonichthyoides pseudotaeniatus*: Fraser & Allen 2011; Psomadakis *et al.* 2015.

Pectoral fins 15 rays; developed GR 2/7–9; ceratobranchial GR 8.

Juveniles semi-transparent and adults grey, both with 2 black bars below anterior third of each dorsal fin, and bars extending to leading edge of each fin and downwards to near ventrum; pectoral-fin axils pale; pelvic fins black anteriorly, with white leading edges; dark basicaudal spot small, 4.6–5.4 in peduncle depth; pupil encircled with narrow white ring. Attains 87 mm SL.



*Apogonichthyoides pseudotaeniatus*, 70 mm SL (Red Sea).  
© SV Bogorodsky

**DISTRIBUTION** Indian Ocean. WIO: northern Red Sea to Oman, Persian/Arabian Gulf and Pakistan.

**REMARKS** Associated with coral and rocky reefs.



*Apogonichthyoides regani* (Whitley 1951)

PLATE 54

*Apogon punctatus* Regan 1908: 225, Pl. 24, Fig. 1 (St Brandon Shoals)[name preoccupied by *Apogon punctatus* Klunzinger 1879].*Apogon regani* Whitley 1951: 65 [replacement name for *Apogon punctatus* Regan 1908]; Fraser 2000\*.*Apogonichthyoides regani*: Fraser & Allen 2011.

Pectoral fins 15–17 rays; developed GR 2/8 or 9; ceratobranchial GR 7 or 8. Preopercle edge fully serrated, ridge smooth.

Freshly dead fish tan to brown on head and upper body, paler ventrally, and with 7–9 longitudinal series of small blackish spots (~1 per scale); cheek mark narrow (sometimes absent); dorsal fins and anal fin dark brown to blackish; pelvic fins black; caudal fin usually pale with dark margin. Attains 87 mm SL.

**DISTRIBUTION** WIO: islands and banks of Mascarene Plateau (Seychelles to Mauritius).

**REMARKS** Collected by trawl at 39–70 m.

*Apogonichthyoides sialis* (Jordan & Thompson 1914)

Twinbar cardinalfish

PLATE 54

*Amia sialis* Jordan & Thompson 1914: 246, Pl. 28, Fig. 2 (Suruga Bay, Japan).*Apogon sialis*: Gon 2000\*.*Apogonichthyoides sialis*: Fraser & Allen 2011; Manjebraayakath *et al.* 2012\*; Psoadakis *et al.* 2015.

Pectoral fins 14 or 15 rays; developed GR 2/8 or 9; ceratobranchial GR 8.

Body grey, with a black bar below anterior third of each dorsal fin; bars extending to leading edge of each fin and downwards to near ventrum; pectoral-fin axils dark; median fins and pelvic fins partly dusky; pelvic fins with white leading edge; dark basicaudal spot slightly smaller than pupil; pupils with narrow white ring. Attains 97 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan and India; elsewhere, Indonesia, Philippines and Japan.

*Apogonichthyoides taeniatus* (Cuvier 1828)

Twobelt cardinalfish

PLATE 54

*Apogon taeniatus* Cuvier (ex Ehrenberg) *in* Cuv. & Val. 1828: 159

(Red Sea); Dor 1984; SSF No. 175.24\*; Goren &amp; Dor 1994; Randall 1995\*;

Carpenter *et al.* 1997\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.*Apogon bifasciatus* Rüppell 1838: 86, Pl. 22, Fig. 2 (Jeddah, Saudi Arabia, Red Sea); Günther 1859 [in part]; Playfair & Günther 1867; Klunzinger 1870, 1884; Sauvage 1891; Regan 1919; Barnard 1927.*Apogonichthyoides taeniatus*: Smith 1961\*; Fraser & Allen 2011.

Pectoral fins 15–17 rays; GR 1 or 2/8–11; ceratobranchial GR 8 or 9; median predorsal scales 3.

Body olive-grey, sometimes with 5–7 narrow diffuse dusky stripes (dorsalmost stripes following lateral-line contour), becoming pale silvery grey ventrally; 2 dark brown bars (one from front of 1st dorsal-fin base; one from rear end of 2nd dorsal-fin base, fading near pectoral-fin level); leading edge of 1st dorsal fin black (and continuous with anterior bar on body); dark brown saddle beneath or preceding spine of 2nd dorsal fin (sometimes joining posterior bar on body and forming diffuse dusky Y-shaped mark under fin); pupils sometimes encircled with narrow white ring; large ocellated dark spot sometimes present between pectoral fin and lateral line (overlying anterior bar on body); pelvic fins dusky, with white leading edge and blackish tip; dark basicaudal spot 3.4–3.8 in peduncle depth; stomach, intestine and peritoneum pale. Attains 86 mm SL.

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, Persian/Arabian Gulf, Gulf of Oman to South Africa, Madagascar and Aldabra; Lessepsian migrant to eastern Mediterranean Sea.

**REMARKS** Found on coastal reefs, in shallow silty areas, and in mangroves, at 5–20 m.

*Apogonichthyoides timorensis* (Bleeker 1854)

Timor cardinalfish

PLATE 56

*Apogon timorensis* Bleeker 1854: 207 (Kupang, Indonesia, Timor Sea); SSF No. 175.27\*; Goren & Dor 1994; Randall 1995\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.*Apogonichthyoides fraxineus* Smith 1961: 396, Pl. 48, Fig. D (Pinda, Mozambique).*Apogon striatus* Fourmanoir & Crosnier 1964: 5 (Nosy Be, Madagascar).*Apogonichthyoides timorensis*: Fraser & Allen 2011.

Pectoral fins 14–17 rays; GR 6–9; predorsal scales 3.

Body brownish with whitish areas; head with dark brownish marks (no stripes on snout): narrow brownish cheek mark from eye to angle of preopercle, and 2 small dark brownish marks behind and above eye near edge of preopercle ridge; brownish bar from 1st dorsal fin to behind pectoral fins, becoming tannish below lateral line; brownish bar from 2nd dorsal fin to anal-fin base; 1st dorsal fin with

blackish area distally between 3rd and 5th spines, whitish membranes behind 3rd, 6th and 7th spines, and yellowish membranes behind 4th and 5th spines; 2nd dorsal fin with stripe-like brownish marks on membranes between 2nd and 7th rays, whitish along base, and yellowish anteriorly and proximally above stripe-like region; anal fin pale along base, rest of membranes yellowish; pectoral fins pale; pelvic fins yellowish, leading edge brownish; whitish bar on anterior part of peduncle; caudal fin with yellowish membranes and small brownish marks on rays; iris dark brown. Attains 69 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Red Sea, Tanzania (Zanzibar), Kenya to South Africa (KwaZulu-Natal), Madagascar, Comoros and Seychelles; elsewhere to Indonesia, Japan, Australia and Solomon Is.

**REMARKS** Found in shallow, protected coastal reefs and lagoons, to ~12 m deep, among coral heads and on coral rubble with seagrasses and algae. Nocturnal, hiding beneath corals during the day.

## GENUS *Jaydia* Smith 1961

First dorsal fin 7 spines (4th spine longest); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 14–18 rays; caudal fin rounded, uroneurals reduced or absent. Preopercle edge and ridge weakly serrated to smooth. Developed GR 10–15. Some species have a light organ associated with the intestine. Usually associated with soft bottom. About 18 species (Gon 1996; Fraser & Prokofiev 2016), in Indo-Pacific, 7 in WIO (2 of these as anti-Lessepsian migrants to Red Sea) (Eryilmaz & Dalyan 2006; Golani *et al.* 2008).

### KEY TO SPECIES

- |    |   |   |
|----|---|---|
| 1a | Preopercle edge ossified, serrations usually present .....  | 2 |
| 1b | Preopercle edge smooth, the ventral part crenulate and membranous .....   | 6 |
| 2a | Developed GR on upper limb usually 1 (rarely 2); if present, dark bars on body wide and number 4–6 .....  | 3 |
| 2b | Developed GR on upper limb usually 2 or 3 (rarely 1); if present, dark bars on body narrow and usually number 7–11 (posterior bars sometimes faint) ..... | 5 |

*Continued...*

### KEY TO SPECIES

- |    |  |                        |
|----|--|------------------------|
| 3a | Anal fin with dark stripe through middle; top of head with conspicuous well-spaced dark spots (may be faded in preserved specimens) .....                  | <i>J. truncata</i>     |
| 3b | Anal fin pale to dusky, without distinct dark stripe; top of head with numerous minute dark spots .....  | 4                      |
| 4a | GR on 1st ceratobranchial usually 8 (rarely 9); developed usually GR 10 or 11 (rarely 12) .....  | <i>J. smithi</i>       |
| 4b | GR on 1st ceratobranchial usually 9 (rarely 8); developed GR 12 or 13 .....  | <i>J. hungi</i>        |
| 5a | Pectoral fins usually 16 (rarely 15 or 17) rays; peritoneum pale or with a few tiny dark spots .....   | <i>J. novaeguineae</i> |
| 5b | Pectoral fins usually 15 (rarely 14 or 16) rays; peritoneum with numerous dark spots of various sizes, may appear black if melanophores are expanded ..... | <i>J. striata</i>      |
| 6a | Large dark spot on rear of 1st dorsal fin; pectoral fins usually 16 rays .....   | <i>J. queketti</i>     |
| 6b | Large dark spot anteriorly on sides of body at level of eyes; pectoral fins usually 15 rays .....  | <i>J. quartus</i>      |

## *Jaydia hungi* (Fourmanoir & Do-Thi 1965)

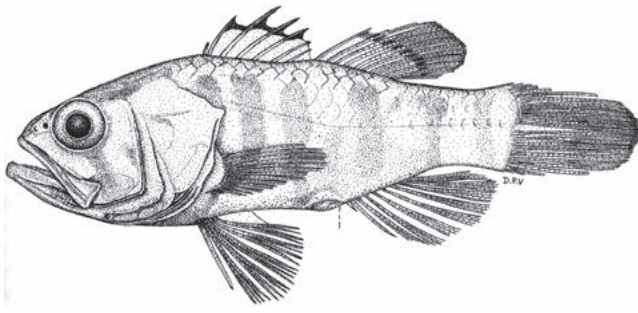
PLATE 59

*Apogon hungi* Fourmanoir & Do-Thi 1965: 36 (Mozambique Channel, off northwestern Madagascar); Gon 1997\*.

*Jaydia hungi*: Mabuchi *et al.* 2014.

Pectoral fins 15–17 rays. Preopercle edge and ridge serrated in adults. In SL: body depth 2.8–3.1, HL 2.3–2.5, pectoral-fin length 4.2–4.8, and pelvic-fin length 4–4.5. In HL: snout length 4.8–5.9, eye diameter 3.5–4.5, and interorbital width 4.6–5.2. First spine of dorsal fin 2–3.1 in 2nd spine, and 2nd spine 4.3–5.3 in HL. Total GR 4 or 5/12 or 13 = 16–18; developed GR 1 or 2/10–12 = 12 or 13. Median predorsal scales 3–5.

Freshly dead fish with minute dark spots on snout and top of head; body with 4–6 faint dark brown bars; scale pockets above lateral line, and sometimes above anal-fin base, with dark edges; cheek and temporal stripes present but may be faint; narrow dark brown stripe usually present along preopercle ridge; distal half of 1st dorsal fin black to dark brown; caudal fin and most of 2nd dorsal fin pale to dusky; 2nd dorsal fin with dark brown stripe (sometimes faint) through middle; anal fin and pelvic fins pale to dusky, pigment arranged as series of small dark spots along rays only (not on membranes); peritoneum with dark spots of various sizes, intestine variably covered with smaller spots (rarely entirely pale). Attains 100 mm SL.



*Jaydia hungi*, 76 mm SL, male neotype (NW Madagascar). Source: Gon 1997

**DISTRIBUTION** WIO: Tanzania, northwestern Madagascar, Comoros and Seychelles.

**REMARKS** Known from 18–62 m.

### *Jaydia novaeguineae* (Valenciennes 1832)

PLATE 59

*Apogon novaeguineae* Valenciennes 1832: 53, Pl. 4, Fig. 1 (New Guinea);

Gon 1997 [as *novaeguinae*]; Fraser 2000.

*Jaydia novaeguineae*: Bogorodsky *et al.* 2014.

Pectoral fins 14–17 rays. In SL: body depth 2.5–3.1, HL 2.2–2.6, pectoral-fin length 3.8–4.5, and pelvic-fin length 4–4.7. In HL: snout length 4.3–5.4, eye diameter 3.1–3.9, and interorbital width 4.9–5.9. Preopercle edge weakly serrated around angle, ridge smooth to irregular or with several small serrae around angle. Total GR 3–5/10–12 = 13–16; developed GR 1 or 2/8–10 = 10–12. Predorsal scales 4 or 5. No light organs.

Freshly dead fish pale brown, darker above lateral line, and occasionally with up to 7 or 8 faint dark bars; edge of gill cover dark brown to black in large males; distal third to half of 1st dorsal fin dusky to dark brown; 2nd dorsal, anal and pelvic fins pale to dusky (anal and dorsal fins sometimes with darker margins), caudal fin darker; leading edges of anal and pelvic fins and lower edge of caudal fin white; peritoneum pale or with several small dark spots, intestine either pale with small patches of minute dark spots to entirely black if melanophores are expanded. Attains 89 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Kenya, Madagascar and India; elsewhere to Philippines and New Guinea.

**REMARKS** Caught in trawls, in 2–62 m.

### *Jaydia quartus* (Fraser 2000)

PLATE 59

*Apogon quartus* Fraser 2000: 250, Fig. 1 (Saya de Malha Bank).

*Jaydia quartus*: Mabuchi *et al.* 2014.

Pectoral fins 15 or 16 rays. Preopercle margin and ridge smooth, ventral margin crenulate and membranous. In SL: body depth 3–3.5, HL 2.1–2.4. In HL: snout length 4.6–6.8, eye diameter 3.4–3.9, and interorbital width 4.1–6.3. Total GR 3–5/12 or 13; developed GR 2 or 3/10 or 11. Median predorsal scales 1 or 2.

Freshly dead fish brown with pinkish tinge; large blackish spot (about pupil-sized) on sides below 1st dorsal fin at about level of eye; caudal fin dusky, with blackish margin and upper and lower edges. Attains 86 mm SL.

**DISTRIBUTION** WIO: Mascarene Plateau.

**REMARKS** Type specimens collected at 57–61 m.

### *Jaydia queketti* (Gilchrist 1903)

Spotfin cardinalfish

PLATE 59

*Apogon queketti* Gilchrist 1903: 206, Pl. 14 (off Thukela River mouth,

KwaZulu-Natal, South Africa); SSF No. 175.21\*; Goren & Dor 1994;

Randall 1995\*; Gon 1997; Carpenter *et al.* 1997\*; Fraser 2000; Gon &

Randall 2003\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

*Jaydia queketti*: Smith 1961\*; Golani & Bogorodsky 2010.

Pectoral fins 15–17 rays. Preopercle edge and ridge smooth, ventral edge crenulated and membranous. In SL: body depth 2.6–2.9, HL 2.2–2.5. In HL: snout length 5–7, eye diameter 3.3–4, and interorbital width 4.1–4.9. Peduncle depth 1.3–1.8 in its length, peduncle length 4.2–5.1 in SL. Total GR 3–7/11 or 12 = 14–18; developed GR 2 or 3/10 or 11. Median predorsal scales 1–3.

Freshly dead fish pinkish grey dorsally, silvery on sides and ventrum, and usually with series of spots that may form sinuous irregular lines; scale edges dark above lateral line; 1st dorsal fin with large dark brown to black spot; 2nd dorsal, anal and caudal fins pale to dusky, with dark margins; faint dark stripe through middle of 2nd dorsal fin and along anal-fin base sometimes present and darker posteriorly; middle of anal fin and pelvic fins yellowish; peritoneum and intestine pale. Attains 81 mm SL.



*Jaydia queketti*, 100 mm TL (Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indian Ocean. WIO: Persian/Arabian Gulf and Arabian Sea off India, Red Sea, Mozambique, South Africa (KwaZulu-Natal) and Mascarene Plateau; Lessepsian migrant to Mediterranean Sea.

**REMARKS** Collected by trawl in 50–92 m.

### *Jaydia smithi* Kotthaus 1970

Smith's cardinalfish

PLATE 59

*Jaydia hungi* Fourmanoir 1967: 265, Fig. 1 (Egypt, Gulf of Suez, Red Sea) [secondarily preoccupied in *Apogon* by *Apogon hungi* Fourmanoir & Do-Thi 1965].

*Jaydia smithi* Kotthaus 1970: 59, Fig. 238 (Somali coast, Gulf of Aden); Bogorodsky *et al.* 2014.

*Apogon andhrae* Dutt & Radhakrishna Rao 1980: 743, Fig. 1a (Visakhapatnam, India).

*Apogon truncatus* (non Bleeker 1855): Randall 1995\*; Carpenter *et al.* 1997\*; Al-Jufaili *et al.* 2010.

*Apogon smithi*: Gon 1997; Adam *et al.* 1998; Fraser 2000; Gon & Randall 2003; Manilo & Bogorodsky 2003.

Pectoral fins 15–17 rays. Preopercle edge weakly serrated, ridge smooth. In SL: body depth 2.3–3.4, HL 2.2–2.6. In HL: snout length 5–7, eye diameter 3.3–4.5, and interorbital width 4.2–5.6. Total GR 3–5/9–13 = 13–17; developed GR 1/9–11. Median predorsal scales 3–5. Intestinal and anal light organs present.

Freshly dead fish with minute dark spots on snout and top of head; body pale brown to brown with pinkish tinge, usually with 4–6 dark brown bars; distal half of 1st dorsal fin dark brown; 2nd dorsal fin and caudal fin pale to dusky with darker margin, and dark brown stripe through middle of 2nd dorsal fin; anal fin and pelvic fins pale to dark brown, with pigment arranged as series of small dark spots mostly along rays, and

proximal third of anal fin occasionally with several dark brown spots, sometimes forming thin stripe; peritoneum with variously sized dark spots, intestine with variable amount of smaller dark spots (rarely entirely pale). Attains 93 mm SL.



*Jaydia smithi*, 90 mm SL (Red Sea). O Gon © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Red Sea, Gulf of Aden and Tanzania; recent Lessepsian migrant to Mediterranean Sea (Golani *et al.* 2008); elsewhere to east coast of India, Indonesia (Bali), Philippines, Taiwan and Marshall Is.

**REMARKS** Found over silty bottoms, at 22–230 m.

### *Jaydia striata* (Smith & Radcliffe 1912)

*Amia striata* Smith & Radcliffe in Radcliffe 1912: 437, Pl. 35, Fig. 1 (Luzon, Philippines).

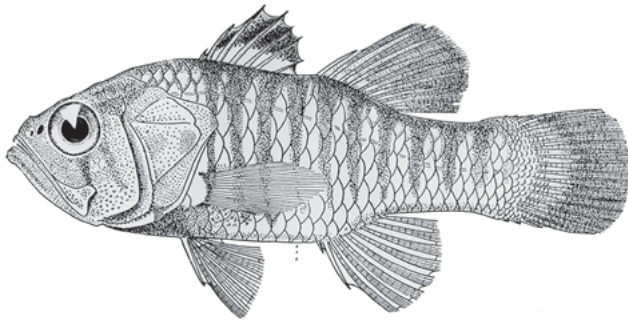
*Apogon striatus*: Gon 1997.

*Apogonichthys striatus*: Manilo & Bogorodsky 2003.

*Jaydia striata*: Psomadakis *et al.* 2015.

Pectoral fins 14–16 rays. Preopercle edge serrated around angle, ridge irregular to slightly crenulate near angle. In SL: body depth 2.6–3, HL 2.2–2.5, pectoral-fin length 3.8–4.7, and pelvic-fin length 4.2–4.9. In HL: snout length 5.4–6.8, eye diameter 3.4–4, and interorbital width 4.7–5.6. Total GR 3–5/10–13 = 13–18; developed GR 2 or 3/9–11 = 11–14. Median predorsal scales 3–5. Intestinal light organ present (Haneda *et al.* 1969).

Body pale grey-brown, silvery, with 7–11 narrow dark brown bars (may be faded in preserved specimens); upper part of gill arches speckled with minute dark spots; edge of gill cover dark brown to black in large males; 2nd dorsal fin and caudal fin pale brown, usually with darker margin, and 2nd dorsal fin sometimes with faint dark stripe on proximal third; peritoneum with numerous dark brown spots of various sizes (may appear nearly black if melanophores are expanded), intestine with variable number of well-spaced dark spots. Attains 76 mm SL.



*Jaydia striata*, 89 mm TL (Philippines). Modified from Radcliffe 1912

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman and Pakistan; elsewhere to Bay of Bengal, Gulf of Thailand, Malaysia, Indonesia, Philippines and Taiwan.

**REMARKS** Found in 10–82 m.

### *Jaydia truncata* (Bleeker 1855)

Flagfin cardinalfish

*Apogon truncatus* Bleeker 1855: 415 (Jakarta, Java, Indonesia); Randall 1995\*; Carpenter *et al.* 1997\*; Gon 1997; Fraser 2000.

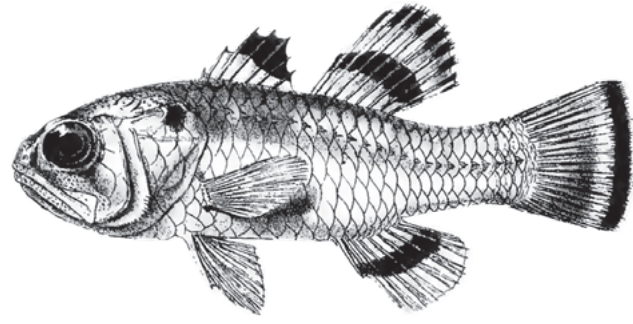
*Apogon ellioti* Day 1875: 63, Pl. 17, Fig. 1 (Chennai, India).

*Jaydia ellioti*: Smith 1961\*.

*Jaydia truncata*: Psoadakis *et al.* 2015.

Pectoral fins 16–18 rays. Preopercle edge and ridge serrated. In SL: body depth 2.9–3.7, HL 2.3–2.7, pectoral-fin length 4.4–5.5, and pelvic-fin length 4.1–4.7. In HL: snout length 5–6, eye diameter 3.6–4.3, and interorbital width 4–4.9. Total GR 3–5/11–14 = 14–17; developed GR 1/9 or 10 = 10 or 11. Median predorsal scales 3 or 4. Intestinal and anal light organs present (Iwai & Asano 1958).

Freshly dead fish with minute dark spots on snout and suborbital area; conspicuous, well-spaced dark spots from interorbital region to nape, sometimes divide into two distinct smaller areas separated by pale area immediately behind eyes; 1st dorsal fin with dark brown stripe through middle, and distal half brown; 2nd dorsal fin and caudal fin pale to dusky with darker margin; anal fin pale to dusky, with dark brown to black stripe through middle; pelvic fins pale to dusky, with dark pigment arranged mostly along rays; peritoneum with variously sized dark spots, intestine variably covered with smaller spots (rarely entirely pale). Attains 10 cm SL.



*Jaydia truncata* (India). Modified from *Apogon ellioti* in Day 1875

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf and India; elsewhere to east coast of India, Indonesia, Japan and Australia.

**REMARKS** Inhabits inshore waters of continental shelf, at 15–110 m. Nocturnal.

### GENUS *Nectamia* Jordan 1917

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 13 rays. Preopercle edges serrated, ridge smooth. GR 22–29. Scales ctenoid; LL scales 24, all pored. No longitudinal stripes on head, body or median fins; pale vertical bars or dark saddles variably present or absent on body; dark spot or bar on peduncle; dark mark on cheek between angle of preopercle and eye; yellowish mark on lachrymal and anterior suborbitals; leading edge of dorsal fins and lower edge of caudal fin often pale to variously coloured; stomach and intestine black, peritoneum pale. Nine species, 5 in WIO.

#### KEY TO SPECIES

- |    |   |                 |
|----|---|-----------------|
| 1a | Oblique mark on cheek triangular and expanded near eye; bar or saddle-like mark on peduncle; body depth generally >42% SL .....   | 2               |
| 1b | Oblique mark on cheek narrow its entire length; basicaudal spot centred and diffuse in adults; body depth generally <42% SL ..... | <i>N. fusca</i> |
| 2a | Adults with complete or nearly complete darkish bar on peduncle .....   | 4               |
| 2b | Adults with partial darkish bar on peduncle, above midline ...  | 3               |

Continued...

## KEY TO SPECIES

- 3a Alternating pale and dark bars on body ..... *N. luxuria*  
3b No alternating pale and dark bars on body ..... *N. savayensis*
- 4a Alternating pale and dark bars on body ..... *N. zebrinus*  
4b No alternating pale and dark bars on body ..... *N. annularis*

## *Nectamia annularis* (Rüppell 1829)

Ringtail cardinalfish

PLATES 55 & 61

*Apogon annularis* Rüppell 1829: 48 (El Tur, Sinai Peninsula, Egypt, Gulf of Suez, Red Sea); Dor 1984; Goren & Dor 1994; Fraser 1998; Fraser *et al.* 1999\*; Gon & Randall 2003\*.

*Apogon erdmani* Lachner 1951: 595, Pl. 18a (Jeddah, Saudi Arabia, Red Sea).

*Ostorhynchus annularis*: Smith 1961\*.

*Nectamia annularis*: Fraser 2008\*.

Percentage SL: body depth 41–50%, peduncle depth 15–20%, 2nd spine of anal fin 18–22%, and pectoral-fin length 26–31%. GR usually 26–29.

Body bronzy or coppery, without bars; cheek mark broad, triangular; juveniles and adults with wide dark brown circumpeduncular bar, broadly bordered by white; leading edges of fins white. Attains 66 mm SL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Found to ~17 m deep.

## *Nectamia fusca* (Quoy & Gaimard 1825)

Ghost cardinalfish

PLATES 55 & 61

*Apogon fuscus* Quoy & Gaimard 1825: 345 (Guam, Mariana Is.); Fraser 1999; Fricke 1999.

*Apogon ocellatus* Fourmanoir & Crosnier 1964: 5, Fig. 3 (Nosy Be, Madagascar) [objectively invalid, preoccupied by *Apogon ocellatus* Weber 1913, and secondarily by *Amia ocellata* Von Bonde 1923 in *Apogon*].

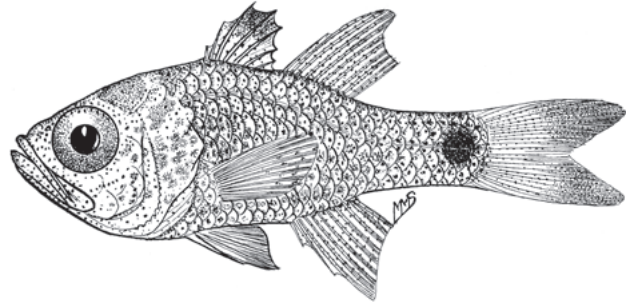
*Ostorhynchus spongicolus* Smith 1965: 529, Fig. 1 (coast of Eritrea, Red Sea).

*Nectamia fusca*: Fraser 2008.

Percentage SL: body depth 37–42%, peduncle depth 15–18%, 2nd spine of anal fin 15–17%, and pectoral-fin length 24–26%. GR 24–28.

In life, head and body bronzy to brownish, sometimes with faint bars (no stripes on body or fins); dark cheek mark

uniformly narrow to near angle of preopercle; lachrymal and anterior suborbitals with yellowish mark; 1st dorsal fin with dusky membranes between 2nd and 4th spines; other fins pale; peduncle with diffuse spot/bar mostly above LL scales, more distinct in young and juveniles; iris yellowish with white inner ring. Preserved specimens with or without a few faint bars on head; cheek mark evident; peduncle spot diffuse; caudal fin without dark edges. Attains 80 mm SL.



*Nectamia fusca*, 21 mm TL, type of *Ostorhynchus spongicolus* (Red Sea). Source: Smith 1965

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa to Mozambique, Madagascar, Comoros, Mascarenes, Chagos, Maldives and India; not known from Seychelles; elsewhere to Indonesia, Ryukyu Is., Mariana Is., northern Australia, New Caledonia, Line Is. and Tuamotu Is.

**REMARKS** Found on outer-reef slopes, in 6–14 m; hides among corals by day and feeds on free-swimming invertebrates at night.

## *Nectamia luxuria* Fraser 2008

Multi-barred cardinalfish

PLATE 61

*Nectamia luxuria* Fraser 2008: 26, Figs. 3e, 6b, 11, 18 (Tandjung Liang, Seram I., Indonesia).

Percentage SL: body depth 39–44%, peduncle depth 16–20%, 2nd spine of anal fin 17–21%, and pectoral-fin length 26–29%. GR 25–31.

In life, head and body bronzy to brownish, with many alternating pale and brown bars on body, centre of brown bars commonly with narrow pale region (no longitudinal stripes on head, body and fins); dark cheek mark oblique, from eye to angle of preopercle; lachrymal and anterior suborbitals with yellowish mark; 1st dorsal fin with dusky membranes between 2nd and 4th spines; other fins pale, except luminescent yellowish at pectoral-fin bases, on leading edges of 2nd dorsal and anal fins, and upper and lower edges of caudal fin; peduncle with wide dark mark mostly above LL scales, fading

or absent below, and partial pale region just in front of mark; iris brownish with white inner ring. Preserved specimens with many pale bars on body (no dark saddle below 2nd dorsal fin); cheek mark thin and triangular; peduncle bar mostly above lateral line; caudal-fin edges dark. Attains 77 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives; elsewhere to Andaman Sea, Indonesia, Philippines, Australia and Tuamotu Is.

**REMARKS** Found to ~11 m deep.

### *Nectamia savayensis* (Günther 1872)

Samoa cardinalfish

PLATE 61

*Apogon savayensis* Günther 1872: 656 (Savai'i I., Samoa; Manado, Sulawesi, Indonesia); SSF No. 175.22\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Fricke 1999; Heemstra *et al.* 2004.

*Ostorynchus savayensis*: Smith 1961\*.

*Nectamia savayensis*: Fraser 2008; Fricke *et al.* 2009.

Percentage SL: body depth 39–44%, peduncle depth 16–20%, 2nd spine of anal fin 17–21%, and pectoral-fin length 26–29%. GR usually 26–30.

In life, head and body uniformly bronzy to brownish, becoming silvery below eyes and on abdomen, sometimes with faint bars on sides or dark saddle under 2nd dorsal fin (no longitudinal stripes on head, body and fins); cheek mark broad, oblique, from eye to angle of preopercle; lachrymal and anterior suborbitals with yellowish mark; 1st dorsal fin membranes dusky distally between 2nd and 4th spines; membranes of 2nd dorsal fin dusky between spine and 2nd ray; anal fin with whitish 2nd spine and 1st ray; peduncle with dark mark mostly above LL scales, and partial pale region in front of mark; caudal fin mostly pale, upper and lower edges narrowly whitish and then blackish; pectoral- and pelvic-fin rays pale; iris brownish with white inner ring. Preserved specimens without dark saddle on body; cheek mark wide and triangular; peduncle with wide dark bar, mostly above lateral line; caudal fin with dark upper and lower edges. Attains 92 mm SL.



*Nectamia savayensis*, 51 mm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: East Africa to Mozambique (Inhaca I.), Seychelles and Chagos; not known from Red Sea; elsewhere widespread to Indonesia, Ryukyu Is., Australia (southern Great Barrier Reef), New Caledonia, Tonga, Samoa, Line Is. and Tuamotu Is.

**REMARKS** Found on protected coastal and seaward reef slopes, to ~15 m deep; secretive and rarely seen during daytime. Feeds on ostracods, amphipods, shrimps and polychaetes.

### *Nectamia zebrinus* (Fraser, Randall & Lachner 1999)

PLATE 61

*Apogon zebrinus* Fraser, Randall & Lachner 1999: 2, Figs. 1–2 (north of Râs Burqa, Egypt, Gulf of Aqaba, Red Sea); Gon & Randall 2003\*; Manilo & Bogorodsky 2003.

*Nectamia zebrinus*: Fraser 2008.

Percentage SL: body depth 40–47%, peduncle depth 18–22%, 2nd spine of anal fin 19–23%, and pectoral-fin length 26–32%. GR usually 25–28.

In life, head and body bronzy to brownish grey dorsally, with pale bars (no longitudinal stripes on head, body and fins); cheek mark broad and triangular, from eye to angle of preopercle; lachrymal and anterior suborbitals with yellowish mark; membranes of 1st dorsal fin darkish distally between 2nd and 4th spines; 2nd dorsal fin with darkish leading edge; anal fin with whitish leading edge; dark peduncle mark wider above LL scales than below, pale region in front of mark not reaching to bases of 2nd dorsal fin and anal fin; caudal fin with whitish edges; pectoral and pelvic fins pale; iris brownish with white inner ring. Preserved specimens with pale bars on body; cheek mark broad, triangular; peduncle mark extends below LL scales in adults; caudal-fin edges dark. Attains 74 mm SL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Found from surface to ~10 m deep.

### GENUS *Sphaeramia* Fowler & Bean 1930

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 11 or 12 rays; caudal fin with spinous procurrent elements. Deep-bodied; black bar from 1st dorsal fin to abdomen, and large spots on rear half of body. Two species, 1 in WIO.

## *Sphaeramia orbicularis* (Cuvier 1828)

PLATE 66

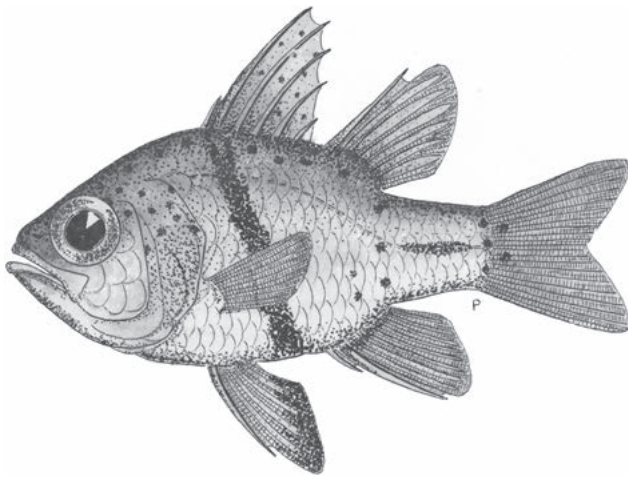
*Apogon orbicularis* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1828: 155 (Java, Indonesia).

*Apogon nigromaculatus* Hombron & Jacquinot in Jacquinot & Guichenot 1853: 32, Pl. 1, Fig. 2 (New Guinea).

*Sphaeramia orbicularis*: Smith 1961\*; SSF No. 175.43\*; Gon & Randall 2003\*.

Pectoral fins 11 or 12 rays. Villiform teeth on premaxillae and dentaries, and in 2 or 3 rows on vomer and palatines. GR 3–5 + 17–21. Median predorsal scales 6 or 7.

Head and body semi-translucent bluish grey, with blackish spots of variable size and number (including on snout, interorbital region, operculum, proximally on 1st dorsal-fin membranes, above and below lateral line, peduncle and caudal-fin base), larger posteriorly; cheek mark triangular, from eye to angle of preopercle; blackish vertical bar from leading edge of 1st dorsal fin to abdomen; pelvic fins with narrow dark streak from base of spine to near tip, membranes between each ray broadly blackish distally, and a few spots proximally; 2nd dorsal, anal and caudal fins mostly translucent. Attains 77 mm SL.



*Sphaeramia orbicularis*, 60 mm TL (WIO). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa, Seychelles and Sri Lanka; elsewhere to Indonesia, Palau, Ryukyu Is., northern Australia, New Caledonia, Gilbert Is. and Tonga.

**REMARKS** Found from near surface to ~9 m deep.

### *Tribe Veruluxini* Fraser & Mabuchi 2014

One genus.

## GENUS *Verulux* Fraser 1972

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 9 rays; pectoral fins 14–16 rays. Villiform teeth in 1 row on premaxillae, dentaries (and slightly enlarged near symphysis) and vomer, and absent or present in 1 row on palatines. GR 1 or 2/10–12. Median predorsal scales 4. Two species, but with molecular evidence of cryptic species in the species presented below. The other species is confined to the West Pacific region (Yoshida & Motomura 2016).

### *Verulux cypselurus* (Weber 1909)

Swallowtail cardinalfish

PLATE 67

*Rhabdamia cypselurus* Weber 1909: 167 (Kawa, Seram I., Indonesia).

*Rhabdamia cypselura*: Winterbottom *et al.* 1989\*; Randall 1994, 1995\*;

Randall *et al.* 1994\*; Carpenter *et al.* 1997\*; Gon & Randall 2003\*;

Al-Jufaili *et al.* 2010.

*Verulux cypselurus*: Mabuchi *et al.* 2014.

Diagnosis as for genus.

Body translucent, abdomen and most of head iridescent silvery; snout with black dash between upper jaw and eye; tips of jaws blackish, sides pale greenish or yellowish; tiny spots on nape and dorsum to 2nd dorsal fin; median fins tinged pale red-orange; caudal-fin lobes each with darkish longitudinal stripe, inner and outer rays otherwise translucent. Attains 50 mm SL

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Oman to Mozambique, Comoros, Seychelles, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Ryukyu Is., Palau, Marshall Is., New Guinea, Australia, New Caledonia and Tonga.

**REMARKS** Forms large shoals among rocks or above corals of lagoon patch reefs, at 3–22 m. Often schools with *Rhabdamia gracilis* and spreads out at night, floating in midwater to catch plankton.

### *Tribe Zoramiini* Fraser & Mabuchi 2014

First dorsal fin 6 spines (2nd spine longest); 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 or 9 rays; caudal fin forked. Preopercle ridge smooth, edges serrate. No supramaxilla. One supernumerary dorsal spine. Head and body with ctenoid scales; LL scales 24. Two genera, both represented in WIO.



GENUS *Fibramia* Fraser & Mabuchi 2014

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 9 rays; anal fin 2 spines, 8 rays; pectoral fins 13 or 14 rays; one supernumerary dorsal spine, and one supernumerary anal spine. Posttemporal edge smooth. Anterior nostrils tubular. GR 16–25. LL scales 24. Body with discreet or diffuse dark or silvery midlateral stripe ending in basicaudal spot smaller than pupil; first 3 dorsal-fin membranes mostly black, remainder of 1st dorsal fin pale; intestine and stomach with tiny melanophores, peritoneum silvery. At least 3 species, 2 in WIO.

## KEY TO SPECIES

- |    |  |                     |
|----|--|---------------------|
| 1a | Broad lateral stripe on snout through eye to opercle; small spot between dorsal fins .....                                     | <i>F. thermalis</i> |
| 1b | No stripe on snout, but usually with narrow dark line from opercle to basicaudal spot; no small spot between dorsal fins ..... | <i>F. lateralis</i> |

*Fibramia lateralis* (Valenciennes 1832)

Humpback cardinalfish

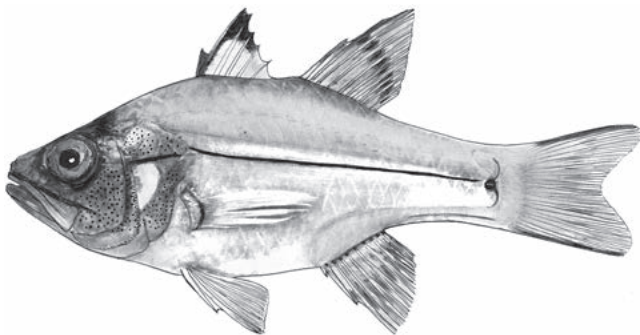
PLATE 57

*Apogon lateralis* Valenciennes 1832: 58 (Vanikoro I., Santa Cruz Is.);  
Smith 1961\*; SSF No. 175.14\*; Fricke 1999.

*Fibramia lateralis*: Mabuchi *et al.* 2014.

Pectoral fins 13 or 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Villiform teeth on premaxillae and dentaries, in 1 or 2 rows on vomer and palatines. GR 3 or 4/12–16. Median predorsal scales 6 or 7.

Freshly dead fish semi-translucent tan, scales with narrow darkish margins, and thin dark line laterally, from opercle to small basicaudal spot; 1st spine and membrane of 1st dorsal fin blackish, 3rd spine and part of membrane blackish, rest of fin translucent; 2nd dorsal fin and anal fin with faint stripe proximally; caudal fin with darkish upper and lower edges. Attains 67 mm SL.



*Fibramia lateralis*, 90 mm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, Madagascar, Aldabra, Comoros, Seychelles and Sri Lanka; elsewhere to Taiwan, Ryukyu Is., Caroline Is., Mariana Is., Australia, New Caledonia and Samoa.

*Fibramia thermalis* (Cuvier 1829)

Half-barred cardinalfish

PLATES 55 &amp; 57

*Apogon thermalis* Cuvier in Cuv. & Val. 1829: 492 (Cania, Sri Lanka);  
SSF No. 175.26\*; Sluka 2013.

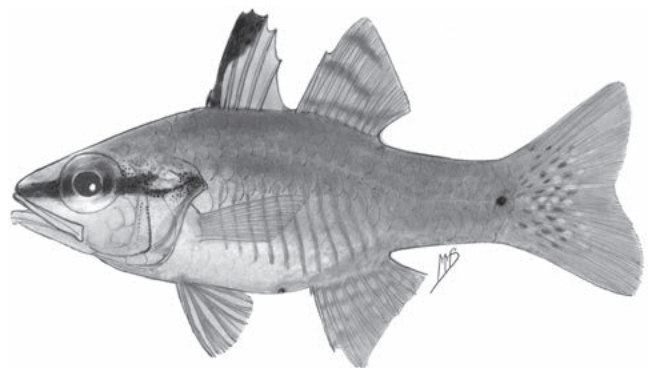
*Apogon franssedai* (non Allen, Kuitert & Randall 1994): Anderson *et al.* 1998.

*Apogon sangiensis* Bleeker 1857: 375 (Sangi [Sangihe] I., Indonesia);  
Smith 1961\*; Anderson *et al.* 1998.

*Fibramia thermalis*: Mabuchi *et al.* 2014.

Pectoral fins 14 rays. Last ray of 2nd dorsal fin and anal fin not elongate. Anterior nostrils a long tube. Villiform teeth on premaxillae and dentaries, in 2 rows on vomer, and in 1 row on palatines. GR 3–5/14–16. Median predorsal scales 6.

Head and body semi-translucent; darkish lateral stripe on snout, through eye, to opercle; small darkish spot between dorsal fins; 1st–3rd or 4th membranes of 1st dorsal fin darkish, and small darkish spot at rear of 2nd dorsal-fin base; all fins without stripes or other markings; small darkish basicaudal spot; peritoneum, stomach and intestine pale. Attains 64 mm SL.



*Fibramia thermalis*, 65 mm TL (N Mozambique). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, Madagascar, Aldabra, Seychelles and Sri Lanka; elsewhere to Indonesia, Ryukyu Is., Palau, Australia and Vanuatu.

**REMARKS** Euryhaline: one of the few cardinalfishes found in small aggregations in small tidal streams, river mouths, estuaries and marine environments, including shallow inshore reefs, sheltered lagoons with rocks and corals, and deep coastal

reefs with outcrops or sand, as well as among seagrasses and clumps of algae or on algal-covered rubble, to ~20 m deep. Nocturnal.

**GENUS** *Zoramia* Jordan 1917

First dorsal fin 6 spines (2nd and 3rd spines variably elongate or filamentous); 2nd dorsal 1 spine, 8 rays; anal fin 2 spines, 9 rays; pectoral fins 13–15 rays. Villiform teeth in 2 or 3 rows towards symphysis of premaxillae, in 1 or 2 rows on dentaries (1 row posteriorly), and in 1 row on palatines. Preopercle ridge smooth, edges serrate. GR 22–32. Median predorsal scales 6; LL scales 24, all pored; scale rows 2 between lateral line and dorsal fin. Stomach and intestine blackish. Six species, 2 in WIO.

**KEY TO SPECIES**

- 1a Dense melanophores forming dark line on dorsum from 1st dorsal-fin origin to dorsal surface of peduncle, and similarly on ventral surface of peduncle; no basicaudal spot or dusky mark..... *Z. leptacantha*
- 1b No dense melanophores on dorsal and ventral surfaces of peduncle; small dark basicaudal spot present ..... *Z. fragilis*

*Zoramia fragilis* (Smith 1961)

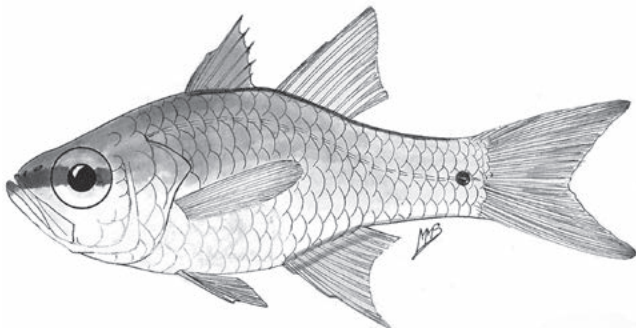
Fragile cardinalfish

PLATE 55

*Apogon fragilis* Smith 1961: 385, Pl. 46h (Pinda, Mozambique); Fraser & Lachner 1985\*; SSF No. 175.10\*.  
*Zoramia fragilis*: Mabuchi *et al.* 2014.

Basicaudal spot smaller than pupil; 2nd spine of dorsal fin 16–20% SL. GR 23–28.

Body translucent (no blue or yellow bars), with small dark basicaudal spot; all fins translucent without markings, except caudal-fin tips usually blackish. Attains 43 mm SL.



*Zoramia fragilis*, 50 mm TL, holotype (N Mozambique). Source: SSF



*Zoramia fragilis*, 34 mm SL, holotype (Mozambique). © TH Fraser, FLMNH

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, Madagascar, Seychelles and Maldives; elsewhere to southern Japan, Australia and Samoa.

*Zoramia leptacantha* (Bleeker 1856)

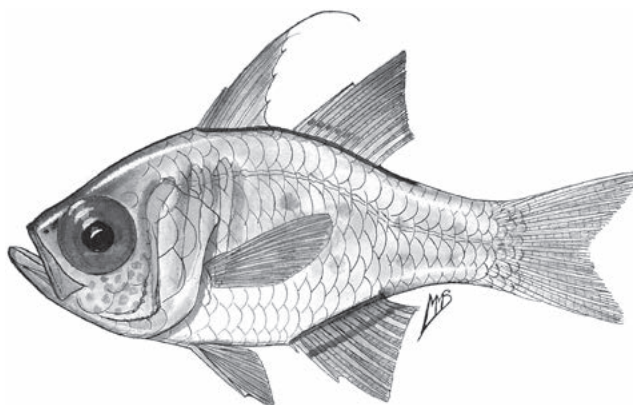
Threadfin cardinalfish

PLATES 55 & 68

*Apogon leptacanthus* Bleeker 1856: 204 (Ternate, Moluccas, Indonesia); Smith 1961\*; Dor 1984; Fraser & Lachner 1985\*; SSF No. 175.15\*; Winterbottom *et al.* 1989\*; Gon & Randall 2003\*; Manilo & Bogorodsky 2003.  
*Apogon graeffii* Günther 1873: 22, Pl. 20e (Boston I., Marshall Is.).  
*Zoramia leptacantha*: Mabuchi *et al.* 2014.

Second spine of dorsal fin filamentous, usually >30% SL. GR 27–31.

Body translucent, with irregular iridescent blue and yellow bars (from opercle to anterior half of body); thin dark line along dorsum and dorsal-fin bases extending to upper procurent rays of caudal fin, and similar, fainter line along ventral surface of peduncle (no basicaudal spot or dusky mark on peduncle). Attains 45 mm SL.



*Zoramia leptacantha*, 50 mm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Aden, Tanzania (Zanzibar), Mozambique, Madagascar, Comoros, Aldabra, Seychelles, Maldives and Chagos; elsewhere to Indonesia, Marshall Is., Australia, New Caledonia and Samoa.

## SUBFAMILY PSEUDAMIINAE

Smith 1954

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8–10 rays; anal fin 1 spine, 8 rays, or 2 spines, 8–10 rays. Dorsal fins separate and not associated internally; epineurals absent or present on all but last 3 or 4 pleurals. Mouthbrooding of eggs reported for one species. One genus (Mabuchi *et al.* 2014).

GENUS *Pseudamia* Bleeker 1865

First dorsal fin 6 spines; 2nd dorsal fin 1 spine, 8–10 rays (8 rays in WIO species); anal fin 2 spines, 7–10 rays; pectoral fins 15–17 rays; caudal fin rounded. Preopercle ridge smooth, horizontal edge and corner serrate (serrae may be reduced in large adults). Mix of caniniform and villiform teeth on premaxillae and dentaries; vomer and palatines with villiform teeth. GR 8–24. Scales cycloid and deciduous; LL scales 23–43; lateral line not obvious, first few LL scales pored, remaining scales notched, and partial lateral line along abdomen with notched scales. Seven species, 3 in WIO.

## KEY TO SPECIES

- |    |  |       |                      |
|----|--|-------|----------------------|
| 1a | LL scales 39–43; anterior nostrils with long flap  | ..... | <i>P. gelatinosa</i> |
| 1b | LL scales 23–31; anterior nostrils with short flap | ..... | 2                    |
| 2a | LL scales 31–35                                    | ..... | <i>P. tarri</i>      |
| 2b | LL scales 23 or 24                                 | ..... | <i>P. hayashii</i>   |

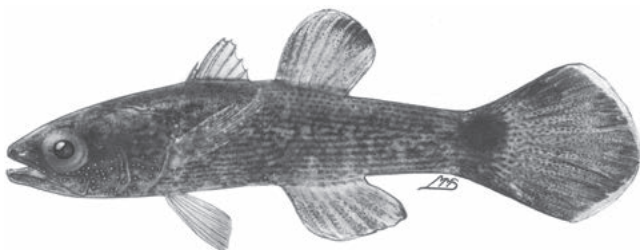
*Pseudamia gelatinosa* Smith 1956

PLATE 65

*Pseudamia gelatinosa* Smith 1956: 690, Pl. 18a (Aldabra); Randall *et al.* 1985\*; SSF No. 175.52\*; Winterbottom *et al.* 1989\*; Fricke 1999; Gon & Randall 2003\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004.  
*Pseudamia polystigma* (non Bleeker 1860): Smith 1954.

Anal fin 8 rays; pectoral fins 15–17 rays. Anterior nostril flaps long. GR 8 or 9. LL scales 39–43.

Body translucent brownish, with numerous dark spots, spots larger on head, smaller and tending to form linear rows on body; anterior nostril flaps dark; 2nd dorsal, anal and caudal fins dusky distally. Attains 79 mm SL.



*Pseudamia gelatinosa*, 75 mm TL, holotype (Aldabra). Source: Smith 1956

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (Sodwana Bay), Comoros, Seychelles, Mauritius, Aldabra and Chagos; elsewhere to Japan, Australia and Society Is.

**REMARKS** Found to ~40 m deep.

*Pseudamia hayashii* Randall, Lachner & Fraser 1985

PLATE 65

*Pseudamia hayashii* Randall, Lachner & Fraser 1985: 11, Fig. 4 (Ngargol I., Palau); Anderson *et al.* 1998; Manilo & Bogorodsky 2003.

Anal fin 7 or 8 rays; pectoral fins 15–17 rays. Anterior nostril flaps short. GR 8. LL scales 23 or 24.

Body translucent reddish, with iridescent coppery reddish dots forming linear rows on body (no largish dark spots on head); anterior nostril flaps tannish; 2nd dorsal, anal and caudal fins dusky with hyaline margins. Attains 62 mm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden and Comoros; elsewhere widespread to Indonesia, southern Japan, Palau, northern Australia and Samoa.

**REMARKS** Found at 2–64 m.

*Pseudamia tarri* Randall, Lachner & Fraser 1985

PLATE 65

*Pseudamia tarri* Randall, Lachner & Fraser 1985: 15, 23 [addendum], Pl. 1c (base of drop-off at Jana I., Saudi Arabia, Persian/Arabian Gulf).

Anal fin 8 rays; pectoral fins 17 rays. Anterior nostril flaps short. GR 8. LL scales 31.

Body translucent lavender, with small black dots, and head with some dark spots; anterior nostrils pale; 2nd dorsal fin and anal fin with narrowly black along base, pale stripe above, and broadly dusky distally; caudal fin dusky with pale margin. Attains at least 37 mm SL.

**DISTRIBUTION** Known only from two type specimens collected in the Persian/Arabian Gulf.

**REMARKS** Found at ~15 m.

## GLOSSARY

**Cymodacea** – a genus of seagrass.

**hypurals** – the fan-shaped series of bones (sometimes fused to one or two plates) to which the caudal fin rays are attached.

**supernumerary spine** – an additional spine (or spines); more than the normal single spine supported by a pterygiophore.

**urostyler centrum** – the last vertebra, and part of the caudal skeleton.

## FAMILY EPIGONIDAE

### Deepwater cardinalfishes

Ofer Gon

Body elongate and subcylindrical or compressed, to short and stocky. Two separate dorsal fins: 1st dorsal fin 6–8 spines, and 2nd dorsal fin 1 spine, 8–11 rays; anal fin 1–3 spines, 7–10 rays; pectoral fins 14–23 rays; caudal fin emarginate to forked. Eyes large, round to oval. Opercle with 1–3 weak to strong spines (rarely absent); edges of orbital and opercular bones smooth or serrated, sometimes poorly ossified. Mouth large, oblique; maxilla narrow, not reaching beyond vertical through middle of eye; where present, teeth on jaws, vomer and palatines small, conical, but some species with enlarged teeth protruding forward at tip of lower jaw (*Epigonus glossodontus*) or both jaws (*Florenciella* and *Rosenblattia*). Branchiostegal rays 6 or 7. Scales usually ctenoid, but spinoid or cycloid in some species. Lateral line complete and extending onto caudal fin, with 33–56 tubular scales (counted to end of hypural plate). Vertebrae 10 + 15, or 11 + 14.

Epibenthic or pelagic, small- to medium-sized, typically reddish brown to blackish. Found in all oceans, from northern cold-temperate to sub-Antarctic waters, on continental and insular slopes, seamounts and oceanic rises, adults in 75–3 700 m (usually 200–1 400 m). Feed on zooplankton, including copepods, euphausiids and shrimps, and small fishes. Most species not fished commercially, but taken as bycatch.

Seven genera and 44 species; 3 genera and 9 species in WIO at depths of <250 m.

#### KEY TO GENERA AND SPECIES

- 1a Anal fin 3 spines, 7 rays; branchiostegal rays 6 ..... *Sphyraenops bairdianus*
- 1b Anal fin 2 spines, 8–10 (rarely 7) rays; branchiostegal rays 7 ... 2
- 2a Second dorsal fin 7 or 8 rays; opercular bones strongly serrated; opercle spine flanked above and below by several smaller spines; fin spines with longitudinal grooves; supraneural bones 2 ..... *Florenciella lugubris*
- 2b Second dorsal fin 9 or 10 rays; opercular bones at most weakly serrated; opercle spine, when present, not flanked above and below by several smaller spines; fin spines without longitudinal grooves; supraneural bones 3 ..... 3 [*Epigonus*]
- 3a Opercle with large bony spine ..... *Epigonus marimonticolus*
- 3b Opercle spine short and weak, or absent ..... 4

Continued...

#### KEY TO GENERA AND SPECIES

- 4a GR 17–26 ..... 5
- 4b GR 26–34 ..... 7
- 5a GR 17–23; pyloric caeca 7–9; pectoral fins 18–20 rays; vertebrae 10 + 15 ..... 6
- 5b GR 23–26; pyloric caeca 21–34; pectoral fins 19–23 rays; vertebrae 11 + 14 ..... *Epigonus telescopus*
- 6a GR 17–21; 1st dorsal fin 8 (rarely 7) spines; body depth 20–26% SL ..... *Epigonus macrops*
- 6b GR 22 or 23; 1st dorsal fin 7 spines; body depth 16–18% SL ..... *Epigonus elongatus*
- 7a First dorsal fin 8 spines; pyloric caeca 21–23 ..... *Epigonus angustifrons*
- 7b First dorsal fin 7 spines; pyloric caeca 5–14 ..... 8
- 8a LL scales 35–37; lower jaw symphysis with anteriorly projecting teeth ..... *Epigonus exodon*  
[deep water, usually ~450–500 m]
- 8b LL scales 45–51; no anteriorly projecting teeth at lower jaw symphysis ..... 9
- 9a Tongue not bearing teeth (small tooth patches rarely present on middle or edges of tongue); pectoral-fin length 14.1–19.9% SL; pectoral fins 18–21 rays; 1st dorsal-fin spine 2.4–3.7% SL ..... *Epigonus denticulatus*
- 9b Tooth patch present on tongue; pectoral-fin length 24–25% SL; pectoral fins 18 rays; 1st dorsal-fin spine 6.1% SL ..... *Epigonus marisrubri*

#### GENUS *Epigonus* Rafinesque 1810

Body elongate, depth at least 3.3, usually 4–5 in SL; caudal fin emarginate to forked. First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 9–11 rays; pectoral fins 15–23 rays. Edges of opercular bones smooth to weakly serrated; infraorbital bones 8, smooth. Branchiostegal rays 7. GR 17–35. Scales ctenoid; LL scales 33–51. Pyloric caeca 5–34. Most species found on continental and insular slopes, at 50–1 400 m; juveniles of some species may be found in caves as shallow as 15 m. Revised by Mayer (1974) and reviewed by Abramov (1992); 35 species divided into 4 species groups (Abramov 1992; Okamoto & Motomura 2011, 2013; Okamoto 2012; Okamoto *et al.* 2012), probably 7 species in WIO at depths of <250 m.

*Epigonus angustifrons* Abramov & Manilo 1987

*Epigonus angustifrons* Abramov & Manilo 1987: 45, Fig. 1 (southwestern Indian Ocean, 36°33' S, 52°05' E); Abramov 1992.

First dorsal fin 8 spines; 2nd dorsal fin 1 spine, 10 rays; pectoral fins 20–22 rays. Body depth 18–22% SL; HL 30–33% SL; peduncle length ~26–27% SL; eye diameter 36–37% HL. Opercle spine weak; teeth present on tongue. GR 33 or 34. LL scales 48–50. Pyloric caeca 21 or 22. Vertebrae 10 + 15.

Body dark brown, scale edges darker; fin rays dusky, membranes pale; mouth cavity, gill chamber and gill membranes dark. Attains 36 cm SL.

**DISTRIBUTION** WIO: seamounts south of Madagascar.

**REMARKS** Found at 150–880 m.

*Epigonus denticulatus* Dieuzeide 1950

Pencil cardinalfish

PLATE 68

*Epigonus denticulatus* Dieuzeide 1950: 89, Figs. 1–11 (Algeria,

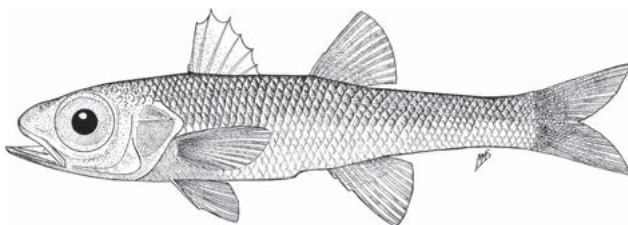
Mediterranean Sea); SSF No. 175.45\*; Fricke 1999; Fricke *et al.* 2009.

*Epigonus atherinoides* (*non* Gilbert 1905): Smith 1961\*.

*Hynnodus atherinoides* (*non* Gilbert 1905): Smith 1949; SFSA No. 495a\*.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 9 or 10 rays; pectoral fins 18–20 rays. Body depth 18–23% SL; HL 32–36% SL; peduncle length 26–34% SL; eye diameter 38–48% HL. Opercle spine weak and poorly ossified; usually no teeth on tongue, rarely patches of teeth present along midline or edges. GR 28–34. LL scales 46–51. Pyloric caeca 10–14. Vertebrae 10 + 15.

Body dark brown; fins dusky to brown; mouth cavity pale; gill chamber and gill rakers blackish. Attains 20 cm SL.



*Epigonus denticulatus*, 17 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Circumglobal in warm and temperate seas, including the Mediterranean. In WIO known from off Cape Agulhas, Reunion and the Melville Seamount.

**REMARKS** Found on continental and insular slopes and seamounts, at 130–180 m.

*Epigonus elongatus* Parin & Abramov 1986

*Epigonus elongatus* Parin & Abramov 1986: 55, Fig. (off Saya de Malha Bank); Abramov 1992; Okamoto & Motomura 2013.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 10 rays; pectoral fins 18–20 rays. Body depth 16–18% SL; HL 31–33% SL; peduncle length 27–30% SL; eye diameter 39–43% HL. Opercle spine weak and poorly ossified; no teeth on tongue. GR 22 or 23. LL scales 48–50. Pyloric caeca 7–9. Vertebrae 10 + 15.

Body brown, shading to silvery brown on abdomen; opercle membrane dark; fin rays with little pigment, fin membranes pale, except caudal-fin margin dark; dark ring visible posteriorly on peduncle when scales missing; mouth cavity pale; gill chamber dark dorsally. Attains at least 16 cm SL.

**DISTRIBUTION** WIO: Saya de Malha Bank.

**REMARKS** Types collected at 320 m, but may occur shallower.

*Epigonus macrops* (Brauer 1906)

Luminous deepsea cardinalfish

*Oxyodon macrops* Brauer 1906: 288, Fig. 172 (west coast of Sumatra, Indonesia).

*Epigonus macrops*: Mayer 1974\*; Abramov 1992; Okamoto *et al.* 2012.

First dorsal fin 8 spines; 2nd dorsal fin 1 spine, 10 rays; pectoral fins 18 or 19 rays. Body depth 20–25% SL; HL 34–39% SL; peduncle length 22–29% SL; eye diameter 37–44% HL. Opercle spine short, weak; no teeth on tongue; teeth in upper jaw visible when mouth closed. GR 17–21. LL scales 46–50. Pyloric caeca 7 or 8; 1 pyloric caecum modified into bioluminescent organ placed in pouch on ventral part of body cavity. Vertebrae 10 + 15.

Body of adults greyish brown, with darker, narrowly outlined scale edges; fins dusky, except caudal fin blackish; no dark ring on peduncle; mouth and gill cavities dark. Juveniles with forward-slanting narrow black ring on middle of peduncle; mouth and gill cavities pale. Attains 21 cm SL.

**DISTRIBUTION** Continental and insular slopes and seamounts in tropical western Atlantic (including Gulf of Mexico) and Indo-Pacific (including Tanzania to Vietnam, Indonesia and northwestern Australia).

**REMARKS** Adults found at 550–1 300 m; juveniles pelagic, in 120–550 m.

## *Epigonus marimonticolus* Parin & Abramov 1986

*Epigonus marimonticolus* Parin & Abramov 1986: 53, Fig. (west of Agaléga Shoals); Abramov 1992; Manilo & Bogorodsky 2003.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 10 rays; pectoral fins 20 or 21 rays. Body depth 20–24% SL; HL 37–40% SL; peduncle length 25–32% SL; eye diameter 35–41% HL. Opercle spine short and strong; no teeth on tongue. GR 30–32. LL scales 48–50. Pyloric caeca 12–14. Vertebrae 10 + 15.

Body dark brown, paler anteriorly; scale edges brown, paler ventrally; fins and opercular membrane dark; mouth cavity pale; gill chamber dark. Attains 16.5 cm SL.

**DISTRIBUTION** WIO: seamounts between Socotra and Madagascar.

**REMARKS** Known from 250–420 m.

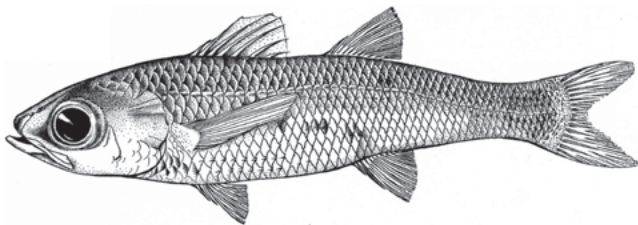
## *Epigonus marisrubri* Krupp, Zajonz & Khalaf 2009

Red Sea deepwater cardinalfish PLATE 68

*Epigonus marisrubri* Krupp, Zajonz & Khalaf 2009: 224, Figs. 1–3 (northern Gulf of Aqaba, Jordan, Red Sea); Okamoto & Motomura 2013.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 10 rays; pectoral fins 18. Body depth 23–25% SL; HL 32–33% SL; peduncle length 25% SL; eye diameter 35–37% HL. Opercle spine short, weak; 2–4 series of small close-set teeth posteriorly along middle of tongue. GR 29 or 30. LL scales 48 or 49. Pyloric caeca 10. Vertebrae 10 + 15.

Preserved specimens: head dark brown, upper half of body brown and lower half silvery; irregular dark marks scattered on sides; front margin of eyes blackish. Attains at least 14 cm SL.



*Epigonus marisrubri*, 14 cm SL, female holotype (Red Sea).  
Source: Krupp *et al.* 2009

**DISTRIBUTION** Known only from two type specimens collected from the Red Sea.

**REMARKS** Taken from a coral reef in relatively shallow water, at ~52 m.

## *Epigonus telescopus* (Risso 1810)

Black cardinalfish

*Pomatomus telescopus* Risso 1810: 301, Pl. 9, Fig. 31 (Nice, France, Mediterranean Sea).

*Epigonus telescopus*: Goode & Bean 1896; Barnard 1927; SFSA No. 474\*; Mayer 1974\*; SSF No. 175.48\*.

First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 9–11 rays; pectoral fins 19–23 rays. Body depth 20–27% SL; HL 31–38% SL; peduncle length 19–28% SL; eye diameter 36–42% HL. Opercle spine short, weak; no teeth on tongue. GR 23–26. LL scales 46–50. Pyloric caeca 21–34. Vertebrae 11 + 14.

Body dark brown to black with purple iridescent tinge; fins and gill chamber blackish; juveniles with pale mouth cavity that darkens with age. Attains 64 cm SL.

**DISTRIBUTION** Mediterranean Sea, Atlantic (antitropical) and Indo-Pacific, including Walvis Ridge off South Africa to New Zealand.

**REMARKS** Occurs on continental and insular shelves and slopes as well as seamounts, at 75–1 200 m.

## GENUS *Florenciella* Mead & De Falla 1965

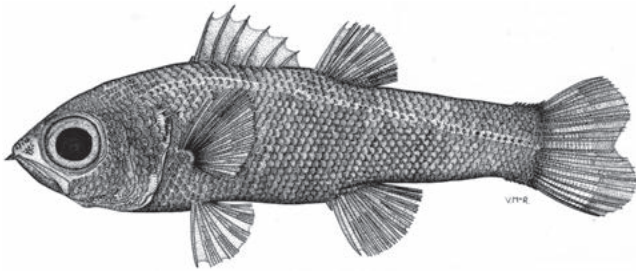
Opercular bones serrated; opercle spine flanked above and below by several smaller spines; orbital bones serrated, except anteroventrally. Fin spines strong, with longitudinal grooves; caudal-fin procurent rays exposed and strong. Branchiostegal rays 7. Scales spinoid. One species.

## *Florenciella lugubris* Mead & De Falla 1965

*Florenciella lugubris* Mead & De Falla 1965: 268, Figs. 2–3 (equatorial Indian Ocean); SSF No. 175.49\*; Prokofiev 2007.

First dorsal fin 7 spines; 2nd dorsal fin 1 spine, 8 rays; anal fin 2 spines, 8 rays. Body depth 25–30% SL. LL scales on peduncle similar to body scales, not scute-like; 4 or 5 scales rows on cheeks. Bioluminescent oesophageal diverticula present.

Body of adults uniformly dark, and with dark mouth and gill cavities, but gill rakers dusky. Attains 10 cm SL.



*Florenciella lugubris*, 10 cm TL (Kenya). Source: SSF

**DISTRIBUTION** Tropical and subtropical waters of Indian Ocean. Northeast of Seychelles, Kenya, and the SW Indian Ridge; elsewhere to western North Pacific.

**REMARKS** Known from 150–800 m.

**GENUS** *Sphyraenops* Gill 1860

Anal fin 3 spines; opercular spines 3; infraorbital bones 7, first 4 serrated, including orbital margin of lachrymal; rudimentary supramaxilla present. Branchiostegal rays 6. Scales ctenoid. Reviewed by Suda & Tominaga (1983). One species.

*Sphyraenops bairdianus* Poey 1861

*Sphyraenops bairdianus* Poey 1861: 350, Pl. 18, Fig. 12 (Cuba); Fricke *et al.* 2009.

*Scombrosphyraena oceanica* Fourmanoir 1970: 27, Fig. 5 (Espiritu Santo, Vanuatu, southwestern Pacific [stomach content]); Fraser & Fourmanoir 1971\*.

First dorsal fin 7 or 8 spines; 2nd dorsal fin 1 spine, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 14 or 15 rays. Body depth 18–21% SL; HL 30–34% SL; peduncle length 22–28% SL; eye diameter 28–34% HL. Opercle spines strong and conspicuous; preopercle edge serrated, its angle with 1 or 2 flat triangular spines. GR 30–34. LL scales 50–56. Vertebrae 10 + 15.

Body dark brown, sometimes with pale area on chest. Attains 9.5 cm SL.

**DISTRIBUTION** Western Atlantic (including Caribbean Sea), Réunion in WIO, and anti-equatorial in western Pacific.

**REMARKS** Known from 200–1 750 m.

## GLOSSARY

**antitropical distribution** – the distribution pattern where a group is found north and south of, but not in, the tropics (also anti-equatorial).

**bioluminescent oesophageal diverticula** – outgrowths of the oesophagus that contain bioluminescent bacteria.

**epibenthic** – living on the sediments on the bottom of the sea.

**hypural / hypural plate** – the fan-shaped series of bones (sometimes fused to one or two plates) to which the caudal fin rays are attached.

**spinoid** – modified ctenoid scales with spines fused to the surface and/or posterior margin.

**supraneural bones** – unpaired bones above the neural spines of the anterior vertebrae, between the skull and the origin of the dorsal fin.

## FAMILY LUTJANIDAE

### Snappers

Phillip C Heemstra and Elaine Heemstra

Body oblong, slender or deep, and slightly compressed. Dorsal fin single, with 10–12 spines, 10–16 rays, fin margin deeply notched before soft rays in some species; anal fin 3 spines, 7–10 rays; last dorsal- and anal-fin rays often split to base but counted as 1 ray; caudal fin truncate to deeply forked, with 17 principal rays, 15 branched rays; axillary process of pelvic fins well-developed in most species. Mouth terminal, jaws even or lower jaw projecting in front of upper jaw in some species; upper jaw moderately protrusile (fixed in *Aphareus*); maxilla slipping under preorbital bone when mouth is closed; most species with distinct canines (absent in *Aphareus*); vomer and palatines usually with small conical teeth (toothless in *Aphareus*). Preopercle edge serrate or smooth, notched in some species; rear edge of opercle with 2 flat, blunt points (spines), the upper point hidden by skin and scales. Scales ctenoid; cheeks, opercle and interorbital area scaly (naked in *Aprion*); maxilla with or without scales; snout, preorbital area and lower jaw naked. Body depth is measured at dorsal-fin origin; gill-raker counts include rudiments. Vertebrae 10 + 14.

Worldwide in tropical to warm-temperate seas, from shore to ~550 m. Occur in a variety of habitats, including coral and rocky reefs, estuaries, mangroves and rivers. Adults are demersal; some species occur in schools, others are solitary. Unlike most serranids and many other reef fishes, lutjanids are dioecious and show no sexual dimorphism. Forage mainly at night, feeding on fishes, crustaceans, cephalopods, gastropods and zooplankton. Important food fishes, with some reaching >1 m TL, but some species are notorious for causing ciguatera poisoning.

Seventeen genera and 109 species; 9 genera and 51 species in WIO.

**KEY TO GENERA**

- 1a Dorsal and anal fins naked or with scaly sheath at base; dorsal fin 10 spines, 9–11 rays ..... 2
- 1b Soft-rayed dorsal and anal fins scaly or with scaly sheath at base; dorsal fin 9–12 spines, 10–18 rays ..... 6
  
- 2a Maxilla scaly ..... 3
- 2b Maxilla without scales ..... 5
  
- 3a Dorsal-fin margin distinctly notched before soft rays; 10 spines, 10 or 11 rays ..... *Etelis*
- 3b Dorsal-fin margin without notch before soft rays; 10 spines, 10 rays ..... 4
  
- 4a Upper jaw protrusile; last ray of dorsal and anal fins shorter than penultimate ray; jaws with outer row of canines, and vomerine tooth patch crescentic or chevron-shaped ..... *Paracaesio*
- 4b Upper jaw not protrusile, attached at symphysis by frenum to snout; last ray of dorsal and anal fins distinctly longer than penultimate ray; teeth in jaws minute, no canines, and no teeth on roof of mouth ..... *Aphareus*
  
- 5a Groove present on snout below nostrils; pectoral-fin length <math>< \frac{1}{2}</math> HL; no scales on top of head ..... *Aprion*
- 5b No groove on snout; pectoral-fin length >math>> \frac{1}{2}</math> HL; scales on top of head extend to interorbital area ..... *Pristipomoides*
  
- 6a GR 60–80 on lower limb, long and slender; adults black, and juveniles black with white bands, spots and various white zones ..... *Macolor*
- 6b GR 7–28 on lower limb; colour various, but body not mostly black and white ..... 7
  
- 7a Dorsal and ventral head profiles equally convex; snout short, subequal to eye diameter; eye equidistant from dorsal fin and maxilla; jaws with outer row of small, fixed, conical teeth but no canines ..... *Pinjalo*
- 7b Dorsal and ventral head profiles convex or straight; adults with eye closer to head profile than to maxilla ..... 8
  
- 8a Adults with thick fleshy protrusion at front of upper lip; dorsal fin 10 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins longer than HL, reaching past anal-fin origin; LL scales 48 or 49; GR 5–7/11–14 ..... *Lipocheilus*
- 8b Lips normal, no fleshy protrusion at front of upper lip; dorsal fin 10–12 spines, 11–16 rays ..... *Lutjanus*

**GENUS** *Aphareus* Cuvier 1830

Body robust, fusiform; dorsal fin 10 spines, 10 or 11 rays, fin not notched before soft rays; anal fin 3 spines, 8 rays; last dorsal- and anal-fin rays elongated, reaching nearly to caudal-fin origin; pectoral fins subequal to HL, with 15 or 16 rays; caudal fin forked. Nostrils minute, contiguous. Scale rows on upper body parallel to lateral line. Two species, both in WIO.

**KEY TO SPECIES**

- 1a GR 6–10/16–18; head and body grey-blue; caudal-fin lobes subequal ..... *A. furca*
- 1b GR 16–19/32–35; body red or pink dorsally; caudal-fin upper lobe larger than lower lobe ..... *A. rutilans*

*Aphareus furca* (Lacepède 1801)

Smalltooth jobfish

PLATES 69 & 74

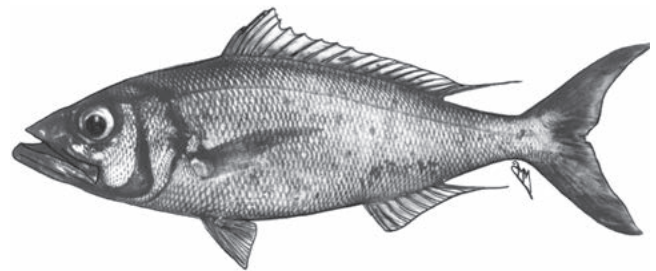
*Labrus furca* Lacepède (ex Commerson) 1801: 429, 477, Pl. 21, Fig. 1 (Mauritius, Mascarenes).

*Aphareus furcatus*: Smith 1954, 1980; Kyushin *et al.* 1977\*; Allen 1985\*; Winterbottom *et al.* 1989.

*Aphareus furca*: SSF No. 181.1\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*; Kuitert 1998\*; Allen 2005; Fricke *et al.* 2009.

Body depth 2.9–3.5 in SL; HL 3.1–3.4 in SL. LL scales 71–74.

Head and body grey-blue dorsally, lower half silvery; head bones with black margins; median fins dusky yellow to orangish; pectoral fins hyaline, yellow basally; pelvic fins yellowish. Attains 70 cm TL.



*Aphareus furca*, 36 cm TL (Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (Sodwana Bay, rarely to Eastern Cape), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos, Maldives and Sri Lanka; elsewhere to Cocos (Keeling) Is., Japan, Australia and Hawaii.



**REMARKS** Usually solitary, sometimes in small groups; found in lagoons and on reefs, at 6–237 m. Feeds on fishes, squid and crustaceans.

## *Aphareus rutilans* Cuvier 1830

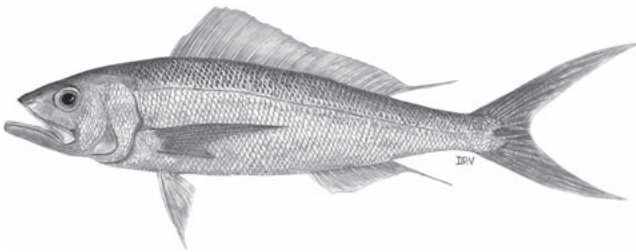
Rusty jobfish

PLATES 69 & 74

*Aphareus rutilans* Cuvier in Cuv. & Val. 1830: 490 (Red Sea); Smith 1954\*; Kyushin *et al.* 1977\*; Smith 1980; Allen 1985\*; SSF No. 181.2\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Randall 1995\*; Winterbottom & Anderson 1997; Adam *et al.* 1998; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

Body depth 3.3–4 in SL; HL 3–3.3 in SL; caudal-fin upper lobe longest. LL scales 69–75.

Head and body silvery red or pink, with bluish reflections overall and tiny blue spots dorsally; lower lip, edge of preorbital bone, maxillary groove and maxilla margin black; median fins edged with red; dorsal fin greenish yellow; pectoral fins reddish; inside of mouth, gill chamber and gills silvery. Attains 125 cm TL.



*Aphareus rutilans*, 56 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Port Alfred, Eastern Cape), Madagascar, Comoros, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Japan, Gilbert Is., Australia and Hawaii.

**REMARKS** Solitary, on rocky and coral reefs, in 20–330 m (usually >100 m). Feeds on fishes, crustaceans and squid.

## GENUS *Aprion* Valenciennes 1830

Body elongate, interorbital region flat and broad; dorsal fin not notched before soft rays; pectoral fins short, subequal to snout length; caudal fin lunate. Snout with groove below nostrils. Jaws with bands of minute teeth and 2 large canines anteriorly, vomer and palatines with minute teeth. Scale rows on upper body parallel to lateral line; no scales on dorsal and anal fins; interorbital area naked. One species.

## *Aprion virescens* Valenciennes 1830

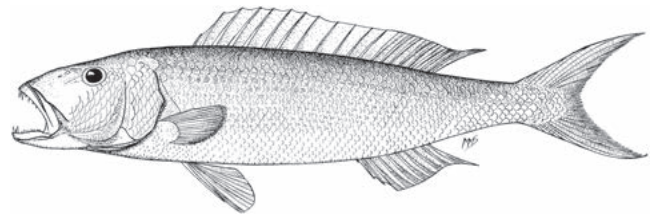
Green jobfish

PLATE 74

*Aprion virescens* Valenciennes in Cuv. & Val. 1830: 544, Pl. 168 (Seychelles); Smith 1949\*; Van der Elst 1981\*; Allen 1985\*; SSF No. 181.3\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

Diagnosis as for genus. Body depth 3.7–4.5 in SL; HL 3–3.3 in SL. Dorsal fin 10 spines, 11 rays; anal fin 3 spines, 8 rays; pectoral fins 16–18 rays. GR 7 or 8/14–16. LL scales 48–50.

Head and body dark blue-green dorsally, sides iridescent bluish purple or rarely silvery; scales with pale margins; rear interspinous dorsal-fin membranes dark basally. Attains 110 cm TL, ~20 kg.



*Aprion virescens*, 87 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden to South Africa (East London, rarely to Knysna), Madagascar, Seychelles, Mascarenes, Chagos, Maldives, Oman, Pakistan and Sri Lanka; elsewhere to Indonesia, Philippines, southern Japan, Australia, Marquesas Is. and Hawaii.

**REMARKS** Found in lagoons and on rocky and coral reef drop-offs, to at least 180 m. Spawns from January–May in tropical African waters. Usually solitary, but known to hunt in groups of 4–6. Feeds on fishes, crustaceans, cephalopods and zooplankton. Good eating, but has caused ciguatera poisoning.

## GENUS *Etelis* Cuvier 1828

Body deep or slender, fusiform; dorsal fin 10 spines, 11 rays, fin deeply notched before last spine (less so in *E. radiosus*); anal fin 3 spines, 8 rays; caudal fin forked. Teeth small, conical, outer row enlarged, often with 1 or 2 larger canines anteriorly. Scale rows parallel to lateral line in WIO species; maxilla scaly; no scales on base of dorsal and anal fins. Feeds on fishes, squid and crustaceans. Four species, 3 in WIO; *Etelis oculatus* (Valenciennes 1828) occurs in western Atlantic.

## KEY TO SPECIES

- 1a Caudal-fin upper lobe short, ~25–30% SL (fish >12 cm SL); total GR on 1st arch 17–22 ..... *E. carbunculus*
- 1b Caudal-fin upper lobe long, 32–61% SL or longer (fish >13 cm SL); total GR on 1st arch ≥23 ..... 2
- 2a Caudal-fin upper lobe long (more elongate with growth), 33–75% SL (fish >13 cm SL); distance from eye to preopercle angle 8–10% SL; total GR on 1st arch 23–28; predorsal scales ~13–17 ..... *E. coruscans*
- 2b Caudal-fin upper lobe 33–34% SL (fish >13 cm SL); distance from eye to preopercle angle 13–14% SL; total GR on 1st arch 33–36; predorsal scales ~17–19 ..... *E. radiosus*

### *Etelis carbunculus* Cuvier 1828

Ruby snapper

PLATES 69 & 74

*Etelis carbunculus* Cuvier in Cuv. & Val. 1828: 127, Pl. 18 (Mahé, Seychelles); Allen 1985\*; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Adam *et al.* 1998\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Fricke *et al.* 2009.

Body depth greater than HL; pectoral fins 15–17 rays; caudal-fin upper lobe relatively short, ~25–30% SL (fish >12 cm SL). GR 11–14 on lower limb. LL scales 48–50.

Head and body pink to red dorsally, white below; dorsal fin, pectoral fins and caudal fin pink to red (specimens from South Africa and Mozambique with dark caudal-fin tips); pelvic fins and anal fin whitish to pink. Attains 110 cm FL (commonly 50 cm FL).

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (Sodwana Bay), Comoros, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Japan, Australia, New Zealand, Tahiti and Hawaii.

**REMARKS** Found over rocky bottom, in 12–385 m.

### *Etelis coruscans* Valenciennes 1862

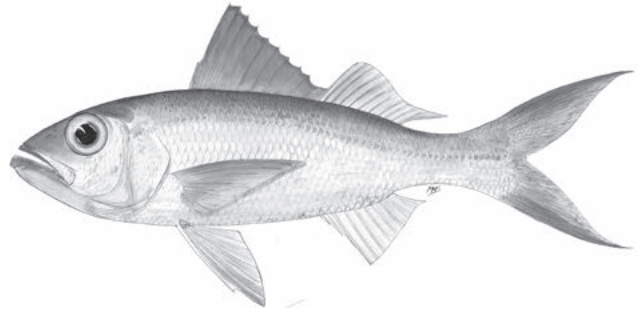
Flame snapper

PLATES 69 & 74

*Etelis coruscans* Valenciennes 1862: 1166 [2] (Réunion, Mascarenes); Anderson 1981; Allen 1985\*; SSF No. 181.4\*; Randall & Anderson 1993\*; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Terashima *et al.* 2001\*; Fricke *et al.* 2009.  
*Etelis carbunculus* (*non* Cuvier 1828): Smith 1949\*.

Body depth 3.4–3.8 in SL; HL 2.8–3.3 in SL; pectoral fins 15 or 16 rays; caudal-fin upper lobe more elongate with growth, 33–75% SL (fish >13 cm SL). GR 15–18 on lower limb. LL scales 47–50.

Body reddish dorsally, silvery ventrally; fins pink to red. Attains 120 cm FL.



*Etelis coruscans*, 45 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Algoa Bay), Comoros, Seychelles, Mascarenes, Nazareth Bank, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Mariana Is., Japan, Australia and Hawaii.

**REMARKS** Found over rocky bottom, at 100–400 m. Feeds on fishes, squid and crustaceans. A good sport fish and good eating.

### *Etelis radiosus* Anderson 1981

Pale snapper

PLATE 69

*Etelis radiosus* Anderson 1981: 821, Fig. 1 (off Galle, Sri Lanka); Allen 1985\*; De Bruin *et al.* 1994\*; Fricke *et al.* 2009.

Body depth 3.5–3.6 in SL; HL 2.7–3 in SL; cheek height ~10% SL; snout slightly longer than eye diameter; caudal-fin upper lobe ~33–34% SL. GR 20 or 21 on lower limb. LL scales 50 or 51.

Body reddish dorsally, silvery white ventrally; fins whitish pink to red. Attains 60 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Réunion and Sri Lanka; elsewhere to Indonesia, southern Japan, New Guinea and Samoa.

**REMARKS** Found on rocky bottom, in 90–370 m. Feeds mainly on fishes. Good eating; caught mainly with handlines.

## GENUS *Lipocheilus*

Anderson, Talwar & Johnson 1977

Moderately deep-bodied; adults with dorsal fleshy protrusion at front of upper lip; dorsal fin with shallow indentation between spines and soft rays; no elongated rays at rear end of dorsal and anal fins; pectoral fins pointed, reaching vertical at anal-fin origin; caudal fin distinctly forked; vomerine tooth patch chevron-shaped; no scales on dorsal and anal fins. One species.

*Lipocheilus carnolabrum* (Chan 1970)

Tang's snapper

PLATE 69

*Tangia carnolabrum* Chan 1970: 20, Pl. 1, Figs. 1–9c (South China Sea, ~145 km southeast of Hong Kong).

*Lipocheilus carnolabrum*: Anderson *et al.* 1977; Allen 1985\*; De Bruin *et al.* 1994\*.

Diagnosis as for genus. Body depth ~2.6 in SL; HL ~2.2 in SL. Dorsal fin 10 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 or 16 rays. Preopercle finely serrate, no notch; opercle rear edge with 2 blunt points. GR 17–21 on lower limb. LL scales 48–53; scale rows above and below lateral line run parallel to it.

Head and body brown dorsally, yellow to pinkish below, silvery ventrally; fins brownish yellow. Attains ~60 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Pakistan, India and Sri Lanka; elsewhere to Indonesia, Philippines and Japan.

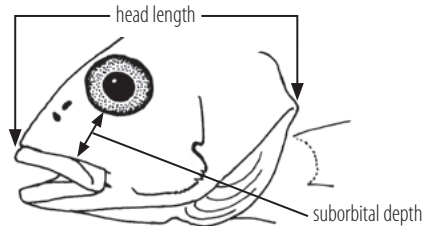
**REMARKS** Found on soft bottom with dead shells and corals; caught with longlines, in 90–300 m.

**GENUS** *Lutjanus* Bloch 1790

Medium- to large-sized, body slightly compressed, fusiform to deep; dorsal fin continuous, but slightly notched before soft rays in some species, with 10–12 spines, 11–16 rays; anal fin 3 spines, 7–10 rays, posteriormost rays shortest, and middle rays of some species elongated to form triangular fin margin; caudal fin truncate, emarginate or slightly forked. Jaws with several enlarged canines; vomerine tooth patch chevron-shaped, crescentic or triangular. Preopercle serrate, its lower vertical edge in some species with shallow to deep notch, and interopercle with bony knob that fits into preopercle notch. Species in WIO generally have oblique scale rows above lateral line, and horizontal scale rows below lateral line (exceptions noted in species accounts); dorsal and anal fins scaly. Body usually yellow, pink or red. Juveniles often occur inshore, adults at moderate depths. Good eating. About 68 species, 31 in WIO.

**KEY TO SPECIES**

- 1a Suborbital depth (distance between eye and upper jaw) narrow,  $\leq \frac{1}{2}$  eye diameter, 9–16 in HL; body slender to very slender, depth 2.9–3.7 in SL ..... 2

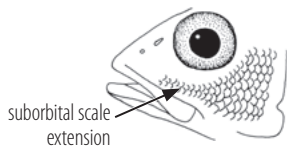


- 1b Suborbital depth 3.3–8.9 in HL; body depth 2.1–3.1 in SL ..... 3
- 2a Body depth 2.9–3.3 in SL; eye diameter 2.9–3.7 in HL; tongue with small patch of teeth; body with yellow or brown band (narrower than pupil) from near preopercle to caudal-fin base; oblique yellow lines between dorsal-fin base and lateral line ..... *L. lutjanus*
- 2b Body very slender, depth 3.5–3.8 in SL; eye diameter 3.5–4.3 in HL; tongue smooth, without teeth; sides with dark band (subequal to or wider than pupil) from snout to caudal-fin base; 2 small white spots on body below dorsal fin ..... *L. biguttatus*
- 3a Body yellow, with 4–8 blue longitudinal stripes; preopercle notch distinct ..... 4
- 3b Colour not as above ..... 10
- 4a Dorsal fin 10 spines ..... 5
- 4b Dorsal fin 11 or 12 spines ..... 7
- 5a Body pale yellow to silvery, with 7 or 8 narrow blue longitudinal stripes, upper 4 stripes extend obliquely to dorsal-fin base; dorsal fin 12–14 rays; preopercle notch indistinct ..... *L. coeruleolineatus*
- 5b Body yellow dorsally, with 4 or 5 blue longitudinal stripes on sides, and 1 or 2 blue stripes below eye (lower stripe may be faint); dorsal fin 13–15 rays; preopercle notch prominent ..... 6
- 6a Body yellow, with 4 blue longitudinal stripes on sides, all extending onto head; eyes and snout dark brown; belly white, with narrow grey or yellow lines following scale rows; scale rows on cheeks 5 or 6 ..... *L. kasmira*
- 6b Head, body and fins yellow to silvery yellow, with 5 blue longitudinal stripes on sides, belly pale without darker lines; scale rows on cheeks 10 or 11 ..... *L. quinquelineatus*

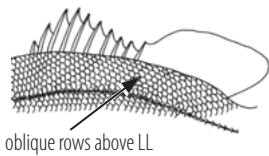
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**KEY TO SPECIES**

- 7a Head and body mostly yellow, paler ventrally; 7 narrow blue stripes on body, 4 upper stripes running obliquely towards dorsal-fin base (1st stripe may be faint or interrupted); large dark spot usually present below anteriormost dorsal-fin rays; dorsal fin 11 or 12 spines, 12 or 13 rays; GR 11–13 on lower limb ..... *L. notatus*
- 7b Colour not as above ..... 8
- 8a Dorsal fin 11 spines; head and body yellow dorsally, with 4 blue stripes (3rd stripe from eye or preopercle); lower half to quarter of body abruptly white ..... 9
- 8b Dorsal fin 12 spines; head and body yellow dorsally, with 4 blue stripes (3rd stripe from opercle); lower half of body abruptly white; median fins yellow, paired fins white ..... *L. octolineatus*
- 9a Head and body with 3rd blue stripe from preopercle; all fins yellow or yellowish; no suborbital extension of cheek scales ..... *L. bengalensis*
- 9b Head and body with 3rd blue stripe from eye; pectoral and pelvic fins whitish, median fins yellow; suborbital extension of cheek scales in 1–4 rows ..... *L. sapphirilineatus*

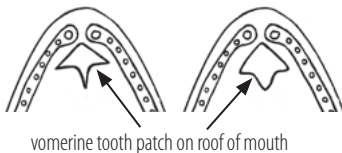


- 10a Scale rows above lateral line oblique ..... 11



- 10b Scale rows above lateral line all horizontal or with some rows below mid-dorsal fin rising obliquely ..... 29

- 11a Vomerine tooth patch triangular or diamond-shaped with median posterior extension (extension may be short) ..... 12

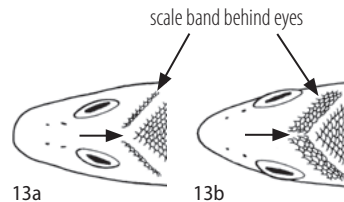


- 11b Vomerine tooth patch crescentic, without median posterior extension ..... 16



- 12a Large blackish spot usually present on body below dorsal-fin rays (may be faint); juveniles sometimes with ocellated spot and/or 4–7 broad dark stripes on body ..... 13
- 12b No large blackish spot on body below dorsal fin; series of yellowish longitudinal lines on sides, those above lateral line oblique ..... 14

- 13a Dorsal fin 13 or (usually) 14 rays; wide gap between scale bands just behind eye; blackish spot on sides mainly above lateral line; 7 yellow to dark brown stripes on posterior head and body, with 4 stripes below lateral line; median fins whitish ..... *L. indicus*
- 13b Dorsal fin 12–14 (usually 13) rays; little or no gap between scale bands just behind eye; blackish spot on sides mostly below lateral line or bisected by it; sides with ~6 narrow, yellowish, longitudinal stripes below lateral line, and stripes above usually indistinct; median fins yellowish ..... *L. fulviflamma*



- 14a Body pale, with yellowish brown lines horizontal below lateral line and oblique above lateral line; yellowish brown midlateral stripe from eye to upper half of peduncle (usually broader and darker than other lateral stripes); juveniles with black midlateral stripe, sometimes extending forward to snout tip, and with blackish eye-sized oval spot at middle of stripe; GR 9–12 on lower limb of 1st arch; transverse scale rows on cheeks 7–10 ..... *L. vitta*

- 14b Body pale, with yellow lines horizontal below lateral line and oblique above lateral line; yellow midlateral stripe from eye to peduncle; GR 12–15 on lower limb of 1st arch; transverse scale rows on cheeks 4–7 (occasionally 8) ..... 15

- 15a Anal fin 9 rays; transverse scale rows on cheeks 7 or 8; GR 17 or 18 on lower limb of 1st arch ..... *L. madras*

- 15b Anal fin 8 rays; transverse scale rows on cheeks 4 or 5; GR 14 or 15 on lower limb of 1st arch ..... *L. xanthopinnis*

- 16a Total GR on 1st arch 25–30; caudal fin forked, lobe tips bluntly rounded; head profile of adults distinctly concave; body red or grey, darker dorsally; paired fins reddish, median fins dusky reddish brown to blackish with narrow pale margin; juveniles with bluish body, yellowish dorsal and caudal fins, and large round black spot at caudal-fin base ..... *L. gibbus*

- 16b Total GR on 1st arch 15–23; caudal-fin shape and body colour not as above ..... 17

Continued ...

## KEY TO SPECIES

- 17a Anal fin 10 rays; dorsal fin 11 spines, 16 (rarely 15) rays; rear end of dorsal and anal fins distinctly pointed; snout much longer than eye diameter; adults red or pink, juveniles pink with broad dark red bands (1st band from dorsal-fin origin, across eye to snout tip; 2nd band from middle of spinous dorsal fin to pelvic fins; 3rd band from last dorsal-fin spine obliquely downwards across peduncle and along lower margin of caudal fin) ..... *L. sebae*
- 17b Anal fin 8 or 9 rays; dorsal fin 10 or 11 spines, 12–16 rays; colour not as above ..... 18
- 18a Preopercle notch distinct ..... 19
- 18a preopercle notch 18b
- 18b Preopercle notch indistinct, shallow or absent ..... 20
- 19a Dorsal fin 15 or 16 rays; body deep, depth 2.1–2.4 in SL; head usually with narrow wavy blue lines; body of adults brown dorsally, silvery buff below; juveniles with narrow dark bars and a half white, half black spot on lateral line below anteriormost dorsal-fin rays; lips thick in adults ..... *L. rivulatus*
- 19b Dorsal fin 13 or 14 rays; body more slender, depth 2.3–2.8 in SL; colour not as above; lips not thick in adults ..... 21
- 20a Dorsal fin 11 spines; dorsal fin whitish with broad yellow margin, caudal fin yellow; head and body reddish pink, silvery white ventrally; 10–12 yellow stripes on sides of body; some fish with blackish spot, eye-sized or smaller, on lateral line below anteriormost dorsal-fin rays ..... *L. rufolineatus*
- 20b Dorsal fin 10 spines; caudal fin and distal third of dorsal fin dusky brown to blackish with white margin; head and body brown to yellowish grey dorsally, paler below, with narrow yellow stripe along each scale row; no small blackish spot on lateral line ..... *L. fulvus*
- 21a Body whitish, with dark bars and stripes forming matrix of white squares on upper half of body; large dark spot at caudal-fin base ..... *L. decussatus*
- 21b Colour not as above ..... 22
- 22a Nostrils set in prominent groove running forward from eyes in specimens >20 cm SL, and smaller specimens usually with 2 well-separated white spots below dorsal-fin base; body dark brown dorsally, buff ventrally; dorsal and caudal fins dusky; anal fin and pelvic fins blackish distally, upper third of pectoral fins dusky brown ..... *L. bohar*

- 22b Nostrils not set in groove; colour not as above ..... 23
- 23a Caudal fin with prominent black crescent; body reddish dorsally, silvery below, belly yellowish; no large blackish spot on body beneath dorsal fin; rear edge of dorsal and anal fins somewhat angular ..... *L. lunulatus*
- 23b Caudal fin without distinctive black crescent mark ..... 24
- 24a Blackish spot on lateral line below dorsal-fin rays (sometimes faint or absent in large adults), body yellowish or pink, and fins yellow; dorsal fin 10 spines ..... *L. monostigma*
- 24b Colour not as above; dorsal fin 10 or 11 spines ..... 25
- 25a Dorsal fin 10 spines; anal fin 8 (rarely 9) rays; pectoral fins 19 rays; tongue with patch of fine granular teeth; dorsal profile of head concave in fish >15 cm SL; body depth 2.5–2.8 in SL; LL scales 49; scale rows on cheeks 6 or 7; pectoral fins whitish with some dusky brown, other fins pink to reddish; head and body brownish grey dorsally, white ventrally (pink to reddish overall in fish from deeper water) ..... *L. lemniscatus*
- 25b Dorsal fin 11 (rarely 10) spines; anal fin 9 (rarely 8) rays; tongue smooth ..... 26
- 26a Head profile concave; LL scales 50–56; scale rows on cheeks 8–10; horizontal scale rows above lateral line 10 or 11; body depth 2.2–2.6 in SL; pectoral fins yellow ..... *L. guilcheri*
- 26b Head profile straight, concave or convex; LL scales 46–50; scale rows on cheeks 5–8; horizontal scale rows above lateral line 6–9; pectoral fins reddish or pink ..... 27
- 27a Transverse scale rows on cheeks 5 or 6; eye diameter 3.4–4.1 in HL; head profile of adults convex; rear margin of dorsal and anal fins rounded ..... *L. erythropterus*
- 27b Transverse scale rows on cheeks 6–8; eye diameter 4.2–6.7 in HL; head profile of adults straight to slightly concave or with hump; rear margin of dorsal and anal fins pointed ..... 28
- 28a Adults with prominent hump on forehead and several shallow grooves behind and below eye; maxilla length less than peduncle depth at last dorsal-fin ray; juveniles with broad brown band from upper jaw to dorsal-fin origin, series of horizontal reddish lines on sides, and large black saddle blotch on peduncle preceded by white patch ..... *L. sanguineus*
- 28b Head profile straight; mouth large, maxilla length subequal to peduncle depth at last dorsal-fin ray; juveniles with broad brown band from upper jaw to dorsal-fin origin, series of horizontal reddish lines on sides (sometimes absent), and large black band on peduncle with white borders ..... *L. malabaricus*

Continued...

**KEY TO SPECIES**

- 29a Vomer tooth patch triangular with median posterior extension; preorbital depth ~½ eye diameter; blackish spot, larger than eye, below posteriormost dorsal-fin spines and bisected by lateral line ..... *L. ehrenbergii*
- 29b Vomerine tooth patch crescentic or triangular and without median posterior extension; preorbital depth greater, 4.7–4.9 in HL; large blackish spot on sides of body present or absent ..... 30
  
- 30a Body greenish brown dorsally, grading to reddish below (specimens from deep water mostly reddish); scales with dark centres and white margins; juveniles (and rarely adults) with 1 or 2 irregular horizontal blue lines on cheeks; upper body scales parallel to lateral line but some posterior rows may ascend obliquely (rows rarely entirely oblique); caudal fin truncate; GR 16–20 on lower limb ..... *L. argentimaculatus*
- 30b Body pale with silvery sheen; each scale with triangular dark brown spot, forming lines along scale rows, parallel to lateral line; large blackish spot on body below dorsal-fin rays and mostly above lateral line (sometimes absent in large adults); caudal fin truncate or slightly emarginate; GR 17 or 18 on lower limb ..... *L. johnii*

***Lutjanus argentimaculatus*** (Forsskål 1775)

Mangrove red snapper

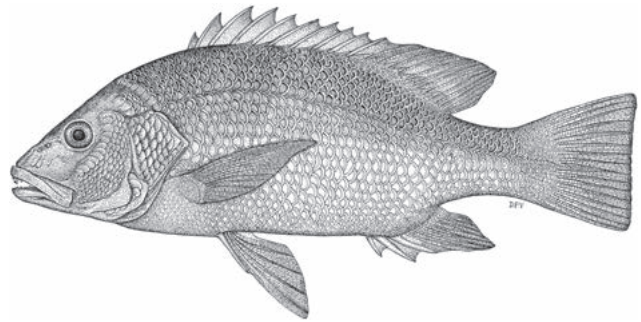
PLATE 70

*Sciaena argentimaculata* Forsskål in Niebuhr 1775: 47, xi [Red Sea]; Gmelin 1789.  
*Mesoprion flavipinnis* Cuvier in Cuv. & Val. 1828: 475 (Puducherry, India).  
*Mesoprion griseoides* Guichenot 1863: C-2 (Réunion, Mascarenes).  
*Lutianus salmonoides* Gilchrist & Thompson 1908: 146 (harbour at Durban [Port Natal], KwaZulu-Natal, and East London, South Africa).  
*Lutianus argentimaculatus*: Smith 1949\*; Talbot 1957\*.  
*Lutjanus argentimaculatus*: Van der Elst 1981\*; Allen 1985\*, 2005\*; Allen & Talbot 1985\*; SSF No. 181.5\*; Allen & Steene 1987\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Randall 1995\*; Debelius 1998\*; Kuitert 1998\*; Whitfield 1998\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.5–2.9 in SL; HL 2.3–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 7 or 8 rays; pectoral fins 16 or 17 rays. Preopercle notch shallow. GR 5–8/10–12. LL scales 44–48; scale rows above lateral line parallel to it (rarely oblique posteriorly).

Body generally green-brown, slightly darker dorsally, but estuarine fish coppery red on sides and fins, and offshore fish silvery; scales with dark centres and white margins; fin membranes brownish, except pectoral fins slightly dusky to hyaline; usually 1 or 2 wavy horizontal blue lines on cheeks in juveniles and subadults, and sometimes in larger specimens.

Juveniles brown dorsally, silvery laterally with numerous brown vertical bars on body; pelvic fins brown, blackish or red with white leading edge; anterior third of anal fin brown or black. Attains ~120 cm TL, ~16 kg.



*Lutjanus argentimaculatus*, 22 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea, Somalia to South Africa (Jeffreys Bay), Madagascar, Aldabra, Seychelles, Mascarenes, Maldives, Pakistan, India and Sri Lanka; elsewhere to Indonesia, Philippines, southern Japan and Australia; Lessepsian migrant to eastern Mediterranean Sea.

**REMARKS** Matures at 45–60 cm TL, 3–7 years. Juveniles common in estuaries and mangroves, adults around rocky and coral reefs, to ~120 m, often in small aggregations. Feeds on fishes and decapod crustaceans. Fine-eating gamefish but ciguatoxic in some areas.

***Lutjanus bengalensis*** (Bloch 1790)

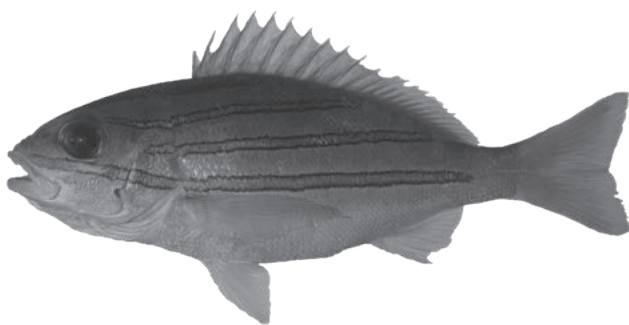
Bengal snapper

PLATES 70 & 72

*Holocentrus bengalensis* Bloch 1790: 102, Pl. 246, Fig. 2 (India, Bay of Bengal).  
*Lutjanus bengalensis*: Allen 1985 [in part]; Allen & Talbot 1985 [in part]; Randall & Anderson 1993; Randall 1995 [in part]; Iwatsuki *et al.* 1999\*; Iwatsuki *et al.* 2016.

Body oblong, depth 2.4–2.8 in SL; HL 2.5–2.8 in SL. Dorsal fin 11 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin shallowly forked, slightly emarginate. Preopercle notch distinct. GR 7 or 8/15–17. LL scales 47–50.

Head, eyes, upper half of body, and fins yellow; ventral half of head and body abruptly white; sides of head and body with 4 dark-edged blue horizontal stripes (except 3rd stripe originating behind preopercle; 4th stripe extending forward as blue band below eye); iris golden. Attains 30 cm TL.



*Lutjanus bengalensis*, 16 cm SL (South Africa). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Cape Vidal), Madagascar, Comoros, Seychelles, Saya de Malha Bank, India and Sri Lanka; elsewhere to east coast of India, Indonesia, Taiwan and Japan.

**REMARKS** Shoals with other yellow snappers. Has become more common in Pacific over the last 30 years (Iwatsuki *et al.* 2016).

### *Lutjanus biguttatus* (Valenciennes 1830)

Twospot banded snapper

PLATES 70 & 71

*Serranus biguttatus* Valenciennes in Cuv. & Val. 1830: 507 (Trincomalee, Sri Lanka; Ambon I., Moluccas, Indonesia).

*Lutjanus biguttatus*: Allen 1985\*; Allen & Talbot 1985\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*.

Body slender, depth 3.5–3.8 in SL; HL 2.6–2.7 in SL; eye diameter 3.5–4.3 in HL. Dorsal fin 10 spines, 12 rays; anal fin 8 rays; pectoral fins 15 or 16 rays; caudal fin truncate to slightly emarginate. Preopercle notch indistinct. GR 7 or 8/16–19. LL scales 48–50.

Head and body dark brown dorsally, golden brown ventrally, separated by broad white band from mouth to caudal fin, and with 2 small white spots on upper body (below 7th dorsal-fin spine, and below middle of dorsal-fin rays); fins yellowish. Attains ~20 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, southern India and Sri Lanka; elsewhere to Indonesia, Philippines, Palau, Australia and New Guinea.

**REMARKS** Found on coral reefs and in lagoons with rich coral growth, in 5–25 m; often in large schools, sometimes solitary. Feeds on fishes and crustaceans. Important market fish in Sri Lanka; caught with handlines, traps and gillnets.

### *Lutjanus bohar* (Fabricius 1775)

Twinspot snapper

PLATE 71

*Sciaena bohar* Fabricius in Niebuhr (ex Forsskål) 1775: 46, xi (no locality [Red Sea]).

*DiaCOPE quadriguttata* Cuvier in Cuv. & Val. 1828: 472 (Massawa, Eritrea, Red Sea; Mauritius, Mascarenes; Seychelles).

*Mesoprion rangus* Cuvier in Cuv. & Val. 1828: 481 (Visakhapatnam, India; Java, Indonesia).

*Lutjanus bohar*: Smith 1949\* [Fig. 662, adult labelled *L. gibbus*]; Talbot 1957\*.

*Lutjanus* sp.: Kotthaus 1974.

*Lutjanus bohar*: Van der Elst 1981\*; Allen 1985\*, 2005; SSF No. 181.6\*

[also Fig. 181.10, adult labelled *L. gibbus*]; Allen & Steene 1987\*;

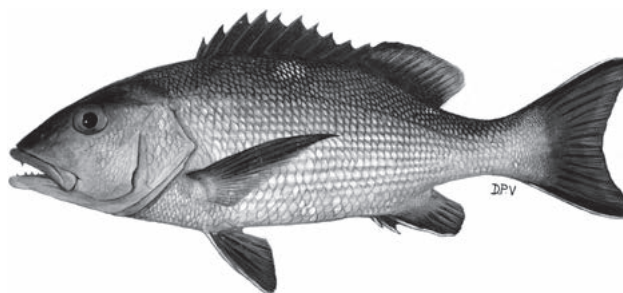
Randall & Anderson 1993; De Bruin *et al.* 1994\*; Randall 1995\*;

Winterbottom & Anderson 1997; Debelius 1998\*; Terashima *et al.* 2001\*;

Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

Body depth 2.4–2.9 in SL; HL 2.4–2.9 in SL; interorbital region flat; nostrils of adults in groove below front of eye. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 17 rays; caudal fin forked. Vomerine tooth patch narrow, chevron-shaped, without median posterior extension; 1 or 2 patches of teeth on tongue. Preopercle notch small. GR 6 or 7/16. LL scales 48–50.

Head and body red-brown dorsally, whitish or pink below; alternating dark and pale horizontal lines following scale rows; pectoral fins white, with uppermost rays dark brown, and upper part of fin axil blackish; pelvic fins blackish, with white leading edge; dorsal fin brown to blackish, soft-rayed part whitish distally; caudal fin dusky to pale distally. Juveniles and adults (<20 cm TL) with 1 or 2 white spots on upper body (below middle of dorsal base, and below end of dorsal fin); anal fin with white leading edge, blackish distally, brown at base; caudal fin dusky hyaline, with brown dorsal and ventral streaks, leading edge narrowly white. Attains 90 cm TL, ~13 kg (13 years).



*Lutjanus bohar*, 31 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Kenya to South Africa (KwaZulu-Natal), Madagascar, Comoros, Aldabra, Seychelles, Mauritius, Rodrigues, Chagos, Maldives and Sri Lanka; elsewhere to eastern India, Indonesia, Japan and Australia.

**REMARKS** Matures at 45–55 cm TL, 3–5 years; spawns offshore in the tropics. Found in lagoons, on coral reef-tops and drop-offs, to ~70 m. Juveniles solitary, but also seen shoaling with similarly coloured *Chromis ternatensis*; adults generally solitary, but sometimes in small aggregations or large schools. Feeds on fishes, crustaceans, echinoderms, polychaetes and cephalopods. Ciguatoxic in some areas.

### *Lutjanus coeruleolineatus* (Rüppell 1838)

Bluelined snapper

PLATE 71

*Diacope coeruleolineata* Rüppell 1838: 93, Pl. 24, Fig. 3 (Massawa, Eritrea; Jeddah, Saudi Arabia, Red Sea).

*Lutjanus coeruleolineatus*: Randall 1983; Allen 1985\*; Allen & Talbot 1985\*; Randall 1995\*; Debelius 1998\*; Field 2013\*.

Body deep, depth 2.4–2.6 in SL; HL 2.5–2.7 in SL. Dorsal fin 10 spines, 12–14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin truncate to slightly emarginate. Preopercle notch indistinct. GR 7 or 8/14 or 15. LL scales 46–49; lower margin of preopercle naked.

Head, body and fins yellow; head white ventrally; body with 7 or 8 blue lines (some broken), most extending onto head (4 or 5 blue lines in juveniles); blackish oval spot (subequal to or slightly bigger than eye) below anteriormost dorsal-fin rays and on but mainly above lateral line. Attains ~35 cm TL.

**DISTRIBUTION** WIO: southern Red Sea, Gulf of Aden, Somalia to Gulf of Oman and Pakistan.

**REMARKS** Solitary or in small groups, on coral reefs, in 10–20 m. More common in southern Oman.

### *Lutjanus decussatus* (Cuvier 1828)

Chequered snapper

PLATE 71

*Mesoprion decussatus* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1828: 487 (Java, Indonesia).

*Mesoprion theraon* Day 1870: 514 (Sri Lanka; Andaman Is.).

*Lutjanus decussatus*: Allen 1985\*; Allen & Talbot 1985\*; De Bruin *et al.* 1994\*.

Body depth 2.6–3.1 in SL; HL 2.4–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin slightly emarginate. Vomerine tooth patch crescentic; patch of granular teeth on tongue. Preopercle notch shallow. GR 6/8–10. LL scales 47–50.

Body silvery white, with 5 reddish brown horizontal bands, and series of short vertical bars crossing upper 2 or 3 bands forming a chequered pattern dorsally; soft-rayed dorsal

and anal fins reddish brown; spinous dorsal fin silvery, with maroon margin; pectoral fins pale red; pelvic fins with pale red rays, silvery membranes; caudal fin dusky red-brown, with or without large dark spot at base. Attains 33 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: southern India and Sri Lanka; elsewhere to Indonesia, Japan and Australia.

**REMARKS** Solitary or in groups, on coral reefs, at 5–30 m. A small species caught mainly by subsistence fishers with gillnets, handlines and traps.

### *Lutjanus ehrenbergii* (Peters 1869)

Blackspot snapper

PLATES 70 & 71

*Mesoprion ehrenbergii* Peters 1869: 704 (Massawa, Eritrea, Red Sea).

*Lutianus johnei* (*non* Bloch 1792): Smith 1949\*.

*Lutianus ehrenbergii*: Talbot 1957\*; Smith 1980.

*Lutjanus ehrenbergii*: Allen 1985\*, 2005; Allen & Talbot 1985\*; SSF No.

181.7\*; Allen & Steene 1987\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Randall 1995\*; Debelius 1998\*; Kuitert 1998 [as *ehrenbergii*].

Body depth 2.5–3 in SL; HL 2.5–2.8 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 7 or 8 rays; pectoral fins 15 or 16 rays; caudal fin truncate to emarginate. Preopercle notch shallow. GR 6 or 7/10–14. LL scales 42–47; upper scale rows parallel to lateral line.

Head and body silvery white, dusky dorsally, white or silvery ventrally; yellow stripe along each scale row above lateral line, and usually 4 or 5 bright yellow horizontal stripes below lateral line; occasionally with brown stripe from snout, through eyes, to middle of sides; large blackish spot (subequal to or larger than eye) on body below rear dorsal-fin spines and bisected by lateral line; pectoral fins hyaline; pelvic fins white; median fins yellow distally, whitish proximally. Attains 35 cm TL.



*Lutjanus ehrenbergii*, 17 cm SL (Qatar). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman and Persian/Arabian Gulf to South Africa (Sodwana Bay),



Madagascar, Aldabra, Seychelles, Maldives, India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Caroline Is. and Australia.

**REMARKS** Found on coral and rocky reefs and turbid inshore reefs, in 5–20 m; juveniles in estuaries and mangroves, to ~10 m.

### *Lutjanus erythropterus* Bloch 1790

Crimson snapper

PLATE 71

*Lutjanus erythropterus* Bloch 1790: 115, Pl. 249 (Japan); Allen 1984, 1985\*; Allen & Talbot 1985\*; De Bruin *et al.* 1994\*; Randall 1995\*.

Body depth 2.5–3 in SL; HL 2.5–2.8 in SL; head profile rounded. Dorsal fin 11 spines, 12–14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin truncate to emarginate. Preopercle notch shallow. GR 5 or 6/13 or 14. LL scales 46–50.

Head and body of adults red dorsally, silvery pink on flanks; fins reddish. Juveniles reddish dorsally, whitish pink below, with dark band from snout through eye to nape; often with red stripes following scale rows; white bar behind dorsal fin next to large black saddle blotch. Attains ~50 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Chagos, Pakistan, India and Sri Lanka; elsewhere to Indonesia, Japan and Australia. Records from Red Sea and East Africa are unsubstantiated.

### *Lutjanus fulviflamma* (Forsskål 1775)

Dory snapper

PLATES 70 & 71

*Sciaena fulviflamma* Forsskål *in* Niebuhr 1775: 45, xi (no locality [Red Sea]).

*Centropomus hober* Lacepède 1802: 248, 256 (Red Sea).

*Mesoprion aurolineatus* Cuvier *in* Cuv. & Val. 1829: 496 (Trincomalee, Sri Lanka).

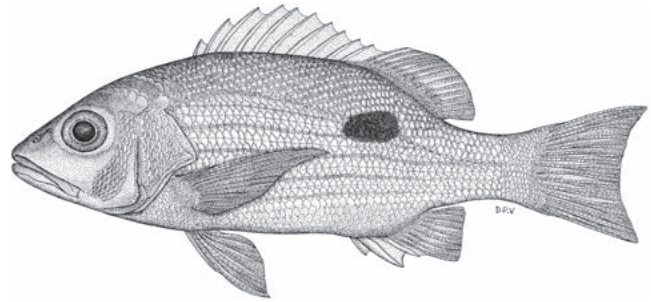
*Lutianus fulviflamma*: Smith 1949\*; Talbot 1957\*.

*Lutjanus fulviflamma*: Van der Elst 1981 [in part: not photograph]; Allen 1985\*, 2005; SSF No. 181.8\*; Allen & Steene 1987\*; De Bruin *et al.* 1994\*; Whitfield 1998\*; Debelius 1999\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Bogorodsky *et al.* 2014.

Body depth 2.6–2.9 in SL; HL 2.4–2.7 in SL. Dorsal fin 10 (rarely 11) spines, 12–14 rays; anal fin 8 rays; pectoral fins 15–17 rays; caudal fin slightly emarginate. Preopercle notch shallow. GR 6 or 7/9–12. LL scales 46–49.

Head and body white or silvery, with yellow line along each scale row above lateral line, and 4–6 brighter yellow lines

below lateral line; head often dusky reddish dorsally, and upper and rear part of body with greenish yellow hue; blackish spot (round in small juveniles, oblong in adults) on body below anterior dorsal-fin rays, on and mainly below lateral line; fins yellow-orange; juveniles <10 cm TL sometimes with dark stripe from snout through eye and across opercle onto body. Attains ~35 cm TL (23 years).



*Lutjanus fulviflamma*, 14 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Oman, Somalia to South Africa (East London; juveniles to Algoa Bay), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan, Japan, Australia and Samoa.

**REMARKS** Matures at 18–21 cm TL. Common; solitary or in aggregations on rock and coral reefs, to ~35 m; juveniles in tidepools, mangroves, estuaries and seagrass beds. Caught in subsistence fisheries.

### *Lutjanus fulvus* (Forster 1801)

Blacktail snapper

PLATES 71 & 75

*Holocentrus fulvus* Forster *in* Bloch & Schneider 1801: 318 (Tahiti, Society Is.).

*Diacope xanthopus* Cuvier *in* Cuv. & Val. 1829: 495 (Trincomalee, Sri Lanka).

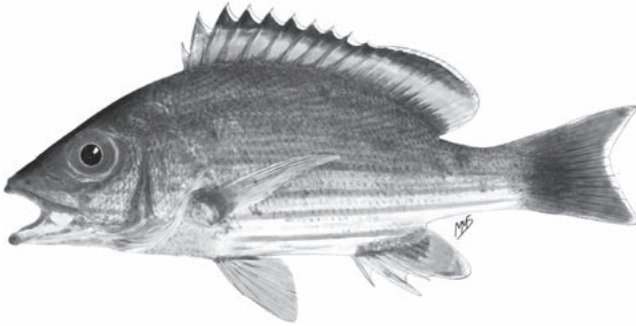
*Diacope analis* Valenciennes *in* Cuv. & Val. 1830: 534 (Mauritius, Mascarenes).

*Lutianus vaigiensis*: Smith 1949\*; Talbot 1957\*.

*Lutjanus fulvus*: Smith 1980; Allen 1985\*, 2005; Allen & Talbot 1985\*; SSF No. 181.9\*; Allen & Steene 1987\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1999\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004.

Body depth 2.3–2.8 in SL; HL 2.4–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 rays; caudal fin emarginate. Vomerine tooth patch crescentic; no teeth on tongue. Preopercle notch well-developed in fish >15 cm SL. GR 6/7–12. LL scales 47–50.

Head and body bronze to grey dorsally, paler below, with narrow yellow stripe along each scale row below lateral line; dorsal fin reddish brown to blackish distally, with narrow white margin on soft rays; pectoral and pelvic fins yellow; anal fin yellow, with white margin; caudal fin dark reddish brown to blackish, with narrow white margin. Attains 40 cm TL.



*Lutjanus fulvus*, 23 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Somalia to South Africa (eastern Cape), Madagascar, Aldabra, Seychelles, Mauritius, Rodrigues, Chagos, Maldives and Sri Lanka; elsewhere to Australia, Japan, Marquesas Is. and Hawaii.

**REMARKS** Usually solitary on coral reefs, to ~80 m; juveniles sometimes in mangroves, lagoons and estuaries. Feeds on crustaceans and fishes.

### *Lutjanus gibbus* (Forsskål 1775)

Humpback snapper

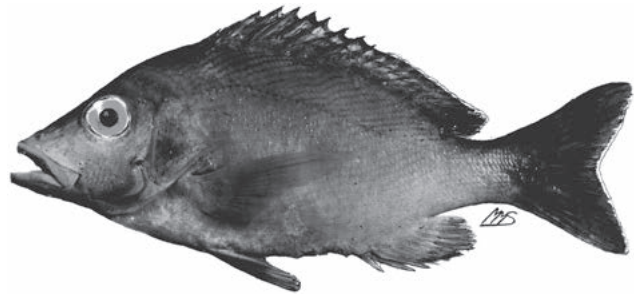
PLATES 71 & 75

*Sciaena gibba* Forsskål in Niebuhr 1775: 46, xi [Red Sea].  
*Diacope coccinea* Cuvier (ex Ehrenberg) in Cuv. & Val. 1828: 437 (Red Sea).  
*Diacope melanura* Rüppell 1838: 92, Pl. 23, Fig. 1 (Jeddah, Saudi Arabia, Red Sea).  
*Lutjanus gibbus*: Smith 1949 [not Fig. on Pl. 37]; Talbot 1957\*.  
*Lutjanus comoriensis* Fourmanoir 1957: 111 (Anjouan, Grande Comore I., Comoros).  
*Lutjanus gibbus*: Van der Elst 1981\*; Allen 1985\*, 2005; SSF No. 181.10 [not Fig. on Pl. 54]; Allen & Steene 1987\*; Winterbottom *et al.* 1989; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*, 1999\*; Kuitert 1998\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body deep, depth 2.2–2.5 in SL; HL 2.4–2.6 in SL; head profile of adult distinctly concave, giving humpback appearance. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin forked, fin lobes rounded, upper lobe proportionately larger with growth. Preopercle notch deep; knob on interopercle pronounced. GR 9 or 10/15–20. LL scales 47–51.

Body grey to orange-red, rarely with 1 or 2 faint bars below dorsal fin; eyes, pectoral-fin base and axil orange-yellow;

median fins and caudal fin dark reddish brown, with narrow white margins. Juveniles silvery white with grey lines along scale rows; spinous dorsal fin grey with dusky margin, dorsal-fin rays yellow with white margin; pelvic fins pinkish; caudal fin yellow, base and peduncle dark brown. Attains 50 cm TL (18 years).



*Lutjanus gibbus*, 23 cm TL (WIO). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros, Aldabra, Seychelles, Chagos, Maldives, India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia, Tuamotu Is. and Hawaii.

**REMARKS** Matures at 26–31 cm TL; spawns in the tropics. Solitary or in large aggregations, over rocky or coral reefs, to ~150 m; juveniles frequent mangroves and seagrass beds.

### *Lutjanus gilchери* Fourmanoir 1959

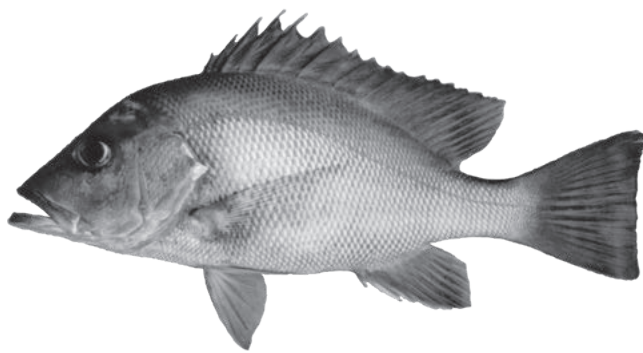
Yellowfin red snapper

PLATES 71 & 75

*Lutjanus gilchери* Fourmanoir 1959: 129, Pl. 3 (off Berafia I., Madagascar); Fourmanoir 1961; Allen 1985\*; Allen & Talbot 1985\*; Randall & Anderson 1993\*; De Bruin *et al.* 1994\*.  
*Lutjanus* sp.: Kyushin *et al.* 1977.

Body depth 2.2–2.6 in SL; HL 2.6–3.1 in SL; head profile steeply sloped, slightly concave below eye. Dorsal fin 10 or 11 spines, 13 or 14 rays; anal fin 3 spines, 9 rays; pectoral fins 17 rays; caudal fin truncate or slightly emarginate. Preopercle notch indistinct. GR 7/13 or 14. LL scales 50–56; scale rows oblique above lateral line, slightly oblique below lateral line on fish <24 cm SL.

Head and body red to reddish orange, underside of head and belly paler; dorsal surface of peduncle sometimes faintly dusky; pectoral fins orange-yellow; median fins reddish to reddish orange; dorsal-fin margin brownish; anal-fin margin white. Attains ~60 cm TL.



*Lutjanus guilcheri*, 43 cm SL (Maldives). Source: Randall & Anderson 1993

**DISTRIBUTION** Indian Ocean. WIO: Mozambique, Madagascar, Maldives and Sri Lanka; elsewhere to Bay of Bengal.

**REMARKS** Found on rocky bottom, to ~140 m. Caught with trawls and handlines.

### *Lutjanus indicus* Allen, White & Erdmann 2013

Indian snapper

PLATES 73 & 75

*Lutjanus indicus* Allen, White & Erdmann 2013: 35, Figs. 1–3 (Trincomalee, Sri Lanka).

*Lutjanus russellii* (non Bleeker 1849): SFSA No. 660\*.

*Lutjanus russellii* (non Bleeker 1849): Van der Elst 1981 [in part: not photograph]; Allen & Talbot 1985\*; SSF No. 181.17\*; De Bruin *et al.* 1994\*; Randall 1995\*; Allen 2005\*.

Body depth 2.5–2.9 in SL; HL 2.5–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 15 or 16 rays; caudal fin truncate. Preopercle notch shallow. GR 5–7/7 or 8. LL scales 47–49; predorsal scales begin behind eyes.

Body silvery grey, dusky dorsally, whitish ventrally; black oval spot (~1.2–1.5 size of eye) below anterior dorsal-fin rays and mostly above lateral line; 7 horizontal brown to yellow stripes posteriorly on head and on sides, those above lateral line slightly oblique; fins mostly translucent whitish; caudal fin brownish basally. Attains ~27 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Gulf of Oman, Persian/Arabian Gulf, Pakistan, India and Sri Lanka; elsewhere to Andaman Is., Thailand and Myanmar.

**REMARKS** Solitary or in small schools, on coral and rocky reefs, in ~5–15 m, and trawled from at least 50 m. Juveniles probably occur in brackish estuaries, mangroves and lower reaches of freshwater streams (Allen *et al.* 2013). Reports of this species (as *L. russellii*) from the Red Sea and East Africa appear to be misidentifications of *L. fulviflamma*.

### *Lutjanus johnii* (Bloch 1792)

Silver snapper

PLATE 71

*Anthias johnii* Bloch 1792: 113, Pl. 318 (Suratta, Tapti River estuary, India).

*Sparus tranquebaricus* Shaw 1803: 471 (Tharangambadi, India).

*Mesoprion yapilli* Cuvier in Cuv. & Val. 1828: 483 (Visakhapatnam, India).

*Serranus pavoninus* Valenciennes in Cuv. & Val. 1831: 443 (Mumbai, India).

*Lutianus johnii*: Smith 1949\*; Talbot 1957\*; Anderson & Allen 1986.

*Lutjanus johnii*: Van der Elst 1981\*; Allen 1985\*, 2005; Allen & Talbot 1985\*; Allen & Steene 1987\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*, 1999\*; Kuitert 1998\*.

Body depth 2.4–2.9 in SL; HL 2.5–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin truncate to slightly emarginate. Preopercle notch indistinct. GR 6 or 7/11. LL scales 46–49.

Head and body mostly silvery yellow dorsally, silvery white below lateral line; centre of each scale with reddish brown spot, forming horizontal lines following scale rows; blackish round spot larger than eye, below anterior soft-rayed dorsal fin and mostly above lateral line, and juveniles (<10 cm SL) with white ring around black spot. Attains ~70 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Kenya, Aldabra, Gulf of Aden, Yemen, Oman, Pakistan, India and Sri Lanka; elsewhere to east coast of India, Indonesia, Philippines, Taiwan, Japan, Australia and Fiji.

### *Lutjanus kasmira* (Fabricius 1775)

Bluestriped snapper

PLATES 72 & 75

*Sciaena kasmira* Fabricius in Niebuhr (ex Forsskål) 1775: 46, xi [Red Sea].

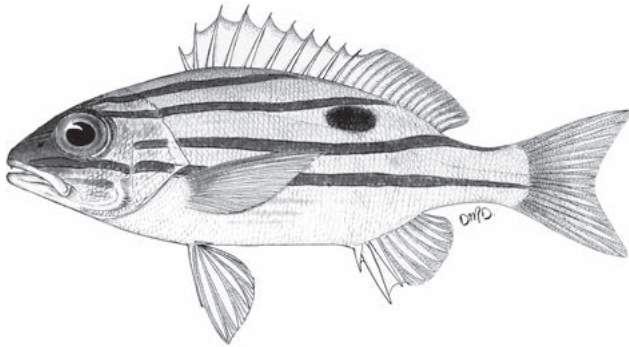
*Lutianus kasmira*: Smith 1949\*; Talbot 1957\*.

*Lutjanus kasmira*: Van der Elst 1981\*; Allen 1985, 2005; Allen & Talbot 1985; SSF No. 181.11\*; Allen & Steene 1987\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*; Kuitert 1998\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

Body depth 2.4–2.8 in SL; HL 2.3–2.7 in SL. Dorsal fin 10 spines, 14 or 15 rays; anal fin 7 or 8 rays; pectoral fins 15 or 16 rays; caudal fin slightly emarginate. Preopercle notch distinct. GR 7 or 8/13 or 14. LL scales 48–51.

Head and body yellow, with 4 dark-edged blue horizontal stripes on sides of head and body (3rd stripe from preopercle; 4th blue stripe runs below eye, often with another faint blue stripe below it); lower third of body abruptly white, with narrow pale yellow stripe on each body scale row (dark in preservative); snout dusky, juveniles with brownish streak

from mouth to eye; faint blackish spot on body below anterior dorsal-fin rays and mainly above lateral line (can disappear in seconds); fins largely yellow; pectoral-fin upper rays dusky yellow, lower rays hyaline; iris brown. Attains 34 cm TL.



*Lutjanus kasmira*, ~20 cm TL (WIO).

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Kenya to South Africa (East London), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Japan, Australia, Marquesas Is. and Hawaii.

**REMARKS** Matures at 17–23 cm TL. Found on coral and rocky reefs, to ~265 m, usually shallower, in 15–40 m; juveniles in seagrass beds. Occurs in large aggregations or small groups; shoals with other yellow snappers.

### *Lutjanus lemniscatus* (Valenciennes 1828)

Yellowstreak snapper

PLATE 72

*Serranus lemniscatus* Valenciennes in Cuv. & Val. 1828: 240 (Sri Lanka).

*Lutjanus lemniscatus*: Allen 1985\*; Allen & Talbot 1985\*; SSF No. 181.12\*; De Bruin *et al.* 1994\*.

Body oblong, depth 2.5–2.8 in SL; HL 2.5–2.8 in SL; snout profile slightly concave. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 19 rays; caudal fin truncate to slightly emarginate. Vomerine tooth patch crescentic. Preopercle notch shallow. GR 6–8/10–14. LL scales 49.

Head and body of adults brownish dorsally, sides grey-brown to reddish, underside of head and belly pale; fish from deep water reddish or pink; soft-rayed dorsal fin dark, with narrow white margin; caudal fin dark, margin broadly paler. Juveniles silvery grey or yellowish dorsally and whitish ventrally, separated by wide midlateral black band from snout tip, through eye, to caudal-fin base. Attains 65 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, India and Sri Lanka; elsewhere to Thailand, Indonesia, Philippines, Taiwan and Australia.

**REMARKS** Juveniles inshore on coral reefs or near silty shores; adults usually solitary, offshore to at least 90 m deep. Records from South Africa and Madagascar are dubious.

### *Lutjanus lunulatus* (Park 1797)

Lunartail snapper

PLATE 72

*Perca lunulata* Park 1797: 35, Pl. 6 (Sumatra, Indonesia).

*Lutjanus lunulatus*: Allen 1985\*; Allen & Talbot 1985\*; Eichler & Lieske 1994\*; De Bruin *et al.* 1994\*; Randall 1995\*.

Body depth 2.5–2.6 in SL; HL 2.4–3 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin slightly emarginate. Preopercle notch shallow. GR 7/8–10. LL scales 47 or 48.

Head and body reddish pink dorsally, sides silvery, bright yellowish ventrally; dorsal fin hyaline to reddish pink or maroon; pectoral, pelvic and anal fins yellow; caudal fin reddish to maroon, with broad black crescent nearly reaching lobe tips. Attains 35 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Pakistan, India and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan and New Guinea.

### *Lutjanus lutjanus* Bloch 1790

Bigeye yellowstriped snapper

PLATES 72 & 75

*Lutjanus lutjanus* Bloch 1790: 107, Pl. 245 (Japan [erroneous: probably Indonesia]); Allen & Talbot 1985\*; SSF No. 181.13\*; Debelius 1999\*; Allen 1985\*, 2005; De Bruin *et al.* 1994\*; Bogorodsky *et al.* 2014.

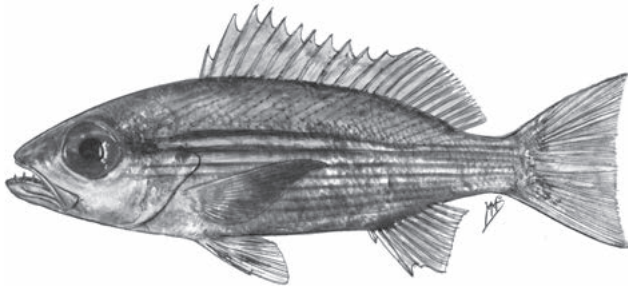
*Mesoprion caroui* Cuvier in Cuv. & Val. 1828: 489 (Visakhapatnam, India). *DiaCOPE lineolata* Rüppell 1829: 76, Pl. 19, Fig. 3 (near Massawa, Eritrea, Red Sea).

*Mesoprion erythrognathus* Valenciennes in Cuv. & Val. 1831: 447 (Seychelles). *Lutjanus lineolatus*: Smith 1949\*; Talbot 1957\*.

Body slender, depth 2.9–3.3 in SL; HL 2.4–2.9 in SL; suborbital depth ~ $\frac{1}{3}$ – $\frac{1}{2}$  eye diameter; eye diameter 2.9–3.7 in HL. Dorsal fin 10–12 spines, 12 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin emarginate. Vomerine tooth patch triangular, with median rear extension. Preopercle notch indistinct. GR 6–8/17–19 scales. LL scales 48–50.

Head and body golden brown dorsally, sides silvery white, belly white; oblique brownish yellow lines along scale rows

above lateral line, and horizontal yellow-brown lines along scale rows below lateral line; broader midlateral golden yellow-brown band (colour can change in seconds) from about preopercle to caudal-fin base; occasionally with broad yellow swathe below pectoral fins, from chest to caudal fin; dorsal fin hyaline greenish yellow, other fins yellowish; eyes yellow. Attains 33 cm TL (~11 years).



*Lutjanus lutjanus*, 20 cm TL (S Mozambique). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Oman, Kenya to South Africa (KwaZulu-Natal), Madagascar, Seychelles and Sri Lanka; elsewhere to east coast of India, Philippines, Japan, Australia and Solomon Is.

**REMARKS** Matures by ~12 cm TL. Solitary or in large aggregations, sometimes with other yellow snappers, usually on coral or rocky reefs, to ~90 m deep. Feeds on fishes and crustaceans.

### *Lutjanus madras* (Valenciennes 1831)

Madras snapper

PLATES 72 & 75

*Mesoprion madras* Valenciennes in Cuv. & Val. 1831: 446 (Mahé, Seychelles).

*Lutjanus madras*: Allen 1985\* [in part]; Allen & Talbot 1985\* [in part]; Randall & Anderson 1993\*; Iwatsuki *et al.* 2015\*.

Body depth 2.7–3 in SL; HL 2.5–2.6 in SL; suborbital depth ~ $\frac{2}{3}$  eye diameter; eye diameter 3.6–3.8 in HL. Dorsal fin 10 spines, 13 rays; anal fin 9 rays; pectoral fins 17 rays; caudal fin truncate to slightly emarginate. Preopercle notch shallow. GR 8 or 9/17 or 18. LL scales 49–51.

Body pinkish to silvery grey dorsally, whitish ventrally; oblique yellow lines above lateral line, horizontal yellow lines on scale rows below lateral line, and broad golden yellow midlateral stripe (1.5–3 scale rows wide) from eye to upper part of peduncle; fins yellow, except pelvic fins white with yellowish hue, and caudal-fin base slightly dusky. Attains ~30 cm TL.



*Lutjanus madras*, 27 cm TL (Seychelles). © Alvheim © IMR/ASCLME

**DISTRIBUTION** WIO: Oman, Tanzania (Zanzibar), Seychelles, Maldives, Lakshadweep, southern India and Sri Lanka.

**REMARKS** Caught with traps, handlines and occasionally trawled, in 20–90 m.

### *Lutjanus malabaricus* (Bloch & Schneider 1801)

Malabar snapper

PLATE 72

*Sparus malabaricus* Bloch & Schneider 1801: 278 (Coromandel coast, India).

*Lutjanus malabaricus*: Allen 1985\*; Allen & Talbot 1985\*;

De Bruin *et al.* 1994\*.

Body deep, depth 2.2–2.8 in SL; HL 2.4–2.8 in SL; head profile straight to slightly concave. Dorsal fin 11 spines, 12–14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin truncate. Vomerine tooth patch triangular, without median posterior extension; no teeth on tongue. Preopercle notch shallow. GR 4–7/12–14. LL scales 46–50.

Head and body of adults silvery reddish to orange-red, darker dorsally; fins reddish. Juveniles silvery pink, fins reddish; broad, oblique, reddish brown band from snout tip, interrupted by eye, to dorsal-fin origin; usually with horizontal reddish stripes on body; peduncle with dark brown bar bracketed by white borders, becoming smaller with growth to form blackish saddle blotch. Attains 50 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, India and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan, Japan, Palau and Australia. Unconfirmed reports from South Africa.

**REMARKS** Found on coastal and offshore reefs, in 12–73 m. Often misidentified as *L. sanguineus*.

## *Lutjanus monostigma* (Cuvier 1828)

Onespot snapper

PLATES 72, 75 & 76

*Mesoprion monostigma* Cuvier in Cuv. & Val. 1828: 446 (Seychelles).

*Lutjanus monostigma*: Talbot 1957\*.

*Lutjanus monostigma*: Smith 1975; SSF No. 181.14\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*; Heemstra *et al.* 2004; Allen 2005; Fricke *et al.* 2009.

Body depth 2.6–3 in SL; HL 2.5–2.7 in SL. Dorsal fin 10 spines, 12–14 rays; anal fin 8 rays; pectoral fins 15–17 rays; caudal fin emarginate. Vomerine tooth patch crescentic; no teeth on tongue. Preopercle notch indistinct. GR 7/11 or 12. LL scales 47–49.

Head and body of adults mostly silvery pink, greyish dorsally; scale margins dusky grey, forming reticulated pattern; blackish spot (about eye-size) on body below anterior dorsal-fin rays and bisected by lateral line (spot prominent in juveniles, smaller and more elongate in adults, absent in large adults); fins yellow to yellow-orange. Attains 60 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman, Kenya to South Africa (Sodwana Bay), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan, Japan, Marshall Is., Solomon Is., Australia, Marquesas Is. and Hawaii.

**REMARKS** Mainly solitary, sometimes in small groups of 3 or 4; in lagoons and on coral reefs and drop-offs, to at least 30 m.

## *Lutjanus notatus* (Cuvier 1828)

Southern bluestriped snapper

PLATES 72 & 76

*Diacope notata* Cuvier in Cuv. & Val. 1828: 422 (Indian Ocean).

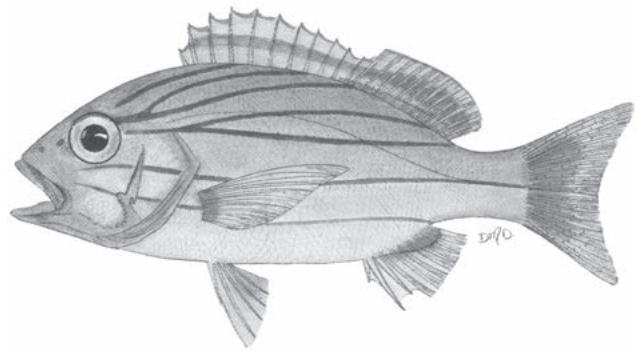
*Diacope duodecimlineata* Valenciennes in Cuv. & Val. 1830: 529 (Mauritius, Mascarenes).

*Lutjanus duodecimlineatus*: Smith 1949\*; Talbot 1957\*.

*Lutjanus notatus*: SSF No. 181.15\*; Heemstra *et al.* 2004; Allen 2005; Fricke *et al.* 2009.

Body depth 2.5–2.7 in SL; HL 2.4–2.7 in SL. Dorsal fin 11 or 12 spines, 12 or 13 rays; anal fin 7 or 8 rays; pectoral fins 15 or 16 rays; caudal fin slightly forked. Preopercle notch deep. GR 5–7/11–13. LL scales 48–50.

Head and body pinkish yellow dorsally, grading to whitish ventrally, snout sometimes reddish; 7 narrow pale blue or pinkish blue stripes on sides, upper 4 stripes slanting obliquely towards dorsal-fin base (1st stripe may be faint or interrupted), and 2 stripes nearly touching near opercle; blackish spot (eye-size or smaller) on body below middle of dorsal fin and just above or on lateral line (spot sometimes faint or absent); fins yellow. Attains 25 cm TL.



*Lutjanus notatus*, 23 cm TL (WIO). Source: SFSA

**DISTRIBUTION** WIO: Mozambique to South Africa (Aliwal Shoal), Madagascar and Mascarenes.

**REMARKS** Found on coral and rocky reefs, to ~46 m deep.

## *Lutjanus octolineatus* (Cuvier 1928)

Whitebelly snapper

PLATE 76

*Diacope octolineata* Cuvier in Cuv. & Val. 1828: 418 (Red Sea; Mauritius, Mascarenes; Tahiti, Society Is.).

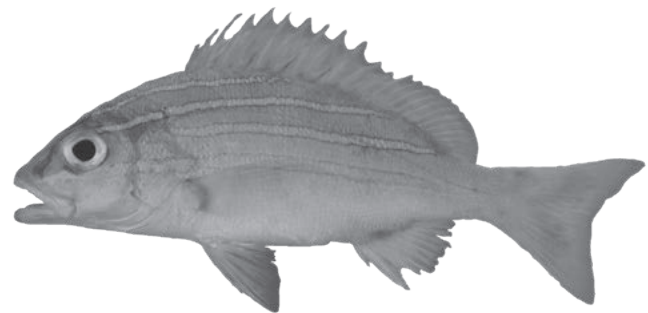
*Lutjanus octovittatus* Bleeker 1874: 35 (Réunion, Mascarenes).

*Lutjanus bengalensis* (non Bloch 1790): Allen 1985\* [in part]; Allen & Talbot 1985\* [Fig. only]; Allen & Steene 1987\*; De Bruin *et al.* 1994\*; Eichler & Lieske 1994\*; Kuitert 1998\*; Debelius 2007\*.

*Lutjanus octolineatus*: Iwatsuki *et al.* 2016\*.

Body depth 2.8–3.1 in SL; HL 2.5–2.8 in SL. Dorsal fin 12 spines, 12 or 13 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin emarginate to shallowly forked. Preopercle notch distinct. GR 8 or 9/18 or 19. LL scales 47–50.

Head and body yellow dorsally, lower quarter abruptly white; 3 horizontal dark-edged blue stripes on sides of head and body, 4th stripe from upper edge of opercle on body only, and single blue stripe on head below lower margin of eye; iris golden; paired fins white; median fins yellow. Juveniles with dark brown stripe across snout, from mouth through eye. Attains at least 22 cm TL.



*Lutjanus octolineatus*, 17 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Mozambique to South Africa (Cape Vidal), Madagascar, Seychelles, Réunion, Mauritius, Saya de Malha Bank and Maldives.

**REMARKS** Solitary or in small loose groups; shoals with other yellow snappers. Has been confused with *L. bengalensis* and *L. kasmira*, thus its complete distribution is uncertain.

### *Lutjanus quinquelineatus* (Bloch 1790)

Fivestripe snapper

PLATE 76

*Holocentrus quinquelineatus* Bloch 1790: 84, Pl. 239 (Japan).

*Diacope decemlineata* Valenciennes in Cuv. & Val. 1830: 528 (New Guinea; Trincomalee, Sri Lanka).

*Diacope spilura* Bennett 1833: 182 (Sri Lanka).

*Lutjanus quinquelineatus*: Allen 1985\*; Allen & Talbot 1985\*;

De Bruin *et al.* 1994\*; Randall 1995\*; Debelius 1998\*, 1999\*.

Body depth 2.3–2.9 in SL; HL 2.5–2.7 in SL; head profile straight. Dorsal fin 10 spines, 13–15 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin slightly forked. Preopercle notch deep. GR 7 or 8/13–15. LL scales 47–50.

Body and fins yellow, head reddish grey anteriorly, and some fish with dusky stripe from eye to mouth; 5 or 6 dark-edged blue stripes on body, most extending onto head; blackish spot (eye-size or larger) on body beneath soft-rayed dorsal fin, between 2nd and 3rd stripes, and mostly above lateral line (in adults, spot can disappear in seconds). Attains 38 cm TL (commonly <20 cm SL).



*Lutjanus quinquelineatus* (New Caledonia). © R Winterbottom, ROM

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Persian/Arabian Gulf and Sri Lanka; elsewhere to Thailand, Philippines, Japan, New Guinea, Australia, New Caledonia and Fiji.

**REMARKS** Occurs in small aggregations or large schools, on rocky bottom or coral reefs, to ~40 m deep.

### *Lutjanus rivulatus* (Cuvier 1828)

Speckled snapper

PLATE 76

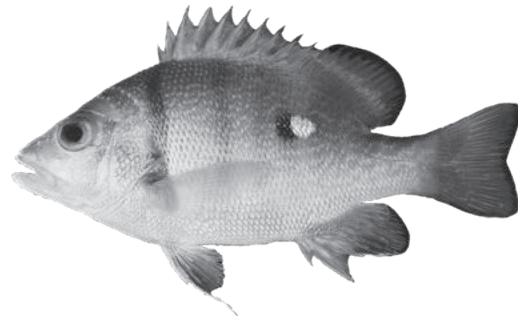
*Diacope rivulata* Cuvier in Cuv. & Val. 1828: 414, Pl. 38 (Red Sea; Puducherry and Malabar coast, India; Java, Indonesia).

*Lutjanus rivulatus*: Smith 1949\*; Talbot 1957\*.

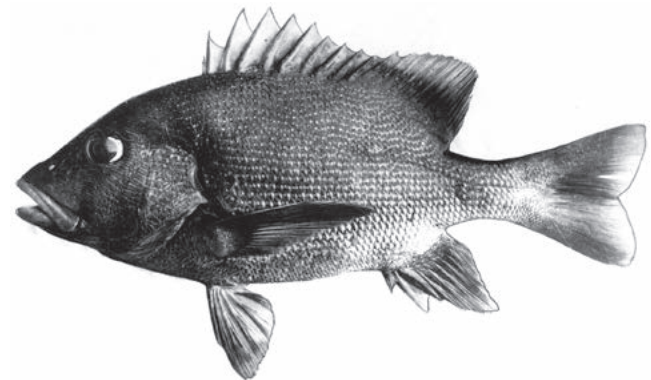
*Lutjanus rivulatus*: Van der Elst 1981\*; Allen 1985, 2005; Allen & Talbot 1985; SSF No. 181.16\*; De Bruin *et al.* 1994\*; Randall 1995\*; Winterbottom & Anderson 1997; Debelius 1998\*; Kuitert 1998\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.1–2.4 in SL; HL 2.4–2.5 in SL; soft-rayed dorsal- and anal-fin margins angular; caudal fin emarginate. Dorsal fin 10 spines, 15 or 16 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 17 rays. Preopercle with distinct notch. GR 6/12 or 13. LL scales 47–49.

Head and body silvery yellowish brown, darker dorsally, and body scales each with 1–4 bluish white dots; juveniles with 3–8 vertical dusky bars on body (darkest above pectoral-fin bases), occasionally adults also display dusky bars; head covered with irregular wavy blue and yellowish brown lines; thick lips pale; pectoral fins yellowish brown, other fins yellow distally and greyish proximally; juveniles with half white, half black spot on lateral line below anterior dorsal-fin rays. Attains 80+ cm TL, 11+ kg.



*Lutjanus rivulatus*, 9 cm SL, juvenile (India). © JE Randall, Bishop Museum



*Lutjanus rivulatus*, 50 cm TL (Mozambique).

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Persian/Arabian Gulf, Mozambique to South Africa (Aliwal Shoal; juveniles to Port Alfred, Eastern Cape), Madagascar, Comoros, Seychelles, Mauritius, India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia and Tahiti.

**REMARKS** Matures at 45–50 cm TL. Solitary or in small groups in rivers, estuaries and on coral or rocky reefs, to ~100 m. Feeds on fishes, cephalopods, crustaceans, red bait, polychaetes and sea urchins.

### *Lutjanus rufolineatus* (Valenciennes 1830)

Yellowstriped snapper

PLATE 76

*Diacope rufolineata* Valenciennes in Cuv. & Val. 1830: 531 (New Guinea).

*Lutjanus boutton* (non Lacepède 1802): Randall & Anderson 1993.

*Lutjanus rufolineatus*: Allen 1995; Anderson *et al.* 1998.

Body depth 2.4–2.6 in SL; HL 2.3–2.7 in SL; head profile steeply sloped. Dorsal fin 11 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin truncate to slightly emarginate. Preopercle with distinct notch. GR 6 or 7/13–15. LL scales 45–48.

Head and body pink or reddish dorsally, white ventrally; 10–12 yellow stripes on sides; occasionally with black spot (eye-size or smaller) on body below soft-rayed dorsal fin, mostly above but sitting on lateral line; spinous dorsal fin whitish with yellow margin; other fins yellowish, except pelvic fins occasionally white; pectoral-fin axil brown. Attains at least 25 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives; elsewhere to Andaman Sea, Indonesia, Philippines, Japan, Marshall Is., Australia and Samoa.

**REMARKS** Often in large aggregations above coral reefs, in 10–50 m. Previously confused with *Lutjanus boutton* in western Pacific.

### *Lutjanus sanguineus* (Cuvier 1828)

Blood snapper

PLATES 73 & 76

*Diacope sanguinea* Cuvier (ex Ehrenberg) in Cuv. & Val. 1828: 437 (Massawa, Eritrea, Red Sea).

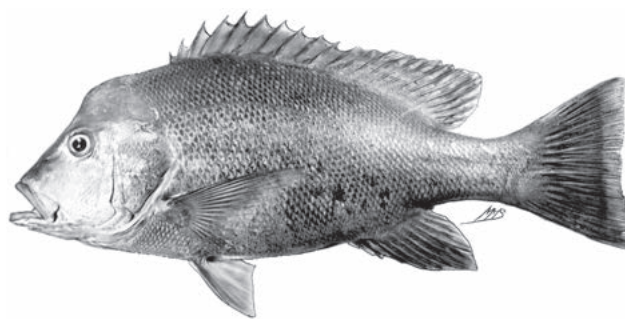
*Diacope erythrina* Rüppell 1838: 92, Pl. 23, Fig. 3 (Red Sea).

*Lutjanus sanguineus*: Smith 1949\*; Talbot 1957\*; Kotthaus 1974.

*Lutjanus sanguineus*: Van der Elst 1981\*; SSF 181.18\*; De Bruin *et al.* 1994\*; Heemstra & Heemstra 2004\*.

Body deep, depth 2.2–2.8 in SL; HL 2.3–2.7 in SL; head profile more or less straight, and adults (>20 cm SL) with pronounced hump on forehead and horizontal grooves behind eye, but head profile undulating in very large fish. Dorsal fin 11 spines, 12–14 rays; anal fin 8 or 9 rays; pectoral fins 16 or 17 rays; caudal fin truncate to slightly emarginate. Preopercle notch shallow. GR 6 or 7/12–14. LL scales 49–51.

Head and body red, may be paler silvery laterally or ventrally; fins red to pink; lips and roof of mouth orange-yellow. Juveniles mostly pale yellowish, with many red-brown horizontal lines on sides, and forehead brown from upper jaw to dorsal fin, including eye; median fins red-brown, pelvic fins dusky; large black saddle on peduncle, preceded by small whitish blotch. Attains 100 cm TL, ~22 kg (~13 years).



*Lutjanus sanguineus*, 68 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Red Sea, Oman, Somalia to South Africa (Algoa Bay), Madagascar, Seychelles, India and Sri Lanka.

**REMARKS** Matures at 60–70 cm TL (6 years). Found on coral and rocky reefs, to at least 138 m.

### *Lutjanus sapphirolineatus*

Iwatsuki, Al-Mamry & Heemstra 2016

Arabian bluestriped snapper

PLATE 77

*Lutjanus bengalensis* (non Bloch 1790): Allen 1985 [in part]; Allen & Talbot 1985 [in part]; Randall 1995\*.

*Lutjanus sapphirolineatus* Iwatsuki, Al-Mamry & Heemstra 2016\* (Muscat, Oman, Gulf of Oman).

Body oblong, depth 2.7–3.1 in SL; HL 2.5–2.7 in SL. Dorsal fin 11 spines, 13 rays; anal fin 8 rays; pectoral fins 17 rays; caudal fin emarginate to slightly forked. Preopercle notch distinct. GR 8 or 9/18 or 19. LL scales 47–49.

Head and body yellow dorsally, lower quarter white; 4 horizontal dark-edged blue stripes on sides of head and body; iris golden; paired fins whitish, median fins yellow. Attains ~20 cm TL.



**DISTRIBUTION** WIO: Oman and Somalia.

**REMARKS** More common in Gulf of Oman than off Somalia. Has been confused with *L. bengalensis*, thus its complete distribution is uncertain.

### *Lutjanus sebae* (Cuvier 1816)

Emperor snapper

PLATES 73 & 77

*Diacope sebae* Cuvier 1816: 275 (Coromandel coast, India; Indonesia).

*Lutianus sebae*: Smith 1949\*; Talbot 1957\*.

*Lutjanus sebae*: Van der Elst 1981\*; Randall 1983\*; Allen 1985, 2005; Allen & Talbot 1985; SSF No. 181.19\*; Winterbottom *et al.* 1989; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.1–2.4 in SL; HL 2.3–2.5 in SL. Dorsal fin 11 spines, 15 or 16 rays; anal fin 3 spines, 10 rays; pectoral fins 17 rays; caudal fin emarginate. Preopercle with small notch. GR 6 or 7/10–12. LL scales 46–50.

Adults reddish, paler ventrally, scales with silvery centres and red edges; juveniles and subadults silvery white, with 3 broad reddish brown bands (1st from snout tip to dorsal-fin origin; 2nd vertical through spinous dorsal fin to pelvic fins; 3rd from beneath anterior dorsal-fin rays to lower leading edge of caudal fin), bars fade with growth and body becomes redder. Attains 110 cm TL, 33 kg (~35 years).



*Lutjanus sebae*, 45 cm TL (Seychelles). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, southern Oman, Somalia to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia and New Caledonia.

**REMARKS** Matures at 60–70 cm, 4 years. Solitary or in small groups, on coral or rocky reefs, to ~180 m; juveniles on shallow inshore reefs and in mangroves. Feeds on crustaceans, stomatopods, squid and tunicates. Ciguatotoxic in some areas.

### *Lutjanus vitta* (Quoy & Gaimard 1824)

Brownstripe snapper

PLATE 73

*Serranus vitta* Quoy & Gaimard 1824: 315, Pl. 58, Fig. 3 (Waigeo I., Papua Barat, Indonesia).

*Lutjanus vitta*: Allen 1985\*; Allen & Talbot 1985\*; Iwatsuki *et al.* 1993\*; De Bruin *et al.* 1994\*.

Body oblong, depth 2.6–3.2 in SL; HL 2.5–3.1 in SL. Dorsal fin 10 spines, 12 or 13 rays; anal fin 8 rays; pectoral fins 15–17 rays; caudal fin slightly emarginate. Preopercle notch shallow. GR 6 or 7/9–12. LL scales 49–52.

Head and body brownish dorsally, lower half whitish; yellow-brown stripes on body oblique above lateral line and horizontal below; darker and broader (pupil-size) yellow-brown stripe from snout through eye to upper part of caudal-fin base; pelvic fins whitish, other fins yellow. See *Lutjanus* Key couplet 14a for juvenile colouration. Attains 40 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Seychelles, India and Sri Lanka; elsewhere to Indonesia, Thailand, Philippines, Taiwan, Japan, Marshall Is., Australia and New Caledonia.

### *Lutjanus xanthopinnis* Iwatsuki, Tanaka & Allen 2015

Yellowfin snapper

PLATE 77

*Lutjanus madras* (*non* Valenciennes 1831): Allen 1985\* [in part]; Allen & Talbot 1985\* [in part].

*Lutjanus xanthopinnis* Iwatsuki, Tanaka & Allen 2015: 24, Figs. 1–5 (Kishira, Uchinoura Bay, Kagoshima, Japan).

Body depth 2.7–2.9 in SL; HL 2.5–2.7 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 8 rays; pectoral fins 16 or 17 rays; caudal fin emarginate. Preopercle notch shallow. GR 7 or 8/14 or 15. LL scales 48–50.

Body red to pinkish brown dorsally, with horizontal yellow line on each scale row below lateral line, and similar but oblique stripes above lateral line, whitish ventrally; pelvic fins white with yellowish hue, other fins yellow; adults sometimes with slightly wider (single scale row) midlateral stripe from rear of eye to upper part of peduncle, and juveniles (~5 cm SL) with brown midlateral stripe. Attains ~25 cm TL.



*Lutjanus xanthopinnis*, 16 cm SL (Sri Lanka). © F Tanaka, MUFS

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Indonesia, Taiwan and southern Japan.

**REMARKS** Formerly confused with *L. madras*, but lacks the darker midlateral stripe from eye to peduncle, and also has predorsal scales extending forward to middle of interorbital area (*L. madras* with predorsal scales extending to vertical at rear edge of eye); the two species are sympatric at Sri Lanka.

**GENUS** *Macolor* Bleeker 1860

Body depth longer than HL; head profile distinctly convex. Dorsal fin 10 spines, 13 or 14 rays, spines not longer than soft rays; anal fin 3 spines, 10 or 11 rays; soft-rayed dorsal- and anal-fin margins angular. Preopercle notch prominent. Maxilla without scales; proximal half of each fin covered with scales. Gill rakers long, slender, GR 60+ on lower limb of 1st arch. Jaws with row of pointed conical teeth, enlarged anteriorly, but no obvious canines. Two species in Indo-Pacific. *Macolor niger* definitely occurs in WIO, as it was originally described by Forsskål from a Red Sea specimen; *M. macularis* has often been confused with *M. niger*, hence the distributions of these 2 species are dubious.

**KEY TO SPECIES**

- 1a GR 71–81 on lower limb; juveniles <20 cm TL with long pointed pelvic fins, much longer than head or pectoral fins; upper half of body black, with 6–10 white spots; pectoral fins black basally, hyaline distally ..... *M. macularis*
- 1b GR 60–71 on lower limb; juveniles <20 cm TL with short rounded pelvic fins, shorter than head or pectoral fins; upper part of body black, with 2 or 3 white spots; pectoral fins entirely black ..... *M. niger*

*Macolor macularis* Fowler 1931

Midnight snapper

PLATES 73 & 77

*Macolor macularis* Fowler 1931: 181 (near Palag Bay, Luzon I., Philippines); Allen 1985\*; Randall & Anderson 1993; Winterbottom & Anderson 1997\*; Debelius 1999\*; Anderson & Allen 2001\*; Vineesh *et al.* 2014\*.

Body depth ~2.4 in SL; HL 2.7–2.9 in SL; head profile of adults distinctly convex; soft-rayed dorsal- and anal-fin margins angular; caudal fin emarginate. Dorsal fin 10 spines, 13 rays; anal fin 10 rays; pectoral fins 17 or 18 rays. Preopercle notch distinct in adults. GR 37–42/70–81 on lower limb. LL scales 50–56; maxilla naked.

Head, body and fins uniformly blackish in large fish; smaller adults with head and body yellowish brown, head with narrow blue vermiculation and small spots, and body with vertical blue line on most scales; several irregular pale spots may be visible on upper body; fins brownish black, with blue spots on dorsal, anal and caudal fins; iris yellow. Juveniles black dorsally, with 4–7 irregular white spots; caudal fin white, with black band extending along upper quarter of fin to fin margin; dorsal and anal fins mostly black, hyaline to whitish posteriorly; body white ventrally, with black band from near anal-fin origin to lower quarter of caudal fin. Attains ~70 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Kenya, Chagos, Maldives and southwestern India; elsewhere to Indonesia, Philippines, Japan, Palau, Pohnpei, Phoenix Is., Australia and Samoa.

**REMARKS** Generally solitary, in 5–90 m; adults solitary or in small groups to ~10 m; juveniles solitary on outer-reef edges at Chagos.

*Macolor niger* (Forsskål 1775)

Black and white snapper

PLATES 73 & 77

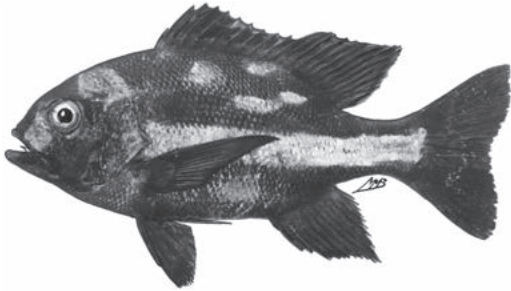
*Sciaena nigra* Forsskål in Niebuhr 1775: 47, xi (Jeddah, Saudi Arabia, Red Sea).

*Macolor niger*: Fowler 1931; Smith 1962\*; Smith 1980; SSF No. 181.20\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Debelius 1998\*, 1999\*; Anderson & Allen 2001\*; Terashima *et al.* 2001\*; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009; Vineesh *et al.* 2014\*.

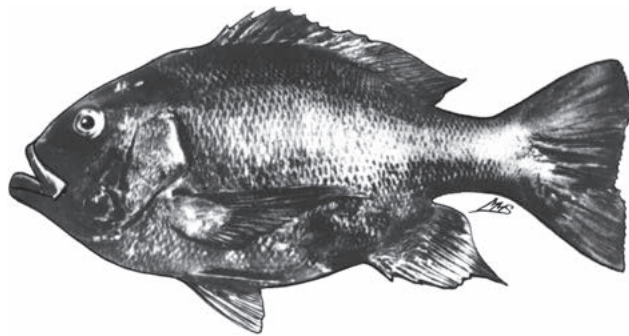
Body depth 2.2–2.9 in SL; HL 2.6–2.8 in SL. Dorsal fin 10 spines, 13 or 14 rays; anal fin 10 or 11 rays; pectoral fins 16–18 rays; caudal fin emarginate. Preopercle notch deep, distinct in adults. GR 37–42/60–71. LL scales 49–57.

Large adults grey-black, with narrow, wavy, pale blue lines on head; iris dark brown. Juveniles and small adults black

and white: small juveniles 3–11 cm TL mostly white, with wide black vertical eye band, snout and paired fins; juveniles ~20–30 cm TL mostly black dorsally and ventrally, with up to 5 white spots on upper body, wide white midlateral band; in small fish, dorsal and anal fins black anteriorly, white posteriorly, but becoming darker overall with growth. Attains 75 cm TL.



*Macolor niger*, 35 cm TL, juvenile (N Mozambique). Source: SSF



*Macolor niger*, 70 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Sodwana Bay; juveniles to Durban, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos, Maldives, southwestern India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Marshall Is., Australia and Samoa.

**REMARKS** Juveniles and some adults solitary; adults usually in small groups or large shoals, in lagoons and on coral and rocky reefs, in 3–90 m.

## GENUS *Paracaesio* Bleeker 1875

Body fusiform; snout short, subequal to or shorter than eye diameter; interorbital area convex. Dorsal fin 10 spines, 9 or 10 rays, fin not notched between spinous and soft parts; anal fin 3 spines, 8 or 9 rays; pectoral fins long, subequal to or longer than head; WIO species with forked caudal fin. Upper jaw slightly protrusile; jaws with a few small canines at front,

outer row of small conical teeth, and inner band of villiform teeth; crescentic or chevron-shaped patch of villiform teeth on vomer, and in band on palatines. Scale rows on upper body parallel to lateral line; maxilla with or without scales; dorsal and anal fins without scales. Eight species, 2 in WIO.

### KEY TO SPECIES

- 1a Preopercle flange usually naked; caudal-fin length 3.2–3.3 in SL; body blue to dark greenish brown, with rear part of upper body, peduncle and caudal fin usually yellow (except body entirely blue-green at Walters Shoals) ..... *P. xanthura*
- 1b Preopercle covered with scales; caudal-fin length 2.6–2.8 in SL; head and body purplish brown to bluish, silvery or whitish ventrally, and fins dark grey to reddish brown ..... *P. sordida*

## *Paracaesio sordida* Abe & Shinohara 1962

Rustyfin snapper

PLATE 77

*Paracaesio sordidus* Abe & Shinohara 1962: 163, Pl. 1, Figs. 1–5 (Okinawa I., Ryukyu Is., Japan); Baranes & Golani 1993\*; Randall & Anderson 1993; Randall 1995\*; SSF No. 181: xi [1995].

*Paracaesio sordida*: De Bruin *et al.* 1994\*; Winterbottom & Anderson 1997; Heemstra *et al.* 2004.

*Paracaesio caeruleus* (*non* Katayama 1934): Debelius 1998\*.

Body depth ~2.5 in SL; HL 3.8–3.9 in SL. Dorsal fin 10 spines, 9 or 10 rays; anal fin 8 rays; pectoral fins 16 or 17 rays. GR 19–22 on lower limb. LL scales 68–73; maxilla naked.

Head and body dark blue-grey to purplish brown, changes to pale grey at cleaning stations; median fins reddish to yellowish brown, paired fins whitish hyaline. Attains ~40 cm TL.



*Paracaesio sordida* (South Africa). © S Chater, ORI/SAAMBR

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, northern Mozambique to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Australia, Marquesas Is. and Pitcairn Is.

**REMARKS** Forms loose schools over rocky bottom and reefs, to ~200 m deep.

## *Paracaesio xanthura* (Bleeker 1869)

Yellowtail blue snapper

PLATE 78

*Caesio xanthurus* Bleeker 1869: 78 (Nosy Be, Madagascar).

*Aetias cantharoides* Barnard 1937: 60, Fig. 2 (KwaZulu-Natal, South Africa).

*Paracaesio xanthurus*: Smith 1949\*, 1953; Winterbottom *et al.* 1989; Randall & Anderson 1993.

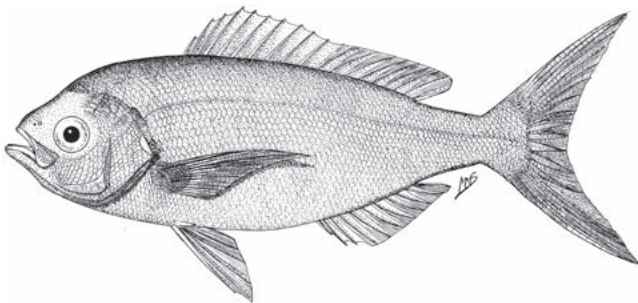
*Paracaesio xanthura*: SSF No. 181.21\*; De Bruin *et al.* 1994\*; Anderson & Allen 2001; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Paracaesio* sp.: Collette & Parin 1991\*.

*Paracaesio waltervadi* Anderson & Collette in Anderson *et al.* 1992: 451, Figs. 1f, 4 (Walters Shoals, Madagascar Ridge).

Body depth 2.6–3.1 in SL; HL 3.2–3.8 in SL; upper jaw protrusile; last dorsal- and anal-fin ray shorter than penultimate ray; caudal fin lunate to deeply forked. Dorsal fin 10 spines, 10 rays; anal fin 8 rays; pectoral fins 16–18 rays. GR 9–11/20–23. LL scales 68–72; maxilla with or without scales.

Head and body largely bright blue, with broad yellow band from below dorsal-fin origin and onto peduncle and caudal fin; other fins bluish. Cruising fish assume a dark green-brown colour; fish from Walters Shoals entirely blue-green. Attains 55 cm TL.



*Paracaesio xanthura*, 33 cm TL (WIO). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: northern Mozambique to South Africa (southern KwaZulu-Natal), Madagascar, Comoros, Seychelles, Walters Shoals, Réunion, Mauritius, Chagos, Maldives and Sri Lanka; elsewhere to Japan, Marshall Is., Australia and Samoa.

**REMARKS** Found on coral reefs and rocky bottom, in 18–250 m, sometimes in large shoals. Feeds on zooplankton. Caught mainly with handlines or longlines; good eating. Specimens from Walters Shoals identified as *Paracaesio waltervadi* are not genetically distinct from *P. xanthura* from South Africa (AD Connell, pers. comm.).

## GENUS *Pinjalo* Bleeker 1845

Body robust; head profile distinctly convex; eye diameter subequal to or greater than snout length; adipose eyelid present. Dorsal-fin margin continuous; dorsal and anal fins with scaly sheath at base; pectoral fins long, reaching anus; caudal fin emarginate. Teeth small, no canines; minute teeth on vomer and palatines. Scale rows oblique above and below lateral line. Two species, both in WIO.

### KEY TO SPECIES

- 1a Dorsal fin 11 spines, 14 or 15 rays; pectoral-fin length 3.1–3.9 in SL; pelvic-fin length 5.2–5.4 in SL; scales on nape and upper body with darker centres, forming oblique lines along scale rows; no pale spot on peduncle ..... *P. pinjalo*
- 1b Dorsal fin 12 spines, 13 rays; pectoral-fin length 2.5–3.1 in SL; pelvic-fin length 1.7–1.8 in SL; nape and upper body without lines formed by scale colouration; pale spot on peduncle ..... *P. lewisi*

## *Pinjalo lewisi* Randall, Allen & Anderson 1987

Slender pinjalo

PLATES 73 & 78

*Pinjalo* sp.: Allen 1985\*.

*Pinjalo lewisi* Randall, Allen & Anderson 1987: 12, Fig. 3, Pl. 1c (Dumaguete market, Negros, Philippines); Randall & Anderson 1993; De Bruin *et al.* 1994\*; Leis 2008.

Body depth 2.1–2.8 in SL; HL 2.5–3.1 in SL; caudal-fin concavity 3.6–5.5 in HL. Dorsal fin 12 spines, 13 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 17 or 18 rays. GR 7 or 8/16 or 17. LL scales 47–52.

Body and head pink to reddish dorsally, white to silvery below; whitish pink spot often on peduncle above lateral line; fins reddish, dorsal and caudal fin often with dark margin. Attains ~50 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, New Guinea and Fiji.

**REMARKS** Found on reefs and rocky bottom, in 40–150 m.

## *Pinjalo pinjalo* (Bleeker 1850)

Pinjalo

PLATES 73 & 78

*Caesio pinjalo* Bleeker 1850: 10 (Jakarta, Java, Indonesia).

*Pinjalo pinjalo*: Allen 1985; Randall *et al.* 1987\*; De Bruin *et al.* 1994\*; Randall 1995\*; Debelius 1998\*; Leis 2008.

Body depth 2.3–2.8 in SL; HL 2.9–4.2 in SL; caudal-fin concavity 2.1–3.6 in HL. Dorsal fin 11 spines, 14 or 15 rays; anal fin 9 or 10 rays; pectoral fins 17–19 rays. GR 6–8/16–18. LL scales 47–52.

Head and body largely pink to reddish, white to silvery ventrally; anal, pectoral and pelvic fins yellow or reddish; dorsal and caudal fins dusky or reddish with dark margin. Attains 56 cm TL, 2.4 kg.

**DISTRIBUTION** Indo-Pacific. WIO: southern Red Sea, Oman, Persian/Arabian Gulf, Pakistan and Sri Lanka; elsewhere to Indonesia, Philippines, Japan and New Guinea.

**REMARKS** Often in small groups on reefs and rocky bottom, in 15–147 m.

## GENUS *Pristipomoides* Bleeker 1852

Small- to medium-sized, body slender to robust and fusiform. Dorsal fin 10 spines, 10–12 rays, fin margin continuous; anal fin 3 spines, 8 rays; dorsal and anal fins without scales, last soft ray of each fin noticeably longest; pectoral fins long, subequal or nearly subequal to HL; caudal fin forked. Jaws with inner row of villiform teeth and outer row of stout conical teeth (often with large canines). Scale rows on upper body parallel to lateral line in WIO species. Eleven species, 7 in WIO.

### KEY TO SPECIES

- |    |  |                     |
|----|--|---------------------|
| 1a | LL scales 48–52; irregular blue-edged golden bands on head .....   | 2                   |
| 1b | LL scales 57–71; colour not as above .....   | 3                   |
| 2a | Sides of snout and preorbital region with 2 orange stripes (brown on preserved fish); top of head with yellow transverse stripes and spots ..... | <i>P. multidens</i> |
| 2b | No orange stripes on sides of snout and preorbital area; top of head with irregular longitudinal vermiculated yellowish stripes and spots .....  | <i>P. typus</i>     |
| 3a | Total GR 28–33; LL scales 67–74 .....  | 4                   |
| 3b | Total GR 17–27; LL scales 57–67 .....  | 5                   |
| 4a | Vomerine tooth patch triangular, with median rear extension short and wide, or long and slender; patch of minute teeth on tongue .....           | <i>P. sieboldii</i> |
| 4b | Vomerine tooth patch triangular, without median rear extension; no teeth on tongue .....   | <i>P. auricilla</i> |



Continued ...

### KEY TO SPECIES

- |    |   |                           |
|----|---|---------------------------|
| 5a | LL scales 63–67; body depth 2.6–2.8 in SL; body with alternating red and yellow oblique bars .....  | <i>P. zonatus</i>         |
| 5b | LL scales 57–66; body depth 2.8–3.8 in SL; no bars on body .....  | 6                         |
| 6a | Dorsal fin 12 rays; total GR 22–25; sides of body without irregular darkish markings .....  | <i>P. filamentosus</i>    |
| 6b | Dorsal fin 11 rays; total GR 17–21; sides of body with irregular darkish markings, including narrow zigzag line, at about level of lateral line anteriorly and onto dorsolateral part of peduncle posteriorly ..... | <i>P. argyrogrammicus</i> |

## *Pristipomoides argyrogrammicus*

(Valenciennes 1832)

Ornate jobfish

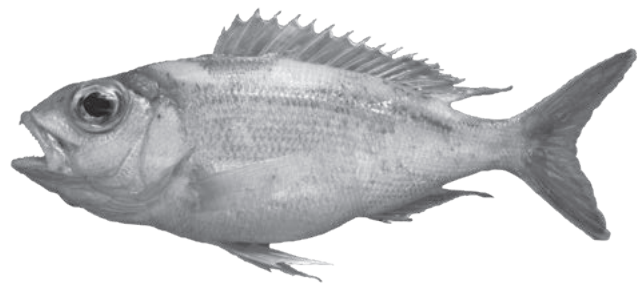
PLATE 74

*Serranus argyrogrammicus* Valenciennes in Cuv. & Val. 1832: 472 (Mauritius, Mascarenes).

*Pristipomoides argyrogrammicus*: Smith 1949\*; Allen 1985\*; Terashima *et al.* 2001\*; Letourneur *et al.* 2004; Fricke *et al.* 2009.

Body depth 2.8–3 in SL. Dorsal fin 11 rays; pectoral fins 15 or 16 rays. GR 8–14 on lower limb. LL scales 58–66.

Head and body reddish dorsally, pale ventrally, with yellow saddles and blue wavy lines and spots; anal and pelvic fins hyaline to reddish; caudal fin red with hyaline margin; dorsal fin yellow. Attains 40 cm TL.



*Pristipomoides argyrogrammicus*, 22 cm SL (St Brandon Shoals).  
O Alvheim © IMR/ASCLME

**DISTRIBUTION** Indo-Pacific. WIO: Madagascar, off St Brandon Shoals, Comoros, Seychelles, Réunion and Mauritius; elsewhere to Indonesia, Philippines, Japan, Marshall Is. and Society Is.

**REMARKS** Found over rocky bottom, in 70–350 m. Feeds on fishes, crustaceans and squid.

## *Pristipomoides auricilla*

(Jordan, Evermann & Tanaka 1927)

Goldflag jobfish

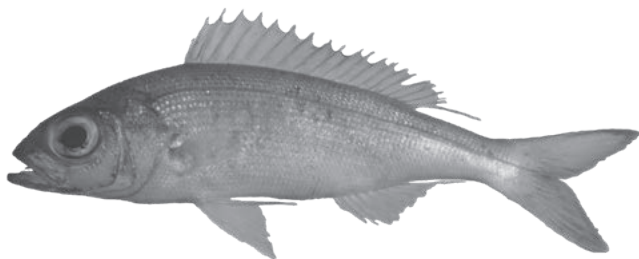
PLATES 74 & 78

*Arnillo auricilla* Jordan, Evermann & Tanaka 1927: 668, Pl. 23, Fig. 3 (Oahu I., Hawaii).

*Pristipomoides auricilla*: Allen 1985; Winterbottom *et al.* 1989; Winterbottom & Anderson 1997; Adam *et al.* 1998; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Letourneur *et al.* 2004; Fricke *et al.* 2009.

Body depth 3.1–3.6 in SL. Dorsal fin 11 rays; pectoral fins 16 rays. GR 17–21 on lower limb. LL scales 70–74.

Body brownish violet, paler ventrally, with numerous irregular yellow spots or faint yellow chevron-shaped bands; dorsal fin pale yellow to yellow-brown; caudal-fin upper lobe yellow, lower lobe pale; adult males (>27 cm FL) with caudal-fin lobe lower mostly yellowish. Attains 45 cm TL.



*Pristipomoides auricilla*, 18 cm SL (Mauritius). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Philippines, Japan, Australia, Samoa and Hawaii.

**REMARKS** Found over rocky bottom, in 90–360 m.

## *Pristipomoides filamentosus* (Valenciennes 1830)

Rosy jobfish

PLATE 74

*Serranus filamentosus* Valenciennes in Cuv. & Val. 1830: 508 (Saint-Denis, Réunion, Mascarenes).

*Serranus mitis* Bennett 1831: 127 (Mauritius, Mascarenes).

*Chaopterus microlepis* Bleeker 1869: 80 (Ambon I., Moluccas, Indonesia; Réunion, Mascarenes).

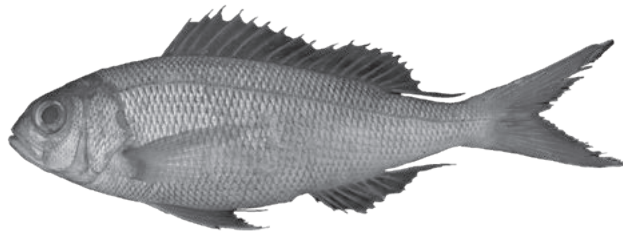
*Pristipomoides argyrogrammicus* (*non* Valenciennes 1832): SFSA No. 653\*; Van der Elst 1981\*.

*Pristipomoides filamentosus*: Allen 1985\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Adam *et al.* 1998; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Letourneur *et al.* 2004.

Body depth 3.2–3.8 in SL; HL 2.9–3.4 in SL. Dorsal fin 12 rays; pectoral fins 15 or 16 rays. GR 7 or 8/15–17. LL scales 57–62.

Head and body silvery reddish to lavender dorsally; snout and interorbital area with tiny blue spots and narrow, wavy,

yellow lines; dorsal and caudal fin lavender-blue with red-orange margin; anal and pelvic fins usually hyaline in females, dusky in males. Attains 100 cm TL, 9 kg (18 years).



*Pristipomoides filamentosus*, 31 cm SL (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman to South Africa (Algoa Bay), Seychelles, Mascarenes, Chagos, Maldives, southwestern India and Sri Lanka; elsewhere to Indonesia, southern Japan, Australia, Samoa, Society Is. and Hawaii.

**REMARKS** Matures by 35 cm TL. Occurs in midwater, over rocky bottom, in 40–360 m. Migrates upwards at night to feed on fishes, crustaceans, salps, stomatopods and amphipods.

## *Pristipomoides multidentis* (Day 1871)

Goldbanded jobfish

PLATES 74 & 78

*Mesoprius multidentis* Day 1871: 680 [4] (Andaman Sea).

*Pristipomoides typus* (*non* Bleeker): Smith 1954\*.

*Pristipomoides multidentis*: Senta & Tan 1975\*; Kyushin *et al.* 1977\*; Allen 1985\*; SSF No. 181.23\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Randall 1995\*; Winterbottom & Anderson 1997; Letourneur *et al.* 2004; Fricke *et al.* 2009.

Body depth 3–3.6 in SL; HL 2.7–3.1 in SL. Dorsal fin 11 rays; pectoral fins 15 or 16 rays. GR 6–8/13–15. LL scales 48–50.

Body pale bluish laterally, brownish dorsally, pale pinkish ventrally; 2 irregular golden bands with dark blue borders beneath eye, on snout and cheek (appearing as 4 brown stripes in preservative); narrow, transverse, wavy yellow lines on top of head; dorsal fin greyish brown, with yellow margin and rows of small yellow-brown spots or stripes. Attains 90 cm TL.



*Pristipomoides multidentis*, 48 cm TL (WIO). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman, Kenya to South Africa (Eastern Cape), Madagascar, Réunion, Chagos and Sri Lanka; elsewhere to Andaman Is., Japan, Australia and Samoa.

**REMARKS** Found on rocky bottom, in 40–215 m. Feeds on fishes, crustaceans, squid, stomatopods and gastropods.

### *Pristipomoides sieboldii* (Bleeker 1855)

Lavender jobfish

PLATES 74 & 78

*Chaetopterus sieboldii* Bleeker 1855: 20 (Nagasaki, Japan).

*Pristipomoides sieboldii*: Allen 1985\*; Randall & Anderson 1993\*;

De Bruin *et al.* 1994\*; Adam *et al.* 1998; Letourneur *et al.* 2004; Fricke *et al.* 2009.

Body depth 3.1–3.8 in SL; HL 3.9–4.3 in SL. Dorsal fin 11 rays; pectoral fins 16 rays. GR 9/21 or 22. LL scales 70–74.

Head and body silvery to lavender, whitish ventrally; small dark spots on head, more marked in juveniles; dorsal-fin margin yellowish brown; caudal fin lavender-brown, with paler margin. Attains ~60 cm TL.



*Pristipomoides sieboldii*, 30 cm SL (Maldives). Source: Randall & Anderson 1993

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Oman, Kenya, South Africa (Eastern Cape), Réunion, Mauritius and Maldives; elsewhere to Japan, New Caledonia, Tahiti and Hawaii.

**REMARKS** Found over rocky bottom, in 180–360 m. Feeds on fishes, crustaceans, cephalopods, polychaetes and pelagic tunicates.

### *Pristipomoides typus* Bleeker 1852

Sharptooth jobfish

PLATES 74 & 79

*Pristipomoides typus* Bleeker 1852: 575 (Sibolga, Sumatera Utara,

Indonesia); Allen 1985\*; De Bruin *et al.* 1994; Fricke *et al.* 2009.

Body depth 3–3.1 in SL. Dorsal fin 11 rays; pectoral fins 15 or 16 rays. Vomerine tooth patch chevron-shaped; no teeth on tongue. GR 8 or 9/15–17. LL scales 48–50.

Head and body reddish; dorsal fin with yellow spots forming wavy lines; top of head with brownish yellow vermiculation. Attains at least 70 cm TL (commonly 40 cm TL).

**DISTRIBUTION** Indo-Pacific. WIO: Comoros, Réunion and Sri Lanka; elsewhere to Indonesia, Philippines, Japan and New Guinea.

**REMARKS** Occurs in deeper waters, at 90–160 m.

### *Pristipomoides zonatus* (Valenciennes 1830)

Obliquebanded snapper

PLATE 74

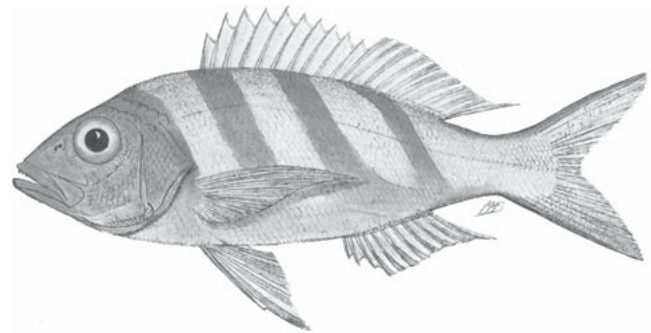
*Serranus zonatus* Valenciennes *in* Cuv. & Val. 1830: 509 (Mauritius, Mascarenes).

*Tropidinius zonatus*: Smith 1949\*.

*Pristipomoides zonatus*: Allen 1985\*; SSF No. 181.24\*; Randall & Anderson 1993; De Bruin *et al.* 1994\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004; Fricke *et al.* 2009; McCosker & Rosenblatt 2010.

Body depth 2.7–3.1 in SL; HL 2.7–2.9 in SL. Dorsal fin 10 or 11 rays; pectoral fins 15 or 16 rays. GR 5–8/12–14. LL scales 63–67.

Head and body reddish, body with 3 or 4 broad oblique yellow-orange bars; caudal fin reddish yellow, other fins yellow. Attains 50 cm TL.



*Pristipomoides zonatus*, 36 cm TL (WIO). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Maputo Bay), Comoros, Mascarenes, Maldives and Sri Lanka; elsewhere to Japan, Australia, Marquesas Is., Hawaii and Galápagos Is.

**REMARKS** Found over rocky bottom, in 70–352 m.

#### GLOSSARY

**ciguatera poisoning (ciguatoxic)** – a type of food poisoning affecting the nervous system in humans caused by eating certain large reef fishes contaminated with ciguatoxin, a toxin produced by the dinoflagellate *Gambierdiscus toxicus*.

**dioecious** – sexes are separate.

## FAMILY CAESIONIDAE

### Fusiliers

Kent E Carpenter and Wouter Holleman

Small- to medium-sized, body streamlined, moderately compressed, oblong to fusiform. Mouth small and highly protrusile, ascending premaxillary process forming separate ossification from premaxilla; teeth conical, small and reduced. Dorsal fin 10–15 slender spines, 8–22 rays; anal fin 3 spines, 9–13 rays; pelvic fins 1 spine, 5 rays; pectoral fins 16–24 rays; all fin rays divided; caudal fin deeply forked. Branchiostegal rays 7. Lateral line complete. Scales moderate to small, weakly ctenoid; LL scales 45–88; count of lower circumpeduncular scale rows includes LL row. Vertebrae 10 + 14.

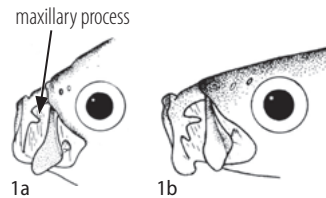
Semipelagic schooling and shoaling, often found in mixed aggregations of 3 or 4 species (typically species having similarly marked caudal fins). Primarily reef inhabitants, found near reefs by day, sheltering in the reef at night. Preyed on by groupers, snappers, jacks and tunas. The sexes are separate and do not undergo gonochoristic sex change. Their spawning season is prolonged, with recruitment peaks once or twice a year. They spawn in large groups at full moon in select areas on the reef at slack water (Bell & Colin 1986). Of minor to moderate importance in fisheries, usually caught with a variety of nets; in Sri Lanka they are caught by fishermen using special techniques and small hooks, and they are an important tuna bait at the Maldives and Lakshadweep.

Closely related to the snappers (Lutjanidae) but distinguished from them by the presence of 1 or 2 postmaxillary processes and a separate premaxillary process. These apomorphic characters contribute to a highly protrusile jaw, adapted for planktivorous feeding. To date, the Caesionidae have been regarded as a family separate from the Lutjanidae; however, recent studies of larvae in the two groups (Reader & Leis 1996) and genetics (Miller & Cribb 2007) provide evidence that the fusiliers should be considered a subfamily of the Lutjanidae, but work remains to be done to formalise this change in taxonomy.

Two subfamilies (Caesioninae and Gymnocaesioninae) recognised, with 4 genera and 23 species (Carpenter 1987; Holleman *et al.* 2013); all genera and 20 species in WIO. While species are relatively easy to identify by their live colour, the patterns do not preserve well, plus their morphological characters are often difficult to use: body proportions and counts of fin rays and scales are similar and overlap, fin rays are slender and easily broken, scales are easily lost, and teeth are small and weak and often need to be stained to be properly seen. Thus, in addition to the standard keys, a single key for all species using fresh specimens, largely with intact colour, is also provided.

#### KEY TO GENERA

- 1a One maxillary process; rear end of maxilla blunt, greatest depth at rear end ..... *Caesio*  
 1b Two maxillary processes; rear end of maxilla tapered ..... 2



- 2a Dorsal and anal fins scaly; premaxillae with small conical teeth, sometimes only at front ..... *Pterocaesio*  
 2b Dorsal and anal fins not scaly; no teeth on premaxillae ..... 3  
 3a Dorsal fin 10 or 11 (usually 10) spines, 14–16 (usually 15) rays, last 2 spines same length as rays ..... *Gymnocaesio*  
 3b Dorsal fin 12–15 (usually 14) spines, 8–11 (usually 10) rays, last 5 or 6 spines ~½ length of 1st ray ..... *Dipterygonotus*

#### KEY TO ALL SPECIES IN WIO

##### [Fresh specimens with intact colour]

- 1a Caudal fin hyaline to pinkish, without dark markings; dorsal fin notched, last 5 or 6 spines shorter than 1st ray ..... *Dipterygonotus balteatus*  
 1b Caudal fin yellow, blue or hyaline whitish, with or without prominent dark markings; dorsal-fin margin continuous ..... 2  
 2a Body above lateral line, upper half of peduncle, dorsal fin and caudal fin bright yellow; no black markings on caudal fin; supratemporal scale band divided ..... *Caesio xanthonota*  
 2b Body above lateral line, upper half of peduncle, dorsal fin and caudal fin pale yellow or blue; caudal fin with or without black markings; supratemporal scale band divided or continuous ... 3  
 3a Caudal fin without black markings ..... 4  
 3b Caudal fin with blackish streak in middle of each lobe or lobe tips black ..... 5  
 4a Dorsum above lateral line, upper half of peduncle, dorsal fin and caudal fin pale yellow; supratemporal scale band continuous ..... *Caesio cuning*  
 4b Dorsum above lateral line, upper half of peduncle, dorsal fin and caudal fin blue; supratemporal scale band divided ..... *Caesio teres*

Continued ...



## KEY TO ALL SPECIES IN WIO

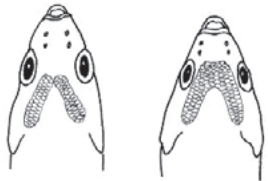
- 5a Caudal fin with distinct blackish streak in each lobe, tips without black blotches ..... 6
- 5b Caudal fin lobes without blackish streaks, but with black blotch at each tip ..... 8
- 6a Body slender, with 4–6 black stripes on sides above midline ..... *Caesio striata*
- 6b Body slender or fairly deep, with single or composite prominent stripe on sides ..... 7
- 7a Body with composite stripe on sides (~6 scale rows at widest point), comprising pale yellow stripe at centre, flanked above and below by orange-yellow stripe, dark stripe and bright blue stripe ..... *Caesio xanthalytos*
- 7b Body with single yellow stripe on sides (2 or 3 scales wide), directly above lateral line for most of its length, flanked above and below by narrow white or pale blue stripe ..... *Caesio caeruleaurea*
- 7c Body with single blackish stripe (1 scale wide), covering lateral line for most of its length, and sides below lateral line often with brilliant blue streak anteriorly ..... *Pterocaesio tile*
- 8a Caudal fin yellowish or with dark streak in each lobe; triangular black patch on upper outside of pectoral-fin base ..... 9
- 8b Caudal fin pale bluish to pinkish; no black patch on upper outside of pectoral-fin base, but pectoral-fin axil black ..... 11
- 9a Sides of body with 3–6 yellow stripes, above and below lateral line ..... *Caesio varilineata*
- 9b Sides of body with or without single yellow stripe above lateral line ..... 10
- 10a Caudal-fin lobes with white band and black tips; single lateral yellow stripe between lateral line and dorsal-fin base, extending to caudal-fin base ..... *Caesio suevica*
- 10b Caudal-fin lobes with black tips, but no white bands; no yellow lateral stripe below dorsal-fin base ..... *Caesio lunaris*
- 11a Sides without distinct stripes or blotches ..... *Pterocaesio pisang*
- 11b Sides with  $\geq 1$  dark or yellow lateral stripes ..... 12
- 12a Sides with 3 distinct dark stripes on upper body ..... *Pterocaesio trilineata*
- 12b Sides with yellowish stripes or 1 broad indistinct yellowish stripe ..... 13
- 13a Most scales on mid to upper sides with yellowish centre, those straddling lateral line forming a more distinctive yellow lateral stripe on anterior two-thirds of body ..... *Pterocaesio capricornis*
- 13b Distinct yellow lateral stripe or stripes on sides ..... 14
- 14a Body with single yellow stripe, and sometimes with another narrow yellow stripe beneath dorsal-fin base ..... 16
- 14b Body with 2 distinct yellow stripes on sides, lower stripe covering lateral line for most of its length ..... 15
- 15a Both stripes usually 1 or 2 scales wide, separated by 4 scales, lower stripe mostly on lateral line ..... *Pterocaesio marri*
- 15b Both stripes 2 or 3 scales wide, separated by 1 or 2 scales, lower stripe mostly on lateral line ..... *Pterocaesio flavifasciata*
- 16a Body with yellow stripe along lateral line, distinctly broader anteriorly, tapering posteriorly ..... 17
- 16b Body with yellow or dark stripe along lateral line, not noticeably broader anteriorly ..... 18
- 17a Lateral yellow stripe ~2 scales wide anteriorly, tapering to 1 scale wide on peduncle, and mostly directly above lateral line ..... *Pterocaesio chrysozona*
- 17b Lateral yellow stripe 3–5 scales wide anteriorly, tapering to 1 scale wide on peduncle, and only partly on lateral line ..... *Pterocaesio lativittata*
- 18a Body extremely slender, depth ~5 in SL; stripe along lateral line typically dark (sometimes yellowish), sometimes a smaller, indistinct, dark or yellowish stripe above lateral-line stripe; scale rows on upper sides in more or less straight lines or slightly wavy ..... *Gymnocaesio gymnoptera*
- 18b Body not extremely slender, depth 3–4 in SL; single, distinct, narrow yellow stripe along lateral line for its entire length; scale rows on upper sides distinctly slanting on posterior half of body ..... *Pterocaesio tessellata*

**GENUS** *Caesio* Lacepède 1801

A genus of subfamily Caesioninae. Characterised by scaly dorsal and anal fins; premaxillae with teeth; caudal fin with 9 or 10 procurrent rays. Body fairly deep to fusiform, moderately compressed; interorbital region convex. Maxilla with single postmaxillary process, its rear end blunt and with greatest depth; jaws, vomer and palatines with small conical teeth. Opercle margin with pronounced dorsoposterior flap. Dorsal fin with continuous margin, 10 spines, 13–16 rays; anal fin 3 spines, 10–13 rays; pectoral fins 17–23 rays; pelvic fins 1 spine, 5 rays. Scales weakly ctenoid; LL scales 45–67; scale rows 7–11 from lateral line to dorsal-fin origin, 14–20 to anal-fin origin; upper circumpeduncular scale rows 9–13, lower 12–17.

Inhabit coastal areas of Indo-Pacific, primarily coral reefs, and often found in mixed-species schools. Feed on zooplankton in midwater aggregations. Reproduction seems to be characterised by early sexual maturity, high fecundity and small pelagic eggs; spawning takes place throughout the year, with mass spawning on a lunar cycle. Nine species, all in WIO.

**KEY TO SPECIES**

- 1a Anal fin 3 spines, 11 rays ..... 2
  - 1b Anal fin 3 spines, 12 rays ..... 3
  
  - 2a Dorsal fin usually 14 rays; supratemporal scale band divided; caudal-fin tips blackish ..... *C. lunaris*
  - 2b Dorsal fin usually 15 rays; supratemporal scale band continuous; no black markings on caudal fin ..... *C. cuning*
- 
- 3a LL scales 51–61; scales rows on dorsal fin oblique; caudal fin yellow in life, without blackish tips ..... 4
  - 3b LL scales 57–67; scale rows on dorsal fin horizontal; caudal fin not yellow, each lobe with median blackish streak or blotch at tip, but no white bands ..... 6
  
  - 4a Caudal fin partially yellow in life, tips with black blotch with proximal white border; upper circumpeduncular scale rows usually 11, lower 13–15 [Red Sea endemic] ..... *C. suevica*
  - 4b Caudal fin entirely yellow in life, with or without black markings; upper circumpeduncular scale rows 11–13, lower 15–17 ventrally ..... 5

Continued ...

**KEY TO SPECIES**

- 5a Upper third of body, peduncle and caudal fin deep yellow, sides of body blue; preserved specimens with predorsal and supratemporal area not markedly darker than upper half of peduncle ..... *C. xanthonota*
- 5b Upper two-thirds of body mostly bluish, peduncle and caudal fin dull yellow; preserved specimens with predorsal, supratemporal and interorbital areas dark ..... *C. teres*
  
- 6a Pectoral fins 18 or 19 (rarely 20) rays; supratemporal scale band continuous ..... *C. striata*
- 6b Pectoral fins 20–22 (rarely 19) rays; supratemporal scale band continuous or divided ..... 7
  
- 7a Body with single yellow lateral stripe in life; caudal-fin lobes with median blackish streak, but tips not black ..... 8
- 7b Body with 4–6 yellow lateral stripes in life; caudal-fin lobes without median blackish streaks, but with black tips ..... *C. varilineata*
  
- 8a Supratemporal scale band continuous; composite lateral stripe on sides ~6 scale rows at widest point, comprising yellow stripe in centre flanked above and below by orange-yellow stripe, dark stripe and bright blue stripe ..... *C. xanthalytos*
- 8b Supratemporal scale band divided; single yellow stripe on sides 2 or 3 scales wide, directly above lateral line for most of length, flanked above and below by narrow white or pale blue stripe ..... *C. caeruleaurea*

*Caesio caeruleaurea* Lacepède 1801

Blue and gold fusilier

PLATES 79 & 80

*Caesio caeruleaureus* Lacepède (ex Commerson) 1801: 85, 86 (Moluccas, Indonesia); SSF No. 182.1\*.

*Smaris mauritianus* Quoy & Gaimard 1824: 290, Pl. 44, Fig. 3 (Mauritius, Mascarenes).

*Caesio maculatus* Cuvier in Cuv. & Val. 1830: 439 (Vanikoro I., Santa Cruz Is.).

*Caesio caeruleaurea*: Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989; Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Randall *et al.* 2004\*; Randall 2005\*; Fricke *et al.* 2009; Golani & Bogorodsky 2010; Fricke *et al.* 2013.

Body moderately deep, depth 3–4.2 in SL; HL 2.8–3.6 in SL; eye diameter 3.3–5.1 in HL; pectoral-fin length 1–1.5 in HL. Dorsal fin 10 spines, 15 (rarely 14 or 16) rays; anal fin 3 spines, 12 rays; pectoral fins 20–22 rays. LL scales 57–65; upper circumpeduncular scale rows usually 11, lower usually 15; scale rows from lateral line 8–10 to dorsal-fin origin, 15–17 to anal-fin origin; scale rows on cheek usually 4; predorsal scales 22–25; supratemporal scale band divided; spinous part of dorsal fin with scales to ~¾ its height.

Upper body bluish, lower half pale bluish to white; single yellow stripe (2 or 3 scales wide) directly above lateral line,

narrowing (to 1 scale wide) on peduncle, and bordered above and below by pale blue stripe; dorsal fin hyaline, with narrow black margin; other fins hyaline, except caudal-fin lobes each with median dusky streak. Attains ~35 cm TL.



*Caesio caerulea*, 18 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Socotra, Kenya to South Africa (Aliwal Shoal), Mozambique Channel, Madagascar, Comoros, Seychelles, Mauritius, Chagos, Maldives and India; not known from Persian/Arabian Gulf; elsewhere to Indonesia, southern Japan, Marshall Is., New Guinea, Great Barrier Reef, New Caledonia, Tonga and Samoa.

**REMARKS** Found around coral reefs, often schooling with *C. varilineata*, *C. striata* and *Pterocaesio tile*, in 1–60 m. Of moderate importance to coastal fisheries, and common in fish markets in Indonesia and Philippines; juveniles imported as baitfish for tuna fisheries in some areas. Caught by gillnets, drive-in nets, traps, trawls and handlines.

### *Caesio cuning* (Bloch 1791)

Redbelly yellowtail fusilier

PLATES 80 & 81

*Sparus cuning* Bloch 1791: 31, Pl. 263, Fig. 1 (East Indies).

*Caesio erythrogaster* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1830: 442, Pl. 166 (Java, Indonesia).

*Caesio cuning*: Carpenter 1987\*, 1988\*.

Deep-bodied, depth 2.2–3.1 (usually 2.5) in SL; HL 2.7–3.4 in SL; eye diameter 3.5–4.8 in HL; pectoral-fin length 0.8–1.4 in HL. Dorsal fin 10 spines, 15 (rarely 14 or 16) rays; anal fin 3 spines, 11 rays; pectoral fins 18 or 19 rays. LL scales 45–51; upper circumpeduncular scale rows usually 9 or 10, lower 13 or 14; scale rows from lateral line to dorsal-fin origin 8 or 9, to anal-fin origin 15–17; scale rows on cheek usually 4 or 5; predorsal scales 21–25; supratemporal scale band continuous; spinous part of dorsal fin with scales to ~½ its height.

Dorsum and dorsal fin greyish blue anteriorly, pale yellow posteriorly; lower sides white, shading to pinkish on belly;

pectoral, pelvic and anal fins white to pink; pectoral-fin axil and upper part of fin base black; peduncle and caudal fin deep yellow. Attains 60 cm TL at Sri Lanka, ~50 cm TL elsewhere.

**DISTRIBUTION** Indo-Pacific. WIO: southern India and Sri Lanka; elsewhere widespread to Indonesia, Philippines, Ryukyu Is., New Guinea, northern Australia, New Caledonia and Vanuatu.

**REMARKS** A moderately important food fish in many areas; common in fish markets of Sri Lanka where it is caught with handlines.

### *Caesio lunaris* Cuvier 1830

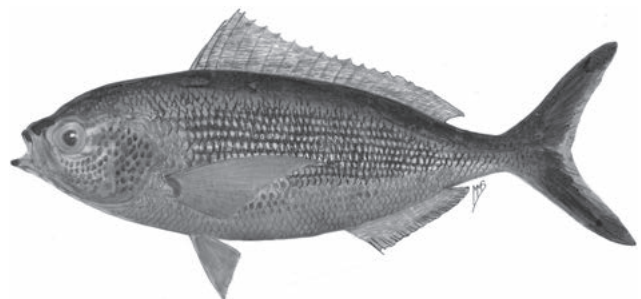
Lunar fusilier

PLATES 79 & 80

*Caesio lunaris* Cuvier (ex Ehrenberg) in Cuv. & Val. 1830: 441 (Red Sea; Indonesia; New Ireland, Papua New Guinea); Dor 1984; Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; SSF No. 182: xi [1995]\*; Manilo & Bogorodsky 2003; Fricke *et al.* 2009; Golani & Bogorodsky 2010; Fricke *et al.* 2013; Holleman *et al.* 2013.

Body moderately deep, depth 2.5–3.5 (usually 2.8) in SL; HL 2.6–3.5 in SL; eye diameter 3.2–5.1 in HL; pectoral-fin length 0.8–1.4 in HL. Dorsal fin 10 spines, 14 (rarely 13 or 15) rays; anal fin 3 spines, 11 rays; pectoral fins 19 or 20 rays. LL scales 45–53; upper circumpeduncular scale rows 10 or 11, lower 14 or 15; scale rows from lateral line to dorsal-fin origin 8 or 9, to anal-fin origin 15–19; scale rows on cheek usually 4; predorsal scales 20–23; supratemporal scale band generally divided; spinous part of dorsal fin with scales to ~¾ its height.

Body bluish, belly paler; pectoral, pelvic and anal fins pale blue to white; dorsal fin and caudal fin bluish, caudal-fin tips black; upper part of pectoral-fin bases with black spot. Attains 40 cm TL.



*Caesio lunaris*, 33 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Gulf of Oman, Persian/Arabian Gulf, Kenya to South Africa (Sodwana Bay), Mozambique Channel, Madagascar, Comoros,

Seychelles, Mascarenes, Chagos, Maldives and India; elsewhere to Andaman Is., Indonesia, Philippines, Ryukyu Is., Marshall Is., New Guinea, Australia, Great Barrier Reef and Solomon Is.

**REMARKS** Found mainly near coral reefs. Feeds on zooplankton in large aggregations. Juveniles commonly school with *C. cuning* close to the reef; adults generally found further from the reef than other fusiliers, in deep, clear water, returning to the reef at night to shelter. Unlike other caesionids it changes colour during development: juveniles have a yellow caudal fin and peduncle, with the yellow colouration lost in adults. Of minor importance to fisheries.

### *Caesio striata* Rüppell 1830

Striated fusilier PLATE 80

*Caesio striatus* Rüppell 1830: 131, Pl. 34, Fig. 1 (Massawa, Eritrea, Red Sea); Goren & Dor 1994.

*Caesio striata*: Carpenter 1987\*, 1988\*; Manilo & Bogorodsky 2003; Golani & Bogorodsky 2010; Kannan *et al.* 2013.

Body fusiform and elongate, depth 3.5–4.5 in SL; HL 2.8–3.7 in SL; eye diameter 3.2–4.6 in HL; pectoral-fin length 1–2.3 in HL. Dorsal fin 10 spines, 15 (rarely 14 or 16) rays; anal fin 3 spines, 12 rays; pectoral fins 18–20 rays. LL scales 59–67; upper circumpeduncular scale rows usually 11, lower usually 15; scale rows from lateral line to dorsal-fin origin 8 or 9, to anal-fin origin 14–16; scale rows on cheek usually 4; predorsal scales 20–23; supratemporal scale band continuous; spinous part of dorsal fin with scales to  $\sim\frac{3}{5}$  its height.

Upper body pale bluish to greenish, with 4 narrow longitudinal black stripes, 2 above and 2 below lateral line; rear part of body and upper peduncle with yellow stripe between the 2 pairs of black stripes; lower half of body white; dorsal fin pale blue to white; pectoral, pelvic and anal fins white; pectoral-fin axil black, upper part of fin base with triangular black patch; caudal-fin lobes each with median black streak, lobe tips with small black blotch, and margin often white. Attains 25 cm TL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Possibly the smallest species of the genus. Of very minor importance to local fisheries; occasionally caught with gillnets, traps and handlines.

### *Caesio suevica* Klunzinger 1884

Suez fusilier PLATE 80

*Caesio suevicus* Klunzinger 1884: 46, Pl. 5, Fig. 2 (Al-Qusayr, Egypt, Red Sea).

*Caesio suevica*: Dor 1984; Carpenter 1987\*, 1988\*; Goren & Dor 1994; Manilo & Bogorodsky 2003; Fricke 2005; Golani & Bogorodsky 2010.

Body moderately slender, depth 3.1–4.2 in SL; HL 2.8–3.4 in SL; eye diameter 3.1–4.7 in HL; pectoral-fin length 1–1.7 in HL. Dorsal fin 10 spines, 14 or 15 rays; anal fin 3 spines, 12 rays; pectoral fins 20 or 21 rays. LL scales 51–58; upper circumpeduncular scale rows usually 11, lower usually 14 or 15; scale rows from lateral line to dorsal-fin origin 7–9, to anal-fin origin 15–17; scale rows on cheek usually 4 or 5; predorsal scales 22 or 23; supratemporal scale band generally divided; spinous part of dorsal fin with scales to  $\sim\frac{3}{5}$  its height.

Body mostly pale to silvery blue, paler ventrally, sometimes pinkish; yellow stripe (2 or 3 scales wide) midway between dorsal-fin base and lateral line, running from below 1st dorsal-fin spine and onto base of upper caudal-fin lobe; base of lower caudal-fin lobe yellow, lobes each with median black streak, proximal white band, and large black blotch at tips; dorsal fin bluish grey; pectoral, pelvic and anal fins white to pale blue; pectoral-fin axil and upper part of fin base black. Attains 35 cm TL.

**DISTRIBUTION** WIO: endemic to Red Sea.

### *Caesio teres* Seale 1906

Yellow-and-blueback fusilier PLATES 79 & 80

*Caesio teres* Seale 1906: 44, Fig. 13 (Shortland I., Solomon Is.); Carpenter 1987\*, 1988\*; SSF No. 182.2\*; Winterbottom *et al.* 1989\*; Fricke 1999; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Fricke *et al.* 2013.

*Caesio pulcherrimus* Smith & Smith 1963: 29, Pl. 95, Fig. E (Assumption I., Seychelles).

Body moderately deep, depth 2.7–4.2 (usually 3.2) in SL; HL 2.6–3.6 in SL; eye diameter 3.1–5.7 in HL; pectoral-fin length 0.8–1.6 in HL. Dorsal fin 10 spines, 15 rays; anal fin 3 spines, 12 rays; pectoral fins 20–22 rays. LL scales 51–61; upper circumpeduncular scale rows usually 11–13, lower usually 15 or 16; scale rows from lateral line 8–10 to dorsal-fin origin, 17–20 to anal-fin origin; scale rows on cheek usually 4 or 5; predorsal scales 21–25; supratemporal scale band divided; spinous part of dorsal fin with scales to at least  $\frac{2}{3}$  its height. Scale rows above lateral line oblique, horizontal below lateral line and on peduncle.

Upper body and sides bright blue, lower part pale blue, and bright yellow from just below dorsal-fin origin to peduncle; scales on dorsum and sides with black spots; dorsal fin bluish proximally, yellow distally, with narrow dusky to black margin; pectoral, pelvic and anal fins white proximally, with pinkish membranes; pectoral-fin axil and upper fin base black; caudal fin bright yellow, with narrow dusky margin and lobe tips. Attains 40 cm TL.

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Somalia to South Africa (Sodwana Bay), Mozambique Channel, Comoros, Seychelles, Mascarenes, Chagos, Maldives, southern India and Sri Lanka; elsewhere to Cocos (Keeling) Is., Ryukyu Is., Solomon Is., Australia, Great Barrier Reef, New Caledonia, Tonga and Line Is.

**REMARKS** Found mostly on coral reefs, but with a preference for coralline lagoons. Fast-swimming and schooling, ranges widely around reefs, and often schools with other fusiliers, especially *C. xanthonota*. Spawns in large aggregations around full moon.

### *Caesio varilineata* Carpenter 1987

Variable-lined fusilier

PLATES 79 & 80

*Caesio varilineata* Carpenter 1987: 24, Pls. 2c, 6g (Jana I., Saudi Arabia, Persian/Arabian Gulf); Carpenter 1988; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Golani & Bogorodsky 2010.

Moderately deep-bodied, fusiform, depth 3–3.9 in SL; HL 3.2–3.6 in SL; eye diameter 3.7–5.5 in HL; pectoral-fin length 1–1.2 in HL. Dorsal fin 10 spines, 15 rays; anal fin 3 spines, 12 rays; pectoral fins 20–23 rays. LL scales 57–67; upper circumpeduncular scale rows usually 11, lower usually 15; scale rows from lateral line 8–10 to dorsal-fin origin, 15–17 to anal-fin origin; scale rows on cheek usually 4; predorsal scales 21–26; supratemporal scale band divided; spinous part of dorsal fin with scales to  $\sim\frac{4}{5}$  its height.

Upper body blue, with 3–6 longitudinal yellow stripes (2 or 3 stripes above or on lateral line, and 2 or 3 stripes below) and with turquoise midlateral stripe; dorsal fin pale blue, with narrow black margin; pectoral, pelvic and anal fins white; pectoral-fin axil black, upper part of fin base with triangular black patch; caudal-fin lobes greyish blue, upper and lower edges pale blue, and tips with large black blotch. Attains 40 cm TL.



*Caesio varilineata*, 26 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indian Ocean. WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, Kenya to South Africa (Sodwana Bay), northwestern Madagascar, Comoros, Seychelles, Maldives, southeastern India and Sri Lanka; elsewhere to Indonesia (Mentawai Is., Sumatra and Java).

**REMARKS** Primarily found around coral reefs, commonly schooling with *C. caerulea*, *C. striata* (in the Red Sea) and *Pterocaesio tile*. Of minor importance to coastal fisheries, and fairly common in fish markets in East Africa and Sri Lanka. Caught by gillnets, traps and handlines; juveniles important as baitfish for tuna in Maldives and Lakshadweep.

### *Caesio xanthalytos* Holleman, Connell & Carpenter 2013

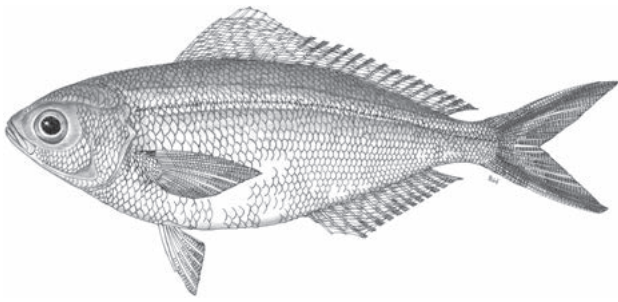
Goldsash fusilier

PLATES 79 & 80

*Caesio xanthalytos* Holleman, Connell & Carpenter 2013: 264, Figs. 1, 3–4 (off Margate, KwaZulu-Natal, South Africa).

Body moderately deep, fusiform, depth 3–3.7 in SL; HL 3.3–3.9 in SL; eye diameter 3.1–3.6 in HL; pectoral-fin length 1–1.3 in HL. Dorsal fin 10 spines, 15 rays; anal fin 3 spines, 12 rays; pectoral fins 19–22 rays. LL scales 57–67; upper circumpeduncular scale rows 11, lower 15; scale rows from lateral line to dorsal-fin origin 8, to anal-fin origin 12–14; scale rows on cheek 3 or 4; predorsal scales 18–22; supratemporal scale band continuous; spinous part of dorsal fin with scales nearly to fin margin.

Upper body blue, lower pale blue to pinkish, with composite longitudinal stripe from above rear margin of eye to caudal-fin base ( $\sim 6$  scales wide in middle); stripe composed of narrow central yellow stripe, bordered above and below by deep orange-yellow, brown, and bright blue stripes, stripe covers lateral line except on peduncle; dorsal fin pale grey; pectoral, pelvic and anal fins white; pectoral-fin axil black, upper part of fin base with small black patch; caudal-fin lobes with median dark streak, upper and lower edges pale blue or white, and tips dusky in fish <9 cm SL. Attains 22 cm SL.



*Caesio xanthalytos*, 18 cm SL (South Africa). Source: Holleman *et al.* 2013

**DISTRIBUTION** WIO: Kenya to South Africa (KwaZulu-Natal) and Madagascar (probably more widespread).

**REMARKS** Long confused with *C. caeruleaurea*. Found on coral reefs and observed schooling with *C. xanthonota*.

### *Caesio xanthonota* Bleeker 1853

Yellowback fusilier

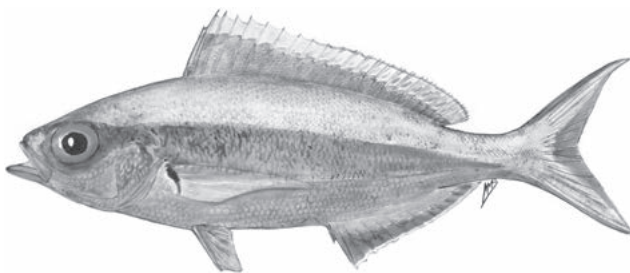
PLATES 80 & 81

*Caesio xanthonotus* Bleeker 1853: 466 (Jakarta, Java, Indonesia).

*Caesio xanthonota*: Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989\*; SSF No. 182: xi [1995]\*; Fricke 1999; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Fricke *et al.* 2013; Holleman *et al.* 2013.

Body moderately deep, fusiform, depth 2.9–3.5 in SL; HL 3–3.4 in SL; eye diameter 3.9–4.9 in HL; pectoral-fin length 0.9–1.2 in HL. Dorsal fin 10 spines, 15 rays; anal fin 3 spines, 12 rays; pectoral fins 21 rays. LL scales 52–59; upper circumpeduncular scale rows 11 or 12, lower 15; scale rows from lateral line to dorsal-fin origin 9 or 10, to anal-fin origin 18 or 19; scale rows on cheek 4 or 5; predorsal scales 21–23; supratemporal scale band divided; spinous part of dorsal fin with scales to  $\sim\frac{2}{3}$  its height.

Upper third of body, dorsal and caudal fins yellowish, middle third of body blue and lower third white; pectoral fins white, except axils and upper part of bases black; pelvic fins pinkish white; anal fin pink at base, pale yellow in centre, with broad pink margin. Attains 40 cm TL.



*Caesio xanthonota*, 15 cm SL (S Mozambique). Source: SSF

**DISTRIBUTION** Indian Ocean and Indonesia. WIO: Kenya to South Africa (Sodwana Bay), Madagascar, Comoros, Seychelles, Réunion, Chagos, Maldives, India and Sri Lanka; not known from Red Sea and Persian/Arabian Gulf; elsewhere to Andaman Is., Nicobar Is., Thailand, Cocos (Keeling) Is., Christmas I. and Indonesia (Mentawai Is. to Moluccas).

**REMARKS** Found primarily on coral reefs; appears to prefer coralline lagoon habitats more than most other fusiliers. Feeds in large midwater aggregations, ranging widely on reef during day, sheltering on the reef at night.

### GENUS *Dipterygonotus* Bleeker 1849

A genus of subfamily Gymnocaesioninae. Characterised by absence of scales on dorsal and anal fins; dorsal fin deeply notched; procurent caudal-fin rays 7 or 8; premaxilla and ascending process fused into single bone; 2 postmaxillary processes; rear end of maxilla tapered, its greatest depth anterior to rear end of bone; dentaries and vomer with small conical teeth, no teeth on premaxilla and palatines. One species.

### *Dipterygonotus balteatus* (Valenciennes 1830)

Mottled fusilier

PLATES 79 & 80

*Smaris balteatus* Valenciennes in Cuv. & Val. 1830: 424 (Sri Lanka).

*Dipterygonotus balteatus*: Carpenter 1987\*, 1988\*; Manilo & Bogorodsky 2003; Holleman *et al.* 2013.

Diagnosis as for genus. Body extremely slender and fusiform, depth 4.4–5.7 in SL; HL 3.3–4 in SL; eye diameter 3.5–4.9 in HL; pectoral-fin length 1.4–1.7 in HL. Dorsal fin 14 spines, 8–11 rays, last 5 or 6 spines  $\sim\frac{1}{2}$  length of 1st ray; anal fin 3 spines, 9 or 10 rays; pectoral fins 16–19 rays. Scales weakly ctenoid; LL scales 68–80; upper circumpeduncular scale rows 11–14, lower 15–18; scale rows from lateral line to dorsal-fin origin 9–11, to anal-fin origin 15–18; scale rows on cheek 6–9; predorsal scales 21–23; supratemporal scale band indistinct.

Upper body brownish bronze, lower half of body silvery white; single thin, straight, pale brown stripe (1 scale wide) from eye to upper caudal-fin base, directly above lateral line for most its length; above this stripe, 2 thin, usually interrupted, pale brown stripes; all fins pinkish to hyaline, except caudal fin pinkish to tan; pectoral-fin axil black. When captured at night entire body and fins often reddish. Attains 14 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Gulf of Aden, Socotra, Somalia to South Africa (Aliwal Shoal), Seychelles, Maldives and Sri Lanka; elsewhere to Bay of Bengal, Indonesia, Philippines, Taiwan, Australia, New Guinea and Solomon Is.

**REMARKS** The smallest species of the fusiliers. Primarily nearshore pelagic as adults, and not associated with coral reefs; however, juveniles school with other juvenile fusiliers on coral reefs. Important as a tuna baitfish in Maldives and Lakshadweep; caught at night with light traps and occasionally marketed with sardines and anchovies in the Philippines.

## GENUS *Gymnocaesio* Bleeker 1856

A genus of subfamily Gymnocaesioninae. Characters as for *Dipterygonotus* but that the dorsal fin is not notched. One species.

### *Gymnocaesio gymnoptera* Bleeker 1856

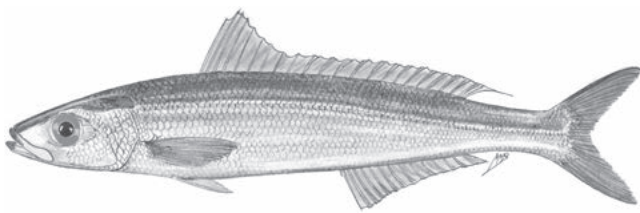
Slender fusilier PLATES 80 & 82

*Gymnocaesio gymnopterus* Bleeker 1856: 372 (Ternate, Moluccas, Indonesia).

*Gymnocaesio gymnoptera*: Carpenter 1987\*, 1988\*; Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.

Body slender and fusiform, depth 3.3–6 in SL; HL 3–4.3 in SL; eye diameter 3.5–5.1 in HL; pectoral-fin length 1.2–1.7 in HL. Dorsal fin 10 spines, 15 (rarely 14 or 16) rays, lengths of last 2 spines subequal to 1st ray; anal fin 3 spines, 12 rays; pectoral fins 20–22 rays. LL scales 64–74; upper circumpeduncular scale rows 11, lower 14 or 15; scale rows from lateral line to dorsal-fin origin 7–9, to anal-fin origin 13 or 14; scale rows on cheek usually 4; predorsal scales 23–26; supratemporal scale band indistinct.

Upper body greenish blue, centres of scales paler, giving striped appearance; single brown or yellow stripe (1 scale wide) from behind eye, covering lateral line for most its length, but above lateral line on peduncle, and often with broad bright blue stripe directly below lateral line; lower body silvery white; all fins white, except caudal fin dusky with darker to black lobe tips; pectoral-fin axils black. Attains 18 cm SL.



*Gymnocaesio gymnoptera*, 15 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Socotra, Somalia to Kenya, Madagascar, Seychelles, Réunion, Maldives, Lakshadweep, India and Sri Lanka; elsewhere to Bay of Bengal, Indonesia, Philippines, Solomon Is., New Caledonia and Fiji.

**REMARKS** Inhabits coastal areas, ranging widely around coral reefs. Feeds in large midwater aggregations, often schooling with *Pterocaesio* species. Of minor importance to fisheries, but used as tuna baitfish in Maldives and Lakshadweep.

## GENUS *Pterocaesio* Bleeker 1876

A genus of subfamily Caesioninae. Body elongate, fusiform and moderately compressed. Two postmaxillary processes; rear end of maxilla tapered, its greatest depth anterior to rear end of bone; dentaries with small conical teeth; vomer and palatines with or without teeth; interorbital region convex. Opercle margin with distinct dorsoposterior flap. Dorsal fin with continuous margin, 10 or 11 spines, 14–16 or 19–22 rays; anal fin 3 spines, 11–13 rays; pectoral fins 17–24 rays. Scales weakly ctenoid; dorsal and anal fins with oblique rows of scales; LL scales 62–88; scale rows from lateral line 7–11 to dorsal-fin origin, 13–20 to anal-fin origin; upper circumpeduncular scale rows 10–14, lower 13–18; predorsal scale band distinct and continuous. Twelve species, 9 in WIO.

### KEY TO SPECIES

- |    |   |                      |
|----|---|----------------------|
| 1a | Dorsal fin 11 or 12 (rarely 10) spines, 19–22 rays; caudal fin with blackish streak in each lobe .....  | <i>P. tile</i>       |
| 1b | Dorsal fin 10 or 11 (usually 10) spines, 14–16 rays; caudal fin lobes with black tips .....   | 2                    |
| 2a | Upper circumpeduncular scale rows usually 11 (rarely 12); LL scales 62–72; pectoral fins 17–21 (usually 19 or 20) rays; scale rows from lateral line usually 8 or 9 to dorsal-fin origin, usually 13–17 to anal-fin origin .....  | 3                    |
| 2b | Upper circumpeduncular scale rows usually 12 or 13 (rarely 11 or 14); LL scales 66–88; pectoral fins 20–24 (usually ≥21) rays; scales from lateral line to dorsal-fin origin usually 9–11, to anal-fin origin usually 16–18 ..... | 7                    |
| 3a | Pectoral fins 19–21 (usually 20) rays; 3 dark and 3 pale stripes along upper sides .....  | <i>P. trilineata</i> |
| 3b | Pectoral fins 17–20 (usually 19) rays; no stripes along upper sides, or with 2 stripes .....  | 4                    |

Continued ...

## KEY TO SPECIES

- 4a No stripes on sides; body pale reddish or greenish blue; caudal-fin tips with reddish to black spots, the spots with pale halo ..... *P. pisang*
- 4b Body with 1 or 2 stripes on sides ..... 5
- 5a Body with single yellow stripe in life, covering most of lateral line, but above lateral line on peduncle ..... *P. capricornis*
- 5b Body with 2 yellow stripes in life ..... 6
- 6a Upper yellow stripe narrow, beneath dorsal-fin base; lower stripe broad, 3 or 4 scales wide anteriorly, mostly directly below lateral line (but above lateral line on peduncle) ..... *P. chrysozona*
- 6b Both yellow stripes broad (4–5 scales wide): upper stripe from nape to end of dorsal fin; lower stripe from above eyes to caudal-fin base, covering lateral line anteriorly .... *P. flavifasciata*
- 7a LL scales 74–88; pectoral fins 21–23 (usually 22) rays; single broad yellow stripe on sides in life covering most of lateral line ..... *P. lativittata*
- 7b LL scales 66–88; pectoral fins either 20–22 (usually 21) rays, or 22–24 (usually 23) rays; 1 or 2 thin yellow stripes on sides .... 8
- 8a Pectoral fins 22–24 rays; 2 narrow yellowish stripes (~2 scales wide) on sides, lower stripe covering lateral line for most of its length but above lateral line on peduncle, upper stripe 1–2 scale rows below dorsal-fin base ..... *P. marri*
- 8b Pectoral fin 20–22 rays; single narrow yellow stripe on sides, covering lateral line for most of its length but above lateral line on peduncle ..... *P. tessellata*

### *Pterocaesio capricornis* Smith & Smith 1963

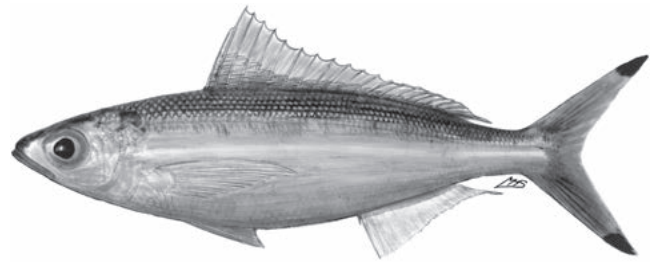
Capricorn fusilier

PLATE 82

*Pterocaesio capricornis* Smith & Smith 1963: 29, Pl. 94, Fig. E (Pinda, Mozambique); SSF No. 182.3\*; Carpenter 1987\*, 1988\*; Goren & Dor 1994; Manilo & Bogorodsky 2003.

Body fusiform and elongate, depth 3.9–4.2 in SL; HL 3.1–3.3 in SL; eye diameter 3.5–4.2 in HL; pectoral-fin length 1.1–1.6 in HL. Dorsal fin 10 spines, 15 rays; anal fin 3 spines, 12 rays; pectoral fins 19 rays. LL scales 65–68; upper circumpeduncular scale rows 11, lower 15; scale rows from lateral line 8 or 9 to dorsal-fin origin, 15 to anal-fin origin; scale rows on cheek 4; predorsal scales 24; spinous part of dorsal fin with scales to ~½ its height.

Uppermost body chequered bronzy green-yellow and blue; narrow yellow stripe from behind eyes and more or less along lateral line to caudal-fin base; sides below stripe orangish pink; dorsal fin blue-grey anteriorly, orangish pink distally and posteriorly; other fins pinkish, caudal-fin tips distinctly brown or black. Attains 21 cm TL.



*Pterocaesio capricornis*, 16 cm TL, holotype (N Mozambique).

Source: Smith & Smith 1963

**DISTRIBUTION** WIO: Somalia to Mozambique (Beira), Comoros and Seychelles.

**REMARKS** Found primarily around coral reefs.

### *Pterocaesio chrysozona* (Cuvier 1830)

Goldband fusilier

PLATES 81 & 82

*Caesio chrysozona* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1830: 440 (Indonesia).

*Pristipomoides aurolineatus* Day 1867: 937 (Chennai, India).

*Pterocaesio chrysozona*: Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989\* [as *chrysozonus*]; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Fricke *et al.* 2013.

Body fusiform and elongate, depth 3.3–4.6 in SL; HL 3–3.5 in SL; eye diameter 3.3–4.6 in HL; pectoral-fin length 1–1.5 in HL. Dorsal fin 9 or 10 spines, 14–16 rays; anal fin 3 spines, 11–13 rays; pectoral fins 17–20 rays. LL scales 62–72; upper circumpeduncular scale rows 11–13, lower 14–17; scale rows from lateral line to dorsal-fin origin 7–9, to anal-fin origin 13–17; scale rows on cheek 4 or 5; predorsal scales 21–27; spinous part of dorsal fin with scales to ½–½ its height.

Upper body pale blue to brownish, lower half white to pinkish; bright yellow stripe from behind eyes to caudal-fin base, 2–3 scales wide directly below lateral line, but 1 scale wide above lateral line on peduncle; less conspicuous stripe just below dorsal-fin base, from nape to end of fin; fins white to pinkish; caudal-fin tips distinctly black; pectoral-fin axil black. Attains 21 cm TL.



*Pterocaesio chrysozona*, 18 cm TL (N Mozambique). Source: SSF



**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman to Kenya, Mozambique, Seychelles, Chagos, Maldives, India and Sri Lanka; elsewhere to Bay of Bengal, Indonesia, Philippines, Taiwan, New Guinea, Australia, Great Barrier Reef, New Caledonia and Samoa.

**REMARKS** Ranges widely around coral reefs, often schooling with other caesionids. Moderately important as a food fish in some areas and common in markets in Sri Lanka and the Philippines. Caught with gillnets, drive-in nets, traps and handlines; valuable tuna baitfish at Maldives and Lakshadweep.

### *Pterocaesio flavifasciata* Allen & Erdman 2006

Yellowstripe fusilier

PLATES 80 & 82

*Pterocaesio* sp. 1: Kuitert 1998\*.

*Pterocaesio flavifasciata* Allen & Erdman 2006: 28, Figs. 1–2 (reef off Weh I., Sumatra, Indonesia).

Body fusiform and elongate, depth 3.4–3.9 in SL; HL 3.4–3.6 in SL; eye diameter 3.4–4.2 in HL; pectoral-fin length 1.1–1.4 in HL. Dorsal fin 10 spines, 15 or 16 rays; anal fin 3 spines, 11–13 rays; pectoral fins 22 or 23 rays. GR 8–10/25–28. LL scales 70–79; upper circumpeduncular scale rows 11–13, lower 15 or 16; scale rows from lateral line 8–10 to dorsal-fin origin, 16 or 17 to anal-fin origin; scale rows on cheek 5; predorsal scales 21–23; dorsal and anal fins covered in scales over most of surface.

Upper body blue to bluish green, with 2 broad lateral yellow stripes (4–5 scales wide at widest point): 1st from nape to end of dorsal fin, 2nd from above eye to caudal-fin base; lower half of body white; sides of snout with silvery streak; dorsal fin and caudal fin bluish, other fins whitish; caudal-fin lobes with black tips preceded by narrow pale band; pectoral-fin axil with black spot; lateral line brown. Attains 20.5 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives (photographed by Kuitert 1998); elsewhere, Andaman Sea (Thailand: photographs or sightings) and Indonesia (Sumatra [specimens]; Java [photographs]).

**REMARKS** Moderately common at Weh I., Indonesia, where it forms midwater aggregations to feed on zooplankton, often schooling with *Caesio caerulea*, *C. lunaris* and *C. varilineata*, from surface to at least 30 m deep.

### *Pterocaesio lativittata* Carpenter 1987

Wideband fusilier

PLATE 81

*Pterocaesio* (*Squamosaesio*) *lativittata* Carpenter 1987: 40, Pl. 4, Fig. B (Turk Reef, Cocos [Keeling] Is.); Carpenter 1988\*.

*Pterocaesio* sp.: Winterbottom *et al.* 1989\*.

Body fusiform and elongate, depth 4.1–5.3 in SL; HL 3.1–4.3 in SL; eye diameter 3.5–4.6 in HL; pectoral-fin length 1.1–1.7 in HL. Dorsal fin 10 spines, 14–16 rays; anal fin 3 spines, 12 or 13 rays; pectoral fins 21–23 rays. LL scales 74–88; upper circumpeduncular scale rows 12–14, lower 15–17; scale rows from lateral line 9–11 to dorsal-fin origin, 16–19 to anal-fin origin; scale rows on cheek 4 or 5; predorsal scales 23–30; spinous part of dorsal fin with scales to ~½ its height.

Upper body bluish or reddish, paler below; single bright yellow stripe covering lateral line, from behind head to caudal-fin base, 3 or 4 scales wide anteriorly, 1 scale wide on peduncle where it lies above lateral line; fins mostly white to pinkish; dorsal fin dusky distally; caudal-fin tips with black blotch; pectoral-fin axil black. Attains 23 cm TL.

**DISTRIBUTION** Indo-Pacific (disjunct). WIO: Chagos and Maldives; elsewhere to Cocos (Keeling) Is., Christmas I., Indonesia, New Guinea, Solomon Is. and Line Is.

**REMARKS** Found around coral reefs, sometimes schooling with other species of *Pterocaesio*. The Indian Ocean and western Pacific populations are possibly different species, which genetic studies could determine.

### *Pterocaesio marri* Schultz 1953

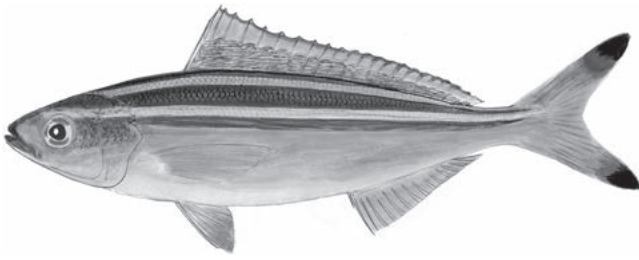
Marr's fusilier

PLATES 80 & 82

*Pterocaesio marri* Schultz *in* Schultz *et al.* 1953: 545, Fig. 85 (lagoon off Amen I., Bikini Atoll, Marshall Is.); Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989\*; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009; Holleman *et al.* 2013\*.

Body fusiform and elongate, depth 3.4–4.6 in SL; HL 3–3.7 in SL; eye diameter 3.1–5.5 in HL; pectoral-fin length 1–1.5 in HL. Dorsal fin 10 or 11 spines, 14–16 rays; anal fin 3 spines, 11–13 rays; pectoral fins 22–24 rays. LL scales 68–76; upper circumpeduncular scale rows 12–14, lower 15–18; scale rows from lateral line 9–11 to dorsal-fin origin, 16–19 to anal-fin origin; scale rows on cheek 4–6; predorsal scales 24–32; spinous part of dorsal fin with scales to ~½ its height.

Body pale blue to greenish dorsally, white below, with 2 thin yellow stripes: lower stripe (~1 scale wide) from behind supratemporal membrane and covering lateral line to caudal-fin base, and above lateral line on peduncle; upper stripe (1–2 scales wide) below dorsal fin to peduncle; fins mostly white to pinkish; dorsal fin dusky distally; pectoral-fin axil with black blotch; caudal-fin tips black. Attains 35 cm TL.



*Pterocaesio marri*, 20 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Cape Vidal), Comoros, Seychelles, Réunion, Mauritius and Chagos; elsewhere to Cocos (Keeling) Is., Indonesia, Ryukyu Is., Marshall Is., Australia, New Guinea, Society Is. and Marquesas Is.

**REMARKS** Seems to prefer clear waters of oceanic islands or reefs far from land masses; ranges widely around coral reefs in schools. Of minor importance to fisheries; caught fairly often by drive-in nets in Philippines, and sometimes used as bait in Indian and Western Pacific tuna fisheries.

### *Pterocaesio pisang* (Bleeker 1853)

Banana fusilier PLATES 81 & 82

*Caesio pisang* Bleeker 1953: 113 (Ambon I., Moluccas, Indonesia; Jakarta, Java, Indonesia).

*Pterocaesio pisang*: Carpenter 1987\*, 1988\*; Goren & Dor 1994; Manilo & Bogorodsky 2003; Fricke *et al.* 2013; Holleman *et al.* 2013\*.

Body fusiform and elongate, depth 3.6–4.8 (usually 3.9) in SL; HL 3–3.5 in SL; eye diameter 3.3–4.3 in HL; pectoral-fin length 1.1–1.4 in HL. Dorsal fin 9 or 10 spines, 14–16 rays; anal fin 3 spines, 11–13 rays; pectoral fins 18–20 rays. LL scales 63–71; upper circumpeduncular scale rows 10–12, lower 13–17; scale rows from lateral line 8–10 to dorsal-fin origin, 13–16 to anal-fin origin; scale rows on cheek 4 or 5; predorsal scales 21–29; spinous part of dorsal fin with scales to  $\frac{1}{3}$ – $\frac{1}{2}$  its height.

Colour variable: from dark red to silvery dorsally, paler below, and without stripes along sides, except lateral line darker than background; snout often yellowish; fins pale; caudal-fin tips with reddish to black spots, the spots with pale halo. Attains 21 cm TL.



*Pterocaesio pisang*, 15 cm TL (N Mozambique). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to South Africa (Sodwana Bay), Mozambique Channel, Seychelles, Maldives, southern India and Sri Lanka; elsewhere to Bay of Bengal, Indonesia, Philippines, Ryukyu Is., Marshall Is., New Guinea, Australia, New Caledonia and Fiji.

**REMARKS** Ranges widely around coral reefs, sometimes schooling with other species of *Pterocaesio*. An important tuna bait.

### *Pterocaesio tessellata* Carpenter 1987

One-stripe fusilier PLATES 81 & 82

*Pterocaesio (Squamosicaesio) tessellata* Carpenter 1987: 47, Pls. 5a, 7j (East Sumilon I., Philippines); Carpenter 1988\*.

Body fusiform and elongate, depth 3.3–4.4 (usually 3.8) in SL; HL 3.2–3.7 in SL; eye diameter 3.5–4.8 in HL; pectoral-fin length 0.9–1.3 in HL. Dorsal fin 10 spines, 14–16 rays; anal fin 3 spines, 11–13 rays; pectoral fins 20–22 rays. LL scales 66–77; upper circumpeduncular scale rows 11–14, lower 15–17; scale rows from lateral line 9–11 to dorsal-fin origin, 16–18 to anal-fin origin; scale rows on cheek 4 or 5; predorsal scales 22–29; spinous part of dorsal fin with scales to  $\sim\frac{1}{2}$  its height.

Upper half of body and dorsal fin pale bluish green, lower half whitish to pink; centres of scales paler than rear of scales on upper two-thirds of body, giving chequered appearance; single thin yellow stripe ( $\sim 1$  scale wide) on sides and covering lateral line for most its length, above lateral line on peduncle; caudal fin dusker, with blackish lobe tips, other fins white to pinkish; pectoral-fin axils black. Attains 25 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, southern India and Sri Lanka, one photograph from Sodwana Bay, South Africa (possibly a waif); elsewhere to Bay of Bengal, Indonesia, Philippines, Caroline Is., Solomon Is., New Caledonia and Vanuatu.

**REMARKS** Found around coral reefs, often schooling with other *Pterocaesio* species. Moderately important as a food fish, and common in markets in the Philippines.

### *Pterocaesio tile* (Cuvier 1830)

Dark-banded fusilier PLATE 81

*Caesio tile* Cuvier in Cuv. & Val 1830: 428 (Caroline Is.).

*Caesio cylindricus* Günther 1859: 393 (Madagascar).

*Pterocaesio tile*: Carpenter 1987\*, 1988\*; Winterbottom *et al.* 1989\*;

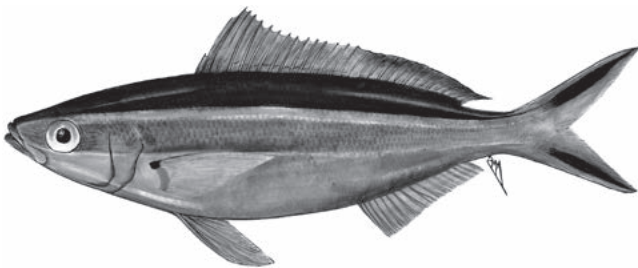
Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003;

Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009;

Fricke *et al.* 2013; Holleman *et al.* 2013\*.

Body fusiform and elongate, depth 3.3–5.4 in SL; HL 3.4–3.9 in SL; eye diameter 2.9–4.9 in HL; pectoral-fin length 1–1.4 in HL. Dorsal fin 10–12 spines, 19–22 rays; anal fin 3 spines, 13 rays; pectoral fins 22–24 rays. LL scales 69–76; upper circumpeduncular scale rows 11–13, lower 15–18; scale rows from lateral line 7 or 8 to dorsal-fin origin, 14–17 to anal-fin origin; scale rows on cheek 4 or 5; predorsal scales 24–32; spinous part of dorsal fin with scales to  $\frac{1}{3}$ – $\frac{1}{2}$  its height.

Body above lateral line bluish green, scales with black margins, creating chequered pattern; lateral line covered for most of length by black stripe about 1 scale wide (above lateral line on peduncle), stripe continuing onto upper caudal-fin lobe; below black stripe sides often brilliant iridescent blue-green, covering about middle third of body; lower third of body white to pinkish; dorsal, anal, pectoral and pelvic fins pale bluish green to pinkish, axil of pectoral fin black, lower caudal-fin lobe also with median black streak. Attains 30 cm TL.



*Pterocaesio tile*, 25 cm TL (Seychelles). Source: Smith & Smith 1963

**DISTRIBUTION** Tropical waters of Indo-Pacific (widespread). WIO: Somalia to South Africa (Cape Vidal), Mozambique Channel, Madagascar, Comoros, Seychelles, Réunion, Chagos, Maldives, India and Sri Lanka; not known from Red Sea or Arabian Sea; elsewhere to Bay of Bengal, Indonesia, Ryukyu Is., Marshall Is., Australia, Great Barrier Reef, New Caledonia, Tonga, Line Is., Tuamotu Is., Pitcairn Is. and Marquesas Is.

**REMARKS** Ranges widely around coral reefs, often schooling with other fusiliers. Moderately important as a food fish; important as tuna bait in Lakshadweep and western Pacific.

### *Pterocaesio trilineata* Carpenter 1987

Three-stripe fusilier

PLATES 81 & 82

*Pterocaesio (Squamosaesio) trilineata* Carpenter 1987: 43, Pls. 4d, 7i (Kadavu I., Fiji); Carpenter 1988\*; Kuitert 1998\*; Holleman *et al.* 2013\*.

Body fusiform and elongate, depth 3.3–4.9 in SL; HL 2.8–3.9 in SL; eye diameter 3.3–4.6 in HL; pectoral-fin length 1–1.7 in HL. Dorsal fin 10 or 11 spines, 14–16 rays; anal fin 3 spines,

11 or 12 rays; pectoral fins 19–22 rays. LL scales 62–75; upper circumpeduncular scale rows 11 or 12, lower 14–16; scale rows from lateral line to dorsal-fin origin 7–9, to anal-fin origin 14–18; scale rows on cheek 4 or 5; predorsal scales 20–30; spinous part of dorsal fin with scales to  $\sim\frac{1}{3}$  its height.

Upper sides of body with 3 yellow-brown yellow stripes and 3 pale bluish stripes, lowest dark stripe about 2 scales wide, originating on snout and upper orbit, covering lateral line for most of length, but above lateral line on peduncle; middle stripe about 2 scales wide, originating on snout and running midway between dorsal profile and lower line; uppermost stripe originating on snout and running about scale width on either side of dorsal midline (and either side of dorsal fin); bluish stripes about 1–1½ scales wide, lying between dark stripes; dorsal fin pale bluish; pectoral, pelvic and anal fins white; pectoral-fin axil black; caudal fin dusky, lobe tips black. Attains 20 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Pomene Bay), South Africa (Sodwana Bay), and Maldives (photographed in Kuitert 1998); elsewhere to Indonesia, Philippines, Marshall Is., Australia, Norfolk I. and Fiji.

**REMARKS** Ranges widely around coral reefs in schools. The disjunct distribution suggests that there may be two similar species, which genetic studies could determine.

## FAMILY SYMPHYSANODONTIDAE

### Slopefishes

William D Anderson Jr.

Body slender to moderately deep, somewhat compressed; head moderate; snout relatively blunt. Eyes moderate to large, diameter longer than snout; interorbital region flattened to slightly convex. Mouth terminal and oblique, jaws subequal; anterior ends of premaxillae incised, forming notch that receives anterior ends of dentaries; uppermost margin of maxilla covered by narrow suborbital with mouth closed, and maxilla reaches vertical through middle of eye or well beyond. Anterior and posterior nostrils fairly close-set. Teeth on jaws usually small, premaxillary teeth somewhat larger anteriorly; symphysis and premaxillary notch toothless; dentary with teeth extending from elevated posterodorsal surface almost to symphysis, and usually a few larger teeth at anterior ends of dentaries which fit into premaxillary notch with mouth closed; vomer, palatines, endopterygoids and tongue with or without teeth (small when present). Opercle with 2 flattened spines, lower spine longer and more prominent; vertical

and horizontal limbs of preopercle with or without serrae, and spine or spine-like process present or absent at angle of preopercle. Dorsal fin continuous, not incised at junction of spines and segmented rays, usually with 9 spines, 10 rays; anal fin 3 spines, 7 or 8 (rarely 6) rays; pelvic fins 1 spine, 5 rays; caudal fin well forked, with 15 (8 + 7) branched rays. Branchiostegal rays 7; pseudobranchiae present. Scales ctenoid; most of head, including maxillae, dentaries, lachrymals and interorbital region scaly; dorsal aspect of snout variously scaled, lateral aspect of snout with or without scales; dorsal and anal fins without scales (except some scales occasionally present proximally on posteriormost soft rays), but with scaly sheaths at fin bases; large modified scales associated with pelvic fin, just above pelvic-fin spine (axillary scales) and in ventral midline between pelvic fins (interpelvic scales). Lateral line gently curved beneath dorsal fin. Vertebrae 10 + 15. Formula for configuration of supraneural bones, anterior neural spines, and anterior dorsal pterygiophores usually 0/0/0+2+1/1/1/ (0/0/0+2/1+1/1/ in one species). Sexual dimorphism (in dentition and/or fin lengths) occurs in at least four species.

Small-sized (8.5–20.5 cm SL), occurring in the Atlantic, Pacific and Indian oceans, at ~80–700 m. One genus with at least 13 species; 6 species (1 undescribed) in WIO.

## GENUS *Symphysanodon* Bleeker 1878

Diagnosis as for family. The larvae of *Symphysanodon* are quite distinctive, bearing massive frontal and preopercular spines. Consequently, even small specimens are relatively easy to identify to genus yet often difficult to place in a species (Campos *et al.* 2009). Larvae and juveniles have been frequently collected with plankton nets, nekton nets and midwater trawls, and juveniles and adults have been removed from the stomachs of a number of predatory fishes (species of *Alepisaurus*, *Epinephelus*, *Seriola*, *Etelis*, *Thunnus*), suggesting that species of *Symphysanodon* may be important links in some marine food webs (Anderson & Springer 2005). Data for selected characters of Indian Ocean *Symphysanodon* species are given in Table 1 (at the end of this section).

### KEY TO SPECIES

- |    |                                      |                          |
|----|--------------------------------------|--------------------------|
| 1a | Total GR on 1st arch 28 .....        | <i>Symphysanodon</i> sp. |
| 1b | Total GR on 1st arch $\geq 34$ ..... | 2                        |

Continued ...

### KEY TO SPECIES

- |    |   |                               |
|----|---|-------------------------------|
| 2a | Length of depressed anal fin 3.9–4.6 in SL; peduncle depth 3.3–5 in HL; anal-fin base 6.8–9.3 in SL; body depth 4–5 in SL; no parapophyses on 1st caudal vertebra .....                       | <i>S. rhax</i>                |
| 2b | Length of depressed anal fin 2.6–4.2 in SL; peduncle depth 2.2–4 in HL; anal-fin base 5.5–7.6 in SL; body depth 3.2–4.2 in SL; parapophyses present on 1st caudal vertebra .....              | 3                             |
| 3a | LL scales 60–65; total GR on 1st arch 41 or 42; LL scales + total GR = 101–106; head depth 3.8–4.8 in SL .....  | <i>S. andersoni</i>           |
| 3b | LL scales 48–59; total GR on 1st arch 34–42; LL scales + total GR = 82–101; head depth 4.3–5.4 in SL .....  | 4                             |
| 4a | LL scales 54–59; total GR on 1st arch 38–42; LL scales + total GR = 94–101 .....  | <i>S. xanthopterygion</i>     |
| 4b | LL scales 48–54; total GR on 1st arch 34–37; LL scales + total GR = 82–91 .....   | 5                             |
| 5a | LL scales ~48–50; length of depressed anal fin 2.9–3.2 in SL; length of 1st anal-fin spine 5–5.8 in HL; caudal fin rosy, with yellow along ventral margin of upper lobe .....                 | <i>S. disii</i>               |
| 5b | LL scales 53 or 54; length of depressed anal fin 2.6–3 in SL; length of 1st anal-fin spine 5.7–7 in HL; both lobes of caudal fin mainly bright yellow basally and yellow-green distally ..... | <i>S. pitondelafournaisei</i> |

## *Symphysanodon andersoni* Kotthaus 1974

Bucktooth slopefish

PLATE 83

*Symphysanodon andersoni* Kotthaus 1974: 52, Fig. 326 (near mouth of Gulf of Aden, off Socotra); Anderson & Springer 2005; Anderson *et al.* 2015.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. In SL: body depth 3.2, HL 3–3.3, head depth 3.8–4.8, anal-fin base 5.8–6.2, and depressed anal-fin length 3.4–3.7. In HL: snout length 4.4–5.3, orbit diameter 3.3–4, interorbital width 3.8–4, length of 1st anal-fin spine 5.3–5.4, and peduncle depth 2.7–3. GR 12 or 13/29 = 41 or 42. LL scales 60–65.

Specimen from Oman: head mostly reddish; upper body yellow, overlain by red-orange beneath dorsal fin and on peduncle, and body beneath lateral line mainly rosy; dorsal-fin spines yellow, interspinous membranes pale violet; soft-rayed portion of dorsal fin mostly yellow, red on distal portions of posterior dorsal soft rays; pectoral, pelvic and anal fins mainly pale, with rosy tinge; caudal fin yellow, overlain with orange and red-orange; iris red adjacent to pupil. Attains at least 20.5 cm SL.



*Symphysanodon andersoni*, 16 cm SL, holotype (Socotra).  
Source: Kotthaus 1974, www.schweizerbart.de/publications/list/series/meteor

**DISTRIBUTION** Known only from two specimens from the Gulf of Aden and southern Oman.

**REMARKS** The holotype (157 mm SL) was collected southwest of Socotra near the entrance to the Gulf of Aden, in 190–290 m, and another (204 mm SL) collected off southern Oman, at ~80 m (Anderson *et al.* 2015). Manilo & Bogorodsky (2003) reported this species from the Gulf of Kutch, India, but this was a misidentification. Small specimens in collections of the National Museum of Natural History (Smithsonian Institution) and the Museum of Comparative Zoology (Harvard University) may be this species. Three specimens (40–47 mm SL) collected off Somalia and 13 smaller specimens (8–20 mm) caught off Somalia and Oman are in either poor condition or are too small to be identified to species with currently recognised diagnostic characters (Anderson & Springer 2005; Anderson *et al.* 2015).

### *Symphysanodon disii* Khalaf & Krupp 2008

Disi's slopefish

PLATE 83

*Symphysanodon disii* Khalaf & Krupp 2008: 86, Figs. 1–2 (Aqaba, Jordan, Gulf of Aqaba, Red Sea); Anderson *et al.* 2011.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. In SL: body depth 3.2–3.6, HL 3.5–3.6, anal-fin base 5.6–6.1, and depressed anal-fin length 2.9–3.2. In HL: snout length 4.5–5.3, orbit diameter 3.3–3.8, interorbital width 3.3–3.6, length of 1st anal-fin spine 5–5.8, and peduncle depth 2.2–2.5. GR 9–11/24–26 = 34–37. LL scales ~48–50.

Head and body red to pink to red-orange, with faint yellowish midlateral band from opercle to midlength of peduncle; iris reddish to dull yellow. Attains 17 cm SL.

**DISTRIBUTION** WIO: Gulf of Aqaba (Aqaba, Jordan; Eilat, Israel).

**REMARKS** All known specimens collected at ~150 m.

### *Symphysanodon pitondelaournaisei*

Quéro, Spitz & Vayne 2009

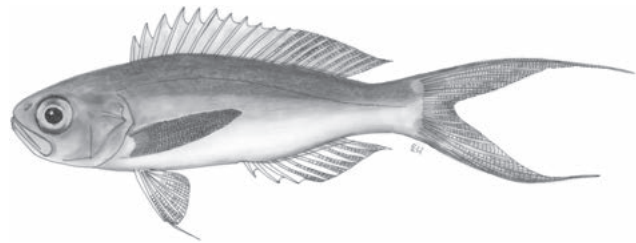
Réunion slopefish

PLATE 83

*Symphysanodon pitondelaournaisei* Quéro, Spitz & Vayne 2009: 74, Figs. 1–2 (off Réunion, Mascarenes); Anderson *et al.* 2011.

Dorsal fin 9 spines, 10 or 11 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. In SL: body depth 3.3–3.8, HL 3.2–3.5, anal-fin base 5.5–6, and depressed anal-fin length 2.6–3. In HL: snout length 4.7–4.8, orbit diameter 2.8–2.9, interorbital width 3.2–3.5, length of 1st anal-fin spine 5.7–7, and peduncle depth 2.4–2.8. GR 10–12/24 = 34–36. LL scales 53 or 54.

Body mostly red above lateral line, with broad yellow band from opercle to rear end of dorsal-fin base where band narrows and becomes attenuated on peduncle; sides below yellow band mostly silvery, but reddish above anal fin and on lowermost peduncle; iris mostly bright yellow. Attains ~10 cm SL.



*Symphysanodon pitondelaournaisei*, 10 cm SL (Réunion).  
Redrawn from Quéro *et al.* 2009

**DISTRIBUTION** Known only from two type specimens collected off Réunion.

**REMARKS** Found at the surface after an eruption of the volcano Piton de la Fournaise in April 2007.

### *Symphysanodon rhax* Anderson & Springer 2005

Maldives slopefish

PLATE 83

*Symphysanodon rhax* Anderson & Springer 2005: 16, Fig. 10 (Maldives).

Dorsal fin 9 spines, 9 or 10 rays; anal fin 3 spines, 6 or 7 rays; pectoral fins 16–18 rays. In SL: body depth 4–5, HL 2.8–3.1, anal-fin base 6.8–9.3, and depressed anal-fin length 3.9–4.6. In HL: snout length 4.5–6.8, orbit diameter 2.9–3.6, interorbital width 4.4–6.3, length of 1st anal-fin spine 6.9–15.8, and peduncle depth 3.3–5. GR 10 or 11/24–27 = 34–38. LL scales 47–52. Attains at least 14.5 cm SL.

**DISTRIBUTION** WIO: Maldives and Nazareth Bank (15°41' S, 61°05' E).

**REMARKS** Known from 218–305 m. No colour information available.

## *Symphysanodon xanthopterygion*

Anderson & Bineesh 2011

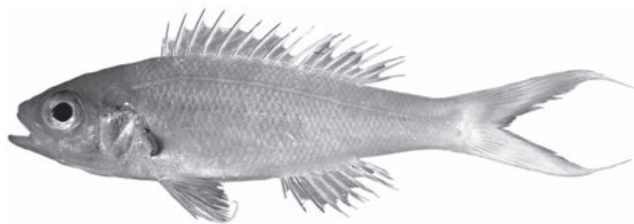
Indian bunquelovely, Indian slopefish

PLATE 83

*Symphysanodon xanthopterygion* Anderson & Bineesh 2011: 32, Figs. 1–2  
(off Kollam, Kerala coast, India).

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16–18 rays. In SL: body depth 3.7–4.2, HL 2.7–3, anal-fin base 6.2–7.6, and depressed anal-fin length 3.6–4.2. In HL: snout length 5.6–7, orbit diameter 3.6–4.3, interorbital width 4.3–5.9, length of 1st anal-fin spine 5.9–9.3, and peduncle depth 3.2–4. GR 11–13/27–30 = 38–42. LL scales 54–59.

Body red to red-orange dorsally, mostly silvery beneath lateral line; usually with bright yellow patch on rear part of opercle; caudal-fin upper lobe orange to red, lower lobe bright yellow; iris mainly yellow. Attains 15 cm SL.



*Symphysanodon xanthopterygion*, 11 cm SL (Mozambique).

PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: known from the type specimens collected off southwestern India at 150–240 m, and from a photograph of a specimen collected off Mozambique.

**REMARKS** Heemstra *et al.* (2006: 454, Fig. 7g) photographed a species of *Symphysanodon* from a submersible operating off Grande Comore and wrote that it is pinkish purple, with bright yellow spot on opercle, caudal-fin lower lobe yellow, upper lobe pink with white tip, and dorsal fin hyaline yellow. The yellow on opercle and lower caudal-fin lobe is reminiscent of *S. xanthopterygion*, but the overall body colouration is different (see similar specimen from South Africa [Plate 83, *Symphysanodon* sp. 2]).

## *Symphysanodon* sp.

Comoro wampeejaw

*Symphysanodon* sp.: Anderson & Springer 2005.

**REMARKS** Known only from two partially digested specimens (7–8 cm SL) removed from a male coelacanth (*Latimeria chalumnae*) collected off Grande Comore, in ~225 m (McCosker 1979). Total GR on 1st arch 28 (8/20) in the more intact specimen, a count which distinguishes it from all other known Indian Ocean *Symphysanodon*.

## GLOSSARY

**parapophysis (pl. parapophyses)** – a long, transverse process arising ventrally from the centrum of abdominal vertebrae; serves to support epipleural ribs when present and, in Gadidae, the gas bladder.

**pseudobranchiae** – small, gill-like organs on the inner surface of the operculum.

**Table 1** Comparisons of data for selected characters in Indian Ocean species of *Symphysanodon* (*piton.* = *S. pitondelafournaisei*; *xantho.* = *S. xanthopterygion*).

Character	<i>andersoni</i>	<i>disii</i>	<i>piton.</i>	<i>rhax</i>	<i>xantho.</i>
	<i>n</i> = 2	<i>n</i> = 5	<i>n</i> = 2	<i>n</i> = 16	<i>n</i> = 15
SL (mm)	157, 204	146–163	90, 99	54–144	119–146
Parapophyses on 1st caudal vertebra	Yes	Yes	Yes	No	Yes
Pectoral-fin rays	16 or 17	16 or 17	17	16–18	16–18
LL scales	60–65	~48–50	53 or 54	47–52	54–59
Total GR on 1st arch	41 or 42	34–37	34–36	34–38	38–42
Sum of LL scales + total GR	101–106	82–87	90 or 91	84–88	94–101
Interorbital width (%SL)	7.5–8.9	7.7–8.7	8.9–9.1	5.3–7.7	6.1–7.9
Body depth at dorsal-fin origin (%SL)	31.2–31.4	27.8–31.1	26.3–30	19.8–24.8	23.8–27.4
Pelvic-fin length (%SL)	22.5–22.9	23.7–25.1	No data	>19–>67	20.5–24.3
Length of depressed anal fin (%SL)	27.1–29.7	31.1–34.9	33.3–38.4	21.8–25.8	24–27.8
Caudal peduncle depth (%SL)	11.1–11.4	11.1–12.9	11.1–12.1	7.1–10.3	8.8–10.5
Length of anal-fin base (%SL)	16.2–17.1	16.5–18	16.7–18.2	10.8–14.8	13.2–16
Length of 1st anal-fin spine (%SL)	5.7–6.2	4.8–5.7	4.4–5	2.1–4.8	3.8–5.9
Length of 2nd anal-fin spine (%SL)	~9.7–9.9	8.3–9.7	9.1–10	7.5–10.5	8.1–9.4
Length of 3rd anal-fin spine (%SL)	11.9–12.1	10.8–11.9	11.1–12.2	9.3–12.5	>9.8–11.6

## FAMILY HAEMULIDAE

## Grunters and rubberlips

Phillip C Heemstra

Body oblong, compressed, head profile convex; dorsal fin single, or deeply notched between spinous and soft-rayed parts, with 9–14 spines, 13–26 rays; anal fin short, located below rear end of dorsal fin, with 3 spines (2nd spine enlarged), 7–10 rays; pelvic fins 1 spine, 5 rays, and scaly axillary process; caudal fin rounded in juveniles, and truncate, emarginate or shallowly forked in adults, with 8 + 7 branched rays. Mouth small to moderate; maxilla hidden by preorbital when mouth closed; lips thick in adults of most *Plectorhinchus*; jaws with band of small conical teeth, outer teeth enlarged, but no canines; no teeth on vomer or palatines. Opercle with 1 inconspicuous spine; preopercle serrate. Lateral line complete, following dorsal curve of body. Scales small to moderate, ctenoid, adherent; head scaly, except for front of snout, lips and chin. Swimbladder well-developed.

Moderate- to large-sized, circumglobal in tropical to warm-temperate waters. Found in shallow bays, in estuaries and on reefs, frequently in large aggregations that are usually inactive during the day, moving out over sandy bottom to feed at dawn, dusk and during the night. Large adults generally solitary. Grunters produce rasping grunting sounds by rubbing pharyngeal teeth together, with the sound being amplified by the swimbladder. Feed on a variety of invertebrates (crustaceans, molluscs, polychaetes, brittlestars) and small fishes. Important food fishes in many areas.

A large family of ~17 genera and ~160 species; 3 genera and 36 species in WIO.

## KEY TO GENERA

- 1a Scales small, in 15–18 rows from dorsal-fin origin to lateral line; pectoral fins shorter than head and subequal to pelvic fins; chin with 4–6 distinct pores; dorsal fin 9–14 spines, 16–25 rays ..... **2**
- 1b Scales moderate, in 4–8 rows from dorsal-fin origin to lateral line; pectoral fins long and pointed, subequal to or longer than head and longer than pelvic fins; chin with 2 small pores followed by median pit with slit-like pore on each side; dorsal fin 9–12 spines, 13–17 rays ..... *Pomadasys*
- 2a Dorsal fin 9–11 spines, 2nd spine longest, 22–24 rays; lips of adults not much enlarged ..... *Diagramma*
- 2b Dorsal fin 11–14 spines, 3rd or 4th spine longest, 15–22 rays; adults of most species with enlarged lips ..... *Plectorhinchus*

GENUS *Diagramma* Oken 1817

Soft-rayed dorsal-fin base longer than spinous base; 1st dorsal-fin spine < ½ length of 2nd spine, which is the longest spine. Outer teeth barely or not enlarged. Scales small, 16–18 in oblique series from dorsal-fin origin to lateral line; preorbital completely scaly. Seven mostly allopatric species recognised, but Johnson *et al.* (2001) considered 6 of these taxa as subspecies of the Indo-Pacific *Diagramma picta* (Thunberg 1792); 3 species in WIO.

## KEY TO SPECIES

- 1a Total GR 17–21 (usually 20); dorsal fin 21–24 (usually 22) rays; tubed LL scales 55–64; juveniles ~15 cm TL striped, with 2nd and 3rd stripes merging (may have slight break) to form one stripe posteriorly; specimens from 20–35 cm TL with yellow wavy lines or spots on operculum and cheeks (may persist from suborbital to operculum in some larger specimens), lines on body forming spots (~3–6 in eye diameter) with growth; adults >40 cm TL grey with scattered darker blotches on head and body but no spots ..... *D. cinerascens*
- 1b Total GR 20–23 (usually 21 or 22); dorsal fin 21–25 (usually 23) rays; tubed LL scales 55–61; colour not as above ..... **2**
- 2a Dorsal fin 9 or 10 spines; tubed LL scales 56–66 (usually 59); total GR 21–23 (usually 23); spots on head and body of large juveniles and subadults (18–35 cm TL) smaller, width 6.5–11.6 in eye diameter, always round, peppered on upper head and body of large juveniles, larger and more sparsely scattered on subadults; adults without small bronze centres to individual scales, but may have a few spots on head and body; adults >40 cm TL grey, sometimes with scattered darker blotches on head and body ..... *D. centurio*
- 2b Dorsal fin 10 spines; tubed LL scales 55–61 (usually 58); total GR 20–23 (usually 21); spots on head and body of large juveniles and subadults (18–35 cm TL) larger, width 4.1–6.6 in eye diameter, and may be slightly elongate; adults with small scattered spots on head and along body near dorsal-fin base and on peduncle; individual adult scales with small bronze centre, forming rows ..... *D. punctatum*

*Diagramma centurio* Cuvier 1930

Sailfin rubberlips

PLATE 84

*Diagramma centurio* Cuvier in Cuv. & Val. 1830: 308 (Seychelles); Heemstra & Heemstra 2004\*.

*Diagramma pertusum* Playfair in Playfair & Günther 1867: 26, Pl. 4, Fig. 2 (Zanzibar, Tanzania).

*Diagramma blochii* (non Cuvier 1830): Playfair in Playfair & Günther 1867.

*Diagramma pictum*: Smith 1962\* [in part]; SSF No. 178.1\*.

*Diagramma pictum centurio*: Johnson *et al.* 2001\*.

Dorsal fin 9 or 10 spines, 22–25 rays; anal fin 3 spines, 7 rays; pectoral fins 16–18 rays. Body depth 2.7–3 in SL; HL 3.2–3.6 in SL. GR 6–8/14 or 15. LL scales 56–65; LSS 110–115.

Juveniles (~10 cm TL): head and body greenish brown; broad black band from snout tip through eyes and across head to middle of caudal-fin margin; dorsal fin mostly black with gold margin, and front and rear ends of fin gold proximally; paired fins and anal fin gold, leading edges of anal fin and pelvic fins black; caudal fin gold, upper and lower corners black. Adults (>30 cm SL): body dusky greyish, with numerous small brownish yellow spots on head, back, sides, upper part of caudal fin, and sometimes over entire caudal fin. Attains 75 cm TL.



*Diagramma centurio*, 10 cm TL, juvenile (S Mozambique). Source: SSF



*Diagramma centurio*, 35 cm TL. Source: SFSA

**DISTRIBUTION** WIO: Kenya to South Africa (KwaZulu-Natal), Seychelles, and probably Madagascar and Comoros.

### *Diagramma cinerascens* Cuvier 1830

Ashen rubberlips

PLATES 84 & 85

*Diagramma cinerascens* Cuvier in Cuv. & Val. 1830: 307 (Trincomalee, Sri Lanka); Rüppell 1830; Manilo & Bogorodsky 2003.

*Diagramma pictum* (non Thunberg 1792): Playfair in Playfair & Günther 1867; Smith 1962\* [in part]; Randall 1995\*; Field 2005\*.

*Diagramma pictum cinerascens*: Johnson *et al.* 2001\*.

Dorsal fin 9–11 spines, 21–24 rays; anal fin 3 spines, 7 rays; pectoral fins 17 or 18 rays. GR 6–8/11–14. LL scales 55–64; LSS ~110.

Juveniles (~10 cm TL): head and body white, with broad black band from front of snout through eyes to end of caudal fin, and another black band from interorbital area and along upper body, merging with black on soft-rayed dorsal fin; dorsal fin mostly black with white margin. Fish ~15 cm TL white, with 2nd and 3rd black stripes often merging below soft-rayed dorsal fin, 2 thinner black stripes from eyes to caudal-fin base, and ~5 black stripes along upper body; dorsal fin and caudal fin yellow with black spots. Fish ~17 cm TL with body stripes breaking up into brown spots; dorsal fin and caudal fin with some yellow and numerous dark brown or black spots; anal fin and pelvic fins mostly dark brown. Fish ~20 cm TL with longitudinal series of brown spots along head and body; caudal fin with submarginal yellow band and black edge. Fish 24 cm TL with head, body, dorsal fin and caudal fin covered with faint brown or black spots; median fins with black margin. Fish ~30 cm TL with pale grey head and body; dorsal fin and caudal fin with dark spots and black margin; anal fin and pelvic fins dark grey distally; pectoral fins pale hyaline yellow. Fish ~45 cm TL (from Maldives) pale silvery grey, with dark spot at base of each body scale forming longitudinal series along scale rows. Large adults (50–80 cm TL) pale greyish brown, with irregular scattered dark blotches. Attains 100 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Oman, Persian/Arabian Gulf, Maldives, west coast of India and Sri Lanka; elsewhere to Bay of Bengal.

### *Diagramma punctatum* Cuvier 1830

Spotted rubberlips

PLATES 84 & 85

*Diagramma punctatum* Cuvier (ex Ehrenberg) in Cuv. & Val. 1830: 302 (Red Sea); Rüppell 1830\*; Heemstra & Heemstra 2004.

*Diagramma pictum* (non Thunberg 1792): Smith 1962 [in part].

*Diagramma pictum punctatum*: Johnson *et al.* 2001\*; Manilo & Bogorodsky 2003.

*Diagramma picta punctata*: Bogorodsky *et al.* 2014.

Dorsal fin 10 spines, 22–24 rays; anal fin 3 spines, 7 rays; pectoral fins 17 or 18 rays. GR 7 or 8/13–15. LL scales 55–61.

Juveniles (<13 cm TL): head and body white; broad midlateral black band from snout through eyes to caudal fin, and another black band from nape to soft-rayed dorsal fin, merging with black stripe from dorsal-fin origin to dorsal-fin rays; dorsal fin mostly black, leading edge and margin of soft-rayed part white; series of faint brown spots above and below midlateral black band. Larger juveniles (~18 cm TL) with black bands, breaking up into series of dark brown or black



spots along body, rear part of head and onto dorsal fin and caudal fin. Small adults (~20–22 cm TL) with more black spots along body, rear of head and onto dorsal fin and caudal fin, which also have blackish margin; black stripe along pectoral-fin bases. Subadults (~30–50 cm TL) pale silvery grey, with numerous, small, faint brown spots on body and peduncle. Adults (>50 cm TL) dark purplish grey, with irregular dark spots. Attains at least 60 cm TL.

**DISTRIBUTION** WIO: endemic to Red Sea.

#### KEY TO SPECIES

- 1a Dorsal fin 11 (rarely 12) spines, 16 or 17 rays; GR 13–16/22–24; head and body more or less grey-bronze, paler ventrally ..... *P. chubbii*
- 1b Dorsal fin 12–14 spines, 15–23 rays; GR 5–14/12–28; colour uniform or with stripes, bars, spots or blotches ..... 2
- 2a Dorsal fin 12 spines, fin margin slightly notched before soft rays ..... 3
- 2b Dorsal fin 13 or 14 spines ..... 5
- 3a Body grey to black dorsally, with 3 narrow oblique white bars, and 4th white bar (least distinct) on top of head behind eye; lower part of head and body silvery white; tips of dorsal-fin spines and opercular membrane red; dorsal fin 12 spines, 19 or 20 rays, 8th–12th rays longer than longest spine ..... *P. playfairi*
- 3b Colour not as above; longest dorsal-fin spine subequal to or greater than longest ray ..... 4
- 4a Dorsal fin 18–21 rays; longest dorsal-fin spine subequal to peduncle depth; body dusky to silvery grey, darker in adults; lips, preopercle and opercle margins, inside of mouth and pectoral-fin axil red head and body of juveniles (≤5 cm TL) yellowish with 6 pale blue longitudinal lines ..... *P. schotaf*
- 4b Dorsal fin 17 or 18 rays; longest dorsal-fin spine ~1.2 times peduncle depth; body of adults dark grey; opercle membrane black; body of juveniles (5–6 cm TL) yellowish brown, with 5 pale blue longitudinal lines on body running onto head (with age, blue lines break into spots and eventually disappear) ..... *P. sordidus*
- 5a Body deep, 2.1–2.7 in SL; dorsal body profile strongly convex, ventral profile almost straight; dorsal fin 15–17 rays, fin deeply notched before soft rays, and soft-rayed base ~1.6 into spinous base; total GR 24–30. Adults with dark grey head, body and fins; body scales pale with dark edges; preopercle and opercle margins black; fins blackish, except pectoral fins pale, and median fins yellowish, transparent or pink distally. Juveniles with dark brown head and body ..... *P. gibbosus*
- 5b Most species with body less deep, depth 2.5–2.9 in SL; dorsal and ventral body profiles slightly convex; dorsal fin 15–23 rays; total GR 26–40; colour not as above ..... 6

#### GENUS *Plectorhinchus* Lacepède 1802

Soft-rayed dorsal-fin base not longer than spinous base; dorsal-fin spines 3–5 longest; pectoral fins subequal to or shorter than pelvic fins, not reaching vertical at anus. Maxilla not reaching past vertical at front edge of eye; outer teeth slightly enlarged, conical; lips of adults more or less enlarged; chin with 4–6 distinct pores. Scales small, 15–18 in oblique series from dorsal-fin origin to lateral line; snout naked or partly scaly. About 25 species, 18 in WIO.

- 6a Dorsal fin 20–22 rays, and fin margin convex; total GR 30–34; head and body bluish grey, juveniles also with golden or reddish orange stripes along head and body, with growth forming reticulum which eventually breaks into spots on nape ..... *P. flavomaculatus*
- 6b Dorsal fin 15–20 rays; total GR 26–40; no wavy orange lines on head or reddish orange spots on body ..... 7
- 7a Juveniles (4–12 cm TL) with pale yellow or white head and body, and 5 or 6 longitudinal dark stripes that converge at front of head, breaking into series of black spots with growth. Adults with grey head, yellow lips, and pale body covered with black spots that extend onto median fins; dorsal fin 13 spines, 19 or 20 rays ..... *P. gaterinus*
- 7b Colour not as above ..... 8
- 8a Juveniles (8–10 cm TL) with upper two-thirds of head and body dark brown or black, and 2 or 3 horizontal yellow or white stripes; dorsal fin orange, soft-rayed margin black; caudal fin dark brown with 2 yellowish, almost horizontal stripes. Adults with grey or grey-brown body; anal fin, paired fins, and distal part of front half of soft-rayed dorsal fin blackish; lower third to half of caudal fin and tip of upper lobe black; dorsal fin 12 or 13 spines, 17–19 rays; total GR 26–31 ..... *P. albovittatus*
- 8b Colour not as above ..... 9
- 9a Juveniles (~8 cm TL) with head, body and spinous dorsal fin dark brown; soft-rayed dorsal fin and caudal fin pinkish yellow distally. Adults (30–60 cm SL) with huge orange or yellow lips; body dark grey, with ~10 alternating reddish orange and black oblique stripes (red stripes fade in large adults, and front two-thirds of soft-rayed dorsal fin becomes blackish); edge of preopercle red; dorsal fin 13 or 14 spines, 15 or 16 rays, fin deeply notched before soft rays, and length of soft-rayed base < 2/3 spinous base; total GR 28–30 ..... *P. plagiodesmus*
- 9b Colour not as above ..... 10

Continued...

## KEY TO SPECIES

- 10a Juveniles (~18 cm TL) with pale body and irregular yellow, black and orange blotches. Larger fish (27–55 cm TL) with pale head and body, and 5–12 horizontal dark stripes (more stripes with growth) which join across front of head; fins bright yellow, and median fins with black spots; dorsal fin 17 or 18 rays; total GR 32–34 ..... *P. vittatus*
- 10b Colour not as above ..... 11
- 11a Dorsal body profile strongly convex, body depth 2–2.6 in SL; dorsal fin 12 spines, 18–20 rays (longest rays distinctly longer than 4th spine), fin deeply notched before soft rays, and soft-rayed portion high; total GR 36–40. Small juveniles (3–4 cm SL) russet, with 7 well-defined large white blotches, and caudal fin white with 2 large oval russet patches. Larger juveniles (7–14 cm SL) with white areas enlarged and including numerous variously sized brown spots. Adults pale dorsally, belly and chest brown; head, body and median fins covered with dark spots; paired fins brown with numerous black spots ..... *P. chaetodonoides*
- 11b Colour not as above ..... 12
- 12a Body silvery yellowish, with 6 narrow, oblique, black stripes from behind head to dorsal fin, lowermost stripe from belly to upper part of peduncle; dark spots and streaks on head below eyes; fins dark, margins black, except caudal-fin margin white; dorsal fin slightly notched before soft rays; dorsal fin 14 spines, 16 rays; total GR 20 or 21 ..... *P. paulayi*
- 12b Colour not as above ..... 13
- 13a Juveniles (12–24 cm SL) oblong, body depth 2.7–2.9 in SL; peduncle length (from anal-fin base) more than twice peduncle depth; head and body white; black mask over eyes and interorbital area to lower edge of preopercle, along upper edge of opercle to black zone over most of upper body and proximal two-thirds of dorsal fin, and black zone interrupted by square white saddle over nape and another at mid-dorsal fin; peduncle and caudal fin with black spots; anal fin white with black spots and distal black blotch; paired fins white. Adults with body and median fins covered with small black spots; dorsal- and caudal-fin margins black; dorsal fin 12 spines, 18–22 rays; total GR 33–37 ..... *P. picus*
- 13b Colour not as above ..... 14
- 14a Head and lower front part of body uniformly silvery grey; dorsal fin, caudal fin and upper rear part of body with numerous black spots; pelvic fins pale with black margin; body deep, depth 2.2–2.5 in SL, head profile concave; dorsal fin 12 spines, 15 or 16 rays, fin margin deeply notched before soft rays ..... *P. pictus*
- 14b Colour not as above; dorsal-fin margin not deeply notched before soft rays ..... 15
- 15a Head and body yellowish brown, with 5–9 longitudinal, dark-edged white stripes running onto head and around front of snout; fins yellow, and median and pectoral fins with dark stripes disappearing with growth; eyes and lips yellow; inside of mouth, tongue and gill rakers scarlet; dorsal fin 12 spines, 19–22 rays ..... *P. polytaenia*
- 15b Colour not as above ..... 16
- 16a Juveniles: head and body dark brown; 2 longitudinal white stripes from head (one above and one below eye) to upper and lower edges of peduncle and converging at caudal-fin margin. Adults: head and body white; 4 dark brown bands from head to base of soft-rayed dorsal fin and caudal fin; 2 dark bands across head below eyes; median fins with irregular dark marks; black mark on upper half of pectoral-fin bases and leading edge of pelvic fins; dorsal fin 12 (rarely 13) spines, 19–21 rays; total GR 19–22 ..... *P. lessonii*
- 16b Colour not as above; dorsal-fin margin not or slightly notched before soft rays ..... 17
- 17a Head and body uniformly greyish brown, but also reddish on head; body deep, depth ~2.3 in SL; dorsal body profile strongly convex, snout profile straight or slightly concave; dorsal fin 12 or 13 spines, 21–23 rays; soft-rayed dorsal-fin base 1.2–1.3 in spinous base; total GR 28 or 29; lips not swollen in adults ..... *P. griseus*
- 17b Head and body slate-grey, with greenish yellow bar from eyes to snout tip; body oblong, depth 2.7 in SL; dorsal fin 14 spines, 19 rays, fin barely notched; total GR 29 ..... *P. ceylonensis*

### *Plectorhinchus albovittatus* (Rüppell 1838)

Giant rubberlips

PLATES 85 & 88

*Diagramma albovittatum* Rüppell 1838: 125, Pl. 31, Fig. 2 (Massawa, Eritrea, Red Sea).

*Gaterin (Leitectus) harrawayi* Smith 1952: 712, Pl. 26 (Ibo I., Mozambique); Smith 1962\*.

*Gaterin albovittatus*: Smith 1962\*.

*Plectorhinchus obscurus*: Kuitert 1998\*.

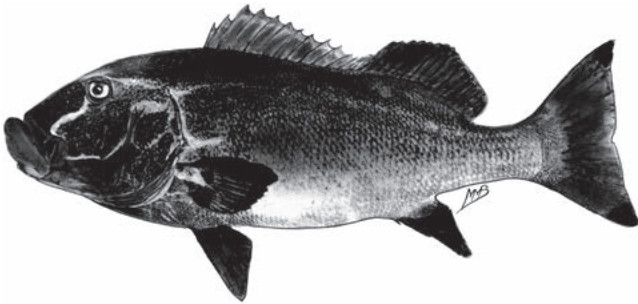
*Plectorhinchus albovittatus*: Randall & Anderson 1993\*; McKay 2001\*.

Dorsal fin 12 or 13 spines, 17–19 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body depth 2.5–3 in SL; dorsal-fin margin slightly notched before soft rays, longest ray longer than longest spine; adults with 2nd spine of anal fin slender, subequal to or shorter than 3rd spine. Lips of adults swollen. GR 6–9/19–21. LL scales 54–60; LSS ~85.

Colour as in key. Attains 120 cm TL.



*Plectorhinchus albovittatus*, 9 cm TL, juvenile (Mozambique).  
Source: Smith 1962



*Plectorhinchus albovittatus*, 83 cm TL, holotype (Seychelles).  
Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to Mozambique, Madagascar, Seychelles (Aldabra, Assumption), Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, Micronesia, Australia, New Caledonia and Tonga.

**REMARKS** Usually found on or near coral reefs, with large adults frequenting caves on the outer reef.

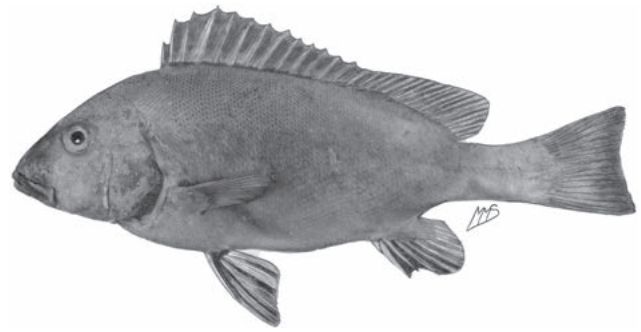
### *Plectorhinchus ceylonensis* (Smith 1956)

Sri Lanka sweetlips

*Gaterin ceylonensis* Smith 1956: 99, Pl. 1, Fig. B (Sri Lanka).  
*Plectorhinchus ceylonensis*: McKay 1984\*.

Dorsal fin 14 spines, 19 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body depth ~2.7 in SL; HL ~3.3 in SL; pectoral fins ~1.4 in HL, subequal to pelvic fins; dorsal-fin margin straight or very slightly notched before rays, soft-rayed base ~1.4 in spinous base. GR 9/20. LL scales 65.

Head, body and fins grey; median-fin margins darker grey; green-tinged yellow band from eyes to upper lip. Attains 44 cm TL.



*Plectorhinchus ceylonensis*, 44 cm TL, holotype (Sri Lanka). Source: Smith 1962

**DISTRIBUTION** Indian Ocean: Sri Lanka and Andaman Is.

**REMARKS** Occurs in small to large groups on or near rocky and coral reefs, to ~20 m. Of moderate interest to fisheries.

### *Plectorhinchus chaetodonoides* Lacepède 1801

Harlequin rubberlips

PLATE 86

*Plectorhinchus chaetodonoides* Lacepède 1801: 134, 135 [no locality given; probably Indonesia] [appeared first with vernacular name in Lacepède 1800: Pl. 13, Fig. 2]; Randall & Anderson 1993; Kuitert 1998\*; Fricke 1999; McKay 2001\*; Terashima *et al.* 2001\*.

*Diagramma pardalis* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1830: 300 (Java, Indonesia); Gudger 1929.

Dorsal fin 12 spines, 18–20 rays; anal fin 3 spines, 8 rays; pectoral fins 17 rays. Body depth ~2.2 in SL; dorsal-fin margin deeply notched before rays, height of soft-rayed portion subequal to length of its base. GR 10–12/26–28. LL scales 52–59.

Colour as in key. Attains 50 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Comoros, Mauritius and Maldives; elsewhere to Indonesia, Philippines, Palau, Japan, Australia, New Caledonia, Fiji and Tonga.

**REMARKS** Apparently rare in WIO. Found in coral-rich areas of clear lagoons and seaward reefs. Feeds on crustaceans, molluscs and fishes at night.

## *Plectorhinchus chubbi* (Regan 1919)

Dusky rubberlips

PLATE 85

*Diagramma chubbi* Regan 1919: 199, Fig. 2 (Durban, KwaZulu-Natal, South Africa).

*Gaterin chubbi*: Smith 1962\*.

*Plectorhinchus chubbi*: SSF No. 179.2\*; Heemstra & Heemstra 2004.

Dorsal fin 11 spines, 16 or 17 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 17 or 18 rays. Body depth 2.5–2.7 in SL; dorsal-fin margin barely notched before soft rays, longest spine longer than longest ray, and height of soft-rayed portion  $\sim\frac{1}{2}$  length of its base; peduncle depth equals half its length. Adults with greatly swollen lips. GR 13–16/22–24. LL scales  $\sim$ 60; LSS 105–110.

Head and body uniformly grey-bronze, paler ventrally. Attains 75 cm TL,  $\sim$ 5 kg.

**DISTRIBUTION** WIO: Kenya to South Africa (Algoa Bay).

**REMARKS** Adults occur on or near reefs to 45 m, and juveniles usually in seagrass beds.

## *Plectorhinchus flavomaculatus* (Cuvier 1830)

Lemon rubberlips

PLATES 85 & 88

*Diagramma flavomaculatum* Cuvier (ex Ehrenberg) in Cuv. & Val. 1830: 304 (Gulf of Suez, Red Sea).

*Diagramma reticulatum* Günther 1859: 334 (China); Fourmanoir 1954\*.

*Diagramma ornatum* Kossmann & Rüber 1877: 387, Pl. 3, Fig. 3 (Red Sea).

*Diagramma jayakari* Boulenger 1888: 656 (Muscat, Oman, Gulf of Oman).

*Plectorhynchus saidae* Steindachner 1895: 181 (Mauritius, Mascarenes).

*Gaterin citronellus* Smith 1956: 101, Pl. 1, Fig. C (Maputo Bay, Mozambique).

*Diagramma maculatus* Fourmanoir 1957: 97, Fig. 72 (Andoany [Hell-Ville], Madagascar, Mozambique Channel).

*Gaterin flavomaculatus*: Smith 1962\*.

*Plectorhinchus flavomaculatus*: SSF No. 179.3\*; Randall 1995\*; Fricke 1999; McKay 2001\*; Field 2005\*.

Dorsal fin 13 spines, 20–22 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body depth 2.6–2.8 in SL; dorsal-fin margin barely notched before soft rays; bases of soft-rayed and spinous portions subequal. Large adults with thick lips. GR 12–14/17–20. LL scales 53–60.

Colour as in key. Attains 72 cm TL.



*Plectorhinchus flavomaculatus*, 23 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman to Pakistan, Red Sea to South Africa (Mthatha River mouth, Eastern Cape), Madagascar, Comoros and Mauritius; elsewhere to Indonesia, Philippines, Japan, Australia and New Caledonia.

**REMARKS** Adults typically solitary on coral reefs to 29 m; juveniles common in seagrass beds.

## *Plectorhinchus gaterinus* (Fabricius 1775)

Blackspotted rubberlips

PLATES 85 & 88

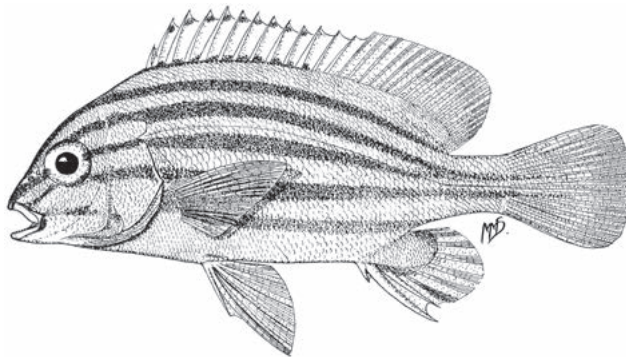
*Sciaena gaterina* Fabricius in Niebuhr (ex Forsskål) 1775: 50, xii (Jeddah, Saudi Arabia, Red Sea); Klauser & Nielsen 1965.

*Gaterin gaterinus*: Smith 1962\*.

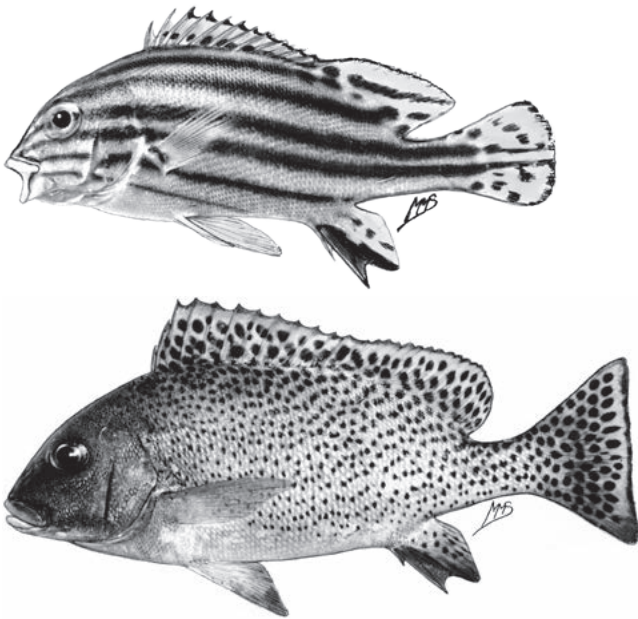
*Plectorhinchus gaterinus*: SSF No. 179.4\*; Randall 1995\*; Fricke 1999; Field 2005\*; Fricke *et al.* 2009.

Dorsal fin 13 spines, 19 or 20 rays; anal fin 3 spines, 7 rays; pectoral fins 16 rays. Body depth 2.5–3 in SL; dorsal-fin interspinous membranes not incised, and fin margin straight, not notched before soft rays; pelvic fins longer than pectoral fins. GR 8/18 or 19. LL scales 55–60; LSS 70–75.

Adults with grey-black head, yellow lips, and white body covered with black spots that extend onto yellow median fins (spots larger and more distinct distally and dorsally). Juveniles (<12 cm TL) with pale yellow or white head and body, and 5 or 6 longitudinal dark stripes that converge at front of head, breaking into series of black spots with growth. Attains 50 cm TL.



*Plectorhinchus gaterinus*, 9 cm TL, juvenile (WIO). Source: SFSA



*Plectorhinchus gaterinus*, 10 cm TL, juvenile (top) (Tanzania); 40 cm TL (bottom) (Kenya). Source: SSF

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Oman, Red Sea to South Africa (Sodwana Bay), Madagascar, Comoros, Réunion (now extinct) and Mauritius.

**REMARKS** Occurs on coral reefs to 30 m; shy and wary of divers, but commonly caught in fish traps. Flesh sometimes tainted by iodoform.

### *Plectorhinchus gibbosus* (Lacepède 1802)

Harry hotlips

PLATE 85

*Holocentrus gibbosus* Lacepède 1802: 344, 389 [no locality given: probably Indonesia].

*Pristipoma leucurum* Valenciennes in Cuv. & Val. 1833: 488 (Seychelles).

*Diagramma crassispinum* Rüppell 1835: 125, Pl. 30, Fig. 4 (Red Sea).

*Gaterin nigrus*: Smith 1962\*.

*Plectorhinchus gibbosus*: SSF No. 179.5\*; Randall & Anderson 1993\*; Randall 1995\*; Kuitert 1998; Fricke 1999; McKay 2001\*; Terashima *et al.* 2001\*; Field 2005\*; Fricke *et al.* 2009.

Dorsal fin 13 or 14 spines (rarely 13), 15 or 16 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body deep, depth 2.1–2.8 in SL, deeper in juveniles; dorsal profile strongly convex; dorsal-fin interspinous membranes distinctly incised, fin margin deeply notched before soft rays, and soft-rayed base ~½ spinous base. Lips of adults swollen. GR 9 or 10/19 or 20. LL scales 50–55; LSS 60.

Adults with dark grey head, body and fins; body scales pale with dark edges; preopercle edge and opercle margin black; fins

blackish, except pectoral fins pale, and median fins yellowish, transparent or pink distally. Juveniles with dark brown head and body. Attains 75 cm TL.



*Plectorhinchus gibbosus*, juvenile (WIO).

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Persian/Arabian Gulf, Oman, Red Sea to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mauritius and Maldives; elsewhere to Indonesia, Philippines, China, Japan, Caroline Is., Australia and Society Is.

**REMARKS** Common; found on soft sandy bottom, in bays and estuaries, and also on protected reefs to 25 m; adults sometimes in small groups. Good eating, but reported to cause ciguatera in the Pacific.

### *Plectorhinchus griseus* (Cuvier 1830)

Grey rubberlips

PLATE 86

*Diagramma griseum* Cuvier in Cuv. & Val. 1830: 306 (Malabar coast, India).

*Gaterin sivalingami* Smith 1956: 97, Pl. 1a (Sri Lanka).

*Plectorhinchus griseus*: McKay 1984\*.

Dorsal fin 12 or 13 spines, 21–23 rays; anal fin 3 spines, 8 rays; pectoral fins 18 rays. Body depth ~2.3 in SL; dorsal body profile strongly convex; snout profile slightly concave; dorsal-fin margin slightly indented before soft rays, soft-rayed and spinous bases subequal; pectoral fins slightly shorter than pelvic fins. GR 11/17 or 18. LL scales ~70.

Head and body uniformly greyish brown, but head sometimes reddish. Attains 50 cm TL.

**DISTRIBUTION** WIO: India and Sri Lanka (reportedly common at latter).

**REMARKS** Found on shallow coral reefs and in shallow turbid water.

## *Plectorhinchus lessonii* (Cuvier 1830)

Striped rubberlips

PLATE 85

*Diagramma lessonii* Cuvier in Cuv. & Val. 1830: 313 (Waigeo I., Papua Barat, Indonesia).

*Plectorhinchus lessonii*: McKay 2001\*.

Dorsal fin 12 or 13 spines, 19–21 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body depth ~2.8 in SL; dorsal-fin margin straight, not notched before soft rays. GR 5–7/12–16. LL scales 54–58.

Colour as in key. Attains 60 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to Tanzania (Zanzibar), and Sri Lanka; elsewhere to Indonesia, Philippines, Taiwan, Japan, Australia and Polynesia.

**REMARKS** Solitary, on or near coral reefs.

## *Plectorhinchus paulayi* Steindachner 1895

Slantstriped rubberlips

PLATE 86

*Plectorhynchus paulayi* Steindachner 1895: 180 (Mauritius, Mascarenes); Fricke 1999; Manilo & Bogorodsky 2003.

*Gaterin baileyi* Smith 1953: 158, Pl. 7 (Malindi, Kenya).

*Gaterin paulayi*: Smith 1962\*.

Dorsal fin 14 spines, 16 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body depth ~3 in SL; dorsal-fin interspinous membranes barely incised, fin margin slightly notched before soft rays, and soft-rayed base ~1.5 in spinous base. GR 6 or 7/14. LL scales 54 or 55; LSS 70–72.

Head and body silvery grey, with oblique dark lines as shown; fins dusky, but spinous dorsal-fin margin, anal-fin tip and pelvic fins black. (One 44-cm-TL curious colour morph with oblique lines paler than body.) Attains 45 cm TL.

**DISTRIBUTION** WIO: Records from Kenya, Madagascar, Aldabra and Mauritius.

**REMARKS** Rare. Caught in fish traps set in mangroves.

## *Plectorhinchus pictus* (Tortonese 1936)

Dorsal-spotted rubberlips or trout thicklips

PLATE 86

*Diagramma cinctum* (non Temminck & Schlegel 1843): Day 1875\*.

*Plectorhynchus cinctus* (non Temminck & Schlegel 1843): Blegvad & Løppenthin 1944\*; Munro 1955.

*Hapalogenys pictus* Tortonese 1936: 1, Pl. 1 (Bandar Abbas, Iran, Strait of Hormuz).

*Plectorhinchus cinctus punctatus*: Fang 1942.

*Gaterin pictus*: Smith 1962\*, 1963\*.

*Plectorhinchus pictus*: Randall 1995\*; McKay 2001\*; Heemstra *et al.* 2004.

Dorsal fin 12 spines, 15–17 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 16 rays. Body deep, depth 2.2–2.5 in SL; dorsal body profile strongly convex, head profile straight or slightly concave at snout; dorsal-fin margin distinctly incised between spines, deeply notched before soft rays, and soft-rayed portion elevated; caudal fin truncate. GR 6–8/12–15. LL scales 49–58.

Adults with pale grey head and body, with black spots on upper and rear parts of body and median fins. Juveniles with pale body, with 3 horizontal dark bands which break into dark blotches and numerous eye-sized dark spots between upper 2 dark bands. Attains 60 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf to India, Seychelles, Mauritius, Rodrigues and Sri Lanka; elsewhere to Thailand and China.

## *Plectorhinchus picus* (Cuvier 1830)

Spotted rubberlips

PLATES 86 & 88

*Diagramma pica* Cuvier in Cuv. & Val. 1830: 297 (Society Is.).

*Diagramma punctatissimum* Playfair 1868: 851, Pl. 40 (Seychelles).

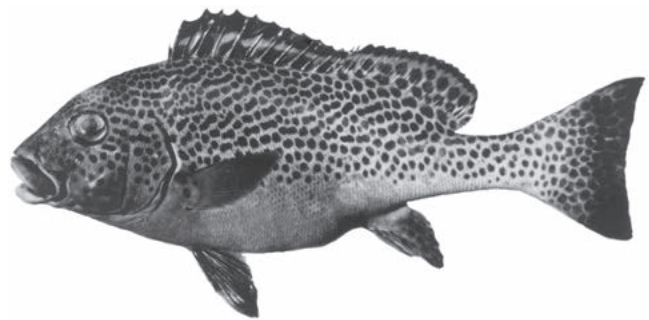
*Gaterin picus*: Smith 1962\*.

*Gaterin punctatissimus*: Smith 1962\*.

*Plectorhinchus picus*: McKay 2001\*; Terashima *et al.* 2001\*; Heemstra *et al.* 2004.

Dorsal fin 12 spines, 18–20 rays; anal fin 3 spines, 7 rays; pectoral fins 17 or 18 rays. Dorsal-fin margin straight in juveniles, slightly notched before soft rays in adults; interspinous membranes incised in juveniles, but less so in adults. GR 8–13/23–27. LL scales 62–70; LSS ~120.

Adults with pale head and body, covered with numerous small black spots (except not on belly); spinous dorsal fin black, with pale stripe along middle of fin; soft-rayed dorsal fin pale, covered with large black spots, margin black. Juveniles as described in key and shown on plates. Attains 85 cm TL.



*Plectorhinchus picus*, 50 cm TL (Seychelles). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Seychelles, Mauritius and Rodrigues; elsewhere to Japan, Micronesia, Australia and Society Is.

**REMARKS** Apparently rare in WIO. Found on and near coral reefs, to ~50 m deep.

### *Plectorhinchus plagiodesmus* Fowler 1935

Obliquebarred rubberlips PLATES 86 & 88

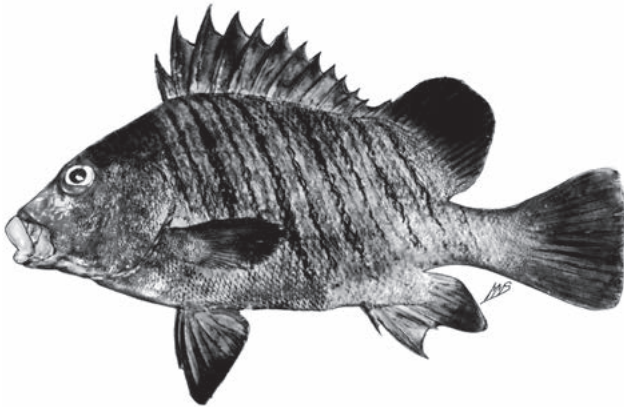
*Plectorhinchus plagiodesmus* Fowler 1935: 387, Fig. 20 (St Lucia estuary, KwaZulu-Natal, South Africa); SSF No. 179.6\*; McKay 1984\*.

*Diagramma obscurus* Fourmanoir 1957: 97 (Andoany [Hell-Ville], Madagascar, Mozambique Channel) [objectively invalid].

*Gaterin plagiodesmus*: Smith 1962\*.

Dorsal fin 14 spines, 15 or 16 rays (longest ray subequal to longest spine); anal fin 3 spines, 7 rays; pectoral fins 17 rays. Dorsal-fin interspinous membranes distinctly incised, fin margin deeply notched before soft rays, and soft-rayed base ~½ length of spinous base. Lips huge. GR 9 or 10/19 or 20. LL scales 48–51.

Colour as in key. Attains 90 cm TL.



*Plectorhinchus plagiodesmus*, 31 cm TL (Kenya). Source: SSF

**DISTRIBUTION** WIO: Somalia to South Africa (south coast), Aldabra and Madagascar.

**REMARKS** Sometimes found in pairs on coral reefs; more common in turbid sheltered waters to at least 35 m.

### *Plectorhinchus playfairi* (Pellegrin 1914)

Whitebarred rubberlips PLATE 86

*Diagramma griseum* var. *playfairi* Pellegrin 1914: 233 (Mahambo, Madagascar); Pellegrin 1933\*.

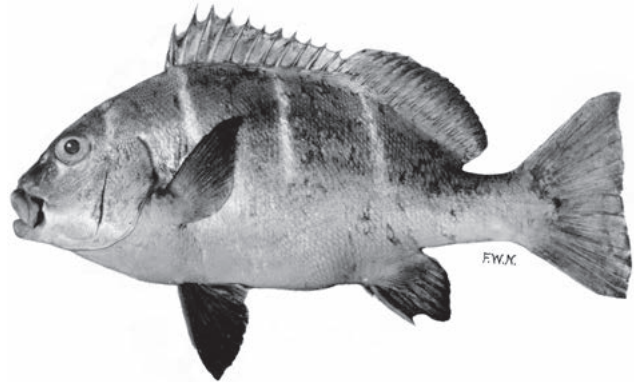
*Gaterin batata* Smith 1952: 713 (East Africa).

*Gaterin playfairi*: Smith 1962\*.

*Plectorhinchus playfairi*: SSF No. 179.7\*; Randall 1995\*; Fricke 1999; Heemstra & Heemstra 2004\*.

Dorsal fin 12 spines, 19 or 20 rays (4th and 5th spines longest but shorter than longest rays); anal fin 3 spines, 7 rays; pectoral fins 16 rays. Body depth 2.4–2.5 in SL; dorsal-fin margin not incised between spines, slightly notched before soft rays, and soft-rayed base shorter than spinous base. Lips of adults swollen. GR 11/21–23. LL scales 58–60; LSS 76–80.

Colour as in key. Attains 90 cm TL.



*Plectorhinchus playfairi*, 45 cm TL (WIO).

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Oman, Red Sea, Gulf of Aden, Kenya to South Africa (Eastern Cape), Madagascar, Seychelles and Mauritius.

**REMARKS** Adults solitary and active by day, to ~80 m deep; juveniles found in tidepools.

### *Plectorhinchus polytaenia* (Bleeker 1852)

Ribboned rubberlips PLATE 86

*Diagramma polytaenia* Bleeker 1852: 755 (Makassar, Sulawesi, Indonesia).

*Plectorhinchus polytaenia*: McKay 2001\*.

Dorsal fin 12 or 13 spines, 19–22 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays; dorsal-fin margin not incised between spines, not notched before soft rays, and bases of soft-rayed and spinous portions subequal. Lips of adults slightly swollen. GR 7–9/18–21. LL scales 54–60.

Colour as in key. Attains 50 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: west coast of India; elsewhere to Indonesia, Malaysia, Philippines, Australia, New Guinea and Solomon Is.

**REMARKS** Uncommon. Occurs on coastal and seaward reefs, solitary or in small groups, usually under ledges by day. Adults typically found on deep current-prone slopes with rich invertebrate growth, and juveniles on sheltered reefs nearby.

### *Plectorhinchus schotaf* (Walbaum 1792)

Minstrel rubberlips

PLATES 86 & 88

*Sciaena schotaf* Walbaum (ex Forsskål) 1792: 315 [Red Sea].

*Diagramma durbanense* Gilchrist & Thompson 1908: 155 (KwaZulu-Natal, South Africa).

*Gaterin schotaf*: Smith 1962\*.

*Plectorhinchus schotaf*: SSF No. 179.8\*; Randall 1995\*; Khalaf & Disi 1997 [photograph is *P. sordidus*]; McKay 2001\*; Field 2005\*; Bogorodsky *et al.* 2014; Johnson & Worthington Wilmer 2015\*.

Dorsal fin 12 spines, 18–21 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. Body depth 2.5–3 in SL; eye diameter of adults ~5 in HL; dorsal-fin margin straight in juveniles, notched before soft rays in adults, and soft-rayed base usually slightly longer than spinous base. Lips of adults moderately swollen. GR 10–12/16 or 17. LL scales ~55; LSS ~90.

Head and body greyish silvery or greyish brown, paler below; head darker dorsally; opercle membrane scarlet; pectoral-fin axil, maxillary groove and inside of mouth red to orange-red. Attains 90 cm TL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Oman, Red Sea to South Africa (Port St Johns, Eastern Cape).

**REMARKS** Found around rocks and corals, from surf zone to ~80 m deep; juveniles found in tidepools. Enters estuaries and rivers in South Africa, Madagascar and Seychelles.

### *Plectorhinchus sordidus* (Klunzinger 1870)

Sombre rubberlips

PLATE 85

*Diagramma sordidum* Klunzinger 1870: 735 (Al-Qusayr, Egypt, Red Sea); Klunzinger 1884\*.

?*Diagramma umbrinum* Klunzinger 1870: 736 (Al-Qusayr, Egypt, Red Sea).

*Diagramma erythrostoma* Bliss 1883: 47 (Mauritius, Mascarenes).

*Diagramma obscurus* (non Günther 1872): Fourmanoir 1957.

*Gaterin sordidus*: Smith 1962\*.

*Plectorhinchus sordidus*: SSF No. 179.9\*; Randall 1995\*; Fricke 1999; Field 2005\*; Fricke *et al.* 2009.

Dorsal fin 12 spines, 17 or 18 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 17 rays. Body depth 2.5–2.8 in SL; dorsal and ventral body profiles moderately convex; eye diameter ~3 in HL; dorsal-fin margin barely notched before soft rays. Lips of adults slightly swollen. GR 9–11/15 or 16. LL scales ~50; LSS ~85.

Head, body and fins of adults dark dusky grey, and opercular membrane black; body of juveniles (~6 cm TL) pale yellowish brown, with 5 dark-edged pale blue stripes. Attains 30 cm TL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea to South Africa (Cape Vidal), Madagascar, Seychelles, Réunion and Mauritius.

**REMARKS** Found over rocks and corals, as well as in shallow weedy areas; solitary or in small groups, generally close to shelter.

### *Plectorhinchus vittatus* (Linnaeus 1758)

Oriental rubberlips

PLATE 86

*Perca vittata* Linnaeus 1758: 291 [no locality given].

*Bodian cuvier* Bennett 1829: no page number, Pl. 13 (south coast of Sri Lanka).

*Gaterin orientalis*: Smith 1962\*.

*Plectorhinchus orientalis*: Winterbottom *et al.* 1989\*; Kuitert 1998\*.

*Plectorhinchus vittatus*: Randall & Anderson 1993; Winterbottom & Anderson 1997; Fricke 1999; Randall & Johnson 2000\*; McKay 2001\*; Heemstra *et al.* 2004; Fricke *et al.* 2009.

Dorsal fin 13 spines, 17 or 18 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 18 rays. Body depth 2.6–2.8 in SL; dorsal-fin margin not incised between spines, but distinctly notched before soft rays. Lips of adults moderately enlarged. GR 10–12/22 or 23. LL scales ~65; LSS ~100.

Juveniles (<14 cm TL) with blotches on body, gradually replaced by horizontal dark stripes (by ~22 cm TL), and juveniles' black pectoral fins become uniformly yellow in adults. Attains 72 cm TL.



*Plectorhinchus vittatus*, 14 cm TL, juvenile (Comoros).





*Plectorhinchus vittatus*, 36 cm TL (Kenya). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to Mozambique, Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, New Guinea, Australia and Polynesia.

**REMARKS** Adults solitary on coral reefs, to 25 m deep; juveniles found in tidepools.

## GENUS *Pomadasys* Lacepède 1802

Dorsal fin 10–12 strong spines, 13–17 rays; soft-rayed dorsal-fin base distinctly shorter than spinous base; dorsal-fin spines 3–5 longest; anal fin 3 spines, 7–13 rays; pectoral fins long and pointed, reaching to or beyond vertical at anus, subequal to or longer than head and longer than pelvic fins. Mouth small; maxilla not reaching much past vertical at front edge of eye; teeth short and conical, no canines; no teeth on palate or tongue; chin with 2 small pores followed by median pit with small pore on each side of pit. Scales moderate-sized, 4–8 in oblique series from dorsal-fin origin to lateral line; preorbital naked or partly scaly. About 34 species, 15 in WIO.

### KEY TO SPECIES

- 1a Head and body pale, with 11 distinct dark stripes along body and running onto head dorsally, and dark marks on opercle; body fusiform, depth ~3.2 in SL; dorsal-fin margin straight; GR 11/14 ..... *P. laurentino*
- 1b Body either without dark stripes or with <7 distinct stripes; dorsal-fin margin straight or with distinct notch before soft rays ..... 2
- 2a Head and body silvery, black blotch at rear of operculum; juveniles with 6–10 dark bars and vertical series of dark spots in 4 longitudinal rows along body; 1 or 2 rows of dark spots along dorsal-fin base; dark spots on body fade with growth and disappear in adults; 2nd spine of anal fin enlarged, longer and thicker than 3rd spine, subequal to 3rd dorsal-fin spine and about twice peduncle depth ..... *P. kaakan*

Continued ...

### KEY TO SPECIES

- 2b Colour not as above ..... 3
- 3a Body silvery, with numerous black spots on dorsal two-thirds of body, and usually a dark blotch on rear of opercle; dorsal fin 10 or 11 spines; body oblong, depth 2.9–3.7 in SL; eyes small, 6.9–7.2 in HL ..... *P. commersonnii*
- 3b Colour not as above; dorsal fin 12 spines; body usually deeper, depth 2.3–3.2 in SL; eye diameter 3.3–5.3 in HL ..... 4
- 4a Adults silvery, with longitudinal yellow stripes or rows of dark spots or dark brown lines ..... 5
- 4b Adults uniformly silvery or with dark blotches or spots (*P. aheneus* juveniles with 3 dark longitudinal stripes) ..... 10
- 5a Body oblong, depth 2.8–3.2 in SL; head and body silvery, with 3 or 4 yellowish, yellow-brown or dark brown stripes on upper half of body; LL scales 54–60 ..... 6
- 5b Body deep, depth 2.2–2.7 in SL; colour not as above; LL scales 50–53 ..... 7
- 6a Lowest (midlateral) body stripe ends at dark blotch on opercle; scale rows below lateral line horizontal; interorbital width less than eye diameter; GR 7 or 8/14–16 ..... *P. stridens*
- 6b Midlateral dark stripe continues across opercle and eye, but no dark blotch on opercle; body scale rows oblique, running dorsoposteriorly; interorbital width subequal to eye diameter; GR 10 or 11/10 or 11 ..... *P. striatus*
- 7a Body silvery, with 7 dark bronze stripes converging down front of head, and black spot on rear end of opercle; dorsal fin 15 rays; GR 5 or 6/12 ..... *P. taeniatus*
- 7b Colour not as above ..... 8
- 8a Body brassy yellow dorsally; soft-rayed dorsal fin and caudal fin blackish; juveniles yellow, with 2 well-defined brown stripes along dorsal half of body and thinner brown stripe in between; dorsal fin 11 or 12 spines, 14 rays ..... *P. aheneus*
- 8b Colour not as above; dorsal fin 12 spines, 14 or 15 rays ..... 9
- 9a Body pale, purplish brown dorsally, with 6 or 7 dark longitudinal bands (bands bifurcate anteriorly in juveniles, becoming double bands in adults); 2nd spine of anal fin distinctly longer and thicker than 3rd; anal fin 7 rays; dorsal fin distinctly notched before soft rays ..... *P. furcatus*
- 9b Body silvery, faintly yellowish green dorsally, with 11 or 12 irregular brown lines on alternate scale rows of dorsal part of body, upper lines broken into series of small contiguous spots; fins dusky, median fins with black margin; pelvic fins and anal fin pale yellow; anal fin 8 rays; dorsal-fin margin not notched ..... *P. punctulatus*

Continued ...

**KEY TO SPECIES**

- 10a Head and body silvery, with dark saddle blotch on nape, 3 interrupted dark bars below dorsal fin and large black blotch on front of fin; dorsal-fin margin deeply notched before soft rays ..... *P. maculatus*
- 10b Colour not as above ..... 11
- 11a Head and body uniformly silvery; dorsal-fin margin straight, not notched; anal fin and paired fins yellow or reddish orange in life; caudal fin black, with pale margin; eye diameter equal to or greater than snout length ..... *P. guoraca*
- 11b Colour not as above; eye diameter less than snout length ... 12
- 12a Head and body uniformly silvery, with dark blotch on rear edge of opercle ..... 13
- 12b Head and body silvery and with numerous small black spots on body ..... 14
- 13a Dorsal fin 12 spines, 15–17 rays; anal fin 11–13 rays, fin base longer than 2nd spine; well-defined dark brown spot on upper rear margin of opercle ..... *P. olivaceus*
- 13b Dorsal fin 12 spines, 13 rays; anal fin 7 rays, fin base shorter than 2nd spine; dark blotch on opercle of juveniles, but diffuse in adults ..... *P. argyreus*
- 14a Head and body with numerous dark spots; dorsal fin 13 rays ..... *P. multimaclulatus*
- 14b Body with dark spots, none on head; dorsal fin 14 rays ..... *P. argenteus*

***Pomadasys aheneus*** McKay & Randall 1995Yellowback grunter PLATES 86 & 88*Pomadasys aheneus* McKay & Randall 1995: 251, Fig. 1a–b (off Salalah Harbour, Oman); Randall 1995\*; Iwatsuki *et al.* 1999.

Dorsal fin 11 or 12 spines, 13 or 14 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 16 or 17 rays. Body depth 2.3–2.6 in SL; eye diameter subequal to snout length. GR 5 or 6/12 or 13. LL scales 51–53.

Juveniles (<8 cm TL) pale yellow, with 3 dark brown stripes along dorsal half of body, lower stripe from behind mid-eye to mid-caudal fin base; upper stripe from interorbital area and just below dorsal-fin base to base of upper caudal-fin rays; narrower brown stripe between upper and lower stripe. Adults with brassy yellow head and body dorsally, silvery grey below; fins dusky, soft-rayed dorsal fin and caudal fin dark grey to black. Attains at least 27 cm TL.

**DISTRIBUTION** WIO: Oman (southern to central coast).**REMARKS** Occurs over inshore rocky substrates; type specimens collected in ~6 m.***Pomadasys argenteus*** (Forsskål 1775)Silver grunter PLATES 87 & 88*Sciaena argentea* Forsskål in Niebuhr 1775: 51, xii (Jeddah, Saudi Arabia, Red Sea); Klauswitz & Nielsen 1965\*.*Pristipoma nageb* Rüppell 1838: 124, Pl. 30, Fig. 2 (Jeddah, Saudi Arabia, Red Sea) [based on *Sciaena nageb* Niebuhr 1775 and *Sciaena nageb* Bonnaterre 1788].*Pomadasys argenteus*: Randall 1995\*; McKay 2001\*; Bogorodsky *et al.* 2014.

Dorsal fin 12 spines, 14 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. Body depth 2.7–2.8 in SL; head profile nearly straight; eye diameter subequal to snout length; dorsal-fin margin deeply notched before soft rays. Preopercle corner produced into parabolic lobe. Lips of adults not thickened. GR 5 or 6/11–13. LL scales 47–50.

Adults silvery, with small black spots scattered on upper body; each interspinous dorsal-fin membrane with 1–4 dark spots; 3 rows of dark spots along soft-rayed dorsal fin. Juveniles pale brownish, with irregular dark streaks on alternate scale rows of dorsal part of body, and poorly defined dusky blotch on opercle. Attains 52 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to southern India; elsewhere to Indonesia, Philippines, Japan, New Guinea, Australia, New Caledonia and Vanuatu.**REMARKS** Found in estuaries and inshore waters of open bays, to ~38 m deep.***Pomadasys argyreus*** (Valenciennes 1833)White grunter PLATE 89*Pristipoma argyreum* Valenciennes in Cuv. & Val. 1833: 485 (Coromandel coast, India; Sumatra and Java, Indonesia; Mauritius, Mascarenes).*Pomadasys argyreus*: Fricke 1999; McKay 2001\*.

Dorsal fin 12 spines, 13 rays; anal fin 3 spines, 7 rays. Body deep, depth distinctly more than HL, 2.3–2.7 in SL; head profile convex; dorsal-fin margin notched before soft rays. Fin spines strong; 2nd spine of anal fin much larger than 3rd spine and longer than entire fin base; pectoral fins longer than head, reaching vertical at anal-fin origin. LL scales 42–47.

Head and body silvery; juveniles with large blue-black blotch on opercle, fading in adults. Attains 40 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to Bangladesh, Indonesia, Philippines, Australia and New Guinea.

**REMARKS** Occurs in estuaries and inshore waters of bays, over soft bottom.

### *Pomadasys commersonnii* (Lacepède 1801)

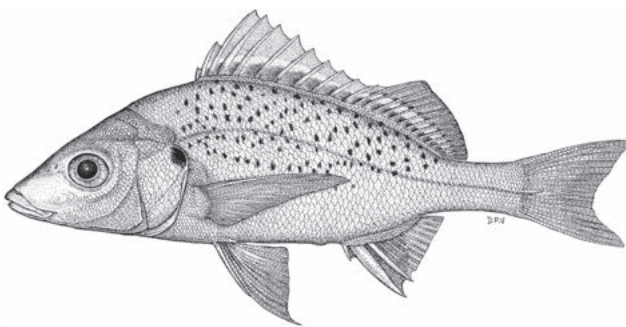
Spotted grunter

PLATE 87

*Labrus commersonnii* Lacepède (ex Commerson) 1801: 431, 477, Pl. 23, Fig. 1 ('Great Ocean' [Indo-Pacific]) [based on drawing by Commerson].  
*Pristipoma operculare* Playfair in Playfair & Günther 1867: 24, Pl. 4, Fig. 1 (Gulf of Aden; Durban, KwaZulu-Natal, South Africa).  
*Pomadasys commersonnii*: Smith 1962\*; SSF No. 179.10\*; Randall 1995\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 13–16 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 17–19 rays. Body elongate, depth usually less than HL, 2.9–3.7 in SL; dorsal profile of interorbital region and snout straight; in large adults the supraoccipital bone at back of skull is enlarged, resulting in prominent bump on nape; peduncle length more than twice its depth; dorsal-fin margin deeply notched before soft rays; pectoral fins longer than head; 2nd and 3rd anal-fin spines subequal. GR 9 or 10/16 or 17. LL scales 52–54.

Adults silvery or brownish dorsally, with numerous small black spots and usually a larger black spot on opercle, but no other spots on head; juveniles (<8 cm TL) without spots on body. Attains 90 cm TL, ~10 kg.



*Pomadasys commersonnii*, 13 cm SL, juvenile (South Africa).  
 Source: Whitfield 1998

**DISTRIBUTION** WIO: Oman (southern coast) to India (northwestern coast) and south to South Africa (Algoa Bay; False Bay in summer), Madagascar and Seychelles.

**REMARKS** Inhabits shallow coastal waters; common in estuaries and often caught in the surf near river mouths; juveniles sometimes found in freshwater. Feeds on small

crustaceans (crabs and prawns) and bivalves: burrowing prey are blown from their holes with a strong jet of water; when adults are feeding in shallow water, one can often see their tails protruding above the surface. An important food fish in the region.

### *Pomadasys furcatus* (Bloch & Schneider 1801)

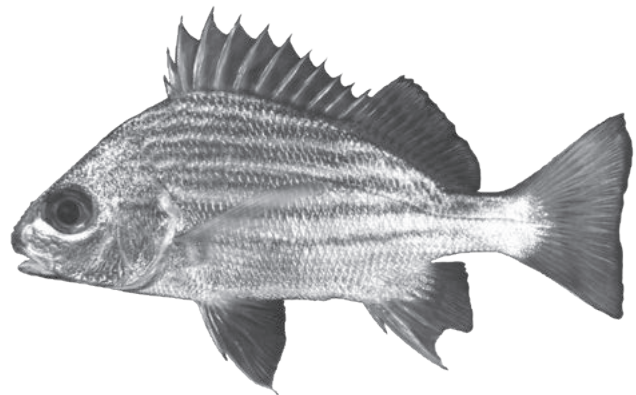
Banded grunter

PLATE 87

*Grammistes furcatus* Bloch & Schneider 1801: 187, Pl. 43 ('India orientali' [Indonesia]).  
*Pristipoma anas* Valenciennes 1862: [8] (Réunion, Mascarenes).  
*Pomadasys taeniophorus* Regan 1908: 251, Pl. 39 (Kosi Bay, KwaZulu-Natal, South Africa).  
*Pomadasys furcatus*: SSF No. 179.11\*; McKay 2001\*; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.  
*Pomadasys furcatus*: McKay & Randall 1995\*; Fricke 1999.

Dorsal fin 12 spines, 14 or 15 rays; anal fin 3 spines, 7 rays; pectoral fins 15–17 rays. Body deep, depth much greater than HL, 2.2–2.7 in SL; dorsal body profile strongly convex; dorsal-fin margin slightly incised between spines, notched before soft rays. Preopercle angle bluntly rounded. GR 5/12 or 13. LL scales 50–52.

Body silvery, but pale purplish brown dorsally and paler ventrally, with 6 brown longitudinal bands: uppermost band runs along scaly sheath of dorsal fin (some bands bifurcate anteriorly in juveniles and become more bifurcate or double in adults); fins pale; brown spot at base of each dorsal-fin spine and ray. Attains 50 cm TL.



*Pomadasys furcatus*, 12 cm SL (South Africa). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Somalia to South Africa (KwaZulu-Natal), Madagascar, Comoros, Réunion, Mauritius, Pakistan, India and Sri Lanka; elsewhere to Indonesia.

**REMARKS** Usually found on sandy areas near rocks.

## *Pomadasys guoraca* (Cuvier 1829)

Blacktail grunter

PLATES 87 & 89

*Pristipoma guoraca* Cuvier 1829: 176 (Visakhapatnam, India; Red Sea).

Dorsal fin 12 spines, 13 rays; anal fin 3 spines, 7 rays; pectoral fins 15–17 rays. Body deep, depth much greater than HL, 2.2–2.5 in SL; dorsal body profile strongly convex; dorsal-fin margin slightly notched before soft rays; 2nd spine of anal fin distinctly longer than 3rd spine and longer than fin base. Preopercle angle bluntly rounded. GR 5/12 or 13. LL scales 47–52.

Head and body silvery; anal fin and paired fins yellow to reddish orange; caudal fin blackish. Attains 18 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to Bangladesh and Philippines.

## *Pomadasys kaakan* (Cuvier 1830)

Javelin grunter

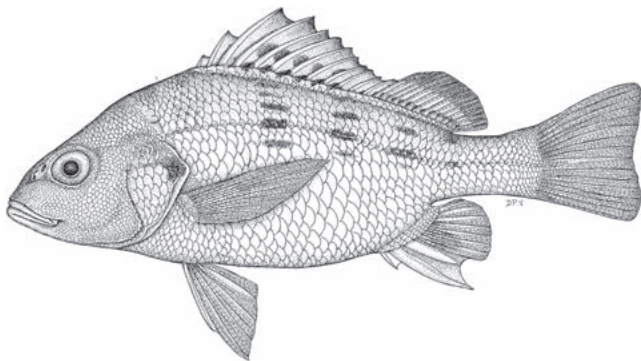
PLATE 87

*Pristipoma kaakan* Cuvier in Cuv. & Val. 1830: 244 (Adrian River, Kupang, Timor; Puducherry and Mahé, India).

*Pomadasys kaakan*: SSF No. 179.13\*; Randall 1995\*; McKay 2001\*; Heemstra & Heemstra 2004\*; Bogorodsky *et al.* 2014.

Dorsal fin 12 spines, 13–15 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 17 or 18 rays. Body depth 2.6–2.8 in SL; dorsal-fin margin distinctly incised between spines and deeply notched before soft rays; dorsal- and anal-fin spines robust, longest dorsal-fin spine 1.6–2.1 in HL. Preopercle corner bluntly rounded, slightly produced. GR 5 or 6/13 or 14. LL scales 43–47.

Juveniles silvery green dorsally, with dark spot on opercle, and 6–10 vertical series of dark spots aligned with 4 longitudinal dark stripes along body; margin of spinous dorsal fin dark, and dorsal-fin base with row of dark spots. Adults silvery; dark spots faint or absent on body and dorsal fin. Attains 75 cm TL, ~6 kg.



*Pomadasys kaakan*, 13 cm SL, juvenile (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea to South Africa (Msikaba River estuary, Eastern Cape), Madagascar and India; elsewhere to Indonesia, Philippines, Taiwan, Australia and New Guinea.

**REMARKS** Occurs inshore, commonly in estuaries; adults solitary, but spawn in aggregations near rivermouths. Excellent food fish, caught by anglers, set nets, traps and spear.

## *Pomadasys laurentino* (Smith 1953)

Manylined grunter

PLATE 89

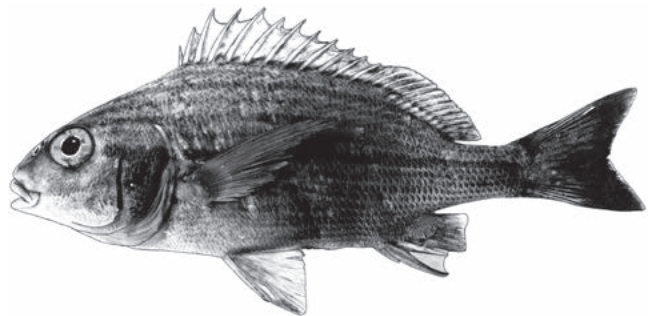
*Pristipoma anas* (*non* Valenciennes 1862): Sauvage 1891\*.

*Rhonciscus laurentino* Smith 1953: 12, Pl. 1, Fig. 1 (off Inhambane, Mozambique).

*Pomadasys laurentino*: SSF No. 179.14\*; Iwatsuki *et al.* 1999.

Dorsal fin 12 spines, 15 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Dorsal-fin margin straight, interspinous membranes not incised and fin not notched before soft-rayed portion. GR 11/14. LL scales ~52.

Body grey, paler ventrally; 11 dark lines along body and upper part of head; irregular dark marks on opercle. Attains 18 cm TL.



*Pomadasys laurentino*, 18 cm TL, holotype (Mozambique). Source: SSF

**DISTRIBUTION** Known only from the holotype from Mozambique and photographs from southeastern Madagascar.

**REMARKS** Holotype collected at ~100 m.

## *Pomadasys maculatus* (Bloch 1793)

Saddle grunter

PLATE 87

*Anthias maculatus* Bloch 1793: 9, Pl. 326, Fig. 2 (East Indies).

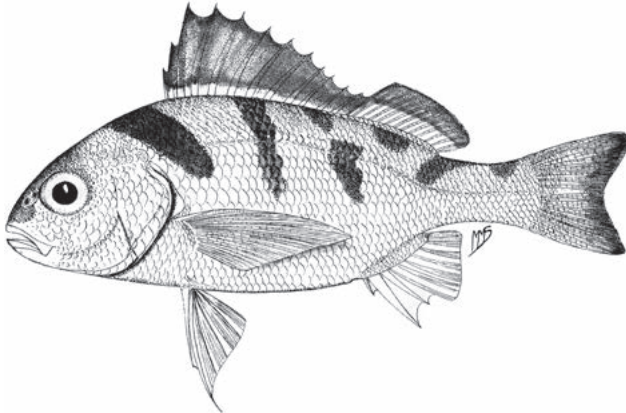
*Pristipoma caripa* Cuvier 1829: 176 (Puducherry, India).

*Pomadasys maculatus*: SFSA No. 677\*; Randall 1995\*; McKay 2001\*; Heemstra & Heemstra 2004\*; Bogorodsky *et al.* 2014.

*Pomadasys maculatum*: SSF No. 179.15\*.

Dorsal fin 12 spines, 13–15 rays; anal fin 3 spines, 6–8 rays; pectoral fins 17 rays. Body oblong, depth 2.3–2.9 in SL; head profile convex; dorsal-fin interspinous membranes not incised, but fin margin deeply notched before soft rays. GR 6/14–16. LL scales 50–55.

Head and body silvery grey, with broad oblique blackish blotch from nape to below lateral line; 3 vertical, blackish blotches below dorsal fin, and large black blotch at front of fin (blotches faint or absent on some fish). Attains 60 cm TL.



*Pomadasys maculatus*, 15 cm TL (S Mozambique). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, Persian/Arabian Gulf, Red Sea to South Africa (KwaZulu-Natal), Madagascar, India and Sri Lanka; elsewhere to Indonesia, Philippines, China, Japan and Australia.

**REMARKS** Found in estuaries and nearshore areas, over soft bottom, and often near reefs; trawled to 50 m.

### *Pomadasys multimaculatus* (Playfair 1867)

Cock grunter

PLATE 87

*Pristipoma multimaculatum* Playfair in Playfair & Günther 1867: 23, Pl. 3,

Fig. 3 (Bagamoyo, Tanzania; Durban, KwaZulu-Natal, South Africa).

*Pomadasys multimaculatum*: SSF No. 179.16\*.

*Pomadasys multimaculatus*: Heemstra & Heemstra 2004.

Dorsal fin 12 spines, 13 rays; anal fin 3 spines, 7 rays; pectoral fins 17 rays. Body elongate, depth 2.8–3 in SL; head profile straight; dorsal-fin margin deeply notched before rays, not incised between spines. GR 6/12 or 13. LL scales 49–54.

Head and body silvery, with head and upper two-thirds of body covered with small black spots. Attains 76 cm TL.



*Pomadasys multimaculatus*, 25 cm TL (WIO).

**DISTRIBUTION** WIO: endemic to East Africa, from Kenya and Tanzania (Zanzibar) to South Africa (Algoa Bay, Eastern Cape).

**REMARKS** Occurs in estuaries and shallow coastal waters.

### *Pomadasys olivaceus* (Day 1875)

Olive grunter

PLATE 87

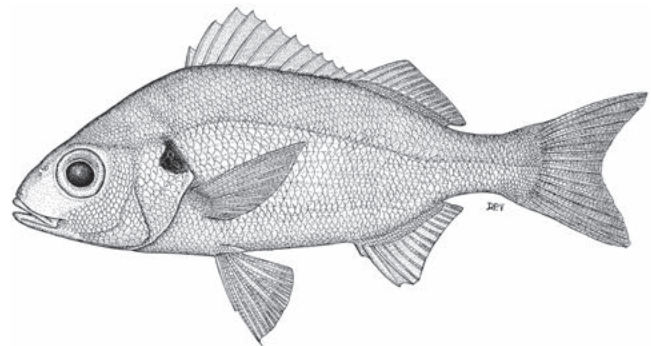
*Pristipoma olivaceum* Day 1875: 73, Pl. 19, Fig. 1 (coasts of Baluchistan and Sindh, Pakistan).

*Pomadasys olivaceum*: SSF No. 179.17\*.

*Pomadasys olivaceus*: Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 12 spines, 15–17 rays; anal fin 3 spines, 11–13 rays; pectoral fins 16 or 17 rays. Body oblong, depth 2.4–2.6 in SL; eye diameter subequal to snout length; dorsal-fin margin slightly incised between spines and deeply notched before soft rays; bases of soft-rayed dorsal fin and anal fin subequal; pectoral fins reach to or beyond vertical at anus. GR 5–7/13–15. LL scales 51–54.

Head and body silvery, pale greenish yellow dorsally; black blotch on upper edge of opercle; fins dusky in adults, yellowish in juveniles. Attains 55 cm TL.



*Pomadasys olivaceus*, 10 cm SL, (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, Oman to South Africa (False Bay), Madagascar, Pakistan, India and Sri Lanka; elsewhere to Andaman Sea, Indonesia and Malaysia.

**REMARKS** Juveniles common in shoals on seagrass beds in estuaries; adults shoal on reefs in deeper water to 70 m.

### *Pomadasys punctulatus* (Rüppell 1838)

Lined grunter PLATE 87

*Pristipoma punctulatum* Rüppell 1838: 124, Pl. 30, Fig. 3 (Massawa, Eritrea, Red Sea).

*Pomadasys punctulatus*: McKay & Randall 1995\*; Randall 1995\*; Iwatsuki *et al.* 1999; Manilo & Bogorodsky 2003; Bogorodsky *et al.* 2014.

Dorsal fin 12 spines, 15 rays; anal fin 3 spines, 8 rays; pectoral fins 16 rays. Body depth 2.3–2.5 in SL; dorsal-fin margin straight, not notched before soft rays. Preopercle rear edge straight, corner rounded. GR 5 or 6/12 or 13. LL scales 50–52.

Head and body silvery greenish yellow dorsally, with longitudinal brown lines or rows of spots on body (except not on belly); fins dusky, with black margins; palate and sides of mouth dull orange-red. Attains 30 cm TL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman, Oman and Red Sea.

**REMARKS** Occurs inshore, over rocky bottom.

### *Pomadasys striatus* (Gilchrist & Thompson 1908)

Striped grunter PLATE 87

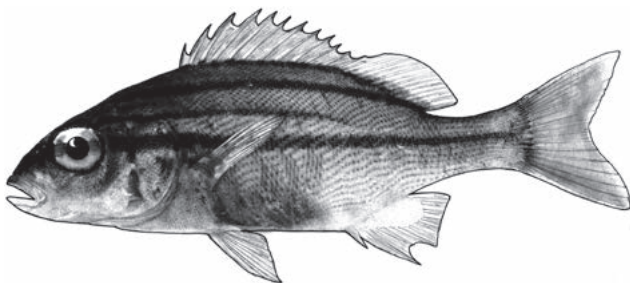
*Pristipoma striatum* Gilchrist & Thompson 1908: 153 (KwaZulu-Natal, South Africa).

*Pomadasys striatum*: SSF No. 179.18\*.

*Pomadasys striatus*: Iwatsuki *et al.* 1999; Heemstra & Heemstra 2004\*.

Dorsal fin 12 spines, 13 or 14 rays; anal fin 3 spines, 6 or 7 rays; pectoral fins 16 or 17 rays. Body depth 3–3.1 in SL; dorsal-fin margin slightly incised between spines, and notched before soft rays; pectoral fins subequal to pelvic fins and less than HL. GR 10 or 11/10 or 11. Scale rows below lateral line rising posteriorly; LL scales 51–54.

Body brownish dorsally, with 3 longitudinal dark stripes, lowest stripe from snout tip through eye, across opercle to caudal fin; paired fins and anal fin yellowish. Attains 23 cm TL.



*Pomadasys striatus*, 23 cm TL (WIO).

**DISTRIBUTION** WIO: endemic to southeastern Africa, from Mozambique (Beira) to South Africa (Knysna, Western Cape).

### *Pomadasys stridens* (Forsskål 1775)

Tripleline grunter PLATE 89

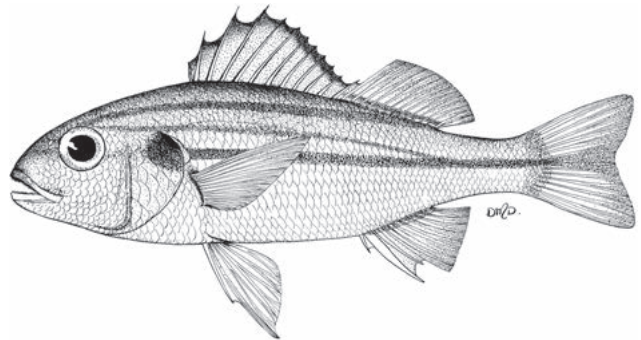
*Sciaena stridens* Forsskål *in* Niebuhr 1775: 50, xii (Massawa, Eritrea, Red Sea).

*Pristipoma simmene* Cuvier (ex Ehrenberg) *in* Cuv. & Val. 1830: 260

(Massawa, Eritrea, Red Sea).  
*Pomadasys stridens*: SSF No. 179.19\*; Randall 1995\*; Golani 1998; Heemstra & Heemstra 2004; Bogorodsky *et al.* 2014.

Dorsal fin 12 spines, 13–15 rays; anal fin 3 spines, 7–9 rays; pectoral fins 16 rays. Body depth 3–3.2 in SL; dorsal-fin margin not incised between spines, but deeply notched before soft rays; pectoral fins subequal to pelvic fins and less than HL. GR 7 or 8/14–16. Scale rows horizontal below lateral line; LL scales 57–60.

Head and body silvery, greenish dorsally, and with 3 yellow to yellowish brown stripes along body, lowest stripe midlateral, extending from black blotch on opercle to middle of caudal fin. Attains 20 cm TL.



*Pomadasys stridens*, 8 cm TL, juvenile (S Mozambique). Source: SSF

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Oman, Red Sea (including Gulf of Suez) to South Africa (KwaZulu-Natal); Lessepsian migrant to Mediterranean Sea.

**REMARKS** Found inshore to 36 m.

### *Pomadasys taeniatus* McKay & Randall 1995

Bronzestriped grunter PLATE 87

*Pomadasys furcatus* (non Bloch & Schneider 1801): Steindachner 1907.

*Pomadasys taeniatus* McKay & Randall 1995: 253, Fig. (off Salalah Harbour, Oman); Randall 1995\*; Manilo & Bogorodsky 2003.

Dorsal fin 12 spines, 15 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body depth 2.3–2.4 in SL; dorsal-fin margin slightly notched before soft rays. GR 5 or 6/12 or 13. LL scales 52 or 53.

Head and body silvery, with 7 dark bronze stripes along body and onto head; black spot on 5th stripe at rear of opercle; fins dusky. Attains 25 cm TL.

**DISTRIBUTION** WIO: endemic to south coast of Arabian Peninsula (Yemen and Oman).

**REMARKS** Occurs in schools, inshore, over rocky or sandy bottom.

#### GLOSSARY

**ciguatera poisoning (ciguatoxic)** – a type of food poisoning affecting the nervous system in humans caused by eating certain large reef fishes contaminated with ciguatoxin, a toxin produced by the dinoflagellate *Gambierdiscus toxicus*.

**iodoform** – smelling of iodine, odour of flesh from a fish that feeds on sponges or tunicates rich in iodine compounds.

## FAMILY DINOPERCIDAE

### Cavebasses

Phillip C Heemstra

Body oval, rather compressed; head, body and fins covered with small ctenoid scales; lateral line extends to end of caudal fin. Dorsal fin 9–11 spines, 18–20 rays; anal fin 3 spines, 12–14 rays; pectoral fins usually larger than pelvic fins; no scaly axillary process at pelvic-fin bases; caudal fin truncate, with 8 + 7 branched rays. Soft-rayed portion of dorsal and anal fins high anteriorly and scaly basally. Maxilla exposed, scaled, with long slender supramaxilla. Small teeth in bands on jaws, vomer, palatines and (in adults) on ectopterygoids. Opercle ends in 2 points; preopercle serrate. Branchiostegal rays 7. Swimbladder large, connected anteriorly to vertebral column, and rear half covered with 3 pairs of intrinsic muscles (capable of making a loud drumming sound). Vertebrae 10 + 16; pattern of supraneural bones 0/0/0+2+1/1/1/.

Two genera, both monotypic. *Centrarchops* Fowler 1923 and *Dinoperca* were formerly included in the family Serranidae, but Heemstra & Hecht (1986) established a separate family for these genera. One species in WIO.

### GENUS *Dinoperca* Boulenger 1895

Third spine of anal fin longer than 2nd spine; no pores on chin. Smith (1949) synonymised the northern Indian Ocean species *D. petersi* (Day 1875) with *D. queketti*. According to Day's original description, *D. petersi* has LL scales ~100, but two specimens examined from Pakistan have LL scales 56 and 61. One species.

### *Dinoperca petersi* (Day 1875)

Cavebass or lampfish

PLATE 89

*Hapalogenys petersi* Day 1875: 77, Pl. 20, Fig. 3 (Pakistan and Makran coast of Iran).

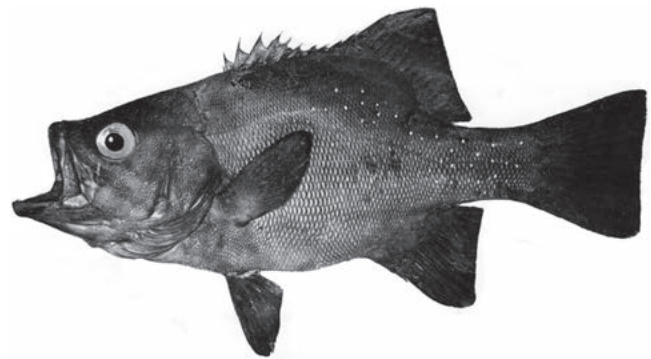
*Dinoperca queketti* Boulenger 1903: 63, Pl. 2 (KwaZulu-Natal, South Africa); Barnard 1927; Fowler 1934\*; Morgans 1982.

*Dinoperca petersii*: SFSA No. 454\*; Van der Elst 1981\*; Johnson 1983.

*Dinoperca petersi*: Heemstra & Hecht 1986\*; SSF No. 180.1\*; Randall 1995\*; Heemstra & Heemstra 2004\*.

Dorsal fin 9–11 spines, 18–20 rays; anal fin 3 spines, 12–14 rays; pectoral fins 17 or 18 rays. Body depth 2.3–2.5 in SL; HL 2.7–3 in SL; eye diameter 2.9–4.2 in HL. Nostrils oval, subequal and close-set. GR 13–18/23–28. LL scales 53–63.

Body, head and fins dark bronze-brown with numerous white specks, fading in large adults; cheek with 2 slightly oblique paler brown bands, from under eye to margin of opercle, and darker brown band in between. Juveniles resemble cardinalfishes, with silvery body and dark markings: 1st dark bar just behind head extending onto mostly black pelvic fins; 2nd bar through front of dorsal fin and through most elongate anal-fin ray; 3rd bar through most elongate dorsal-fin rays, offset at lateral line and continuing to rear of anal-fin base; midlateral band from 3rd bar to peduncle, and a stripe on both upper and lower peduncle. Attains 75 cm TL, ~6 kg.



*Dinoperca petersi*, 35 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Pakistan, Oman and Kenya to South Africa (Mossel Bay).

**REMARKS** Found on rocky reefs, in 5–50 m. During the day usually seen under ledges or at entrance to caves, more active at night; solitary, territorial, and capable of making a loud drumming noise. Juveniles rarely seen. Matures at ~30 cm TL; spawns off coast of South Africa (KwaZulu-Natal) in winter. Feeds on crustaceans and small fishes. Flesh excellent.

## FAMILY SPARIDAE

### Seabreams and porgies

Yukio Iwatsuki and Phillip C Heemstra

Body robust, oblong to ovate, compressed; dorsal fin single, with 10–14 spines, 8–16 rays; anal fin 3 spines, 7–16 rays; pelvic fin 1 spine, 5 rays; caudal fin forked to emarginate, rarely truncate; last ray of dorsal and anal fins usually split to base and counted as one ray. Teeth present as canines, incisors and/or molars; no teeth on vomer (except in *Evynnis tumifrons*), palatines or tongue. Opercle and preopercle edge smooth. Scales usually feebly ctenoid; cheeks and opercle scaly (cheeks naked in *Gymnocrotaphus*).

Occur in temperate to tropical waters of all oceans; demersal inhabitants of the continental shelf and slope, and usually concentrated along the shore in fairly shallow water. Juveniles of some species occur in estuaries, which are used as nursery areas; other species spend their entire life in estuaries. Some species attain 2 m TL and are important food fishes, and several are fine sporting fishes. The smaller species as well as the young of some large species typically form aggregations, whereas large adults are solitary or less gregarious and occur in deeper water. Young are often quite different from adults in their shape and markings, and sometimes more strikingly and vividly coloured. Many species have been found to be hermaphroditic: some have male and female gonads developed simultaneously; others change sex as they get larger, either from male to female (protandrous) or from female to male (protogynous). As many sparids are abundant and excellent food fishes, additional work on their biology and commercial importance is needed.

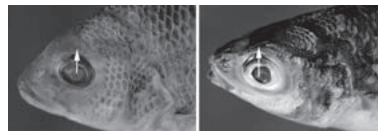
The Sparidae comprises ~35 genera in 6 subfamilies (grouped depending on tooth type — canines, incisors and molars — and morphology), with 126 species worldwide (Iwatsuki & Carpenter 2006, 2009; Iwatsuki *et al.* 2010; Iwatsuki & Heemstra 2010, 2011; Iwatsuki 2013; Iwatsuki & Maclaine 2013; Tanaka & Iwatsuki 2013). Historically, the 3 perciform families — Sparidae, Lethrinidae and Nemipteridae — have been grouped together as the superfamily Sparoidea, along with the Centracanthidae (Smith 1941), as spariform fishes including the Pentapodidae and Lutjanidae (Akazaki 1962), or as spariform fishes not including the Lutjanidae (Johnson 1980; Carpenter & Johnson 2002). Molecular studies have found these groupings not to be monophyletic (Orrell & Carpenter 2004; Chiba *et al.* 2009; Hanel & Tsigenopoulos 2011), and consequently supported a monophyletic Sparidae only with the inclusion of *Spicara* (traditionally included in the Centracanthidae). Nelson (2006) did not include the superfamily Sparoidea, pending further study of other percoid families. Day (2002) also did not accept these subfamilies, considering the evolutionary plasticity of the oral teeth of sparids, which have been fundamental

to the adaptive radiation of the group. The Centracanthidae (*Centracanthus* and *Spicara*) have been merged with the Sparidae based on the genetic studies noted above. However, further molecular and morphological studies on the phylogeny of these fishes are required, as well as reviews of their generic- and specific-level taxonomy.

Twenty-five genera and 60 species in WIO.

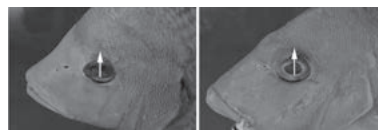
#### KEY TO GENERA

- 1a Anterior head scales not reaching above eyes ..... 3



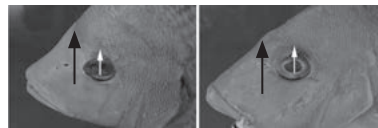
white arrow = uppermost margin of eye

- 1b Anterior head scales reaching above eyes, interorbital area densely covered in scales, and scales reaching beyond vertical in front of interorbital area ..... 2



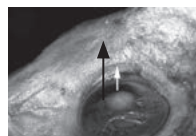
white arrow = uppermost margin of eye

- 2a Anterior head scales reaching above eyes and interorbital area scaly to vertical near nostrils ..... 4



black arrow = anteriormost scales

- 2b Anterior head scales reaching only above eyes (and not forward of interorbital region) ..... *Spicara*



black arrow =  
anteriormost scales

- 3a Dorsal-fin spines 1–2 extremely short ..... 17



- 3b Dorsal-fin spines 1–3 increasingly longer ..... 18



Continued...

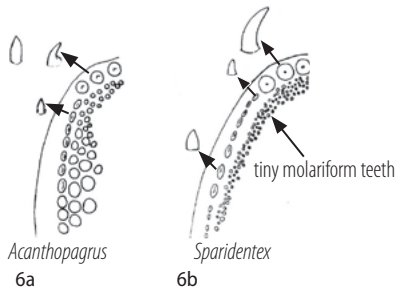


KEY TO GENERA

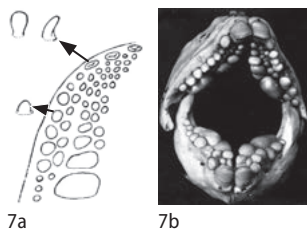
- 4a Upper jaw with 2–10 enlarged canines or incisors at front, usually visible when mouth is almost closed, or jaws with normal or very small molars in rows and visible when mouth is open ..... 5
- 4b Upper jaw with 4–40 small canines or conical, incisiform or villiform teeth at front, usually visible even when mouth is closed (rarely not visible) ..... 8

- 5a Anal fin 8 (rarely 9–12) rays; LL scales 42–52 ..... 6
- 5b Anal fin 10–15 rays; LL scales 55–61 ..... 7

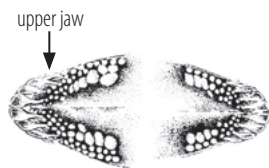
- 6a Both jaws with 2–5 rows of molars posteriorly; interorbital area and preopercular flange usually naked ..... *Acanthopagrus*
- 6b Both jaws with rows of villiform or tiny molariform teeth just inside outermost lateral row of canine teeth ..... *Sparidentex*



- 7a Front of both jaws with 4–8 subequal, enlarged incisors or canines; rows of molars become trapezoidal posteriorly ..... *Rhabdosargus*
- 7b Front of both jaws with an extremely large pair of incisors; row of typical rounded molars present posteriorly on both jaws ..... *Sparodon*

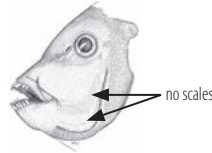


- 8a Front of upper jaw with 8–12 elongate incisors, separate from other teeth ..... *Diplodus*



- 8b Front of upper jaw with small conical, incisiform and villiform teeth, usually visible even when mouth is closed ..... 9

- 9a Cheeks naked; dorsal fin 10 spines; jaws with prominent curved incisors ..... *Gymnocrotaphus*



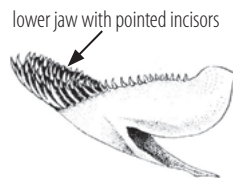
- 9b Cheeks scaly; dorsal fin 10–13 spines; no curved teeth on jaws ..... 10

- 10a Body fusiform or oval, with longitudinal stripes ..... 11
- 10b Body deep but becoming more slender with growth, without longitudinal stripes but sometimes with vertical bars ..... 12

- 11a Dorsal fin 11 spines, 14 or 15 rays; body with 8–10 golden yellow longitudinal stripes ..... *Sarpa*
- 11b Dorsal fin 13–15 spines, 13 or 14 rays; body silvery, with 5 or 6 brownish green longitudinal stripes present in live, stressed or fresh specimens (3 stripes are often retained in preserved specimens: 1 on lateral line, plus 2 below lateral line) ..... *Boops*

- 12a Body bronzy, with wide, curved, dark brown bar from nape to along opercle margin; eyes large, diameter greater than both snout length and least suborbital depth ..... *Boopsioidea*
- 12b Body dark brown to blackish or silvery black, sometimes with crossbars; eyes small to moderate, diameter usually less than snout length ..... 13

- 13a Eye diameter subequal to snout length but distinctly greater than least suborbital depth; front half of lower jaw with cluster of slender, pointed incisors ..... *Spondyliosoma*



- 13b Eye diameter distinctly less than least suborbital depth; no pointed teeth on lower jaw ..... 14

- 14a Outer incisors at front of jaws moveable, with 2 cusps on each side (each tooth with 5 points) ..... *Grenidens*



- 14b Outer teeth at front of jaws fixed and without cusps ..... 15

Continued...

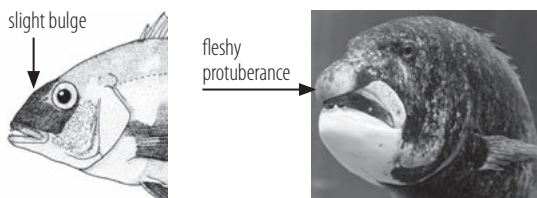
**KEY TO GENERA**

- 15a Body dusky silvery, with dark vertical bars; scale rows 4–6½ between base of 5th dorsal-fin spine and lateral line ..... *Lithognathus*
- 15b Body uniformly brownish, bronzy or blue-grey, without vertical bars; scale rows ≥7½ between base of 5th dorsal-fin spine and lateral line ..... **16**
- 16a One outer row of incisors, and inner teeth conical or molariform, followed by a pavement of granular teeth ..... *Polyamblyodon*



- 16b Both jaws with 4 or 5 rows of incisors and no molars ..... *Pachymetopon*
- 17a LL scales 50–55; body relatively deep in adults, more rounded in juveniles; 3rd dorsal-fin spine longest, spines 3–7 sometimes filamentous ..... *Argyrops*
- 17b LL scales 59–63; body somewhat slender; dorsal-fin spine 3 or 4 always longest ..... *Cheimerius*

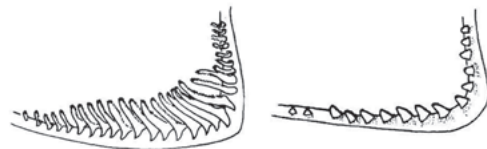
- 18a Dorsal fin 13 spines; diffuse black line along first 8–12 LL scales ..... *Porcostoma*
- 18b Dorsal fin ≤12 spines; no diffuse black line on first 8–12 LL scales ..... **19**
- 19a Scales above lateral line to below base of 5th dorsal-fin spine ~½ size of scales just below lateral line; juveniles with bulge before eyes, large adults with fleshy protuberance on snout; underside of lower jaw usually white ..... *Cymatoceps*



- 19b Scales above lateral line to below base of 5th dorsal-fin spine subequal to half the size of scales just below lateral line; no bulge before eyes or fleshy protuberance on snout; underside of lower jaw not white ..... **20**
- 20a Body depth less than or subequal to HL ..... **21**
- 20b Body depth greater than HL ..... **22**

- 21a Gill rakers of lower limb more than twice length of uppermost 4 or 5 rakers; bases of soft-rayed portion of dorsal and anal fins not fleshy or scaly; no spot below last dorsal-fin ray ..... *Argyrozona*
- 21b Gill rakers of both limbs short, lengths nearly subequal; bases of soft-rayed portions of dorsal and anal fins fleshy and scaly; brownish black spot below last dorsal-fin ray in subadults, becoming diffuse in adults ..... *Petrus*

lower limb gill rakers



21a

21b

- 22a Head profile concave to almost straight from upper lip to interorbital area; mouth projects slightly, with 4–6 canines at front of jaws ..... *Chrysolephus*
- 22b Head profile almost straight or slightly convex from upper lip to interorbital area; mouth not projecting ..... **23**
- 23a Anal fin 3 spines, 10 rays ..... *Pagellus*
- 23b Anal fin 3 spines, 8 rays ..... **24**
- 24a Lower jaw with molars in 2 rows; rear margin of preorbital bone undulate, close to anteriormost cheek scales ..... *Pterogymnus*
- 24b No molars on lower jaw; upper jaw with 4 canines, lower jaw with 6 canines; rear margin of preorbital bone generally straight ..... *Polysteganus*

preorbital bone rear margin undulate



24a

preorbital bone rear margin straight



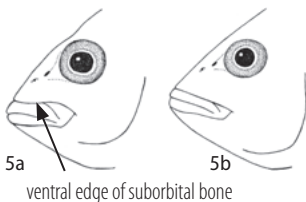
24b

GENUS *Acanthopagrus* Peters 1855

Body moderately deep, compressed; eyes moderate; 4–6 large canines at front of both jaws, followed by 2–5 rows of molars; maxilla exposed posteriorly, ending below mid-eye; 2nd spine of anal fin usually longer and stronger than 3rd spine. Gill rakers lanceolate. Scales ctenoid, moderate-sized; bases of soft-rayed portion of dorsal and anal fins with scaly sheath; scales reach forward on head to in front of eyes; preopercular flange usually naked (except *A. vagus* with several embedded scales). Body typically silvery, dark grey dorsally, paler ventrally. This group requires further study. Twenty species (Iwatsuki 2013), 8 in WIO.

## KEY TO SPECIES

- 1a Head with 2 conspicuous vertical black bars: 1 over rear third of head, and 1 through eyes; dorsal fin 12–14 rays ..... 2  
 1b No vertical black bars on head; dorsal fin 10–13 rays ..... 3
- 2a Dorsal-fin margin black ..... *A. catenula*  
 2b Dorsal-fin margin not black ..... *A. bifasciatus*
- 3a Scale rows 5½ from base of 5th dorsal-fin spine to lateral line; all fins except pectoral fins with wide black margin; molars poorly developed ..... *A. omanensis*  
 3b Scale rows 3½–4½ from base of 5th dorsal-fin spine to lateral line; fin colouration not as above; molars well-developed ..... 4
- 4a Scale rows 4½ from base of 5th dorsal-fin spine to lateral line ..... *A. randalli*  
 4b Scale rows 3½ from base of 5th dorsal-fin spine to lateral line ..... 5
- 5a Ventral edge of suborbital bones with prominent concavity in fish >13 cm SL; body deep and roundish ..... *A. berda*  
 5b Ventral edge of suborbital bones not concave; body relatively slender ..... 6
- 6a Patch of scales in front of dorsal fin with W-shaped anterior edge; pelvic fins and anal fin black; dark streak on membranes between anal-fin rays ..... *A. vagus*  
 6b Patch of scales in front of dorsal fin with rounded anterior edge; anal fin and pelvic fins mostly yellow, and caudal fin yellow or yellowish ..... 7



Continued ...

## KEY TO SPECIES

- 7a Black streaks on membranes between yellow anal-fin rays; 2 (rarely 3) black blotches on membranes between dorsal-fin rays ..... *A. sheim*  
 7b No black streaks on anal-fin membranes; no black blotches on membranes between dorsal-fin rays (rarely with 1 indistinct blotch near base of membranes) ..... *A. arabicus*

*Acanthopagrus arabicus* Iwatsuki 2013

Arabian yellowfin seabream

PLATE 90

*Chrysophrys datnia* (non Hamilton 1822) Day 1875: 140, Pl. 34, Fig. 1 (Pakistan).

*Sparus latus* (non Houuttuyn 1782): Fowler 1933.

*Sparus datnia* (non Hamilton 1822): Blegvad & Løppenthin 1944.

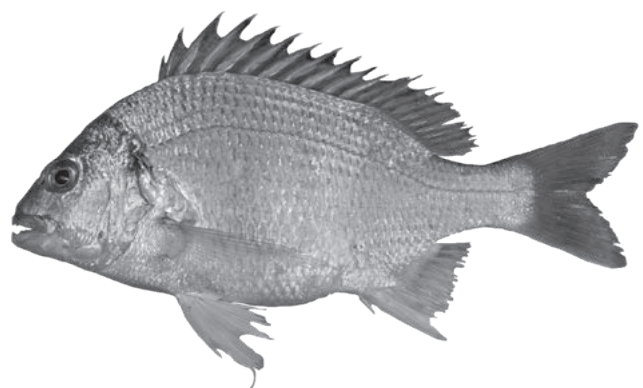
*Acanthopagrus datnia* (non Hamilton 1822): Akazaki 1962.

*Acanthopagrus latus* (non Houuttuyn 1782): Kuronuma & Abe 1972\*; Bauchot & Smith 1984\*; ?Dor 1984; ?Goren & Dor 1994; Randall 1995\*; Coad 1998, 2010; Carpenter 2001\*; Khan 2003; Manilo & Bogorodsky 2003; Iwatsuki & Carpenter 2009; Iwatsuki & Heemstra 2010.

*Acanthopagrus arabicus* Iwatsuki 2013: 83, Fig. 4b (market at west coast of Qatar, Persian/Arabian Gulf; west coast of India).

Dorsal fin 11 or 12 spines, 10 or 11 rays; anal fin 3 spines (2nd spine longer and stronger than 3rd), 8 rays; pectoral fins 14 or 15 rays. Body fairly deep and compressed, depth 2–2.4 in SL; head profile gently convex from snout tip to dorsal-fin origin. GR 5 or 6/9 or 10. LL scales 42–45.

Body silvery pale grey to whitish, darker dorsally, belly usually whitish or with whitish streaks along scale rows; diffuse dark blotch (often less than eye diameter) at origin of lateral line; pelvic fins, anal fin and lower edge of caudal fin pale yellow. Attains 35 cm TL.



*Acanthopagrus arabicus*, 20 cm SL (Qatar). © SV Bogorodsky

**DISTRIBUTION** WIO: Persian/Arabian Gulf and southern Oman to Pakistan and India; not known from Red Sea.

**REMARKS** Inhabits shallow coastal waters, to ~30 m deep; both juveniles and adults enter estuaries. Carnivorous. Important commercially and a good fighter for anglers; flesh excellent.

## *Acanthopagrus berda* (Fabricius 1775)

Riverbream

PLATE 90

*Sparus berda* Fabricius in Niebuhr (ex Forsskål) 1775: 32, xi (Al-Luhayya, Yemen, Red Sea); Nielsen 1974\*.

*Sparus hasta* Bloch & Schneider 1801: 275 (Coromandel coast, India).

*Sparus calamara* Cuvier 1829: 182 (Visakhapatnam, India) [based on drawing in Russell 1803: Pl. 92].

*Chrysophrys madagascariensis* Valenciennes in Cuv. & Val. 1830: 135 (Fort Dauphin, Madagascar) [based on a drawing reproduced in Lacepède 1801: Pl. 17, Fig. 3].

*Chrysophrys robinsoni* Gilchrist & Thompson 1908: 170 (KwaZulu-Natal, South Africa).

*Acanthopagrus berda*: Smith 1938\*; SFSA No. 707\* [in part]; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; Dor 1984; Bauchot & Skelton 1986\*; SSF No. 183.1\*; Coad 1991\*; Talwar & Jhingran 1991\*; Skelton 1993\* [in part]; Carpenter *et al.* 1997\*; Carpenter 2000\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Randall 2005\*; Iwatsuki & Carpenter 2006\*; Iwatsuki *et al.* 2006\*; Iwatsuki & Carpenter 2009\*; Iwatsuki & Heemstra 2010\*.

Dorsal fin 11 or 12 spines, 10–12 rays; anal fin 3 spines (2nd spine longer than 3rd), 8 or 9 rays; pectoral fins 14 or 15 rays. Body relatively deep and compressed, depth 2.4–2.6 in SL; head profile straight from upper jaw to just above eyes, and then gently convex to dorsal-fin origin; strongly curved concavity on ventral edge of first 2 suborbital bones above rear end of maxilla (obvious in fish >13 cm SL); front edge of scaly area on head slightly convex when viewed from above, with small scales anteriorly. GR 5–7/8–12. LL scales 42–44; scale rows 3½ between base of 5th dorsal-fin spine and lateral line.

Body dull dark olive-brown dorsally (dense black when excited), pale to whitish with dark silvery and brassy reflections below. Attains 70 cm SL, 85 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: South Africa (Eastern Cape) to Red Sea and to west coast of India and Sri Lanka; elsewhere to east coast of India and southern Malay Peninsula.

**REMARKS** Young and subadults often seen in estuaries, which are used as nursery areas. Flesh excellent. Previously confused with *A. vagus* in South Africa, now redescribed by Iwatsuki & Heemstra (2010); and western Pacific fish long identified as *A. berda* have recently been described as *A. pacificus* Iwatsuki *et al.* 2010.

## *Acanthopagrus bifasciatus* (Forsskål 1775)

Two-bar seabream

PLATES 90 & 103

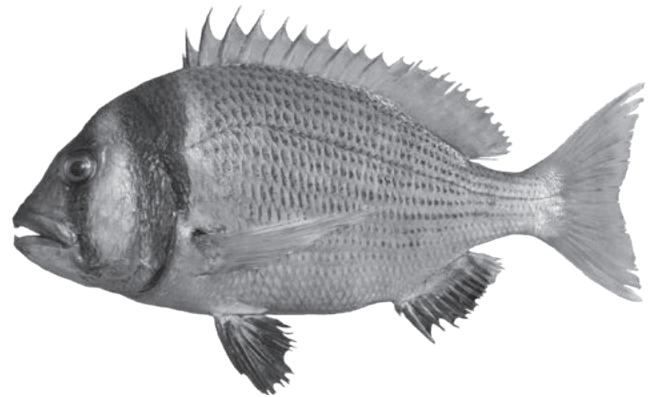
*Chaetodon bifasciatus* Forsskål in Niebuhr 1775: 64, xiii (Jeddah, Saudi Arabia, Red Sea).

*Holocentrus rabaji* Lacepède 1802: 724, 725 (Jeddah, Saudi Arabia, Red Sea). *Acanthopagrus bifasciatus*: Smith 1938\*; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.2\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Iwatsuki & Carpenter 2009; Iwatsuki & Heemstra 2010, 2011\*.

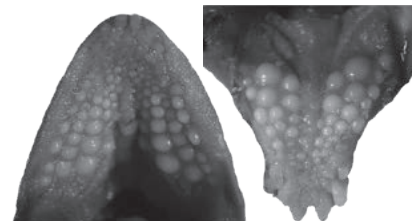
*Neosparus bifasciatus*: Akazaki 1994\* [in part, conditionally proposed for new genus].

Dorsal fin 11 or 12 spines, 12 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 14 or 15 rays. Body relatively deep and compressed, depth 2–2.3 in SL; head profile steep and straight from snout tip to above rear of eyes, and then curved to dorsal-fin origin. Both jaws with outermost row of molars extending to rear of jaw; basal width of middle 4 (of 6) incisors at front of upper jaw relatively narrow (width 0.7–0.8 mm for fish ~15 cm SL; 2.2–2.5 mm for fish ~34 cm SL). GR 6–8/10–13. LL scales 47–51; scale rows 5½ or 6½ between base of 5th dorsal-fin spine and lateral line.

Body silvery, often with black spot at centre of each body scale; 2 conspicuous vertical brownish black bars on head (from occiput through eye and across cheek to rear end of maxilla, and from nape to across opercle); pectoral, dorsal and caudal fins pale yellow (spinous portion of dorsal fin most yellow distally); no dense black margin on dorsal fin or narrow black margin on caudal fin. Possibly attains ~60 cm SL (commonly smaller).



*Acanthopagrus bifasciatus*, 30 cm SL (Qatar). © SV Bogorodsky



*Acanthopagrus bifasciatus*, dentition (Red Sea).

Source: Iwatsuki & Heemstra 2011

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden, Yemen to Oman, Persian/Arabian Gulf, and Iran to Pakistan.

**REMARKS** According to Randall (1995), Red Sea individuals differ from Oman and Persian/Arabian Gulf specimens in lacking rows of black spots (one per scale) on the body. However, such colour characters were found to be inconsistent. Not confirmed in Indo-Malayan region as reported by Smith & Smith (1986). Flesh excellent.

### *Acanthopagrus catenula* (Lacepède 1801)

Bridled seabream

PLATE 103

*Labrus catenula* Lacepède 1801: 426, 468, Pl. 3, Fig. 3 ('Grand Gulf of India' [Mauritius, Mascarenes]).

*Sparus mylio* Lacepède (ex Commerson) 1802: 41, 131 (Mauritius, Mascarenes).

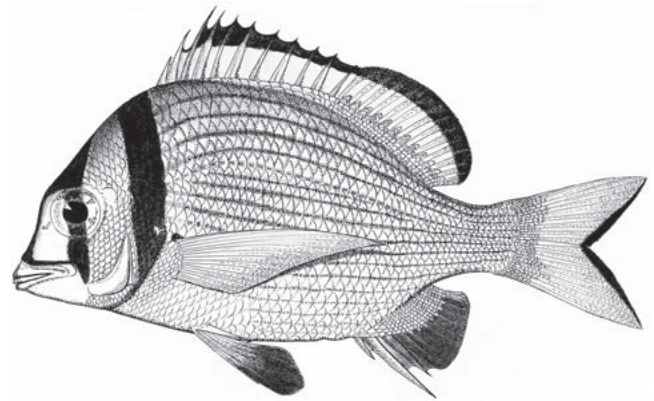
*Acanthopagrus bifasciatus* (non Forsskål 1775): Smith 1938\*; SFSA No. 706\*; Bauchot & Smith 1984 [in part]; Dor 1984; SSF No. 183.2\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Iwatsuki & Carpenter 2009.

*Neosparus bifasciatus*: Akazaki 1994\* [in part: provisionally proposed as new genus]; Manilo & Bogorodsky 2003.

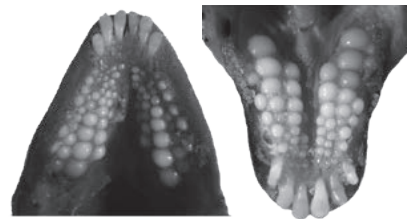
*Acanthopagrus catenula*: Iwatsuki & Heemstra 2011\*; Iwatsuki 2013.

Dorsal fin 11 or 12 spines, 12–14 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 14 or 15 rays. Body relatively deep and compressed, depth 1.9–2.1 in SL; head profile steep and straight from snout tip to above rear edge of eyes, and then curved to dorsal-fin origin; outer (3rd) row of molars in upper jaw extends to rear of jaw, and 2nd row of molars in lower jaw extends to rear of jaw; basal width of middle 4 (of 6) incisors at front of upper jaw relatively wide (width 1–1.1 mm for fish ~15 cm SL; 5–5.5 mm for fish ~34 cm SL). GR 6 or 7/9–12. LL scales 45–49; scale rows 4½ or 5½ between base of 5th dorsal-fin spine and lateral line (usually 4½ rows, but 5½ rows for specimens from Somalia and Socotra).

Body silvery, sometimes with black spot at centre of each scale; 2 conspicuous vertical black bars on head (from occiput through eyes and across cheek to rear end of maxilla, and from nape onto opercle); dorsal fin yellow, with black margin (especially distinct on spine tips in specimens <36 cm SL); caudal fin deep yellow, with narrow black margin in specimens <30 cm SL, disappearing with growth. Attains possibly ~60 cm SL (commonly smaller).



*Acanthopagrus catenula*, 20 cm TL (South Africa). Source: SFSA



*Acanthopagrus catenula*, dentition (South Africa). Source: Iwatsuki & Heemstra 2011

**DISTRIBUTION** WIO: Oman, Persian/Arabian Gulf, Socotra, Somalia to South Africa, Madagascar, Mauritius and Rodrigues; Lessepsian migrant to Mediterranean Sea.

**REMARKS** Recently confirmed from southern Oman (Madrakah), where it is rarely observed, together with *A. bifasciatus*. Flesh excellent.

### *Acanthopagrus omanensis*

Iwatsuki & Heemstra 2010

Black-margined seabream

PLATE 90

*Acanthopagrus omanensis* Iwatsuki & Heemstra 2010: 130, Figs. 1, 3–5 (Duqm, Oman); Iwatsuki 2013.

Dorsal fin 11 spines, 9 or 10 rays; anal fin 3 spines (2nd spine slender and subequal to 3rd), 8 or 9 rays; pectoral fins 15 or 16 rays. Body relatively deep and compressed, depth 2.4–2.6 in SL; head gently convex from snout tip to dorsal-fin origin. Molars in both jaws poorly developed. GR 8 or 9/13. LL scales 45–49; scale rows 5½ between base of 5th dorsal-fin spine and lateral line.

Body silvery grey; all fins except pectoral fins with wide black margins. Attains possibly >50 cm SL (commonly smaller).

**DISTRIBUTION** WIO: southern Oman.

**REMARKS** Inhabits rocky shorelines, entering tidepools as juveniles; in need of further biological information.

### *Acanthopagrus randalli* Iwatsuki & Carpenter 2009

Middle East black seabream PLATE 90

*Acanthopagrus randalli* Iwatsuki & Carpenter 2009: 44, Figs. 1–3 (fish market at Kuwait City: captured off Bahrain, Persian/Arabian Gulf); Iwatsuki 2013.

Dorsal fin 11 spines, 9 or 10 rays; anal fin 23 spines, 8 or 9 rays; pectoral fins 15 or 16 rays. Body relatively deep and compressed, depth 2.4–2.6 in SL; head slightly convex from snout tip to dorsal-fin origin, and adults with prominent convexity in interorbital area. GR 8 or 9/13. LL scales 45–49; scale rows 5½ between base of 5th dorsal-fin spine and lateral line.

Body silvery grey, with 4 or 5 wide dark vertical bars (6 or 7 scale rows in width); conspicuous, diffuse, dark blotch at origin of lateral line, continuous with blackish shading over upper cleithrum and upper edge of opercle. Attains possibly >50 cm SL (current records much smaller).

**DISTRIBUTION** WIO: Persian/Arabian Gulf (off Kuwait and Bahrain, but presumably endemic).

### *Acanthopagrus sheim* Iwatsuki 2013

Spotted yellowfin seabream PLATES 90, 91 & 103

*Acanthopagrus latus* (non Houttuyn 1782): Carpenter 2001\*.  
*Acanthopagrus sheim* Iwatsuki 2013: 85, Fig. 4c (off Hawar I., Bahrain, Persian/Arabian Gulf).

Dorsal fin 11 spines, 11 rays; anal fin 3 spines (2nd spine longer and stronger than 3rd), 8 rays; pectoral fins 14 or 15 rays. Body deep and compressed, depth 2.4–2.6 in SL; head gently convex from snout tip to dorsal-fin origin. GR 4–7/8–11. LL scales 43–47.

Body pale grey to whitish, darker dorsally, belly usually yellowish or with golden streaks along scale rows; large diffuse dark blotch at origin of lateral line, often wider than eye diameter; dorsal-fin rays with 2 black blotches (rarely 3) on each membrane between dorsal-fin rays; anal fin with dusky streaks on membranes between yellowish rays; pelvic fins whitish, with yellow tinge; caudal fin yellowish, with wide black margin. Attains 30 cm SL.



*Acanthopagrus sheim*, 11 cm SL (Persian/Arabian Gulf).  
© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Persian/Arabian Gulf to Pakistan and probably India; presumably not found in southern Oman and Red Sea.

**REMARKS** Inhabits shallow coastal waters to possibly ~50 m deep; both juveniles and adults enter estuaries. Carnivorous. Important commercially; often caught by trawl, and a good fighter for anglers; flesh excellent.

### *Acanthopagrus vagus* (Peters 1852)

Wandering seabream PLATE 91

*Chrysophrys vagus* Peters 1852: 681 (Sena, Zambezi River, Mozambique).  
*Pagrus caffer* Castelnau 1861: 30 (Durban, KwaZulu-Natal, South Africa).  
*Chrysophrys estuarius* Gilchrist & Thompson 1908: 170 (KwaZulu-Natal, South Africa).

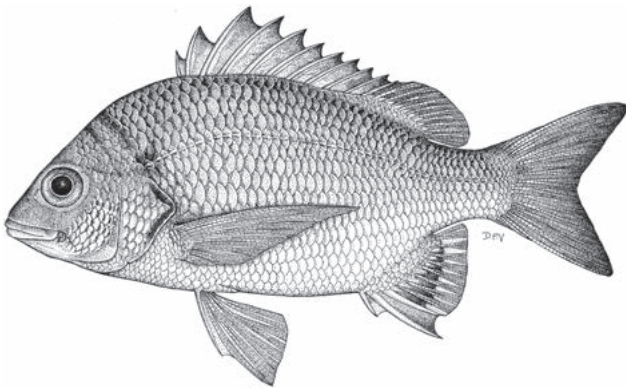
*Sparus vagus*: Boulenger 1915\* [copy of figure from Peters 1868].

*Acanthopagrus berda* (non Fabricius in Niebuhr 1775 [in part]):  
Smith 1938\*; SFSA No. 707\* [in part: northern South Africa and Mozambique]; Van der Elst 1981\*; Bauchot & Smith 1984; Bauchot & Skelton 1986\*; SSF No. 183.1\*; Whitfield 1998\*.

*Acanthopagrus vagus*: Heemstra & Heemstra 2004\*; Bray *et al.* 2006; Iwatsuki *et al.* 2006; Iwatsuki & Heemstra 2010\*; Iwatsuki 2013.

Dorsal fin 11 spines, 9 or 10 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 15 or 16 rays. Body somewhat oblong and compressed, depth 2.4–2.6 SL; head profile straight from jaw tip to just above eyes, and then slightly convex to dorsal-fin origin; ventral edge of first 2 suborbital bones straight in fish <23 cm SL, weakly concave in fish >25 cm SL. Molars in both jaws well-developed. GR 8 or 9/13. LL scales 45–49; scale rows 3½ between base of 5th dorsal-fin spine and lateral line; preopercular flange with 0–6 scales, the number increasing with growth (scales obvious in specimens >20 cm SL).

Body bluish silvery with iridescent scales dorsally, pale to whitish ventrally with yellowish silvery reflections; black streaks on inter-radial membranes near anal-fin base. Attains possibly ~70 cm SL (current records much smaller).



*Acanthopagrus vagus*, 11 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: southern Mozambique to South Africa (Knysna).

**REMARKS** Young and subadults usually seen in estuaries, which are used as nursery areas; according to local anglers' observations, enters upper reaches of estuaries near freshwater sections of rivers. Strong fighter for anglers and common in South Africa. Until recently, often confused with *A. berda*; redescribed by Iwatsuki & Heemstra (2010). IUCN Red List conservation status Vulnerable.

## GENUS *Argyrops* Swainson 1839

Snout blunt, head becomes heavy with age; first 2 dorsal-fin spines very short (except *Argyrops bleekeri* from western Pacific with only 1 short spine), 3rd spine long, and sometimes 4th–7th spines filamentous and longer than head; front teeth conical, with 2 or 3 rows of small molars; interorbital area scaly, preopercular flange naked; body often reddish. This genus was reviewed by Iwatsuki & Heemstra in 2018, with descriptions of three new species, not included here (see Plate 91), for a total of 7 species, 5 in WIO.

### KEY TO SPECIES

- 1a Dorsal-fin spine 3 or 4 long (first 2 spines very short); front edge of scaly interorbital area broadly convex when viewed from above ..... *A. filamentosus*
- 1b Dorsal-fin spines 3–7 elongate and filamentous, especially in juveniles and young (first 2 spines very short); front edge of scaly interorbital area pointed when viewed from above ..... *A. spinifer*

## *Argyrops filamentosus* (Valenciennes 1830)

Soldierbream

PLATES 91 & 103

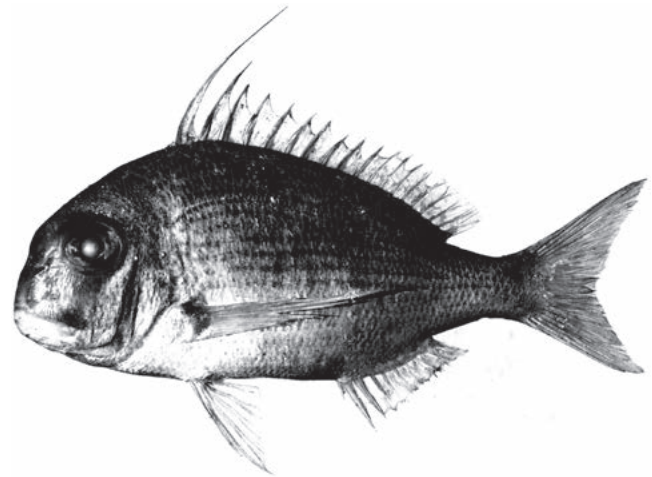
*Pagrus filamentosus* Valenciennes in Cuv. & Val. 1830: 158 (Saint-Denis, Réunion, Mascarenes); Bauchot & Daget 1972\*.

?*Pagrus megalommatus* Klunzinger 1870: 762 (Al-Qusayr, Egypt, Red Sea).

*Argyrops filamentosus*: Smith 1938; SFSA No. 716\*; Bauchot & Smith 1984\*; SSF No. 183.3\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Fricke *et al.* 2009.

Dorsal fin 11 or 12 spines, 8–10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 rays. Body deep and strongly compressed, depth 2–2.5 in SL; no bulbous growth on nape of large adults; 3rd spine of dorsal fin twice length of 4th and longer than HL (except in large adults). GR 6/10 or 11. LL scales 51–54.

Body pink with bluish overlay; belly and chin silvery white; all fins pink, but anal fin and pelvic fins palest. Attains 70 cm TL (commonly 40 cm TL).



*Argyrops filamentosus*, 28 cm TL (WIO).

**DISTRIBUTION** WIO: Red Sea to South Africa (KwaZulu-Natal), Madagascar, Réunion and Mauritius.

**REMARKS** Often found on reefs. Feeds on benthic organisms. The uncertain *Argyrops megalommatus* (Klunzinger 1870) was validated by Iwatsuki & Heemstra (2018). *Argyrops filamentosus* has yellow membrane between 1st and 2nd dorsal-fin spines, vs. reddish in *A. megalommatus*.

## *Argyrops spinifer* (Forsskål 1775)

King soldierbream

PLATES 92 & 103

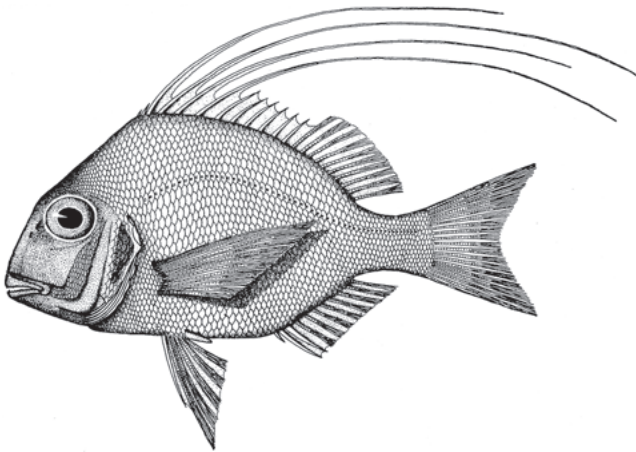
*Sparus spinifer* Forsskål in Niebuhr 1775: 32, xi (Jeddah, Saudi Arabia, Red Sea).

*Pagrus ciliaris* Von Bonde 1923: 19, Pl. 5 (KwaZulu-Natal, South Africa).

*Argyrops spinifer*: Smith 1938; SFSA No. 715\*; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.4\*; Baranes & Golani 1993; Goren & Dor 1994; Randall 1995\*; Allen 1997\*; Carpenter *et al.* 1997\*; Fricke 1999; Carpenter 2001\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Bray *et al.* 2006; Fricke *et al.* 2009; Siddiqui *et al.* 2014.

Dorsal fin 11 or 12 spines, 10 or 11 rays; anal fin 3 spines, 8 rays; pectoral fins 15 rays. Body deep and strongly compressed, depth 1.8–2 in SL; large adults (>60 cm SL) with bulbous growth on nape. First 2 dorsal-fin spines very short, 3rd–7th spines elongate (much longer than SL in young ~10 cm SL; spines becoming proportionately shorter in adults). GR 6/10 or 11. LL scales 49–53.

Body mainly silvery pinkish, darker on head and dorsally; upper edge of opercle usually dark red; all fins reddish, but pelvic and anal fins palest; young with several red vertical bars on body. Attains 70 cm TL (commonly 30 cm TL).



*Argyrops spinifer*, holotype of *Pagrus ciliaris*, juvenile (South Africa).

Source: Von Bonde 1923



*Argyrops spinifer*, 19 cm SL, adult, neotype (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Knysna), Madagascar, Mascarenes, Persian/Arabian Gulf, Pakistan and India; elsewhere to Indo-Malayan Archipelago, and possibly South China Sea and northern Australia (but presumably misidentifications of *A. bleekeri*).

**REMARKS** Found over a wide range of substrates, at 5–100 m; young observed in shallow waters and sheltered areas. Geographical variation is known (Iwatsuki & Heemstra 2018). Feeds on benthic invertebrates, mainly molluscs. A strong fighter for anglers, and important commercially in the Middle East.

## GENUS *Argyrozona* Smith 1938

Body fusiform, depth subequal to HL; lower jaw slightly protruding; rear edge of maxilla fully exposed, upper angle acutely pointed upwards; posterior nostrils circular; gill rakers of lower limb more than twice length of uppermost rakers. One species.

## *Argyrozona argyrozona* (Valenciennes 1830)

Carpenter

PLATES 92 & 103

*Dentex argyrozona* Valenciennes in Cuv. & Val. 1830: 235 (Cape of Good Hope, South Africa).

*Cynaedus lupus* Gronow in Gray 1854: 54 (Indian Ocean).

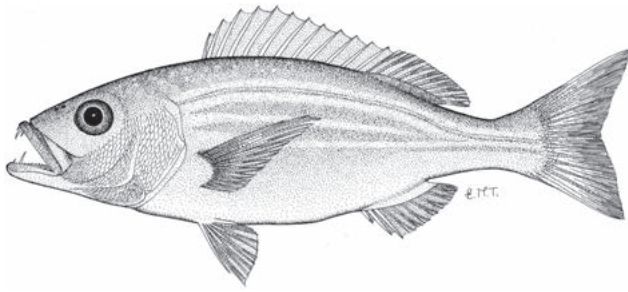
*Dentex macrodens* Castelnau 1861: 30 (Algoa Bay, Eastern Cape, South Africa).

*Argyrozona argyrozona*: Wheeler 1958\*; SFSA No. 745\*; Bauchot & Smith 1984\*; SSF No. 183.5\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 12 spines, 10 or 11 rays; anal fin 3 spines, 8 rays; pectoral fins 15 or 16 rays. Body fusiform, depth ~3 in SL; head long, low, with smooth profile; eyes relatively large; pectoral fins shorter than HL. GR 9 or 10/17–19. LL scales 59–62; interorbital area scaly; outer margin of preopercle naked; dorsal and anal fin bases not scaly or fleshy.

Body silvery reddish, pale ventrally; several bright red longitudinal lines alternating with silvery reflections just after death; fins pink or rosy; eyes brilliant red-orange. Attains 90 cm TL.





*Argyrozona argyrozona*, 33 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: endemic to South Africa (KwaZulu-Natal to Cape Point).

**REMARKS** Found at ~20–200 m. Caught mainly with line gear and trawlers.

**GENUS** *Boops* Cuvier 1814

Body fusiform and elongated; eye diameter greater than snout length; pectoral fins short,  $\sim\frac{3}{4}$  HL; caudal fin deeply forked. Teeth in 1 row on jaws, incisiform, distal edges truncate and denticulate. Body often with several darkish longitudinal stripes, their width  $<\frac{1}{2}$  diameter of black iris. Two species, 1 in WIO (the other, *Boops boops* [Linnaeus 1758], is known from the eastern Atlantic).

*Boops lineatus* (Boulenger 1892)

Striped boga

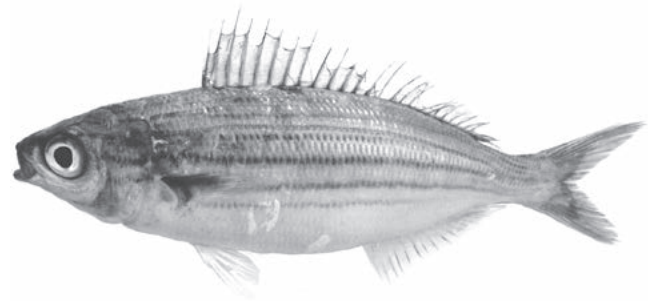
PLATE 92

*Boops lineatus* Boulenger 1892: 134 (Muscat, Gulf of Oman, Oman).

*Boops lineatus*: Randall 1995\*; Manilo & Bogorodsky 2003; Al-Jufaili *et al.* 2010.

Dorsal fin 13–15 slender spines, 13 or 14 rays; anal fin 3 spines, 13 or 14 rays; pectoral fins 18 rays. Body depth 3.4–3.6 in SL; mouth small and oblique, maxilla reaching slightly beyond vertical at front edge of eye. GR 9/19. LL scales 69 or 70; scale rows 6 from base of dorsal-fin spines to lateral line.

Body silvery blue-green or brownish green dorsally, often with 6 longitudinal reddish brown stripes, and shading to iridescent silvery ventrally; caudal fin yellow, upper lobe dusker. Attains 25 cm SL.



*Boops lineatus*, 15 cm SL (Oman). © F Tanaka, MUF5

**DISTRIBUTION** WIO: Gulf of Oman to southern Red Sea (Yemen).

**REMARKS** Observed in schools in shallow water.

**GENUS** *Boopsoidea* Castelnau 1861

Body ovate, HL  $\sim\frac{2}{3}$  body depth; eyes large, diameter greater than snout length; both jaws with outer series of small, sharp teeth, and inner teeth small molars; interorbital area, preopercular flange, and bases of dorsal and anal fins naked. One species.

*Boopsoidea inornata* Castelnau 1861

Fransmadam

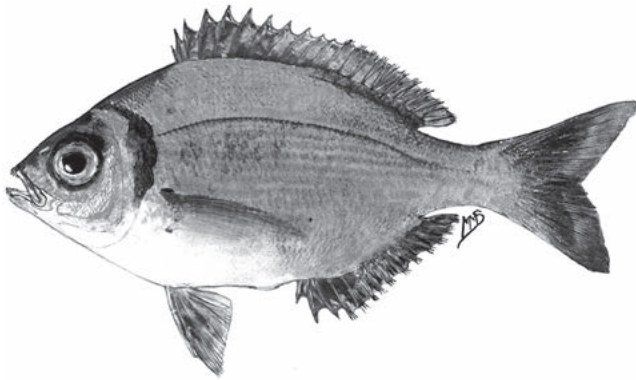
PLATES 92 & 103

*Boopsoidea inornata* Castelnau 1861: 26 (Kalk Bay and Algoa Bay, South Africa); Smith 1938; SFSA No. 729\*; Smith & Smith 1966\*; Bauchot & Daget 1972; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.6\*; Heemstra & Heemstra 2004\*.

*Pagrus (Chrysophrys) holubi* Steindachner 1881: 203 [25], Pl. 2 (Algoa Bay, Eastern Cape, South Africa).

Diagnosis as for genus. Dorsal fin 12 spines, 10 or 11 rays; anal fin 3 spines, 11 rays; pectoral fins 15 or 16 rays. Body depth 2–2.3 in SL; head profile gently convex from upper lip to dorsal-fin origin. GR 8–10/14–16. LL scales 60–65.

Body bronzy with pinkish tinge, often with 1 thin golden-brown longitudinal stripe from upper edge of opercle to peduncle; wide dark brown curved bar from nape and along edge of opercle; pectoral-fin axil with dark brown patch; young with head, body and fins vivid red. Attains 30 cm SL.



*Boopsoida inornata*, 13 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: endemic to South Africa (Aliwal Shoal, KwaZulu-Natal, to Kalk Bay, Western Cape).

**REMARKS** Found on shallow rocky reefs, at 10–30 m; seen in schools.

**GENUS** *Cheimerius* Smith 1938

Body ovate, slightly elongated; first 2 dorsal-fin spines short, 3rd or 4th spine always longest; 1st pelvic-fin ray elongate. Both jaws with 4–6 canines at front, and with narrow bands of small villiform teeth, outer lateral series of teeth enlarged. Two species, 1 in WIO.

*Cheimerius nufar* (Valenciennes 1830)

Santer seabream

PLATES 93 & 103

*Dentex nufar* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 240 (Egypt and Massawa, Eritrea, Red Sea).

*Dentex variabilis* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 241 (Red Sea).

*Dentex fasciolatus* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 242 (Red Sea).

*Dentex (Polysteganus) nuphar* Klunzinger 1870: 764 [invalid name].

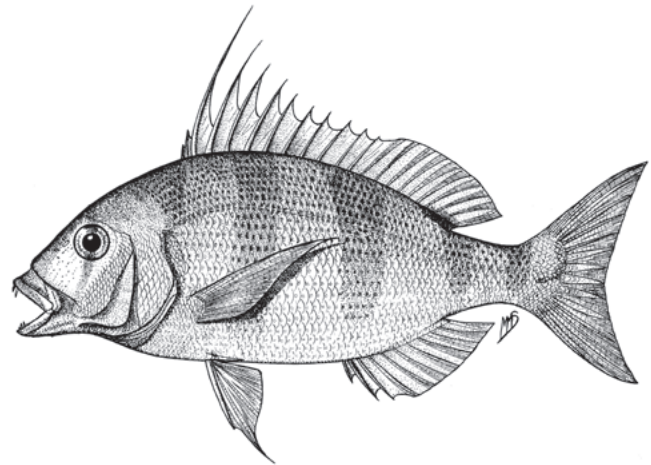
*Dentex miles* Gilchrist & Thompson 1908: 155 (KwaZulu-Natal, South Africa).

*Dentex albus* Gilchrist 1914: 128, Fig. (KwaZulu-Natal, South Africa); Gilchrist & Thompson 1908\*.

*Cheimerius nufar*: Smith 1938\* [proposed for new genus]; SFSA No. 740\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.7\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Siddiqui *et al.* 2014.

Dorsal fin 11 or 12 spines, 10 or 11 rays; anal fin 3 spines, 8 rays; pectoral fins 16 rays. Body depth 2.2–2.5 in SL; head profile convex from upper lip to dorsal-fin origin. No molars on jaws. GR 8–11/13–16. LL scales 59–63; preopercle margin with a few small scales; interorbital area partly scaly; no scales on soft-rayed portion of dorsal and anal fins.

Body silvery rosy pink to pinkish tan, silvery ventrally; juveniles with 6 faint darker vertical bars on head and body (1 bar through eyes), but disappearing in large adults. Attains 75 cm TL (commonly 30 cm TL).



*Cheimerius nufar*, 25 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: Red Sea to South Africa (Mossel Bay), Madagascar, Mauritius, Réunion, and Pakistan to India and Sri Lanka.

**REMARKS** Found over rocky bottom, at 60–100 m. Smith & Smith (1986) note that the young shelter in estuaries when stormy weather approaches (*Cheimerius* from the Latin for ‘sign of the storm’). Feeds on benthic organisms. Good fighting fish for line anglers and very important commercial fish off Mozambique and in the Middle East; flesh excellent.

**GENUS** *Chrysolephus* Swainson 1839

Interorbital area scaly (except naked in *C. lophus*); preopercular flange and bases of soft-rayed portion of dorsal and anal fins scaly; both jaws with 4–6 canines at front and  $\geq 3$  rows of small molars behind; body reddish orange. Well-known as ‘reds’ in the fishing industry and to line and boat anglers in South Africa. Six species, all in WIO.

## KEY TO SPECIES

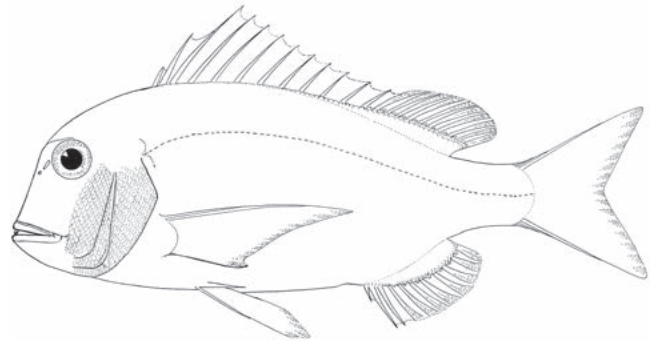
- 1a Black blotch at base of last dorsal-fin rays; LL scales 59–61 ..... *C. cristiceps*  
 1b No blotch at base of last dorsal-fin rays ..... 2
- 2a Triangular white blotch on upper side of body (and sometimes on head); LL scales 58–64 ..... *C. laticeps*  
 2b No triangular white blotch on side ..... 3
- 3a Distinct thin blue line below eyes; lower GR 14–16; LL scales 49–52 ..... *C. puniceus*  
 3b No blue line below eyes; lower GR 10–13 ..... 4
- 4a Dorsal-fin spines 3–5 abruptly long; bony interorbital area pitted; LL scales 56–58 ..... *C. lophus*
- interorbital area pitted
- 4b Dorsal-fin spine 3 shorter than HL; interorbital area scaly, not pitted ..... 5
- 5a Pectoral fins when bent forward reach beyond snout tip; LL scales 65–68; no small dark spots on body ..... *C. anglicus*  
 5b Pectoral fins when bent forward not reaching beyond snout tip; LL scales 52–55; scattering of irregular dark spots mostly on upper body ..... *C. gibbiceps*

*Chrysolephus anglicus* (Gilchrist & Thompson 1908)Englishman seabream PLATES 93 & 104*Chrysolephus anglicus* Gilchrist & Thompson 1908: 172 (Durban, KwaZulu-Natal, South Africa).*Chrysolephus anglicus*: Smith 1938\*; SFSA No. 724\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.8\*; Heemstra & Heemstra 2004\*.

Dorsal fin 12 spines (spines 3–5 rather elongate, but not longer than head), 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body deep and compressed, depth 2–2.3 in SL; snout blunt, head profile from upper lip to interorbital area

almost vertical, and then sloping gently to dorsal-fin origin; eye diameter less than least suborbital depth. GR 6/10–12. LL scales 65–68.

Body reddish, paler ventrally, with ~4 darker red vertical bars (often faint); rows of blue spots on scales, especially above lateral line. Attains ~100 cm TL.

*Chrysolephus anglicus*, 25 cm SL (South Africa).

**DISTRIBUTION** WIO: southern Mozambique (Maputo Bay) to South Africa (Algoa Bay).

**REMARKS** Occurs offshore to ~80 m deep. Feeds on crustaceans, molluscs and worms. Flesh good.

*Chrysolephus cristiceps* (Valenciennes 1830)

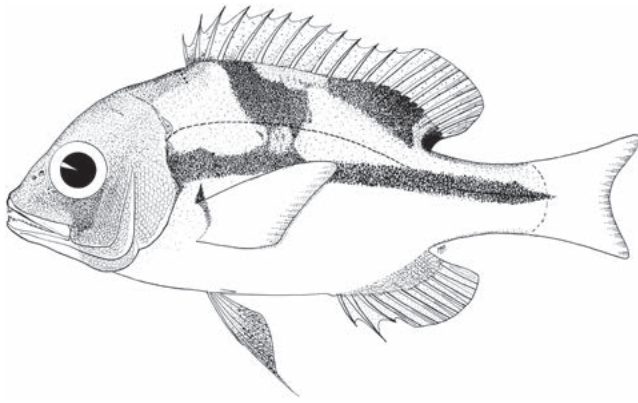
Daggerhead seabream

PLATES 93 &amp; 104

*Chrysolephus cristiceps* Valenciennes in Cuv. & Val. 1830: 132 (Cape of Good Hope, South Africa).*Chrysolephus cristiceps*: Smith 1938\*; SFSA No. 720\*; Smith & Smith 1966\*; Robinson 1976; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.9\*; Heemstra & Heemstra 2004\*.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 rays. Body deep and compressed, depth 2–2.3 in SL; head profile more or less concave from snout tip to above eyes, and then gently convex to dorsal-fin origin. GR 6 or 7/10–13. LL 59–61 scales.

Head and body red (presenting with waves of colour at death: blue, green, bronze, orange), pale ventrally; fins red; opercle orange; faint blue bar under eyes; conspicuous dark spot at base of last dorsal-fin rays; dark spot at pectoral-fin axil; juveniles pink, with horizontal midlateral band, and 2 or 3 dark blotches below dorsal fin. Attains 65 cm SL.



*Chrysoblephus cristiceps*, ~6 cm SL, juvenile (South Africa).  
Source: Smith 1943

**DISTRIBUTION** WIO: endemic to South Africa (Durban, KwaZulu-Natal, to False Bay; most common southwest of East London).

**REMARKS** Found to ~100 m deep; not often caught from shore. Feeds on crustaceans, molluscs, worms and small fishes. Flesh good. IUCN Red List conservation status Critically Endangered.

### *Chrysoblephus gibbiceps* (Valenciennes 1830)

Red stumpnose PLATES 93 & 104

*Chrysophrys gibbiceps* Valenciennes in Cuv. & Val. 1830: 127, Pl. 147 (Cape of Good Hope, South Africa).

*Chrysoblephus gibbiceps*: Smith 1938\*; SFSA No. 725\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.10\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 or 12 spines, 10 or 11 rays; anal fin 3 spines, 7–9 rays; pectoral fins 17 rays. Body deep and compressed, depth 2–2.4 in SL; head profile very steep from upper lip, slightly concave between snout and nostrils, with bulge at interorbital region with growth, nape becoming especially gibbous with large protruding forehead in adults. GR 6 or 7/10–12. LL scales 52–55.

Body reddish orange with golden reflections, slightly paler ventrally, with 5–7 faint, dark red vertical bars; numerous irregular dark flecks mostly on upper body. Attains 75 cm TL.

**DISTRIBUTION** WIO: endemic to South Africa (Margate, KwaZulu-Natal [rarely] to False Bay; most common southwest of East London).

**REMARKS** Occurs in coastal waters at 10–100 m. Feeds on crustaceans, molluscs and small fishes. Of considerable commercial significance at False Bay, South Africa; flesh good. IUCN Red List conservation status Endangered.

### *Chrysoblephus laticeps* (Valenciennes 1830)

Roman PLATES 93, 94 & 104

*Chrysophrys laticeps* Valenciennes in Cuv. & Val. 1830: 122 (Cape of Good Hope, South Africa).

*Cynaedus torvus* Gronow in Gray 1854: 54 (several localities, including Cape of Good Hope, South Africa).

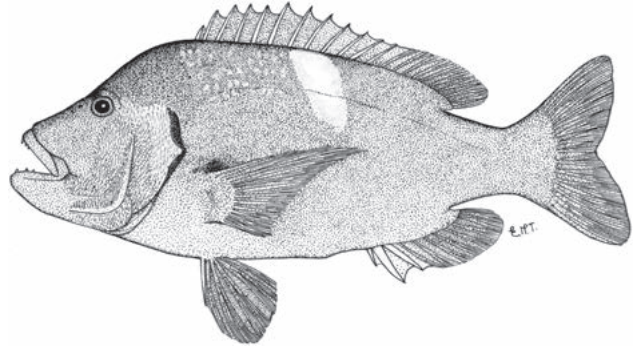
*Chrysophrys algoensis* Castelnau 1861: 22 (Algoa Bay, South Africa).

*Chrysophrys pugicephalus* Gilchrist & Thompson 1909: 234 (off Durban, KwaZulu-Natal, South Africa).

*Chrysoblephus laticeps*: Smith 1938; SFSA No. 721\*; Smith & Smith 1966\*; Penrith 1972; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.11\*; Fricke 1999; Heemstra & Heemstra 2004\*.

Dorsal fin 11 or 12 spines, 10 or 11 rays; anal fin 3 spines, 7–9 rays; pectoral fins 17 or 18 rays. Body more ovate, depth 2.3–2.5 in SL; head profile gently sloping from snout to dorsal-fin origin, becoming concave in front of eyes with age; interorbital region and nape broad and convex. GR 6 or 7/10–12. LL scales 58–64.

Body, head and fins brilliant orange-red; blue interorbital bar; white saddle below dorsal-fin spines 7–9 and extending to below lateral line, and often with similar white triangular area on nape and opercle, and scattered silvery spots on body scales anterior this. Attains 50 cm TL (commonly ~30 cm TL).



*Chrysoblephus laticeps*, 50 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** Southern Africa: northern Namibia in southeastern Atlantic, to South Africa (Durban, KwaZulu-Natal) in WIO; a report from Mauritius is dubious (Heemstra & Heemstra 2004).

**REMARKS** Occurs over rocky substrates in deepish waters, often observed well offshore. Feeds on crustaceans, molluscs, worms and fishes. Romans are first gregarious females and then change sex with age to become solitary, territorial males, each living in its own particular cave (Van der Elst 1981). Live fish are particularly beautiful.

*Chrysolephus lophus* (Fowler 1925)

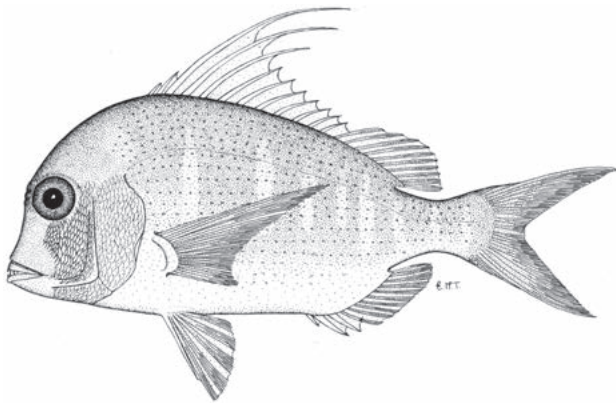
False Englishman seabream

PLATES 94 &amp; 104

*Sparus lophus* Fowler 1925: 234, Fig. 3 (KwaZulu-Natal, South Africa).*Chrysolephus lophus*: Smith 1938; SFSA No. 723\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.12\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines (spines 3–5 abruptly elongated), 10 rays; anal fin 3 spines, 9 rays; pectoral fins 16 or 17 rays. Body deep and compressed, depth 2–2.3 in SL; snout blunt, head profile very steep (nearly vertical), slightly concave from above upper lip to corrugated bony interorbital area, which becomes more pitted with age. GR 7–9/10–13. LL scales 55–58.

Body silvery red-orange, with 5–8 pale bars, and belly pale. Attains 50 cm TL.

*Chrysolephus lophus*, 35 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: South Africa (Sodwana Bay to East London, Eastern Cape) and Madagascar.

**REMARKS** Found to ~150 m deep. Feeds on crustaceans, molluscs, worms and small fishes. Caught by line.

*Chrysolephus puniceus* (Gilchrist & Thompson 1908)

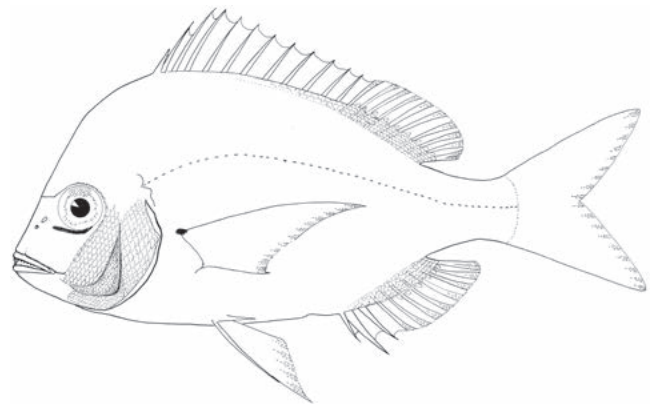
Slinger seabream

PLATES 94 &amp; 104

*Chrysolephus puniceus* Gilchrist & Thompson 1908: 173 (KwaZulu-Natal, South Africa); Smith 1938\*.*Chrysolephus puniceus*: SFSA No. 722\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.13\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 rays. Body deep and compressed, depth ~2 in SL; head profile very steep from lip to angular nape, with a ridge before dorsal fin. GR 9–12/14–16. LL 49–52 scales.

Body reddish pink with bluish sheen; fins rosy; thin blue line under eyes; tiny dark spot at pectoral-fin axil. Attains 85 cm TL (commonly 55 cm TL).

*Chrysolephus puniceus*, 20 cm SL (South Africa). Source: Smith 1938

**DISTRIBUTION** WIO: southern Mozambique to South Africa (Algoa Bay) and southern Madagascar.

**REMARKS** Shoals in great numbers, making it probably the most important food fish off KwaZulu-Natal, South Africa, and southern Mozambique.

**GENUS** *Crenidens* Valenciennes 1830

Both jaws with 2 rows of incisors (sometimes 3rd row in upper jaw), cutting edge of each tooth with 5 points (3 distinct median points), and outer teeth moveable, with brown edges; several rows of small molars also present. Three species in Indian Ocean, 2 species in WIO (Iwatsuki & Maclaine 2013).

**KEY TO SPECIES**

- 1a Scale rows 4½ (rarely 5½) between base of 10th dorsal-fin spine and lateral line; body depth 2.1–2.4 in SL ..... *C. indicus*
- 1b Scale rows 5½ or 6½ between base of 10th dorsal-fin spine and lateral line; body depth 2.4–2.8 in SL ..... *C. crenidens*

*Crenidens crenidens* (Forsskål 1775)

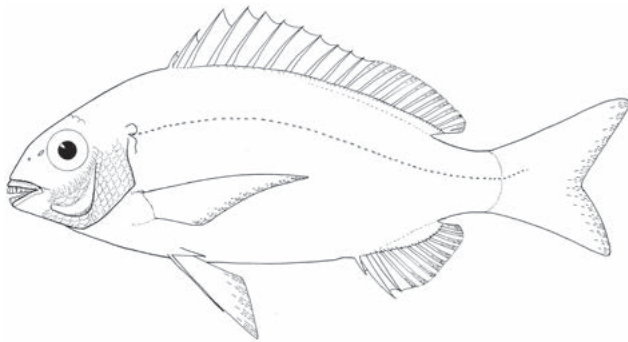
Karanteen seabream

PLATE 94

*Sparus crenidens* Forsskål in Niebuhr 1775: xv (Jeddah, Saudi Arabia, Red Sea; Egypt, Gulf of Suez, Red Sea); Klausewitz & Nielsen 1965\*; Nielsen 1974\*.*Crenidens crenidens*: Smith 1938\*; SFSA No. 732\*; Hureau & Monod 1973; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.14\*; Whitehead *et al.* 1986; Talwar & Jhingran 1991\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Golani 1998\*; Heemstra & Heemstra 2004\*; Iwatsuki & Maclaine 2013\*.*Crenidens crenidens crenidens*: Manilo & Bogorodsky 2003.

Dorsal fin 11 spines, 11 rays; anal fin 3 spines, 10 rays; pectoral fins 13 or 14 rays. Body oblong oval, depth 2.4–2.8 in SL, slightly compressed; upper head profile of juveniles gently convex to dorsal-fin origin, profile of adults becoming concave above eyes and convex or produced in front of eyes. GR 6–8/9–11. LL scales 50–60; opercular flange and interorbital area naked.

Body silvery, with greenish blue or olive tinge, fading ventrally; narrow longitudinal stripes along scale rows; fins tinged yellowish or olive; pectoral-fin axil sometimes darkish. Attains 30 cm TL.



*Crenidens crenidens*, 13 cm SL (South Africa). Source: Smith 1938

**DISTRIBUTION** WIO: Red Sea and Persian/Arabian Gulf to South Africa (rarely to East London, Eastern Cape).

**REMARKS** Usually seen in quiet muddy areas of shallow coastal waters. Feeds on algae and invertebrates (crustaceans and worms). Caught with small hooks baited with shrimp or prawn; excellent bait and good eating.

### *Crenidens indicus* Day 1873

Day's karanteen seabream PLATES 94 & 95

*Crenidens indicus* Day 1873: clxxxvi (northern Indian Ocean); Menon & Yazdani 1968\*; Whitehead & Talwar 1976.

*Crenidens macracanthus* Günther 1874: 368 [2] (Chennai, India).

*Crenidens crenidens*: Dor 1984; Talwar & Jhingran 1991.

*Crenidens crenidens indicus*: Bauchot & Smith 1984\*; Randall 1995\*; Manilo & Bogorodsky 2003.

*Crenidens indicus*: Iwatsuki & Maclaine 2013\*; Siddiqui *et al.* 2014.

Dorsal fin 11 spines, 11 rays; anal fin 3 spines, 10 rays; pectoral fins 13 or 14 rays. Body oblong oval, depth 2.1–2.4 in SL, slightly compressed; upper head profile of juveniles gently convex to dorsal-fin origin, profile of adults becoming concave above eyes and convex or produced in front of eyes. GR 6 or 7/9–11. LL scales 52–60; opercular flange and interorbital area naked.

Body silvery, with greenish blue or olive tinge; narrow longitudinal stripes along scale rows, somewhat darker

dorsally; fins dull yellowish hyaline; blackish spot in pectoral-fin axil, extending above pectoral-fin base. Attains 30 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, Persian/Arabian Gulf, Pakistan to southwestern India; elsewhere, Bay of Bengal and Nicobar Is.

**REMARKS** Omnivorous, presumably with feeding habits similar to *Crenidens crenidens*. Excellent bait fish.

## GENUS *Cymatoceps* Smith 1938

Interorbital area and bases of soft-rayed portion of dorsal and anal fins scaly; preopercular flange partly scaly. One species.

### *Cymatoceps nasutus* (Castelnau 1861)

Black musselcracker PLATES 95 & 104

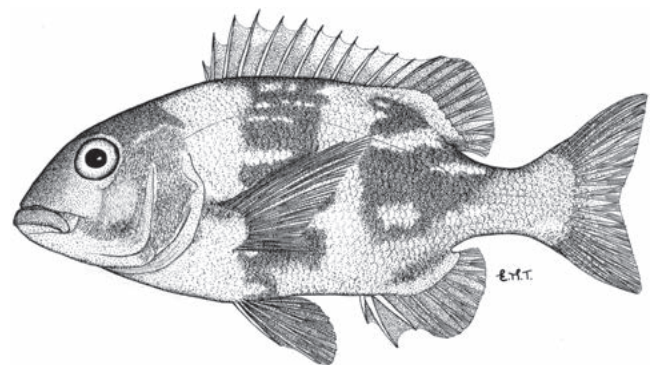
*Chrysophrys nasutus* Castelnau 1861: 24 (Table Bay, Cape Town, South Africa).

*Pagrus nigripinnis* Boulenger 1903: 67, Pl. 7 (KwaZulu-Natal, South Africa).

*Cymatoceps nasutus*: Smith 1938\*; SFSA No. 719\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.15\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body moderately deep and compressed, depth 2.3–2.5 in SL; head profile gently sloping, but large adults developing large fleshy protuberance on snout and a bulge before eyes. GR 6–8/10 or 11. Scales rough, those on body above lateral line much smaller than those below lateral line; LL scales 61–65.

Adults with drab dark grey body, and chin and belly bright white; juveniles with dark greenish brown body mottled with irregular white spots. Attains 150 cm TL, ~34 kg.



*Cymatoceps nasutus*, 21 cm TL, juvenile (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: Mozambique (Maputo Bay) to South Africa (False Bay).

**REMARKS** Occurs in shallow coastal waters, chiefly in rocky areas. Feeds on molluscs and crustaceans, using its large molars to crush the shells. A premier angling fish in South Africa, takes almost any bait and fights doggedly but is not speedy; in some areas the body was once cooked to feed pigs and dogs, while the head was retained as a delicacy (Smith & Smith 1986). IUCN Red List conservation status Vulnerable.

## GENUS *Diplodus* Rafinesque 1810

Body deep, ovate to somewhat elongate; upper jaw with 8–12 incisors at front, and both jaws with molars; LL scales  $\geq 60$ ; scaly sheath at bases of dorsal and anal fins; preopercular flange naked; body with dark vertical bars, or entirely silvery with black blotch on peduncle. Needs taxonomic review worldwide. About 20 species or subspecies, 5 species in WIO.

### KEY TO SPECIES

- |    |  |                       |
|----|--|-----------------------|
| 1a | Sides of body with 5 or 6 broad dark vertical bars; 10–12 incisors at front of upper jaw .....   | 2                     |
| 1b | No dark vertical bars on sides in adults, but juveniles with 8 or 9 narrow dark bars disappearing with age; usually 8 (occasionally 7–10) incisors at front of upper jaw ..... | 3                     |
| 2a | Sides with 6 broad dark bars (excluding faint patch on snout), 5th bar at midpoint of dorsal and anal fins .....   | <i>D. hottentotus</i> |
| 2b | Sides with 5 broad dark crossbars (excluding faint patch on snout), 5th bar across peduncle .....  | <i>D. omanensis</i>   |
| 3a | GR 12–14 on lower limb of 1st arch; 6 or 7 scales between lateral line and base of 4th dorsal-fin spine; body depth 2.3–2.6 in SL .....  | <i>D. noct</i>        |
| 3b | GR 8–10 on lower limb of 1st arch; 7–9 scales between lateral line and base of 4th dorsal-fin spine; body depth 2–2.3 in SL .....  | 4                     |
| 4a | Peduncle with saddle-like black blotch larger than eye .....   | <i>D. capensis</i>    |
| 4b | Peduncle with distinct round black blotch, smaller than or subequal to eye diameter .....  | <i>D. kotschy</i>     |

## *Diplodus capensis* (Smith 1844)

Blacktail seabream

PLATE 95

*Sargus capensis* Smith 1844: no page number, Pl. 23, Fig. 2 (southeastern coast of South Africa).

*Diplodus rondeleti* var. *capensis* Barnard 1927: 691 [Namibe, Angola].

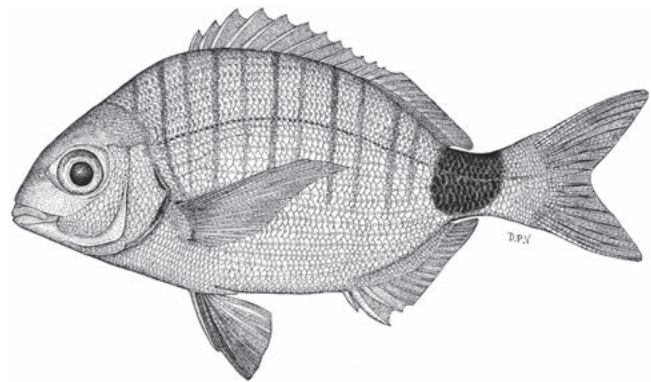
*Diplodus sargus* (*non* Linnaeus 1758): Smith 1938; SFSA No. 713\*; Smith & Smith 1966; Van der Elst 1981\*.

*Diplodus sargus capensis*: Smith 1980; Bauchot & Smith 1984\*; SSF No. 183.17\*; Bianchi & Carpenter 1993; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003.

*Diplodus capensis*: Heemstra & Heemstra 2004\*; Siddiqui *et al.* 2014.

Dorsal fin 12 spines, 14 or 15 rays; anal fin 3 spines, 13 or 14 rays; pectoral fins 16 or 17 rays. Body oval, compressed, rather deep, depth 2–2.3 in SL. Both jaws with 8 large inclined incisors at front, followed by 3 or 4 more incisors in upper jaw, and 2 or 3 molars in lower jaw. GR 6–8/8–11. LL scales 62–72.

Body of large adults uniformly silvery, with large saddle-like black blotch at peduncle; young with faint vertical bars. Attains 45 cm TL.



*Diplodus capensis*, 10 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Southeastern Atlantic (Angola to South Africa) and Indian Ocean. WIO: Pakistan to Oman, Mozambique, South Africa, southern Madagascar, and possibly to Mauritius.

**REMARKS** Found over rocky substrates and also enters estuaries.

## *Diplodus hottentotus* (Smith 1844)

Zebra

PLATE 95

*Sargus hottentotus* Smith 1844: no page number, Pl. 23, Fig. 1 (southeastern South Africa).

*Diplodus trifasciatus* (*non* Rafinesque 1810): Smith 1938\*; SFSA No. 714\*; Smith & Smith 1966\*.

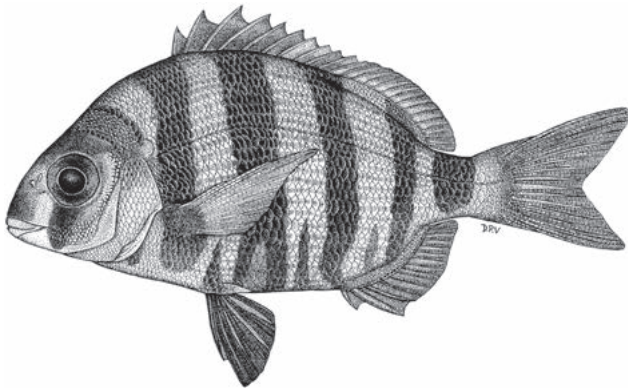
*Diplodus cervinus* (*non* Lowe 1838): Bauchot & Daget 1971; Smith 1975; Van der Elst 1981\*.

*Diplodus cervinus hottentotus*: Bauchot & Smith 1984\*; SSF No. 183.16\*; Randall 1995\*.

*Diplodus hottentotus*: Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 12 or 13 rays; anal fin 3 spines, 11 rays; pectoral fins 15 rays. Body oval, deep and compressed, depth 2–2.3 in SL. Upper jaw with 10–12 inclined incisors at front, lower jaw with 8 incisors. GR 7–9/9 or 10. LL scales 61–68.

Body bright yellow, with 5 broad dark vertical bars; front of head black; opercle grey; fins dark grey, except caudal fin of juveniles pink, with black bar at base. Attains 60 cm TL.



*Diplodus hottentotus*, 8 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: southern Mozambique to South Africa (Kosi Bay to False Bay).

**REMARKS** Occurs over rocky substrates, to ~100 m deep; enters estuaries as juveniles. Feeds on a wide variety of organisms, including fishes, molluscs, crustaceans and worms. Flesh good to eat, but a freshly landed fish emits a powerful, nauseating odour. Previously considered a subspecies of *Diplodus cervinus* from the eastern Atlantic.

### *Diplodus kotschy* (Steindachner 1876)

One-spot seabream

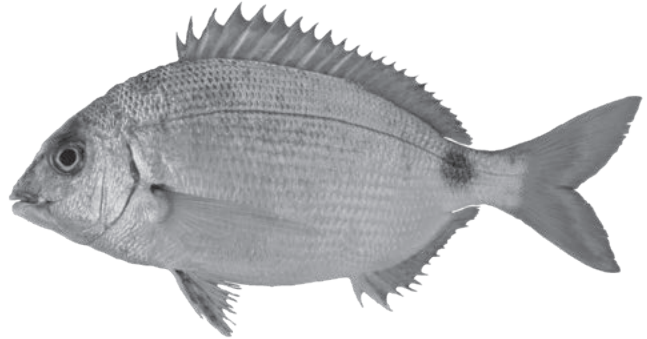
PLATE 95

*Sargus kotschy* Steindachner 1876: 203 [155] (Persian/Arabian Gulf; Madagascar).

*Diplodus sargus kotschy*: Bauchot & Smith 1984\*; Abou-seedo *et al.* 1990; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Siddiqui *et al.* 2014.

Dorsal fin 12 spines, 13–15 rays; anal fin 3 spines, 12–14 rays; pectoral fins 15 rays. Body oval, somewhat deep and compressed, depth 2–2.3 in SL. Both jaws with 8 broad incisor-like teeth at front, compressed and inclined forward. GR 7 or 8/8–10. LL scales 60–68; well-developed scaly sheath at bases of dorsal and anal fins.

Body silvery, with distinct round black blotch on peduncle. Attains 30 cm TL.



*Diplodus kotschy*, 16 cm SL (Qatar). © SV Bogorodsky

**DISTRIBUTION** WIO: Persian/Arabian Gulf and Arabian Sea to northern India.

**REMARKS** Common in rocky areas of shallow coastal waters. Easily caught on lines. Feeds on algae and small invertebrates. In need of further study.

### *Diplodus noct* (Valenciennes 1830)

Red Sea seabream

PLATES 95, 96 & 104

*Sargus noct* Valenciennes (ex Ehrenberg) *in* Cuv. & Val. 1830: 51 (Egypt, Gulf of Suez, Red Sea).

*Diplodus noct*: Bauchot & Smith 1984\*; Dor 1984; Goren & Dor 1994; Randall 1995\*.

Dorsal fin 10–13 spines, 12–15 rays; anal fin 3 spines, 12–14 rays; pectoral fins 15 or 16 rays. Body oval, rather elongate and compressed, depth 2.3–2.6 in SL. Upper jaw with 7–10 incisors at front, lower jaw with 7 incisors, compressed and inclined forward. GR 8 or 9/12–14. LL scales 60–69.

Body silvery, with scale rows forming darker stripes; dark blotch over lateral line on anterior part of peduncle, becoming indistinct with age. Attains 30 cm TL.

**DISTRIBUTION** WIO: likely endemic to Red Sea.

**REMARKS** Occurs on sandy bottom, around coral reefs, and in shallow coastal waters. Feeds on algae and small invertebrates. Presumably of little commercial significance and best utilised as bait.



*Diplodus omanensis* Bauchot & Bianchi 1984

Oman porgy

PLATE 96

*Diplodus cervinus omanensis* Bauchot & Bianchi 1984: 103, Fig. A (Khuriya Muriya Bay, Oman, Arabian Sea); Randall 1995\*; Manilo & Bogorodsky 2003.

*Diplodus omanensis*: Amir *et al.* 2013.

Dorsal fin 11 spines, 12 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 15 rays. Body oval, deep and compressed, depth 2–2.3 in SL. Both jaws with 10–12 incisors teeth at front, compressed and inclined forward. GR 9 or 10/8–10. LL scales 61–63.

Body white, with 5 broad black vertical bars (1st through eyes; 5th across peduncle); head yellowish, with indistinct dark patch on dorsal surface of snout; dorsal, anal and pelvic fins dark; caudal and pectoral fins pale to transparent. Attains >30 cm TL.

**DISTRIBUTION** WIO: southern Oman to Pakistan.

**REMARKS** Occurs inshore, over rocky bottom. Biological information is needed, but presumably has similar habits to *Diplodus hottentotus*.

**GENUS** *Gymnocrotaphus* Günther 1859

Head naked, except for opercle; both jaws with prominent curved incisors, band of smaller conical teeth within, and some innermost teeth as small molars. One species.

*Gymnocrotaphus curvidens* Günther 1859

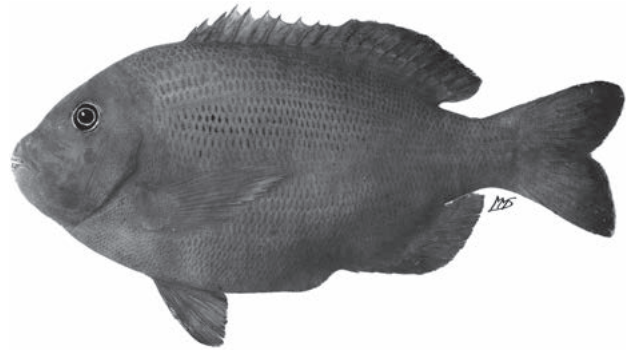
Janbruin

PLATE 96

*Gymnocrotaphus curvidens* Günther 1859: 432 (Cape of Good Hope, South Africa); Smith 1938\*; SFSA No. 730\*; Smith & Smith 1966\*; Van der Elst 1981\*; SSF No. 183.18\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 10 spines, 11 or 12 rays; anal fin 3 spines, 9 or 10 rays; pectoral fins 17 rays. LL scales 64–68. GR 5 or 6/7–9. Plump and deep-bodied, depth 2.3 in SL; head profile somewhat concave in front of eyes and also just above eyes, and then straight to dorsal-fin origin. Preopercular flange, interorbital area and cheeks naked.

Body coppery brown, head bluish grey; live fish with blue eyes and orange lines along scale rows; after death, body quickly becomes uniformly black with salmon pink abdomen. Attains 50 cm TL.



*Gymnocrotaphus curvidens*, 25 cm TL (WIO). Source: SFSA

**DISTRIBUTION** WIO: endemic to South Africa (Port St Johns to False Bay; rare north of East London).

**REMARKS** Found in rocky areas of shallow waters. Usually caught using redbait (*Pyura stolonifera*), but rarely more than two fish are caught in the same spot; flesh excellent.

**GENUS** *Lithognathus* Swainson 1839

Body moderate to oblong, compressed, and snout elongate; pectoral-fin tips reach nearly to base of 1st anal-fin spine; anterior teeth small, set in bands, followed by 3–6 rows of rounded and trapezoidal molars in upper jaw, and 2–4 rows of molars in lower jaw; maxilla of adults not reaching front margin of eye; scales extend forward on head to above rear margin of eye. Three species, 2 in WIO. This genus is in need of taxonomic review.

**KEY TO SPECIES**

- |    |  |                        |
|----|--|------------------------|
| 1a | LL scales 60–65; dorsal fin 11–13 rays; anal fin 10 or 11 rays; >10 narrow dark bars on body .....                         | <i>L. mormyrus</i>     |
| 1b | LL scales 44–51; dorsal fin 9 or 10 rays; anal fin 10 or 11 rays; ~7 wide dark vertical bars on body, fading with age..... | <i>L. lithognathus</i> |

*Lithognathus lithognathus* (Cuvier 1829)

White steenbras

PLATE 96

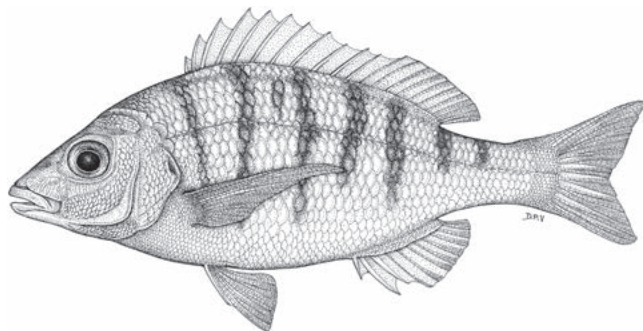
*Pagrus lithognathus* Cuvier 1829: 183 (Cape of Good Hope, South Africa); Valenciennes 1830\*; Bauchot & Daget 1972\*.

*Pagellus (Lithognathus) capensis* Swainson 1839: 222, Pl. 114 [based on Cuv. & Val. 1830: Pl. 141].

*Lithognathus lithognathus*: Smith 1938, 1962\*; SFSA No. 726\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.20\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 9 or 10 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 16 or 17 rays. LL scales 44–51. GR 5 or 6/8–10. Body oblong and compressed, depth 2.2–2.4 in SL; head profile almost straight (becoming convex with growth) from upper lip to dorsal-fin origin; eye moderate to small; lips thick in adults; teeth in bands, feeble, pointed, 2 series of small molars in both jaws.

Body mainly silvery, darker dorsally, with 6 or 7 dusky vertical bars that fade in large adults. Attains 200 cm TL.



*Lithognathus lithognathus*, 12 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** South Africa: Orange River mouth in southeastern Atlantic, to KwaZulu-Natal in WIO.

**REMARKS** Uses estuaries as nursery grounds; large fish inhabit sandy or mud-sand bottom. Feeds on bottom organisms; caudal fin frequently seen waving above the water as it feeds on shallow banks, often blowing prey out of burrows. IUCN Red List conservation status Endangered.

### *Lithognathus mormyrus* (Linnaeus 1758)

Sand steenbras

PLATE 96

?*Sparus hurta* Linnaeus 1758: 279 (Mediterranean Sea).

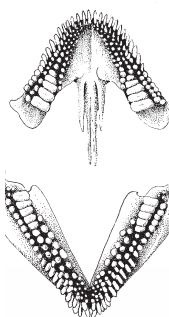
*Sparus mormyrus* Linnaeus 1758: 281 (Mediterranean Sea).

*Pagellus goreensis* Valenciennes in Cuv. & Val. 1830: 203 (Gorée, Senegal).

*Lithognathus mormyrus*: Smith 1938\*, 1962\*; SFSA No. 727\*; Smith & Smith 1966\*; Bauchot *et al.* 1981; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.21\*; Bianchi & Carpenter 1993\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

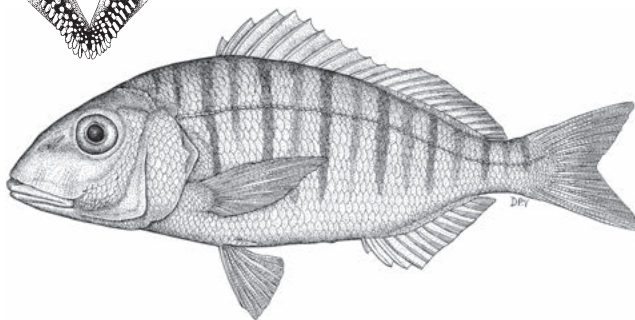
Dorsal fin 11 spines, 11–13 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 16 or 17 rays. Body oblong and compressed, depth 2.2–2.4 in SL; head profile smoothly convex from upper lip to dorsal-fin origin, snout elongated and pointed; eyes small. Both jaws with trapezoidal molars. GR 5 or 6/8–10. LL scales 60–65.

Body silvery grey with pinkish or yellowish sheen; ~4–17 dark, evenly spaced, vertical bars between eyes and caudal-fin origin. Attains 55 cm TL.



*Lithognathus mormyrus*, dentition.

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*Lithognathus mormyrus*, 13 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: Red Sea to southern Oman, Mozambique, South Africa; elsewhere in eastern Atlantic, Mediterranean Sea and Black Sea. Not known from tropical waters of WIO.

**REMARKS** Inhabits sandy or mud-sand bottom as well as seagrass meadows in shallow coastal areas. Not abundant, but caught by anglers using small hooks in sandy areas of estuaries and down to ~50 m. Feeds on benthic organisms.

### GENUS *Pachymetopon* Günther 1859

Plump-bodied; mouth small, pouting, and oblique when closed; both jaws with 4 or 5 rows of incisors and no molars. Interorbital area naked; membrane between each ray of soft-rayed portion of dorsal and anal fins densely scaly at base, but fins without scaly basal sheath. Three species, all off southern Africa.

#### KEY TO SPECIES

- |    |   |                   |
|----|---|-------------------|
| 1a | Pectoral fins subequal to HL; LL scales 60–65.....              | <i>P. blochii</i> |
| 1b | Pectoral fins distinctly longer than head; LL scales 80–86..... | 2                 |
| 2a | Inner margin of preopercular flange scaly; lower GR 15–18.....  | <i>P. aeneum</i>  |
| 2b | Entire preopercular flange naked; lower GR 10–13.....           | <i>P. grande</i>  |

*Pachymetopon aeneum* (Gilchrist & Thompson 1908)

Blue hottentot

PLATE 97

*Cantharus aeneus* Gilchrist & Thompson 1908: 166 (KwaZulu-Natal, South Africa).

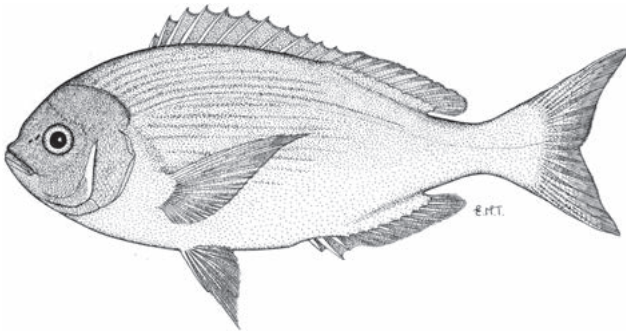
*Cantharus natalensis* Gilchrist & Thompson 1908: 167 (KwaZulu-Natal, South Africa).

*Cantharus simus* Gilchrist & Thompson 1909: 231 (fish market at Durban, KwaZulu-Natal, South Africa).

*Pachymetopon aeneum*: Smith JLB 1938; SFSA No. 737\*; Smith & Smith 1966\*; Smith MM 1980; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.22\*; Heemstra & Heemstra 2004\*.

Dorsal fin 10 or 11 spines, 11–13 rays; anal fin 3 spines, 10 rays; pectoral fins 17 rays. Body ovate, depth 2.2–2.5 in SL; head profile gently rounded from dorsal-fin origin to bulge between eyes, and then abruptly, briefly concave to mouth. Teeth of juveniles with triangular tips. GR 6–8/15–18. LL scales 80–86; inner margin of preopercular flange scaly.

Head cobalt blue dorsally; body bronzy yellow with fine blue streaks along scale rows, and silvery ventrally; dorsal-fin spines blue, fin membranes yellowish, margin darker. Attains 50 cm TL.



*Pachymetopon aeneum*, 30 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: endemic to South Africa (KwaZulu-Natal to Cape Point).

**REMARKS** Inhabits rocky areas in shallow waters, at 20–50 m. Feeds mainly on bottom-dwelling invertebrates (worms, ascidians, crustaceans, molluscs). Not often caught by shore anglers. A beautiful fish under water: Smith & Smith (1986) note that “no artist may hope to portray these colours in their natural brilliance.”

*Pachymetopon blochii* (Valenciennes 1830)

Hottentot

PLATE 97

*Cantharus blochii* Valenciennes in Cuv. & Val. 1830: 339 (Cape of Good Hope, South Africa).

*Cantharus castelnaui* Bleeker 1859: 59 (Cape of Good Hope, South Africa).

*Pachymetopon canescens* Norman 1935: 14, Pl. 2 (?False Bay, South Africa).

*Pachymetopon blochii*: Smith 1938; SFSA No. 736\*; Van der Elst 1981\*; SSF No. 183.23\*; Bianchi & Carpenter 1993\*; Heemstra & Heemstra 2004\*.

Dorsal fin 10 or 11 spines, 11 or 12 rays; anal fin 3 spines, 10 rays; pectoral fins 17 rays. Body ovate, depth 2.2–2.5 in SL; head profile gently rounded from snout to dorsal-fin origin. GR 7 or 8/13 or 14. LL scales 60–65; preopercular flange naked.

Body bronzy brown or dark brown, pale ventrally. Attains 46 cm TL.

**DISTRIBUTION** Southern Africa: Angola in southeastern Atlantic, to South Africa (Port Alfred, Eastern Cape; but rarely east of Cape Agulhas) in WIO.

**REMARKS** Inhabits rocky areas in shallow waters, to at least 55 m deep, but occasionally taken in fair numbers from deeper rocky areas. Feeds mainly on bottom-dwelling invertebrates. A common food fish of the Cape Point area of South Africa, but not of much significance to recreational anglers.

*Pachymetopon grande* Günther 1859

Bronze seabream

PLATE 97

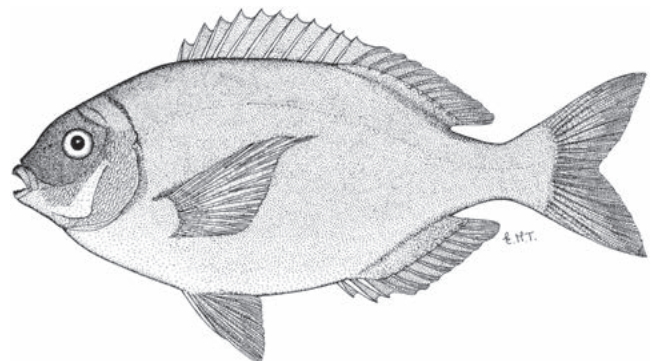
*Pachymetopon grande* Günther 1859: 424 (Cape of Good Hope, South Africa); Günther 1886\*; Smith 1938; SFSA No. 738\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.24\*; Heemstra & Heemstra 2004\*.

*Pachymetopon guentheri* Steindachner 1869: 126 (Cape of Good Hope, South Africa).

*Pachymetopon glaucum* Norman 1935: 20, Fig. 6 (East London, Eastern Cape, South Africa).

Dorsal fin 11 spines, 11–13 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 17 or 18 rays. Body plump and deep, depth 2–2.3 in SL; head profile gently convex with slight protuberance before eyes. GR 5–7/10–13. LL scales 80–85; preopercular flange naked.

Body bronzy, chest and belly paler; head iridescent blue; pectoral fins blue in life. Attains 65 cm TL.



*Pachymetopon grande*, ~31 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: southern Mozambique to South Africa (False Bay) and southern Madagascar.

**REMARKS** Often found in shallow waters around rocks, to ~25 m deep. Feeds mainly on seaweeds, ascidians, crustaceans and algae. An important species to the recreational and small-scale fishing sector.

**GENUS** *Pagellus* Valenciennes 1830

Body oblong and typically silvery pink; scales reach forward on head to beyond vertical at front half of eyes; dorsal and anal fins with low scaly sheath at base. Six species, 2 in WIO.

**KEY TO SPECIES**

- 1a Scale rows usually 6 on cheek, 8 or 9 on opercle .... *P. natalensis*
- 1b Scale rows usually 7 on cheek, 10 or 11 on opercle ..... *P. affinis*

*Pagellus affinis* Boulenger 1888

Arabian pandora

PLATE 97

*Pagellus affinis* Boulenger 1888: 659 (Muscat, Oman, Gulf of Oman); Bauchot & Smith 1984\*; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Amir *et al.* 2013; Iwatsuki *et al.* 2013.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 10 rays; pectoral fins 15 or 16 rays. Body elongate, somewhat fusiform, depth 2.6–3 in SL; head profile convex from upper lip to dorsal-fin origin. Jaws with fine sharp teeth and small molars. GR 7/9 or 10. LL scales 59–63; preopercular flange naked.

Body and head silvery pink, paler ventrally. Attains 37 cm TL.

**DISTRIBUTION** WIO: northern Somalia to Gulf of Aden, Oman, Persian/Arabian Gulf and Pakistan.

**REMARKS** Known to at least 150 m deep. Omnivorous, with a preference for carnivorous food. Of great commercial significance in the Middle East, and taken commonly by trawl.

*Pagellus natalensis* Steindachner 1903

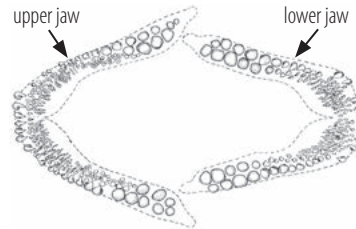
Natal pandora

PLATES 97 & 103

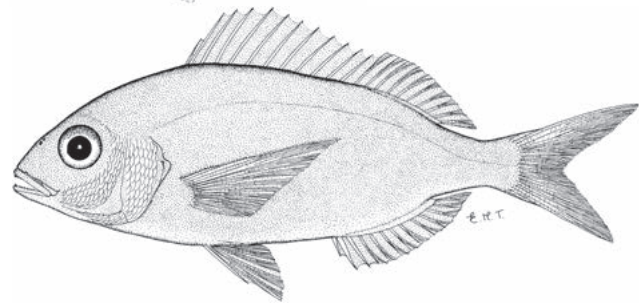
*Pagellus natalensis* Steindachner 1903: 134 [12] (Durban, KwaZulu-Natal, South Africa); Smith 1938\*; SFSA No. 728\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; Leis *et al.* 2002\*.  
*Pagellus bellottii natalensis*: SSF No. 183.25\*.

Dorsal fin 12 spines, 10 or 11 rays; anal fin 3 spines, 10 rays; pectoral fins 16 rays. Body elongate, somewhat fusiform and slightly compressed, depth 2.8–3 in SL; head profile convex from upper lip to dorsal-fin origin; pectoral fins subequal to HL. Jaws with small pointed teeth at front, and 2 series of small molars at rear. GR 5 or 6/10–13. LL scales 59–62; preopercular flange naked.

Body silvery red, fins rosy pink; lower half of head and body pale. Attains 30 cm TL.



*Pagellus natalensis*, dentition.  
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*Pagellus natalensis*, 16 cm SL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: South Africa to southern Madagascar.

**REMARKS** Found to ~70 m deep. Omnivorous, with a preference for worms, molluscs and crustaceans. Commonly taken by trawl, but of little commercial value because of its small size.

**GENUS** *Petrus* Smith 1938

Scales on head extend beyond vertical at eye; gill rakers of both limbs short; soft-rayed portion of dorsal and anal fins with scaly, fleshy base. One species.

*Petrus rupestris* (Valenciennes 1830)

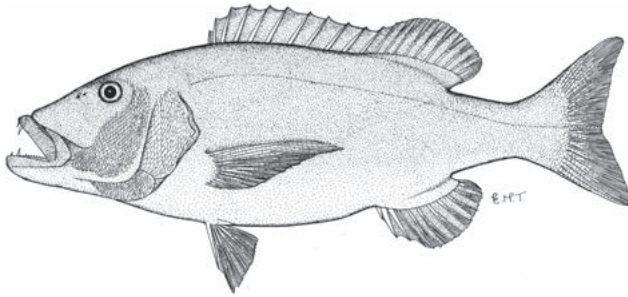
Red steenbras

PLATE 97

*Dentex rupestris* Valenciennes *in* Cuv. & Val. 1830: 231 (Cape of Good Hope, South Africa); Smith 1841\*.  
*Dentex brevis* Kner 1865: 63 (Cape of Good Hope, South Africa).  
*Petrus rupestris*: Smith 1938\*; SFSA No. 741\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.26\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 11 spines, 10 or 11 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body oblong, elongate, fairly compressed, depth 2.5–3 in SL; head profile almost straight from upper lip to dorsal-fin origin in juveniles, developing slight hump before eyes with growth, and ridge above eyes increasing with age; eyes small, diameter ~4–8 in HL (proportionately smaller with growth). Upper jaw with 4 powerful canines at front, lower jaw with 4–6 canines, and both jaws with band of fine teeth behind canines. GR 5–7/9–11, very short. LL scales 57–63; preopercular flange and interorbital area partly scaly.

Body bright red to golden yellow or bronzy, often mottled red, yellow and green dorsally; anal, pelvic and pectoral fins uniformly reddish; brownish spot below last dorsal-fin ray in subadults, becoming diffuse in adults. Attains 200 cm TL.



*Petrus rupestris*, 120 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: endemic to South Africa (St Lucia to False Bay, Western Cape).

**REMARKS** Relatively large-sized. Inhabits coastal waters, typically on rocky banks, to ~160 m deep, and sometimes enters estuaries. Feeds on octopuses, crabs and fishes. IUCN Red List conservation status Endangered.

## GENUS *Polyamblyodon* Norman 1935

Jaws with 1 outer row of incisors (none enlarged at front), followed by pavement of granular teeth; interorbital region naked; soft-rayed portion of dorsal and anal fins densely scaly at base. Two rather rare species, from tropical waters of southeastern Africa in WIO.

### KEY TO SPECIES

- |    |  |                    |
|----|--|--------------------|
| 1a | Dorsal fin 11 or 12 rays; pectoral fins 17 rays; pelvic fins reach anus .....  | <i>P. germanum</i> |
| 1b | Dorsal fin 13 rays; pectoral fins 15 rays; pelvic fins not reaching anus ..... | <i>P. gibbosum</i> |

## *Polyamblyodon germanum* (Barnard 1934)

German seabream

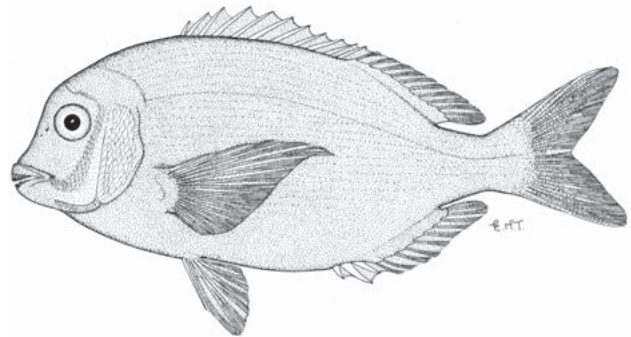
PLATE 98

*Pachymetopon germanum* Barnard 1934: 230, Fig. 2 (Durban, KwaZulu-Natal, South Africa).

*Polyamblyodon germanum*: Smith 1938; SFSA No. 735\*; Bauchot & Smith 1984\*; SSF No. 183.27\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 11 or 12 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 17 rays. Body ovate, compressed, moderately deep, depth 2.2–2.5 in SL; snout blunt, profile concave to bulge between and above eyes, then gently convex to broad nape, the angle becoming sharper with age; pelvic fins reach anus. GR 7 or 8/14–16. LL scales 67–71; preopercular flange naked.

Body grey-blue to bronzy dorsally, paler ventrally; forehead, cheeks and fins darker. Attains 50 cm TL.



*Polyamblyodon germanum*, ~29 cm TL (South Africa). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: Mozambique (Maputo Bay) to South Africa (Algoa Bay).

**REMARKS** Inhabits deeper water; a rare catch for line fishermen, but flesh excellent. Feeds on crustaceans, small molluscs and algae. Easily confused with *Pachymetopon grande*.

## *Polyamblyodon gibbosum* (Pellegrin 1914)

Knifeback seabream

PLATE 98

*Pachymetopon gibbosum* Pellegrin 1914: 264 (Fort Dauphin, Madagascar).

*Polyamblyodon* (*Leptomtopon*) *cristiceps* Smith 1940: 178, Figs. 1–2 (Maputo Bay, Mozambique).

*Polyamblyodon gibbosum*: SFSA No. 733\*; Bauchot & Smith 1984\*; SSF No. 183.28\*; Heemstra & Heemstra 2004.

*Polyamblyodon cristiceps*: SFSA No. 734\*.

Dorsal fin 11 spines, 13 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 15 rays. Body relatively deep to ovate with age, compressed, depth 2–2.3 in SL; head profile very elevated with

age, slightly concave from upper lip to sharp nape, and then convex to dorsal-fin origin. GR 6–8/15–18. LL scales 72–78; preopercular flange with small patch of embedded scales.

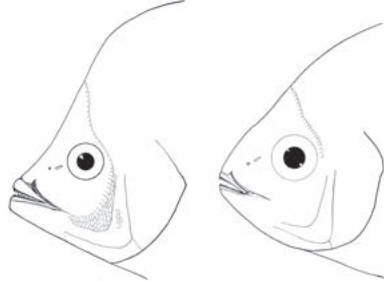
Body grey-blue to dusky dorsally, LL scales darker and prominent, body paler below lateral line; rear edge of opercle dark; fins mostly paler than body, except pelvic-fin tips, pectoral fins and caudal-fin lobes somewhat dusky. Attains 60 cm TL.

**DISTRIBUTION** WIO: Mozambique (Pomene) to South Africa (Algoa Bay, Eastern Cape) and Madagascar.

**REMARKS** Feeds on crustaceans, small molluscs and algae. Not often caught, but flesh excellent to eat.



*Polyamblyodon gibbosum*, dentition of 51 cm TL type specimen of *P. cristiceps* (Mozambique). Source: Smith 1940



*Polyamblyodon gibbosum*, 51 cm TL (left) and 26 cm TL (right), head profile changes with growth (both Mozambique). Source: Smith 1940

## GENUS *Polysteganus* Klunzinger 1870

Dorsal fin 12 (rarely 11) spines; interorbital space and preopercular flange scaly; dorsal and anal fins naked; canines at front of jaws not very strong, 4 canines on upper jaw and 6 canines on lower jaw (except 4 canines on both jaws in *P. baissaci*); no molars on lower jaw. This genus is considered by some authors to be a subgenus of *Dentex*. Presumably in need of further review. Eight species (Iwatsuki & Heemstra 2015), all in WIO.

### KEY TO SPECIES

- 1a Large dark oval blotch on sides below dorsal-fin spines 5–6; HL >4 in SL ..... *P. undulosus*
- 1b No dark blotch on sides; HL <4 in SL ..... 2
- 2a Body depth greatest at vertical through rear of preopercle; GR 14–16 ..... *P. praeorbitalis*
- 2b Body depth greatest at vertical through pectoral-fin bases; GR 10–13 ..... 3

Continued...

### KEY TO SPECIES

- 3a Body with 6–8 prominent, bright blue longitudinal stripes ..... *P. baissaci*
- 3b No longitudinal blue stripes or lines of blue spots on body ... 4
- 4a Caudal fin weakly forked, nearly truncate if widely spread; distinct bony bulge before and above eyes in specimens >60 cm SL (bulge probably not apparent in juveniles); body reddish orange, without lines of blue spots ..... *P. mascarenensis*
- 4b Caudal fin forked; no strong bony bulge both before and above eyes; body reddish yellow, often with irregular lines of blue spots ..... 5
- 5a Scale rows 4½ between 5th dorsal-fin spine and lateral line; no irregular lines of blue spots; rear margin of branchiostegal membranes yellow, plus yellow colour on a few body scales just above upper pectoral-fin base ..... *P. cerasinus*
- 5b Scale rows 5½–7½ between 5th dorsal-fin spine and lateral line; sometimes 7 or 8 irregular lines of blue spots present; rear margin of branchiostegal membranes white ..... 6
- 6a Blue iridescence in each body scale on dorsal and lateral sides of body visible at some angles, and no irregular lines of blue spots; caudal-fin upper lobe yellow, lower lobe red ..... *P. flavodorsalis*
- 6b No blue iridescence in body scales on dorsal and lateral sides; 7 or 8 irregular lines of blue spots on body, visible at some angles; both caudal-fin lobes with pink or red membranes ... 7
- 7a Scale rows above LL 6½; LL scales 51 or 52; dorsal-fin rays reddish pink, but distal fin margin not bright yellow; canines large, upper and lower canines (on both jaws) usually visible even when mouth is closed; body deeper ... *P. coeruleopunctatus*
- 7b Scale rows above LL 7½; LL scales 53–55; dorsal-fin rays reddish pink or orangish red, distal fin margin bright yellow; canines somewhat smaller, generally only upper canines visible when mouth is closed; body somewhat slender ..... *P. lineopunctatus*

## *Polysteganus baissaci* Smith 1978

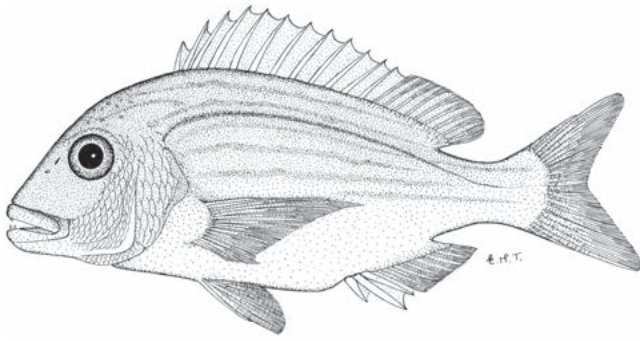
Frenchman seabream

PLATE 98

*Polysteganus baissaci* Smith 1978: 563, Fig. 1 (northwest of Gunner's Guoin, Mauritius, Mascarenes); Bauchot & Smith 1984\*; Fricke 1999; Iwatsuki & Heemstra 2011.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body deep, depth 2.3–2.5 in SL, and greater than HL in large adults; head profile gently curving from lip to dorsal-fin origin; eyes moderate. GR 7–9/11–13. LL scales 50–55; preopercular flange scaly anteriorly, rear margin naked.

Body rosy pink with golden sheen; 6–8 bright blue longitudinal stripes on body (3 above lateral line, 3–6 below), becoming indistinct on abdomen. Attains at least 40 cm SL (probably larger).



*Polysteganus baissaci* (Mauritius). Source: Bauchot & Smith 1984

**DISTRIBUTION** WIO: Madagascar and Mauritius.

**REMARKS** Found around reefs and over sandy bottom, at 80–100 m.

### *Polysteganus cerasinus* Iwatsuki & Heemstra 2015

Cherry seabream

PLATE 98

*Polysteganus cerasinus* Iwatsuki & Heemstra 2015: 144, Fig. 4  
(Saya de Malha Bank).

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body deep, depth 2.3 in SL, greater than HL; head profile gently curving from upper lip to dorsal-fin origin; eyes moderate, suborbital depth clearly less than eye diameter. GR 7–9/11–13. LL scales 49; preopercular flange scaly anteriorly, with  $\sim\frac{1}{3}$  of margin naked; scale rows  $4\frac{1}{2}$  between base of 5th dorsal-fin spine and lateral line; LL scales 49.

Body head and body uniformly pink; caudal-fin margin and upper and lower lobes pinkish, and most of fin with yellowish hyaline membrane (upper and lower margins not whitish); no longitudinal stripes or blue spots on body. Attains at least 13.5 cm SL.

**DISTRIBUTION** Known only from the holotype collected from Saya de Malha Bank.

**REMARKS** Taken at  $\sim$ 127 m. Probably free-swimming around reefs and over sandy bottom.

### *Polysteganus coeruleopunctatus*

(Klunzinger 1870)

Blueskin seabream

PLATE 98

*Dentex (Polysteganus) coeruleopunctatus* Klunzinger 1870: 763 (Al-Qusayr, Egypt, Red Sea); Fricke 1992\*.

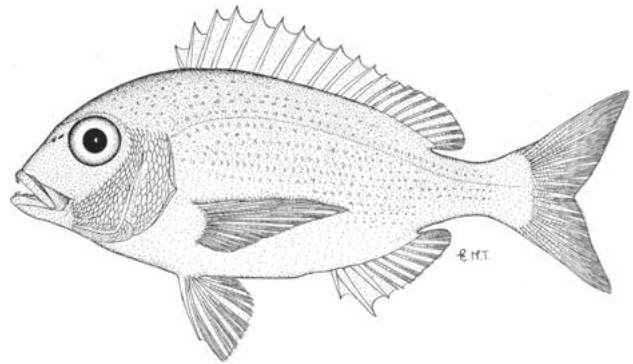
*Dentex lineopunctatus* Boulenger 1903: 66, Pl. 6 (KwaZulu-Natal, South Africa).

*Dentex natalensis* Gilchrist & Thompson 1908: 156 (KwaZulu-Natal, South Africa).

*Polysteganus coeruleopunctatus*: Smith 1938\*; SFSA No. 744\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.29\*; Baranes & Golani 1993; Goren & Dor 1994; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Fricke 2005; Iwatsuki & Heemstra 2011, 2015.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 rays. Body deep, depth 2.2–2.3 in SL, greater than HL in large adults; head profile smoothly convex, with slight bump in front of eyes; pectoral fins longer than HL. Upper-jaw canines not very strong. GR 7 or 8/11–13. LL scales 52–56.

Body rosy pink dorsally, silvery ventrally; upper half of body with blue spot on each scale, forming longitudinal lines of spots along scale rows. Attains 60 cm TL.



*Polysteganus coeruleopunctatus*, 33 cm TL (Kenya). Source: SSF

**DISTRIBUTION** WIO: known from deeper waters of WIO, Red Sea to KwaZulu-Natal, South Africa.

**REMARKS** Found in deep water around reefs, at 50–450 m; predatory. Commercially important along East Africa because of large catches, but not of commercial significance in South Africa because of low catches; flesh good.

### *Polysteganus flavodorsalis*

Iwatsuki & Heemstra 2015

Yellowfin seabream

PLATE 98

*Polysteganus flavodorsalis* Iwatsuki & Heemstra 2015: 141, Figs. 3a–c  
(Nazareth Bank, Mascarene Plateau).

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 or 16 rays. Body deep, depth 2.4–2.5 in SL, greater than HL in large adults; head profile gently curving from upper lip to dorsal-fin origin; eyes moderate. GR 7/16 or 17. LL 52 or 53; preopercular flange naked.

Head and body uniformly pinkish red or orange with blue iridescence at centre of each scale; upper part of head and dorsolateral part of body with more blue iridescence than ventral parts, and snout and upper part of head somewhat yellowish with growth; no longitudinal stripes and no blue spots on body. Attains at least 32 cm TL (presumably larger sizes).

**DISTRIBUTION** Known only from St Brandon Shoals and Nazareth Bank on the Mascarene Plateau.

**REMARKS** Type specimens collected at 214–305 m. Presumably free-swimming around reefs and over sandy bottom. Additional specimens urgently needed for biological information.

### *Polysteganus lineopunctatus* (Boulenger 1903)

Bluespotted seabream PLATE 98

*Dentex lineopunctatus* Boulenger 1903: 66, Pl. 6 (KwaZulu-Natal, South Africa).

*Dentex natalensis* Gilchrist & Thompson 1908: 156 (KwaZulu-Natal, South Africa).

*Polysteganus coeruleopunctatus* (non Klunzinger 1870): Smith & Smith 1986\* [in part: southwestern Africa]; Heemstra & Heemstra 2004\* [in part: South Africa and Mozambique]; Van der Elst 1985\* [in part: South Africa]; Iwatsuki & Heemstra 2011\* [in part: southwestern Indian Ocean].

*Polysteganus lineopunctatus*: Iwatsuki & Heemstra 2015\*.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 16 or 17 rays. Body deep, depth 2.2–2.4 in SL, greater than HL in large adults; head profile gently curving from upper lip to dorsal-fin origin; eyes moderate. GR 7–9/11–13. LL scales 49; preopercular flange scaly anteriorly, with ~1/3 of margin naked.

Head and body uniformly reddish orange with silvery reflections at centre of each scale; upper part of head and dorsolateral part of body brighter than lower part of head and abdomen; no longitudinal stripes and no blue spots on body. Attains at least 33 cm TL (presumably larger).

**DISTRIBUTION** WIO: South Africa and Mozambique.

**REMARKS** Presumably free-swimming around reefs and over sandy bottom, known from deeper waters, at ~50–200 m.

### *Polysteganus mascarenensis*

Iwatsuki & Heemstra 2011

Mascarene red seabream PLATE 98

*Dentex* sp.: Kyushin *et al.* 1977.

*Polysteganus mascarenensis* Iwatsuki & Heemstra 2011: 14, Fig. 1 (Mascarene Plateau and islands: 15°23' S, 61°13' E); Iwatsuki & Heemstra 2015.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 rays. Body depth 2.5–2.6 in SL; head profile evenly convex, but some large adults developing prominent hump before and above eyes, forming low median ridge; caudal fin emarginate, nearly truncate if widely spread. GR 6/12. LL scales 51–54.

Head and body orangish red dorsally, paler ventrally; all fins uniformly orange-red, but membrane of spinous portion of dorsal fin paler to hyaline; rear margin of operculum red; no dark blotch on lateral line below middle dorsal-fin spines, and no blue longitudinal lines on body. Attains 75 cm TL.



*Polysteganus mascarenensis*, 57 cm SL, paratype (Nazareth Bank).  
O Alvheim © IMR

**DISTRIBUTION** Known only from three type specimens from Seychelles and Mascarene Plateau and from photographs.

**REMARKS** Collected at 258–288 m. Probably more widespread and likely to also occur in shallower water.

### *Polysteganus praeorbitalis* (Günther 1859)

Scotsman seabream PLATE 99

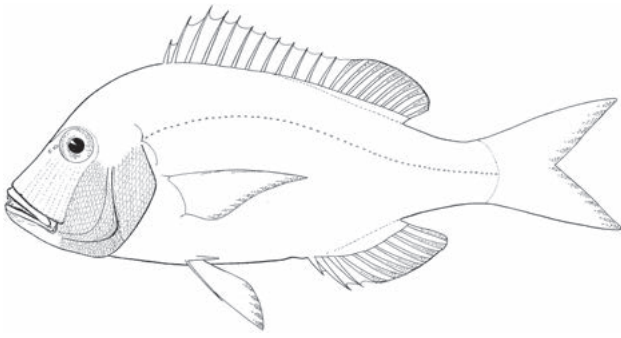
*Dentex praeorbitalis* Günther 1859: 368 (Cape of Good Hope, South Africa).

*Polysteganus praeorbitalis*: Smith 1938\*; SFSA No. 743\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.31\*; Heemstra & Heemstra 2004\*; Iwatsuki & Heemstra 2015.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 or 16 rays. Body moderately deep, depth 2.5–2.8 in SL, greatest at vertical through rear of preopercle; head profile smooth; pectoral fins subequal to HL; preorbital region deep, 1.5–2 times eye diameter. GR 10/15 or 16. LL scales 59–63.

Body reddish orange dorsally, paler ventrally, with narrow orange stripe below lateral line; face deep orange with blue lines radiating from eyes to mouth; dorsal fin orange, with narrow blue line along base; caudal, pectoral and pelvic fins deep red-orange. Attains 60 cm TL.





*Polysteganus praeorbitalis*, 25 cm SL (South Africa). Source: Smith 1938

**DISTRIBUTION** WIO: Mozambique (Beira) to South Africa (Algoa Bay, Eastern Cape).

**REMARKS** Found at 20–120 m. Carnivorous. Rarely caught by shore anglers; flesh good. IUCN Red List conservation status Vulnerable.

### *Polysteganus undulosus* (Regan 1908)

Seventy-four seabream

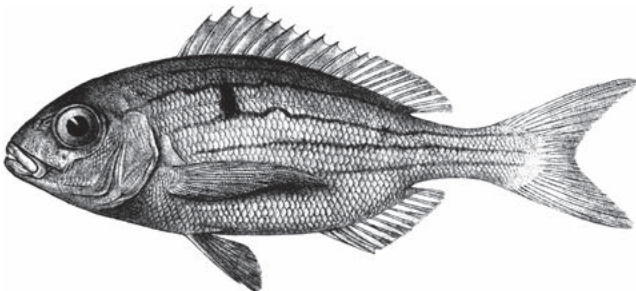
PLATE 99

*Dentex undulosus* Regan 1908: 252, Pl. 40 (northeast of Bird I., KwaZulu-Natal, and Table Bay, South Africa).

*Polysteganus undulosus*: Smith 1938\*; SFSA No. 742\*; Smith & Smith 1966\*; Bauchot & Smith 1984\*; SSF No. 183.32\*; Heemstra & Heemstra 2004\*; Iwatsuki & Heemstra 2011.

Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 16 rays. Body moderately deep but becoming more elongate with age, depth 2.4–2.9 in SL; head profile moderately steep, rising to nape, with prominent hump above eyes in juveniles but profile straight in large adults; pectoral fins subequal to HL in young, longer than HL in adults; preorbital depth usually less than eye diameter, sometimes slightly greater in large fish. GR 8–10/14–16. LL scales 58–62.

Body brilliant red, with numerous blue longitudinal lines and 1 yellow line along lateral line; blue lines along lips, and edge of suborbital blue; large oval dark blotch on sides below dorsal-fin spines 5–6; dorsal and anal fins reddish, with blue and yellow mottling; caudal fin reddish. Attains 120 cm TL (~15 kg at 100 cm TL).



*Polysteganus undulosus*, holotype (South Africa). Source: Regan 1908

**DISTRIBUTION** WIO: southern Mozambique to South Africa (Knysna, Western Cape).

**REMARKS** Lives among rocks. Carnivorous. This elegant fish was once scarce, but stocks appear to be recovering; flesh greatly esteemed. IUCN Red List conservation status Critically Endangered.

### GENUS *Porcostoma* Smith 1938

Interorbital area scaly; soft-rayed portion of dorsal and anal fins scaly at base; characteristic black streak along first few LL scales. One species.

### *Porcostoma dentata* (Gilchrist & Thompson 1908)

Dane seabream

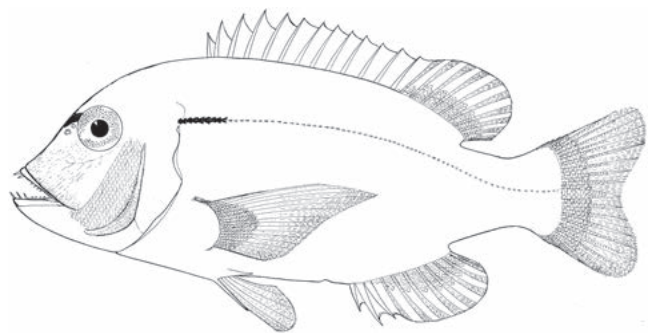
PLATE 99

*Chrysophrys dentatus* Gilchrist & Thompson 1908: 173 (KwaZulu-Natal, South Africa).

*Porcostoma dentata*: Smith 1938\*; SFSA No. 717\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.33\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 13 spines, 10 or 11 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 17 or 18 rays. Body ovate and rather plump, depth ~2.5 in SL; head profile straight or somewhat concave from lip to interorbital region, and then gently rounded to dorsal-fin origin; caudal-fin lobes rounded. GR 4–7/11–13. LL scales 71–73; preopercular flange partly scaly.

Body red, paler ventrally, sometimes with streaks along scale rows; dark bar across interorbital region; characteristic dark streak along first 8–12 LL scales; soft-rayed portion of dorsal and anal fins, and pectoral and pelvic fins with golden tinge; juveniles yellow, with 2 black blotches on lateral line. Attains at least 46 cm TL.



*Porcostoma dentata*, 17 cm SL (South Africa). Source: Smith 1938

**DISTRIBUTION** WIO: Mozambique (Beira) to South Africa (Tsitsikamma, Western Cape).

**REMARKS** Resembles a wrasse of the family Labridae. Found near reefs in midwater, to ~120 m deep; plentiful at times on reefs in KwaZulu-Natal, South Africa. Carnivorous. Flesh good.

**GENUS** *Pterogymnus* Smith 1938

Interorbital area and preopercular flange scaly; dorsal fin 12 spines; lower jaw with 2 rows of molars; soft-rayed portion of dorsal and anal fins naked, but with scaly sheath at base. One species.

*Pterogymnus laniarius* (Valenciennes 1830)

Panga seabream PLATE 100

*Pagrus laniarius* Valenciennes in Cuv. & Val. 1830: 163 (Cape of Good Hope, South Africa).

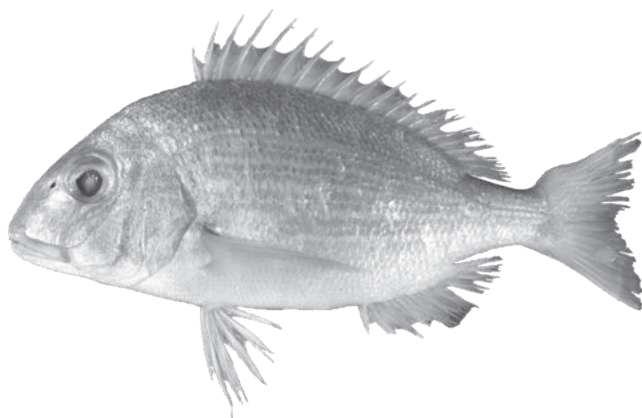
?*Pagellus afer* Pappe 1853: 20 (Cape of Good Hope, South Africa).

*Chrysophrys laniarius*: Gilchrist 1902\*.

*Pterogymnus laniarius*: Smith 1938\*; SFSA No. 718\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.34\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 12 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 or 16 rays. Body ovate and compressed, depth 2.3–2.5 in SL; head profile gently convex; eyes relatively large; hind margin of preorbital bone undulate and free, not concealed by cheek scales. GR 7–9/11–13. LL scales 56–59.

Body rosy or vermilion red, slightly paler ventrally, with 5 or 6 faint bluish longitudinal lines below lateral line. Attains 45 cm TL.



*Pterogymnus laniarius*, 25 cm SL (South Africa). © F Tanaka, MUF5

**DISTRIBUTION** WIO: Mozambique (Beira) to South Africa (False Bay, Western Cape).

**REMARKS** Found at 20–230 m; observed in large shoals. Seldom caught inshore in shallow water, but often taken from deeper water or in midwater by trawlers. A plentiful fish in South Africa, exported to Japan and South Korea; flesh good.

**GENUS** *Rhabdosargus* Fowler 1933

Lateral-line scales >50; jaws with 4–6 enlarged, subequal incisors at front, followed by ≥3 rows of molars, which become trapezoidal posteriorly; interorbital region and soft-rayed portion of dorsal and anal fins naked; preopercular flange naked or with a few scales. *Austrosparus* Smith 1938 is a synonym. This genus warrants a review. Six species, 5 in WIO.

**KEY TO SPECIES**

- 1a Body with 6 or 7 dark, narrow, vertical crossbars; pectoral fins 16 or 17 rays; dorsal fin 11 spines, 11 (rarely 12) rays ..... *R. globiceps*
- 1b Body without vertical crossbars or at most very faint bars; pectoral fins 14–16 (rarely 16) rays; dorsal fin 11 spines, 12 or 13 rays ..... 2
- 2a Golden midlateral stripe along body scales; 2–8 embedded scales on preopercular flange; anterior teeth of juveniles tricuspid; black spot on uppermost part of pectoral-fin base ..... *R. holubi*
- 2b No golden midlateral stripe along body; preopercular flange entirely naked; anterior teeth of juveniles not tricuspid; no clear black spot on uppermost part of pectoral-fin base ..... 3
- 3a Body slender, depth >2.4 in SL ..... *R. haffara*
- 3b Body deeper, depth ≤2.3 in SL ..... 4
- 4a Lower GR 10–12; anal fin 3 spines, 11 or 12 rays; entire ventral region (including pelvic fins and anal fin) bright yellow ..... *R. thorpei*
- 4b Lower GR 7–9; anal fin 3 spines, 10 or 11 rays; entire ventral region silvery white, but not yellow ..... *R. sarba*

*Rhabdosargus globiceps* (Valenciennes 1830)

White stumpnose PLATE 100

*Chrysophrys globiceps* Valenciennes in Cuv. & Val. 1830: 100 (Cape of Good Hope, South Africa); Bauchot & Daget 1972\*.

*Sargus natalensis* Steindachner 1861: 180 (Durban, KwaZulu-Natal, South Africa).

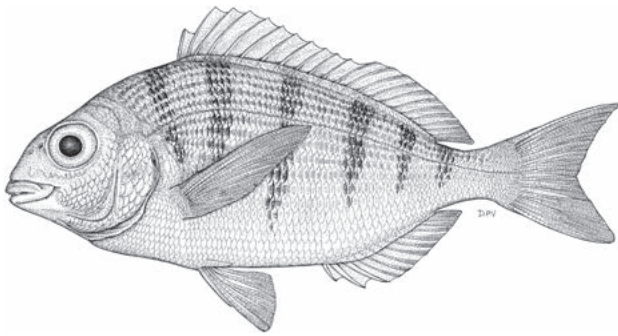
*Sargus nigrofasciatus* Regan 1908: 253, Pl. 41 (northeast of Bird I., KwaZulu-Natal, South Africa).

*Austrosparus globiceps*: Smith 1938\*.

*Rhabdosargus globiceps*: SFSA No. 708\*; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.35\*; Bianchi & Carpenter 1993\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 11–13 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 16 or 17 rays. Body moderately deep, depth 2.2–2.4 in SL, compressed; head profile fairly steep, with bulge before eyes, and then gently rounded to dorsal-fin origin. GR 5 or 6/8–10. LL scales 57–61; preopercular flange naked.

Body mainly silvery, with 6 or 7 darker vertical bars (no yellow lines or areas on body); fins dusky. Attains 65 cm TL.



*Rhabdosargus globiceps*, 8 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Southern Africa: Namibia (Walvis Bay) in southeastern Atlantic, to South Africa (KwaZulu-Natal) in WIO.

**REMARKS** Found over sandy bottom, juveniles in estuaries, and adults to ~120 m deep. Feeds on benthic organisms (worms, crustaceans and molluscs). Economically important; taken in large numbers by nets and anglers at the Cape of Good Hope, caught close inshore at night, and a sporting fish on light tackle. IUCN Red List conservation status Vulnerable.

### *Rhabdosargus haffara* (Fabricius 1775)

Haffara stumpnose

PLATE 100

*Sparus haffara* Fabricius in Niebuhr (ex Forsskål) 1775: 33, xi [Red Sea].  
*Rhabdosargus haffara*: Bauchot & Smith 1984\*; Dor 1984; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Golani 1998\*; Manilo & Bogorodsky 2003; Siddiqui *et al.* 2014.

Dorsal fin 11 or 12 spines, 11–14 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 15 rays. Body oval and compressed, depth 2.5–3 in SL; head large, profile strongly convex (most abruptly at eye level). GR 6 or 7/7–9. LL scales 58–66; preopercular flange naked.

Body silvery grey with golden or bluish reflections on dorsum (longitudinal dark lines appear on body after death); dark blotch at origin of lateral line; small dark spot at pectoral-fin axil; fins pale pink and hyaline. Attains 35 cm TL.

**DISTRIBUTION** WIO: Red Sea (common in northern part), Oman and presumably Gulf of Aden and Persian/Arabian Gulf; Lessepsian migrant to Mediterranean Sea (Israel: D Golani, pers. comm.).

**REMARKS** Inhabits shallow, sandy shorelines. Carnivorous. Feeds on benthic invertebrates (gastropods and crustaceans).

### *Rhabdosargus holubi* (Steindachner 1881)

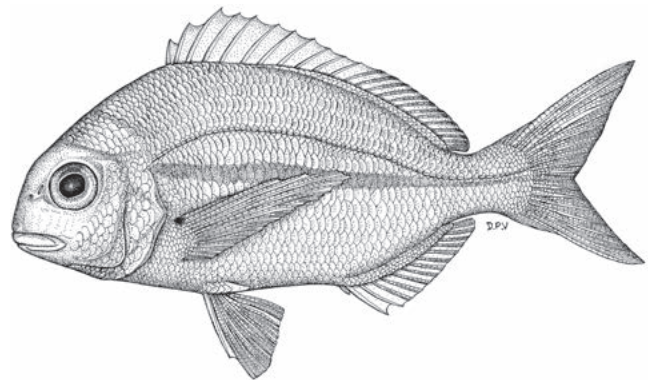
Cape stumpnose

PLATE 100

*Sargus holubi* Steindachner 1881: 208 [30], Pl. 3 (Algoa Bay, South Africa).  
*Austrosparus auriventris* (non Peters 1855): Smith 1938.  
*Austrosparus tricuspidens* Smith 1942: 282 (Knysna, South Africa).  
*Rhabdosargus tricuspidens*: SFSA No. 709\*; Smith & Smith 1966\*.  
*Rhabdosargus holubi*: Smith 1979\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.36\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 12 or 13 rays; anal fin 3 spines, 10 or 11 rays; pectoral fins 14 or 15 rays. Body moderately deep and compressed, 2.2–2.4 in SL; head profile fairly steep to bulge before eyes, and then gently rounded to dorsal-fin origin; eyes moderate. Jaws of adults with incisors at front; anterior teeth tricuspid in juveniles. GR 5 or 6/8 or 9. LL scales 55–57; preopercular flange with a few concealed scales posteriorly.

Body silvery, head slightly dusky dorsally, with darker lines along scale rows; conspicuous yellow band along flanks from above pectoral fins to caudal-fin base; black spot at pectoral-fin axil. Attains 40 cm TL.



*Rhabdosargus holubi*, 10 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Southern Africa: South Africa (St Helena Bay) in southeastern Atlantic, to Mozambique (Maputo) in WIO.

**REMARKS** Inhabits estuaries and shallow sandy bottom to ~50 m deep. Feeds on worms, crustaceans and especially molluscs.

## *Rhabdosargus sarba* (Gmelin 1789)

Goldlined seabream

PLATE 101

*Sparus sarba* Gmelin (ex Forsskål) 1789: 31, xi (Jeddah, Saudi Arabia, Red Sea); Klausewitz & Nielsen 1965\*.

*Sparus maurosparus* Walbaum 1792: 301 (Red Sea).

?*Sparus bufonites* Lacepède 1802: 47, 141, Pl. 2, Fig. 3 (Indo-Pacific).

*Sparus psittacus* Lacepède 1802: 47, 141 ('Indian seas').

*Chrysophris chrysargyra* Cuvier 1829: 182 (India).

*Chrysophris chrysargyra* Valenciennes in Cuv. & Val. 1830: 107 (Visakhapatnam, India).

*Sargus auriventris* Peters 1855: 435 (Mozambique).

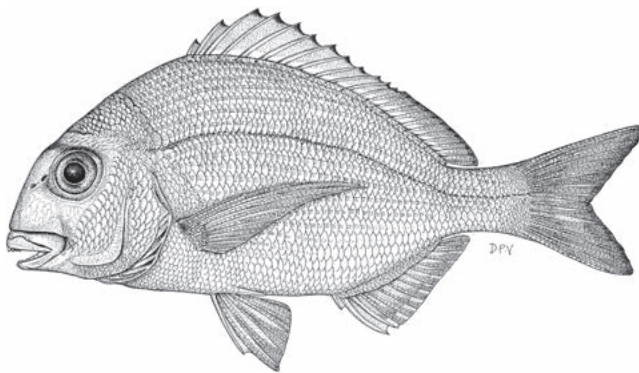
*Chrysophris natalensis* Castelnau 1861: 25 (KwaZulu-Natal, South Africa).

*Austrosparus sarba*: Smith 1938\*.

*Rhabdosargus sarba*: SFSA No. 710\*; Smith & Smith 1966\*; Smith 1979\*; Van der Elst 1981\* [in part]; Bauchot & Smith 1984\*; Dor 1984; SSF No. 183.37\*; Talwar & Jhingran 1991\*; Kuitert 1993\*; Goren & Dor 1994; Poll & Gosse 1995\*; Randall 1995\*; Carpenter 2000\*, 2001\*; Allen *et al.* 2002\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009\*.

Dorsal fin 11 spines, 12 or 13 rays; anal fin 3 spines, 11 rays; pectoral fins 14 or 15 rays. Body compressed, depth 2–2.3 in SL; head large, profile convex, most strongly arched from snout to dorsal-fin origin; eyes moderate, becoming proportionately smaller in adults; last molars of 3rd outer row in upper jaw largest. GR 6 or 7/7–9. LL scales 56–59; preopercular flange naked.

Body bright silvery with golden centre on each scale, forming golden lines on body; pectoral and pelvic fins dusky yellowish green; anal fin yellow, hyaline towards margin; caudal-fin lower lobe yellowish, lower edge whitish. Attains 80 cm TL.



*Rhabdosargus sarba*, 13 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (southern Cape), Madagascar and Réunion; not known from oceanic islands such as Seychelles; elsewhere to east coast of India, Philippines, China, southern Japan and northern Australia.

**REMARKS** Fairly abundant where known. Young fish inhabit estuaries as nursery areas, moving into deep coastal waters as adults. Feeds on benthic invertebrates, mainly molluscs. A famed and beautiful angling fish that fights gamely; flesh excellent. Several different colour morphs are recognised, requiring further taxonomic review.

## *Rhabdosargus thorpei* Smith 1979

Bigeye stumpnose

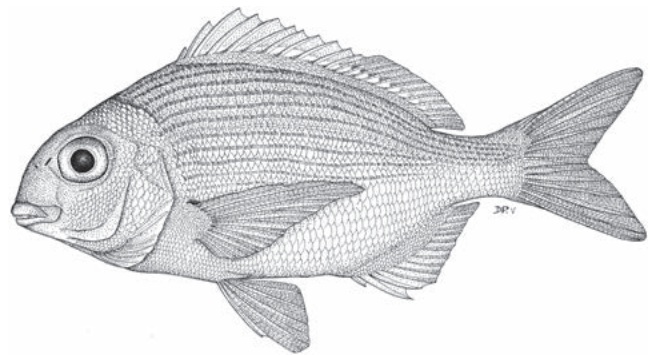
PLATE 101

*Rhabdosargus thorpei* Smith 1979: 704, Fig. 1a (Hulley Point, KwaZulu-Natal, South Africa); Bauchot & Smith 1984\*; SSF No. 183.38\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Rhabdosargus auriventris* (*non* Peters 1855): Van der Elst 1981\*.

Dorsal fin 11 spines, 13 rays; anal fin 3 spines, 12 rays; pectoral fins 14 or 15 rays. Body moderately deep, depth 1.9–2.2 in SL; head profile well-rounded from upper lip to dorsal-fin origin, with slight bulge before eyes; eyes relatively large. GR 6 or 7/10–12. LL scales 55–60.

Body bluish silvery, with numerous yellow reflections, and yellow lines along scale rows of upper body; whole ventral surface bright yellow, from chest to pelvic and anal fins. Attains 40 cm TL.



*Rhabdosargus thorpei*, 10 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: Somalia to South Africa (Eastern Cape), Mozambique Channel (Europa I.), Madagascar and Réunion.

**REMARKS** Found in estuaries and coastal waters to ~70 m deep; often observed in shoals. Feeds mainly on molluscs, but also worms and crustaceans. An esteemed angling fish with good flesh.

GENUS *Sarpa* Bonaparte 1831

Body fusiform to elongate; 1 row of notched incisors on upper jaw, pointed incisors on lower jaw, and no molars. One species.

*Sarpa salpa* (Linnaeus 1758)

Strepie or saupe

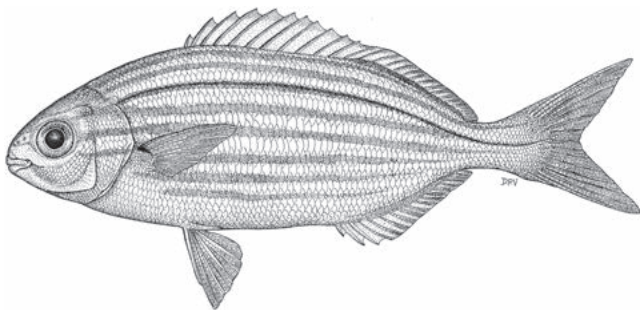
PLATE 101

*Sparus salpa* Linnaeus 1758: 280 (Mediterranean Sea).

*Sarpa salpa*: Smith 1938; SFSA No. 731; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.39\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 14 or 15 rays; anal fin 3 spines, 13–15 rays; pectoral fins 16 rays. Body neatly oval, relatively slender, depth ~2.8 in SL. GR 6–8/12–14. LL scales 71–79; cheeks scaly below eyes; anal fin with scaly basal sheath; interorbital region, preopercular flange, and base of soft-rayed portion of dorsal fin naked.

Body silvery, with 8–10 thin golden yellow longitudinal stripes; black spot at pectoral-fin axil. Attains 45 cm TL (commonly much smaller).



*Sarpa salpa*, 13 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Black Sea, Mediterranean Sea, eastern Atlantic to Cape of Good Hope, and South Africa to southern Mozambique in WIO.

**REMARKS** Schooling; enters estuaries as nursery areas. Herbivorous. Often captured using handlines in rocky areas; flesh firm and tasty when fresh, but soon softens.

GENUS *Sparidentex* Munro 1948

Body elongate, compressed; mouth large, maxilla exposed posteriorly and ending at level of mid-eye; 6 enlarged, fang-like, conical teeth at front of both jaws, and outer lateral row of canines, rows of villiform teeth and variably an additional row

of tiny molariform teeth just inside outermost row of teeth (no molars); eyes moderate, diameter less than snout length. Gill rakers lanceolate. Scales ctenoid, moderate-sized; scales on head not reaching forward beyond vertical at mid-eye; preopercular flange naked; soft-rayed portion of dorsal and anal fins with scaly sheath at base. Body silvery, dark grey dorsally, paler to whitish ventrally. Two species, but in need of review; one in WIO.

*Sparidentex hasta* (Valenciennes 1830)

Sobaity seabream

PLATE 101

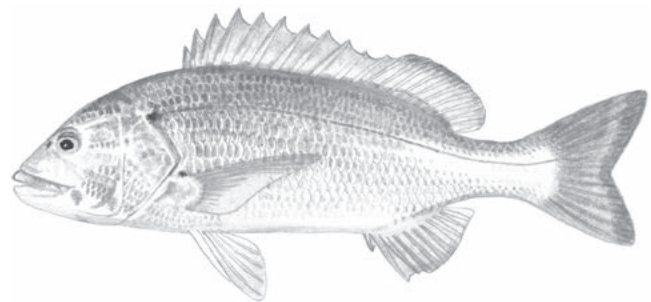
*Dentex hasta* Valenciennes in Cuv. & Val. 1830: 255 (Malabar coast, India).

*Chrysophrys cuvieri* Day 1875: 141, Pl. 34, Fig. 3 (Chennai, India).

*Sparidentex hasta*: Bauchot & Smith 1984\*; Randall 1995\*; Carpenter *et al.* 1997\*; Hutchins 2001; Manilo & Bogorodsky 2003; Iwatsuki & Carpenter 2009; Iwatsuki & Heemstra 2010; Siddiqui *et al.* 2014.

Diagnosis as for genus. Dorsal fin 11 spines, 10 or 11 rays; anal fin 3 spines, 8 rays; pectoral fins 14 or 15 rays. Body elongate and compressed, depth 2.4–2.6 in SL; head profile generally straight from snout tip to dorsal-fin origin. GR 5–7/9–14. LL scales 43–51.

Body silvery grey, darker dorsally, paler to whitish ventrally; sometimes with dark mottling on sides forming irregular bars; 7 or 8 scale rows on cheeks forming thin radiating dusky lines. Attains 70 cm TL.



*Sparidentex hasta*, 36 cm TL (Persian/Arabian Gulf).

**DISTRIBUTION** Indian Ocean. WIO: Persian/Arabian Gulf to Pakistan, India; elsewhere, Bay of Bengal.

**REMARKS** Of great commercial significance; a common aquaculture species in countries of the Persian/Arabian Gulf. In need of taxonomic review as subtly different morphs and colours are recognised. *Sparidentex jamalensis* (Plate 102) was described from Sindh, Pakistan, by Amir *et al.* (2014) who noted that *S. jamalensis* has 3½–4 scale rows between the lateral line and base of the 5th dorsal-fin spine, compared to 5–5½ in *S. hasta*.

GENUS *Sparodon* Smith 1938

Lateral-line scales 58–61; interorbital region and preopercular flange naked; middle pair of incisors in each jaw extremely large. One species.

*Sparodon durbanensis* (Castelnau 1861)

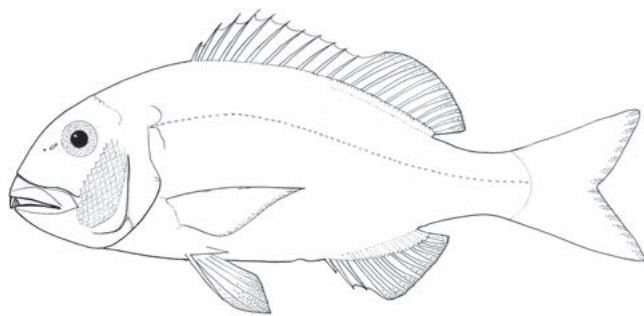
Musselcracker PLATE 102

*Sargus durbanensis* Castelnau 1861: 18 (Durban, KwaZulu-Natal, South Africa).

*Sparodon durbanensis*: Smith 1938\*; SFSA No. 711; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.40\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 11 spines, 11 or 12 rays; anal fin 3 spines, 10 rays; pectoral fins 15–17 rays. Body elongate-oval, depth 2.5–3 in SL; head large, becoming heavier with age, its profile gently convex in young; lower jaw slightly shorter than upper jaw; interorbital space wide. GR 5 or 6/7 or 8.

Body predominantly silvery grey or silvery blue, paler ventrally, with chin abruptly white, spreading to chest and belly; soft-rayed portion of dorsal and anal fins, caudal fin and parts of pelvic fins dusky; young with vivid yellow fins. Attains 120 cm TL.



*Sparodon durbanensis*, 24 cm SL, juvenile (South Africa). Source: Smith 1938

**DISTRIBUTION** Southern Africa: South Africa (St Helena Bay) in southeastern Atlantic, to southern Mozambique in WIO.

**REMARKS** Juveniles frequently found in tidepools; adults known to ~80 m. Adults become solitary except at breeding time (Smith & Smith 1986). A splendid fighter and one of the best known angling fishes of South Africa, taking almost any bait.

GENUS *Spicara* Rafinesque 1810

Body oblong, depth greater than HL; dorsal fin undivided; base of soft-rayed portions of dorsal and anal fins with scaly sheath. Genus formerly placed in a separate family, the Centracanthidae. Eight species, 2 in WIO.

KEY TO SPECIES

- 1a Anal fin 7 or 8 rays; LL scales 54–60; no black blotch at pectoral-fin base ..... *S. australis*
- 1b Anal fin 11 or 12 rays; LL scales 70–73; black blotch at pectoral-fin base ..... *S. axillaris*

*Spicara australis* (Regan 1921)

Southern picarel PLATE 102

*Smaris australis* Regan 1921: 416 (off Umvoti River, KwaZulu-Natal, South Africa).

*Centracantus australis*: SFSA No. 705\*.

*Spicara australis*: SSF No. 184.1\*.

Dorsal fin 12 spines (4th and 5th spines longest), 9 or 10 rays; anal fin 3 spines, 7 or 8 rays; pectoral fins 15 rays, fin length subequal to HL and reaching vertical at anal-fin origin; caudal fin forked. Body depth 3–3.3 in SL; peduncle length twice its depth. GR 10/18–20. LL scales 54–60. Swimbladder not bifurcate posteriorly.

Body dusky silvery. Attains 30 cm TL.



*Spicara australis*, ~20 cm TL (South Africa). © AR Thorpe

**DISTRIBUTION** WIO: southern Mozambique (Xai-Xai) to South Africa (Eastern Cape).

**REMARKS** Found in 80–460 m (usually 200–400 m). More common off southern Africa than *S. axillaris*.

*Spicara axillaris* (Boulenger 1900)

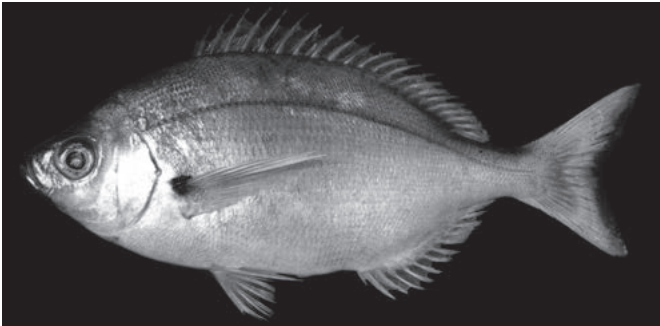
Windtoey

PLATE 102

*Caesio axillaris* Boulenger 1900: 10, Pl. 1 (False Bay, South Africa).*Caesio algoae* Smith 1935: 195 (off Algoa Bay, Eastern Cape, South Africa).*Pterosmaris axillaris*: SFSA No. 704\*; Smith & Smith 1966\*.*Spicara axillaris*: SSF No. 184.2\*.

Dorsal fin 11 spines, 12 rays; anal fin 3 spines, 11 rays; pectoral fins 17 rays, fins falcate, their length subequal to HL; caudal fin crescentic to slightly forked. Body depth 2.3–2.8 in SL. GR 8 or 9/17–20. LL scales 70–73. Swimbladder bifurcate posteriorly, the 2 branches reaching haemal spine of 4th caudal vertebra.

Body golden, silvery, rosy olive or bluish dorsally. Attains 28 cm TL.



*Spicara axillaris*, 23 cm SL (South Africa). © JT Williams, Smithsonian Institution

**DISTRIBUTION** WIO: endemic to South Africa (KwaZulu-Natal to False Bay, Western Cape).

**REMARKS** Schooling; rarely captured, trawled from 20–160 m; found inshore in stormy weather.

**GENUS** *Spodyliosoma* Cantor 1849

Jaws with 4–6 rows of slender pointed incisors, and larger fish with 1 row of molars behind these (teeth more conical in juveniles); eye diameter subequal to snout length; soft-rayed portion of dorsal and anal fins naked, but with low scaly sheath at base. Two species, 1 in WIO.

*Spodyliosoma emarginatum*

(Valenciennes 1830)

Steentjie seabream

PLATE 102

*Cantharus emarginatus* Valenciennes in Cuv. & Val. 1830: 338 (Cape of Good Hope, South Africa).

*Chrysophrys microlepis* Gilchrist & Thompson 1909: 231 (Durban, KwaZulu-Natal, South Africa).

*Spodyliosoma emarginatum*: Smith 1938\*, 1962\*; SFSA No. 739; Smith & Smith 1966\*; Van der Elst 1981\*; Bauchot & Smith 1984\*; SSF No. 183.41\*; Randall 1995\*; Heemstra & Heemstra 2004\*.

Dorsal fin 11 spines, 11–13 rays; anal fin 3 spines, 10 rays; pectoral fins 16 rays. Body moderately deep, depth 2–2.6 in SL; head profile almost straight from upper lip to dorsal-fin origin, but becoming convex in larger adults, yet slightly concave above eyes; maxilla with lateral ridge distally fitting into preorbital notch when mouth closed. Teeth narrow, lanceolate, slender, in 4 or 5 rows in both jaws, those of outer row largest. GR 7–9/15–18. LL scales 80–92; interorbital region and preopercular flange naked.

Body brownish or dull grey dorsally, pale ventrally; scale rows above lateral line with darker lines, those below creating narrow grey and yellow lines; dorsal and anal fins dusky greenish, and spinous portion of dorsal fin sometimes with darker mottling; pelvic fins dull golden; pectoral fins and caudal fin dusky. Attains 45 cm TL.



*Spodyliosoma emarginatum*, 16 cm SL (South Africa).

R Palmer © NRF-SAIAB

**DISTRIBUTION** Endemic to South Africa: Saldanha Bay in southeastern Atlantic, to KwaZulu-Natal in WIO (plentiful on the southern Cape and southeastern coasts).

**REMARKS** Inhabits offshore waters to ~60 m deep, often near rocky ground, but also enters estuaries. Eggs are protected by the male after spawning until they hatch. Excellent bait; normally too small to be of any significance as a food fish.

**GLOSSARY**

**gibbous** – convex or protruding.

**monophyletic** – a group of organisms (a clade) comprising the most recent common ancestor and all its descendants.

**FAMILY LETHRINIDAE**

Emperors, emperor snappers and large-eye breams

Kent E Carpenter

Typical perch-like, small- to large-sized (up to ~100 cm TL), body moderately elongate, oblong or roughly rhomboidal. Eyes moderately large. Mouth terminal, small to large; lips often fleshy; maxilla concealed when mouth closed and not articulating with tip of premaxilla. Teeth conical anteriorly, with inner band of villiform teeth, and conical or molariform laterally; no teeth on vomer and palatines. Dorsal fin continuous, 10 spines, 9 or 10 rays; anal fin 3 spines, 8–10 rays; pelvic fins thoracic, 1 spine, 5 rays; caudal fin emarginate to forked. Lateral line complete. Scales finely ctenoid, moderate in size; cheek and preopercle naked in *Lethrinus*, preopercle scaly in other genera.

Found mostly around rocky and coral reefs, with some species ranging widely over mud and sand bottom, seagrass beds and mangrove swamps, from shallow water to ~100 m. Typically solitary, but some (such as *Gnathodentex aureolineatus*) occur in small aggregations, and some form large aggregations when spawning. Feed mostly on bottom-dwelling invertebrates but also on cephalopods and fishes. Excellent food fishes and an important component of fisheries landings in some countries.

Two subfamilies recognised: Monotaxinae (with 4 genera and 19 species, and 4 undescribed species of *Gymnocranius*; Chen & Borsa 2020) and Lethrininae (with 1 genus and 28 species); all 5 genera with 31 species in WIO.

**KEY TO GENERA**

- 1a Cheeks naked; dorsal fin 9 rays; anal fin 8 rays ..... *Lethrinus*
- 1b Cheeks with 3–6 transverse rows of scales; dorsal fin 10 rays; anal fin usually 9 or 10 rays ..... 2
- 2a Inner surface of pectoral-fin bases densely scaly; sides of jaws with round, flat molars ..... *Monotaxis*
- 2b Inner surface of pectoral-fin bases scaleless; sides of jaws with canines and villiform teeth ..... 3
- 3a Outer surface of maxilla smooth ..... *Gymnocranius*
- 3b Outer surface of maxilla with denticulate longitudinal ridge ... 4
- 4a Caudal-fin lobes pointed; anal fin 8 or 9 rays; pectoral fins 15 rays ..... *Gnathodentex*
- 4b Caudal-fin lobes rounded; anal fin 10 rays; pectoral fins 14 rays ..... *Wattsia*

**GENUS *Gnathodentex* Bleeker 1873**

Dorsal fin 10 spines, 10 rays; anal fin 3 spines, 8 or 9 rays; pectoral fins 15 rays. Caudal-fin lobes pointed; cheeks with transverse scale rows; inner surface of pectoral-fin axils scaleless; sides of jaws with canines and villiform teeth; outer surface of maxilla with denticulate longitudinal ridge. One species.

***Gnathodentex aureolineatus* (Lacepède 1802)**

Striped large-eye bream

PLATE 105

*Sparus aureolineatus* Lacepède (ex Commerson) 1802: 42, 132 [no locality given].

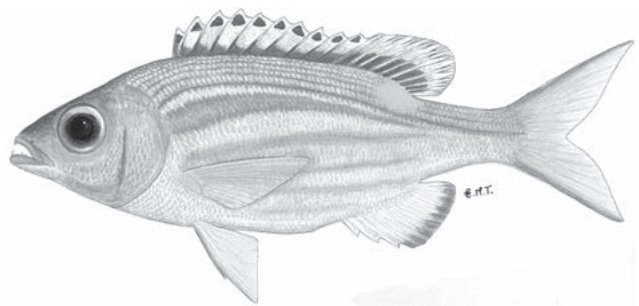
*Dentex lycogenis* Bennett 1831: 127 (Mauritius, Mascarenes).

*Gnathodentex oculomaculatus* Herre 1935: 407 (Isabel I., Solomon Is.).

*Gnathodentex aureolineatus*: SSF No. 185.1\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Heemstra *et al.* 2004; Fricke 2009; Fricke *et al.* 2013.

Body depth 2.3–2.8 in SL. Jaw teeth in narrow villiform band bordered by outer series of conical teeth. LL scales 68–74; transverse scale rows on cheeks 4–6; scale rows between lateral line and mid-dorsal-fin spines 5.

Upper head and body brown to yellowish, with narrow silvery stripes following scale rows; lower head and body silvery whitish, with 4 or 5 orange or yellowish stripes, uppermost widest; outer pectoral-fin bases orange or yellowish; prominent golden yellow blotch directly below rear part of dorsal fin; dorsal- and anal-fin margins reddish. Attains 30 cm TL (commonly 20 cm TL).



*Gnathodentex aureolineatus*, 23 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to South Africa (KwaZulu-Natal), Mozambique Channel, Madagascar, Comoros, Seychelles and Mascarenes; elsewhere to Marshall Is., southern Japan, northern Australia, New Caledonia, Solomon Is., Tuamotu Is. and Pitcairn Is.; not known from Red Sea, Persian/Arabian Gulf and Hawaii.



**REMARKS** Generally found on coral reefs, at 3–20 m; solitary or in moderately large aggregations. Feeds on benthic invertebrates.

**GENUS** *Gymnocranius* Klunzinger 1870

Dorsal fin 10 spines, 10 rays; anal fin 3 spines, 10 rays; pectoral fins 14 rays. Cheeks with 3–6 transverse scale rows; inner surface of pectoral-fin axils scaleless; sides of jaws with canines and villiform teeth; outer surface of maxilla smooth. Occur in Indo-Pacific; 7 species recorded from WIO, 4 of which undescribed (Chen & Borsa 2020); 2 species included here, and *G. microdon* also recently recognised from the WIO.

**KEY TO SPECIES**

- 1a Caudal fin strongly forked, median rays shorter than eye diameter; lower edge of eye intersected by line from snout tip to middle of caudal-fin fork ..... *G. elongatus*
- 1b Caudal fin moderately forked, median rays subequal to or longer than eye diameter; lower edge of eye well above line from snout tip to middle of caudal-fin fork ..... *G. grandoculis*

*Gymnocranius elongatus* Senta 1973

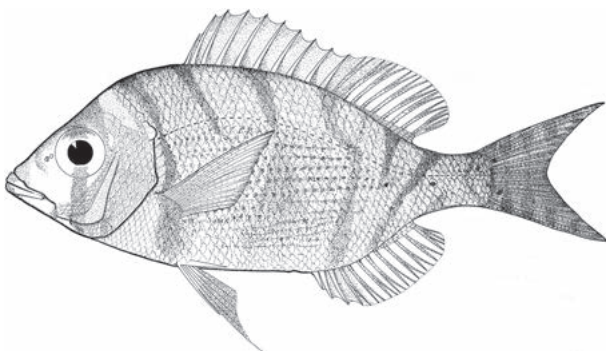
Forktail large-eye bream

PLATE 105

*Gymnocranius elongatus* Senta 1973: 135, Figs. 1–5 (Sarawak, Borneo, Malaysia); Carpenter & Allen 1989\*; SSF No. 185: xi [1995]; Manilo & Bogorodsky 2003.

Body depth 2.2–2.4 in SL. Jaw teeth conical anteriorly, villiform to conical laterally. LL scales 46–48; transverse scale rows on cheeks 4–6; scale rows between lateral line and mid-dorsal-fin spines 5.

Body silvery, with typically 8 transverse brownish bars on sides with varying intensity. Attains 35 cm TL (commonly 25 cm TL).



*Gymnocranius elongatus*, 23 cm TL, juvenile (South Africa). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: reported from East Africa, from Kenya, Mozambique and South Africa; elsewhere, eastern Indian Ocean to southern Japan, northern Australia and Solomon Is.

**REMARKS** Generally found on soft mud or sand bottom, at 50–100 m. Feeds on benthic invertebrates.

*Gymnocranius grandoculis* (Valenciennes 1830)

Bluelined large-eye bream

PLATE 105

*Cantharus grandoculis* Valenciennes in Cuv. & Val. 1830: 341 (Seychelles).  
*Dentex rivulatus* Rüppell 1838: 116, Pl. 29, Fig. 2 (Jeddah, Saudi Arabia, Red Sea).

*Pentapus dux* Valenciennes 1862: 1203 [8] (Réunion, Mascarenes).

*Pentapus curtus* Guichenot 1865: C-5 (Réunion, Mascarenes).

*Dentex robinsoni* Gilchrist & Thompson 1909: 226 (KwaZulu-Natal, South Africa).

*Gymnocranius ruppellii* Smith 1941: 449 (Jeddah, Saudi Arabia, Red Sea).

*Gymnocranius griseus*: SSF No. 185.2\*; Winterbottom *et al.* 1989.

*Gymnocranius robinsoni*: SSF No. 185.3\*; Winterbottom *et al.* 1989.

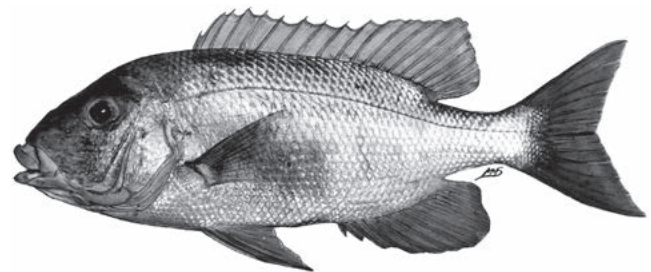
*Gymnocranius grandoculis*: Carpenter & Allen 1989\*; Fricke 1999;

Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009;

Bogorodsky *et al.* 2014.

Body depth 2.4–2.5 in SL. Jaw teeth conical anteriorly, villiform to conical laterally. LL scales 48; transverse scale rows on cheek 3 or 4; scale rows between lateral line and mid-dorsal-fin spines 5½.

Body silvery or yellowish, with thin brown scale margins; front half of head sometimes brown or dark yellowish, with series of narrow undulating blue lines on cheeks and snout; juveniles with 5 or 6 irregular dark bars on sides, and dark bar below eyes. Attains 80 cm TL (commonly 50 cm TL).



*Gymnocranius grandoculis*, 46 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, East Africa to South Africa (Park Rynie), Madagascar, Comoros, Seychelles, Réunion, Mauritius and Chagos; not known from Persian/Arabian Gulf; elsewhere to southern Japan, Marshall Is., northern Australia, New Caledonia, Line Is. and Marquesas Is.

**REMARKS** Found on soft mud or sand bottom as well as offshore rocky bottom, at 50–100 m. Feeds on benthic invertebrates and small fishes.

**GENUS** *Lethrinus* Cuvier 1829

Dorsal fin 10 spines, 9 rays; anal fin 3 spines, 8 rays; pectoral fins 13 rays; cheeks scaleless. Occur mostly in Indo-Pacific, except 1 species in eastern Atlantic; 28 species, 20 in WIO.

**KEY TO SPECIES**

- 1a Prominent scaleless patch above pectoral-fin bases bright red in life ..... *L. conchyliatus*
- 1b No prominent, red scaleless patch above pectoral-fin bases ... 2
  
- 2a Inner surface of pectoral-fin bases without scales ..... 3
- 2b Inner surface of pectoral-fin bases entirely or partially scaly (sometimes only a fraction of lower and inner part of base scaly) ..... 11
  
- 3a Scale rows 4½ between lateral line and base of mid-dorsal-fin spines; lateral teeth in jaws conical ..... 4
- 3b Scale rows 5½ between lateral line and base of mid-dorsal-fin spines; lateral teeth in jaws either conical, rounded molars, or molars with a tubercle ..... 10
  
- 4a Interorbital area distinctly or slightly concave ..... 5
- 4b Interorbital area nearly flat or convex ..... 6
  
- 5a Dense melanophores on innermost pelvic-fin membranes; 5–8 scales in supratemporal patch; live fish with yellowish lips, red spot on upper pectoral-fin bases ..... *L. xanthochilus*
- 5b No dense melanophores on innermost pelvic-fin membranes; 7–10 scales in supratemporal patch; live fish with reddish lips, upper part of pectoral-fin bases, upper edge of opercle, sometimes rear edge of preopercle, and sometimes as indistinct band on snout ..... *L. reticulatus*
  
- 6a Transverse scale rows below lateral line 13 or 14; posterior nostril a vertical slit, often closer to anterior nostril than to eye; body very slender, its depth 3.2–3.9 in SL ..... *L. variegatus*
- 6b Transverse scale rows below lateral line 15–17; posterior nostril a longitudinal slit, closer to eye than to anterior nostril or about half-way between anterior nostril and eye; body depth 2.8–3.4 in SL ..... 7

Continued ...

**KEY TO SPECIES**

- 7a Snout long, its length (measured without lip) 0.7–0.8 in cheek height; 3 dark streaks radiating forward from eyes onto snout usually visible; inner surface of pectoral fins never red in life ..... *L. microdon*
- 7b Snout length (measured without lip) 0.8–0.9 in cheek height; 3 distinct dark streaks radiating from eyes usually not apparent, but, if apparent, inner surface of pectoral-fin bases red in life ..... 8
  
- 8a Large, persistent, irregular black blotch on sides, under lateral line and below soft-rayed portion of dorsal fin; no wide scaleless area on upper rear margin of opercle; 4–8 scales in supratemporal patch ..... *L. semicinctus*
- 8b No large persistent black blotch on sides under lateral line and below soft-rayed portion of dorsal fin; often a wide scaleless area on upper rear margin of opercle; 7–10 scales in supratemporal patch ..... 9
  
- 9a No distinct hump on snout directly in front of eyes, snout profile concave; live fish with red blotch on upper/outer base of pectoral fins and upper rear margin of opercle, an indistinct red bar along edge of preopercle, red markings on lower and sometimes upper edge of eyes, and sometimes an indistinct red swath from eyes to mid-upper lip ..... *Lethrinus* sp.
- 9b Usually no distinct hump on snout in front of eyes, snout profile nearly straight or slightly concave; red markings confined to upper rear margin of opercle ..... *L. rubrioperculatus*
  
- 10a Snout long, its length (measured without lip) 0.6–0.8 in cheek height; body relatively slender, its depth 2.8–3.4 in SL (fish >10 cm SL); teeth in jaws conical laterally; margin of opercle and outer part of pectoral-fin bases not red in life ..... *L. olivaceus*
- 10b Snout length (measured without lip) 0.8–1 in cheek height; body depth 2.5–2.9 in SL; in adults, lateral teeth in jaws with molars, molars with tubercles, or broadly rounded; rear margin of opercle red and outer part of pectoral-fin bases often red in life ..... *L. lentjan*
  
- 11a Small dark blotches around lower rim of eyes, usually persistent in preserved material; scale rows between lateral line and base of 5th dorsal-fin spine variable, changing from 5½ to 4½ under dorsal-fin spines 2–7 ..... *L. enigmaticus*
- 11b No persistent small dark blotches around lower rim of eyes 12
  
- 12a Large prominent oblong black blotch below lateral line, centred below last dorsal-fin spine (usually persistent in preserved specimens) ..... *L. harak*
- 12b No dark blotch on sides below lateral line ..... 13

Continued ...

## KEY TO SPECIES

- 13a Scale rows 4½ between lateral line and base of 5th dorsal-fin spine ..... 14
- 13b Scale rows 5½ between lateral line and base of 5th dorsal-fin spine ..... 16
- 14a Anal-fin ray 1 or 2 usually longest, and shorter than, subequal to, or slightly longer than length of soft-rayed portion of anal fin; longest anal-fin ray 1.1–1.8 in length of entire anal-fin base ..... *L. mahsena*
- 14b Anal-fin ray 3, 4 or 5 usually longest, much longer than length of soft-rayed portion of anal fin; longest anal-fin ray 0.8–1.1 in length of entire anal-fin base ..... 15
- 15a Teeth in jaws conical or rounded laterally; LL scales 46–48; membranes of inner pelvic-fin rays usually with dense melanophores; small orange spots on head often visible in life ..... *L. erythracanthus*
- 15b Teeth in jaws usually with distinct molars laterally; LL scales 44–46; membranes of inner pelvic-fin rays usually not with dense melanophores; 2 pale bars on peduncle often visible ..... *L. erythropterus*
- 16a Body depth 2.3–2.4 in SL; HL 0.8–0.9 in body depth; head profile near eyes nearly straight ..... *L. crocineus*
- 16b Body depth 2.5–2.9 in SL and head profile near eyes concave, nearly straight or slightly convex, or body depth 2.4–2.6 in SL and head profile near eyes distinctly convex; HL 0.9–1.1 in body depth, and head profile near eyes either concave, nearly straight or slightly convex, or HL 0.8–0.9 in body depth, and head profile near eyes convex ..... 17
- 17a Rear margin of preopercle and opercle red in life; snout relatively short and blunt, preorbital width 0.7–0.8 in cheek height; angle of snout relative to upper jaw 64–73°; outer surface of maxilla usually smooth, without prominent ridge or knob; HL 0.8–0.9 in body depth; head profile near eyes distinctly convex ..... *L. ornatus*
- 17b Rear margin of preopercle not red, but edge of opercle and pectoral-fin bases sometimes red in *L. lentjan*; snout blunt or sharp, preorbital width 0.7–1 in cheek height, but if preorbital width <0.8 in cheek height, with prominent ridge or knob on surface of maxilla; angle of snout relative to the upper jaw 52–69°, but if >64°, usually with ridge or knob on outer surface of maxilla; HL 0.9–1.1 in body depth; head profile near eyes slightly concave, nearly straight, or convex ..... 18
- 18a Scale rows in lower series around peduncle usually 13 or 14; lateral teeth include distinct molars; eyes relatively large, 3.4–4 in HL, and eyes close to dorsal profile; head profile near eyes often slightly convex ..... *L. borbonicus*
- 18b Scale rows in lower series around peduncle usually 15; lateral teeth in jaws, rounded molars with tubercles or simple molars; eye diameter 3.8–5.9 in HL, eyes usually not close to dorsal profile; head profile near eyes nearly straight or slightly concave ..... 19
- 19a Melanophores covering most of pelvic-fin membranes, including area near inner rays; transverse scale rows 16 or 17 from anal-fin origin to lateral line; 3 blue lines and/or rows of blue spots radiating forward from eyes onto snout in life ..... *L. nebulosus*
- 19b Melanophores largely absent on inner pelvic-fin membranes; transverse scale rows 15 or 16 from anal-fin origin to lateral line; no prominent blue lines radiating from eyes in life ..... 20
- 20a Rear edge of opercle and sometimes outer part of pectoral-fin bases red in life; lateral teeth in jaws either rounded, molars with a tubercle, or simple molars; snout profile straight ..... *L. lentjan*
- 20b Rear edge of opercle and outer part of pectoral-fin bases never red; lateral teeth in jaws rounded; snout profile concave ..... *L. obsoletus*

*Lethrinus borbonicus* Valenciennes 1830

Snubnose emperor

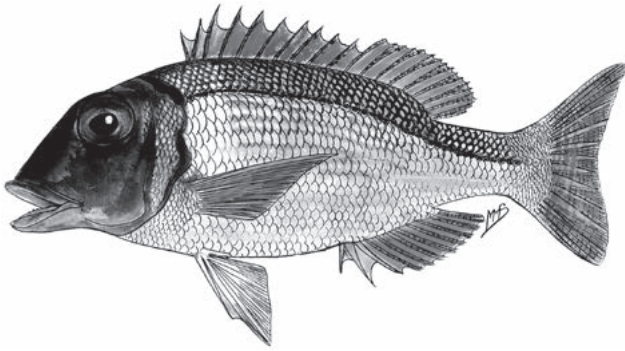
PLATE 105

*Lethrinus borbonicus* Valenciennes in Cuv. & Val. 1830: 303 (Saint-Denis, Réunion, Mascarenes); Carpenter & Allen 1989\*; Goren & Dor 1994; Carpenter *et al.* 1997\*; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.

*Lethrinus bungus* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 279 (Indian Ocean; Gulf of Suez and Eritrea, Red Sea).

Body depth 2.5–2.8 in SL; interorbital space typically convex; HL 0.9–1 in body depth; eyes relatively large, 3.4–4 in HL, and close to dorsal profile; head profile near eyes often slightly convex. Teeth in jaws include distinct molars laterally; outer surface of maxilla smooth. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils densely scaly.

Body dark grey or yellow-brown, whitish below, and with irregular pattern of broken dusky bars. Attains 40 cm TL (commonly 20–30 cm TL).



*Lethrinus borbonicus*, 20 cm TL (Kenya). Source: SSF

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, East Africa to South Africa (Sodwana Bay), Madagascar, Seychelles and Mascarenes.

**REMARKS** Found on sandy bottom near reefs, from shallow areas to ~40 m deep. Feeds on benthic invertebrates.

### *Lethrinus conchyliaius* (Smith 1959)

Redaxil emperor

PLATE 106

*Lethrinella conchyliaius* Smith 1959: 292, Pl. 22, Fig. E (Pinda, Mozambique).

*Lethrinus floridus* Wheeler 1961: 46, Pl. 3, Fig. 20 (Seychelles; Chagos; Saya de Malha Bank).

*Lethrinus conchyliaius*: SSF No. 185.5\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Carpenter 2001\*.

LL scales 47 or 48; scale rows between lateral line and mid-dorsal-fin spines  $4\frac{1}{2}$ ; inner surface of pectoral-fin axils scaleless; prominent distinct scaleless patch above pectoral-fin bases.

Body brownish or grey; lips, edge of operculum, pectoral-fin bases and scaleless patch above pectoral-fin bases red. Attains 76 cm TL (commonly 50 cm TL).



*Lethrinus conchyliaius*, 48 cm TL, holotype (N Mozambique). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Tanzania, Mozambique, northern Madagascar, Seychelles and Chagos; elsewhere, Andaman Is. and Indonesia (southern and western Sumatra).

**REMARKS** Found on deep reefs, to ~220 m. Feeds on fishes and crustaceans.

### *Lethrinus crocineus* Smith 1959

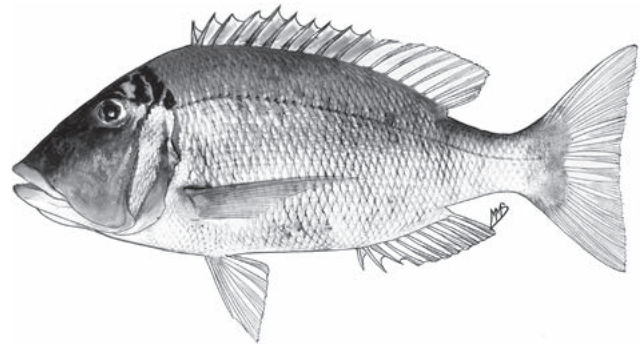
Yellowtail emperor

PLATE 106

*Lethrinus crocineus* Smith 1959: 290, Pls. 20–21, Figs. A, F–G (Pinda, Mozambique); Carpenter & Allen 1989\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Body depth 2.3–2.4 in SL; HL 0.8–0.9 in body depth; head profile near eyes nearly straight. Teeth in jaws rounded or with distinct molars laterally; outer surface of maxilla smooth. LL scales 46 or 47; scale rows between lateral line and mid-dorsal-fin spines  $5\frac{1}{2}$ ; inner surface of pectoral-fin axils densely scaly.

Head grey or brownish, body greyish or tan, and base of scales typically black; in life, edge of operculum and dorsal- and caudal-fin margins reddish; no distinct dark markings under eyes or dark oblong blotch on sides. Attains 55 cm TL.



*Lethrinus crocineus*, 55 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Kenya to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes and Sri Lanka.

**REMARKS** Occurs on reefs and nearby sandy areas, to ~150 m deep.

### *Lethrinus enigmaticus* Smith 1959

Blackeye emperor

PLATE 106

*Lethrinus enigmaticus* Smith 1959: 291, Pl. 21, Fig. E (Bird I., Seychelles); Carpenter & Allen 1989\*.

Lateral teeth in jaws rounded. LL scales 47 or 48; scale rows between lateral line and mid-dorsal-fin spines  $4\frac{1}{2}$  or  $5\frac{1}{2}$ ; inner surface of pectoral-fin axils densely scaly.

Head grey or brownish, body greyish or tan; dark purplish spots around front and lower rim of eyes; pale yellowish streak radiating forward from eyes to nostrils, and yellowish cross-stripes on upper head; upper sides often with ~7 dark bars, sometimes 3 bronze stripes ventrally. Attains 55 cm TL (commonly 25–40 cm TL).

**DISTRIBUTION** WIO: South Africa, Seychelles to Saya de Malha Bank.

**REMARKS** Occurs on seagrass beds, coral reefs and adjacent sandy areas, to ~50 m deep.

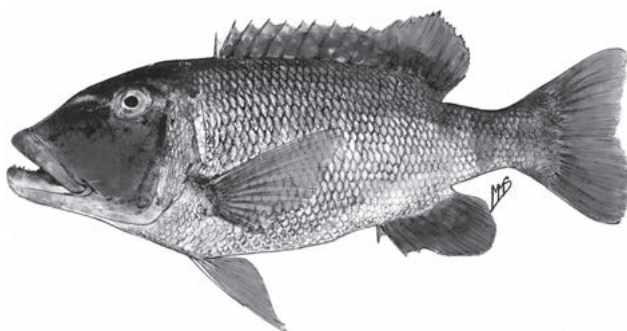
### *Lethrinus erythracanthus* Valenciennes 1830

Orange-spotted emperor PLATE 106

*Lethrinus erythracanthus* Valenciennes in Cuv. & Val. 1830: 314 (Lukunor I., Caroline Is.); Carpenter & Allen 1989\*; Fricke 1999; Manilo & Bogorodsky 2003.

Anal-fin ray 3–5 longest, its length much longer than length soft-rayed portion of anal-fin base, 0.8–1.1 in length of entire anal-fin base. Lateral teeth in jaws conical or rounded. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils densely scaly.

Body brown or dark grey, with variable pale and dark indistinct markings, often dependent on age; small orange spots on head often visible in life; fins often with orangish hues, and caudal fin often bright orange; inner pelvic-fin membranes usually with dense melanophores. Attains 70 cm TL (commonly 50 cm TL).



*Lethrinus erythracanthus*, 60 cm TL (Kenya). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: East Africa, Madagascar, Seychelles, Mauritius, Chagos and Maldives; elsewhere to Thailand, Ryukyu Is., Micronesia, Marshall Is., Solomon Is., Australia, New Caledonia, Samoa, Society Is. and Tuamotu Is.

**REMARKS** Found on outer-reef slopes and in adjacent deep lagoons, channels and nearby soft bottom, at 10–120 m. Feeds mostly on benthic invertebrates.

### *Lethrinus erythropterus* Valenciennes 1830

Longfin emperor PLATE 107

*Lethrinus erythropterus* Valenciennes in Cuv. & Val. 1830: 313

(Uléa, Caroline Is.); Carpenter & Allen 1989\*; SSF No. 185\*: xi [1995]; Carpenter 2001\*.

*Lethrinus striatus* Steindachner 1866: 479, Pl. 5, Fig. 3 (Zanzibar, Tanzania).

Anal-fin ray 3–5 longest, its length much longer than length of soft-rayed portion of anal-fin base, 0.7–1 in length of entire anal-fin base. Lateral teeth in jaws rounded or molars. LL scales 44–46; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils densely scaly.

Body brown or russet, paler ventrally; typically 2 pale bars on peduncle; broad streak from eyes to snout tip and lips, and pectoral-fin bases red in life; fins reddish; no dense melanophores on inner pelvic-fin membranes. Attains 50 cm TL (commonly 30 cm TL).

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania, Mozambique, Mauritius and Chagos; elsewhere to Indonesia (Sumatra), Philippines, Palau, Caroline Is., Solomon Is. and Australia.

**REMARKS** Found on coral reefs and adjacent sandy areas, ~10–120 m. Feeds on benthic invertebrates and small fishes.

### *Lethrinus harak* (Fabricius 1775)

Thumbprint emperor PLATE 107

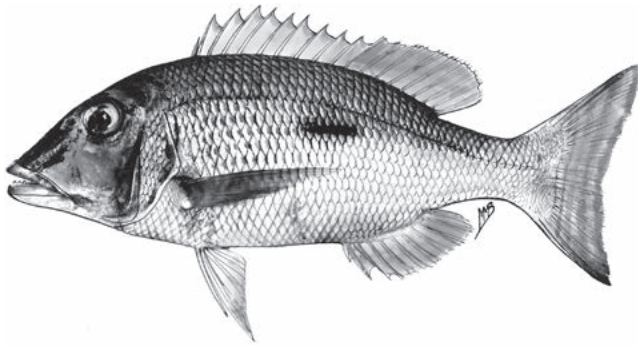
*Sciaena harak* Fabricius in Niebuhr (ex Forsskål) 1775: 52, xii [Red Sea].

*Lethrinus bleekeri* Klunzinger 1884: 41 (Red Sea).

*Lethrinus harak*: SSF No. 185.7\*; Carpenter & Allen 1989\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Lateral teeth in jaws rounded or molars. LL scales 47 or 48; scale rows between lateral line and mid-dorsal-fin spines usually 5½, sometimes 4½; inner surface of pectoral-fin axils densely scaly.

Body olive, tan or grey dorsally, shading to silvery white ventrally; large elliptical black spot, often broadly edged in yellow, on sides directly below lateral line and centred at vertical near pectoral-fin tips. Attains 50 cm TL (commonly 20–30 cm TL).



*Lethrinus harak*, 45 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, East Africa to South Africa (northern KwaZulu-Natal), Madagascar, Seychelles, Mascarenes, Maldives and Sri Lanka; elsewhere to Andaman Is., southern Japan, Caroline Is., Marshall Is., northern Australia, New Caledonia, Fiji and Samoa.

**REMARKS** Found on coral rubble and in shallow sandy areas, mangroves, seagrasses and adjacent coral reef areas, to ~30 m deep.

### *Lethrinus lentjan* (Lacepède 1802)

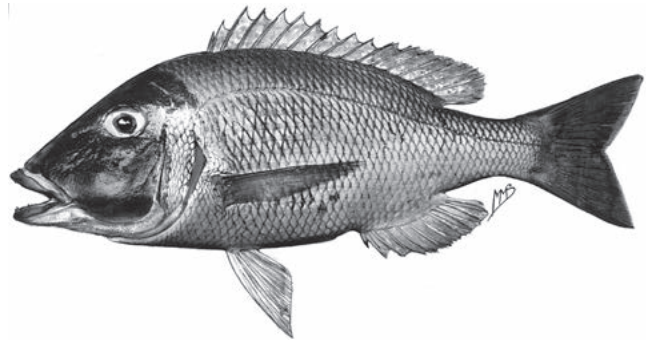
Redspot emperor

PLATE 107

*Bodianus lentjan* Lacepède 1802: 281, 293 [probably Java, Indonesia].  
*Lethrinus mahsenoides* Valenciennes (ex Ehrenburg) in Cuv. & Val. 1830: 286 (Massawa, Eritrea, Red Sea).  
*Lethrinus opercularis* Valenciennes in Cuv. & Val. 1830: 289 (Trincomalee, Sri Lanka).  
*Lethrinus cinereus* Valenciennes in Cuv. & Val. 1830: 293 (Kaitz, Sri Lanka).  
*Lethrinus croceopterus* Valenciennes in Cuv. & Val. 1830: 302 (Seychelles).  
*Lethrinus argenteus* Valenciennes in Cuv. & Val. 1830: 303 (Seychelles).  
*Lethrinus geniguttatus* Valenciennes in Cuv. & Val. 1830: 304 (Indian Ocean).  
*Lethrinus lentjan*: SSF No. 185.10\*; Carpenter & Allen 1989\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Carpenter 2001; Manilo & Bogorodsky 2003; Bogorodsky *et al.* 2014.

Snout moderately short, its length 0.8–1 in cheek height; body depth 2.5–2.8 in SL. Lateral teeth in jaws rounded, often with conical tips, or molars often with tubercles. LL scales 46 or 47; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils either densely scaly, with few scales or naked; transverse scale rows 15 or 16 from anal-fin origin to lateral line.

Body greenish or grey, shading to white ventrally; centres of scales on upper sides often white; rear margin of opercle and sometimes pectoral-fin bases red; melanophores largely absent on inner pelvic-fin membranes. Attains 50 cm TL (commonly 30 cm TL).



*Lethrinus lentjan*, 35 cm TL (Kenya). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Persian/Arabian Gulf, Red Sea, East Africa to South Africa (Sodwana Bay), Madagascar, Seychelles, Mascarenes, Maldives and Sri Lanka; elsewhere to Andaman Is., Indonesia, Ryukyu Is., Marshall Is., Australia, New Caledonia, Lord Howe I. and Tonga.

**REMARKS** Found on sandy bottom in coastal areas, in deep lagoons and near coral reefs, to ~50 m deep.

### *Lethrinus mahsena* (Fabricius 1775)

Sky emperor

PLATE 107

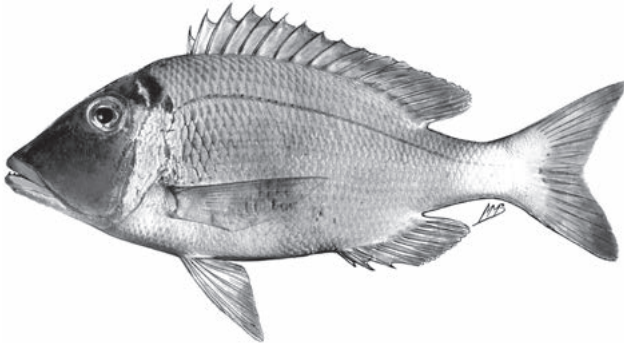
*Sciaena mahsena* Fabricius in Niebuhr (ex Forsskål) 1775: 52, xii (Ra's Baridi, Saudi Arabia, Red Sea).  
*Lethrinus caeruleus* Valenciennes in Cuv. & Val. 1830: 301 (Seychelles).  
*Lethrinus abbreviatus* Valenciennes (ex Ehrenburg) in Cuv. & Val. 1830: 312 (Red Sea).  
*Lethrinus sanguineus* Smith 1955: 12, Pl. 3, Fig. 14 (Shimoni, Kenya).  
*Lethrinus mahsena*: SSF No. 185.11\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Anal-fin ray 1 or 2 usually longest; length of longest anal-fin ray 1.1–1.8 in length of entire anal-fin base. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils densely scaly.

Body yellow to greenish blue, paler ventrally; sides usually with 7–10 dusky yellow-green or brown bars, fading ventrally, and sometimes yellowish below soft-rayed portion of dorsal fin to peduncle; red bar at pectoral-fin bases sometimes extending broadly to upper edge of fin, below fin, and to edge of opercle; deep red also sometimes below eyes, on membranes of spinous portion of dorsal fin and anal fin, as well as diffuse red on caudal-fin margin and other fin membranes. Attains 65 cm TL (commonly 45 cm TL).



*Lethrinus mahsena*, 20 cm SL (Mauritius). G Gouws © NRF-SAIAB



*Lethrinus mahsena*, 28 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** WIO: Red Sea, East Africa to South Africa (Sodwana Bay), Madagascar, Seychelles, Mauritius, Chagos, Maldives and Sri Lanka.

**REMARKS** Found on coral reefs and adjacent sandy and seagrass areas, to ~100 m deep.

### *Lethrinus microdon* Valenciennes 1830

Smalltooth emperor PLATES 107 & 108

*Lethrinus microdon* Valenciennes in Cuv. & Val. 1830: 295 (Moluccas, Indonesia); Carpenter & Allen 1989\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.

*Lethrinus elongatus* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 289 (Red Sea).

*Lethrinus acutus* Klunzinger 1884: 39, Pl. 7, Fig. 1 (Massawa, Eritrea, Red Sea).

Body depth 2.9–3.4 in SL; interorbital area nearly flat or convex. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils scaleless; transverse scale rows 16 or 17 from anal-fin origin to lateral line.

Body grey or brown, sometimes with scattered irregular dark blotches on sides; sometimes 3 dark streaks radiating forward

from eyes; fins pale or orangish; inner surface of pectoral fins never red in life. Attains 70 cm TL (commonly 50 cm TL).



*Lethrinus microdon*, 37 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, East Africa, northern Madagascar, Seychelles, Réunion, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Ryukyu Is., New Guinea, Australia and Palau.

**REMARKS** Found on sandy bottom near coral reefs, to ~80 m deep.

### *Lethrinus nebulosus* (Forsskål 1775)

Spangled emperor

PLATE 108

*Sciaena nebulosa* Forsskål in Niebuhr 1775: 52 (Red Sea).

*Lethrinus gothofredi* Valenciennes in Cuv. & Val. 1830: 286 (Gulf of Suez, Red Sea).

*Lethrinus fasciatus* Valenciennes in Cuv. & Val. 1830: 290 (Trincomalee, Sri Lanka).

*Lethrinus fraenatus* Valenciennes in Cuv. & Val. 1830: 291 (Sri Lanka).

*Lethrinus korely* Valenciennes in Cuv. & Val. 1830: 292 (Puducherry, India).

*Lethrinus maculatus* Valenciennes in Cuv. & Val. 1830: 292 (Puducherry, India).

*Lethrinus erythrurus* Valenciennes in Cuv. & Val. 1830: 293 (Sri Lanka).

*Lethrinus centurio* Valenciennes in Cuv. & Val. 1830: 301, Pl. 158 (Seychelles).

*Lethrinus esculentus* Valenciennes in Cuv. & Val. 1830: Pl. 158 (Seychelles).

*Lethrinus karwa* Valenciennes in Cuv. & Val. 1830: 311 (Visakhapatnam, India).

*Lethrinus scoparius* Gilchrist & Thompson 1908: 168 (KwaZulu-Natal, South Africa).

*Lethrinus nebulosus*: SSF No. 185.13\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Fricke *et al.* 2013.

Body depth 2.5–2.9 in SL; eye diameter 3.6–5.9 in HL. Lateral teeth in jaws rounded, often with conical tips, or molars often with tubercles. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils densely scaly; transverse scale rows 16 or 17 from anal-fin origin to lateral line; usually 15 rows in lower series of scales around peduncle.

Body yellowish or bronze, paler ventrally; centres of many scales whitish or pale blue; sometimes irregular dark bars on sides; 3 blue streaks or series of dots radiating forward and ventrally from eyes; melanophores covering most of pelvic-fin membranes. Attains 80 cm TL (commonly 50 cm TL).



*Lethrinus nebulosus*, 23 cm SL (India). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Persian/Arabian Gulf, Red Sea, East Africa to South Africa (Algoa Bay), Mozambique Channel, Madagascar, Seychelles, Réunion, Chagos, Maldives, India and Sri Lanka; elsewhere to east coast of India, Andaman Is., southern Japan, Australia and Samoa.

**REMARKS** Occurs on nearshore and offshore coral reefs and adjacent habitats, to ~75 m deep. Recent genetic work of Healey *et al.* (2018) has determined that the species in the WIO is two distinct species. The species found along the coast of South Africa overlaps with *L. nebulosus* in southern Mozambique, and has been identified as *L. scoparius* Gilchrist & Thompson 1908.

### *Lethrinus obsoletus* (Forsskål 1775)

Orange-striped emperor

PLATE 108

*Sciaena obsoleta* Forsskål in Niebuhr 1775: 52, xii [Red Sea].

*Sciaena ramak* Forsskål 1775: 52 [Red Sea].

*Lethrinus obsoletus*: Smith 1986; Carpenter & Allen 1989\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Fricke *et al.* 2013.

Body depth 2.6–2.9 in SL; eye diameter 3.5–5 in HL. Lateral teeth in jaws rounded or conical. LL scales 45–48; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils densely scaly; transverse scale rows 15 or 16 from anal-fin origin to lateral line; usually 15 rows in lower series of scales around peduncle.

Body tan, paler ventrally; centres of scales often paler than background colour; sometimes irregular dark bars on sides; orange-yellow stripe on lower side at level of pectoral-fin base, some fish with additional faint stripes above and below

this stripe; no dense melanophores on pelvic-fin membranes closest to body. Attains 60 cm TL (commonly 30 cm TL).



*Lethrinus obsoletus*, 27 cm SL (Seychelles).

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**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, East Africa to South Africa (Sodwana Bay), Madagascar, Seychelles, Maldives and Sri Lanka; elsewhere to Andaman Is., Ryukyu Is., Marshall Is., Wake Atoll, Australia, New Caledonia, Tonga and Samoa.

**REMARKS** Inhabits seagrass beds and sand and rubble areas of reefs, to ~30 m deep.

### *Lethrinus olivaceus* Valenciennes 1830

Longface emperor

PLATE 108

*Lethrinus olivaceus* Valenciennes in Cuv. & Val. 1830: 295 (Jawa Barat, Java, Indonesia); Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Carpenter 2001\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Fricke *et al.* 2013.

*Lethrinus longirostris* Playfair in Playfair & Günther 1867: 44, Pl. 7, Fig. 2 (Zanzibar, Tanzania).

Body depth 2.8–3.4 in SL; snout elongate, its length 0.6–0.8 in cheek height. Lateral teeth in jaws conical. LL scales 46–48; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils scaleless.

Body grey, paler ventrally, often with scattered irregular dark blotches; snout with wavy dark streaks; upper jaw near corner of mouth sometimes edged red. Attains 100 cm TL (commonly 70 cm TL).

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, East Africa, northern Madagascar, Seychelles, Réunion, Maldives and Sri Lanka; elsewhere to Andaman Is., Indonesia, Ryukyu Is., Marshall Is., Australia, New Caledonia, Samoa, Line Is. and Pitcairn Is.

**REMARKS** Found on sandy bottom in coastal areas, lagoons and near coral reefs, to ~180 m deep.



*Lethrinus ornatus* Valenciennes 1830

Ornate emperor

PLATE 109

*Lethrinus ornatus* Valenciennes in Cuv. & Val. 1830: 310 (Java, Indonesia); Carpenter & Allen 1989\*; Carpenter 2001\*.

Body depth 2.3–2.6 in SL; HL 0.8–0.9 in body depth; head profile near eyes convex. Lateral teeth in jaws rounded with points or as molars; outer surface of maxilla usually smooth, sometimes with longitudinal ridge. LL scales 46 or 47; scale rows between lateral line and mid-dorsal-fin spines 5½; inner surface of pectoral-fin axils densely scaled.

Body dusky whitish, paler ventrally, with 5 or 6 orange stripes on sides; rear margin of opercle and preopercle bright red. Attains 40 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives and Sri Lanka; elsewhere to Indonesia, Ryukyu Is., New Guinea and northeastern Australia.

**REMARKS** Found on sandy and soft bottom of inshore bays, seagrass beds and adjacent reefs, at 5–30 m.

*Lethrinus reticulatus* Valenciennes 1830

Redsnout emperor

PLATE 109

*Lethrinus reticulatus* Valenciennes in Cuv. & Val. 1830: 298 (New Guinea); Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Heemstra *et al.* 2004.

Interorbital area concave, sometimes only slightly. LL scales 46 or 47; scale rows between lateral line and mid-dorsal-fin spines 4½; 7–10 scales in supratemporal patch; inner surface of pectoral-fin axils scaleless.

Body olive-grey or tan, often with scattered irregular black blotches; pectoral-fin bases, upper margin of opercle and sometimes rear margin of preopercle red; innermost pectoral-fin membranes not densely covered with melanophores. Attains 40 cm TL.



*Lethrinus reticulatus*, 12 cm SL (Philippines). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific. WIO: Mauritius, Rodrigues and Chagos; elsewhere to Andaman Sea, Indonesia, Philippines, southern Japan, New Guinea and Samoa.

**REMARKS** Probably inhabits sandy and soft bottom near reefs, at 5–30 m.

*Lethrinus rubrioperculatus* Sato 1978

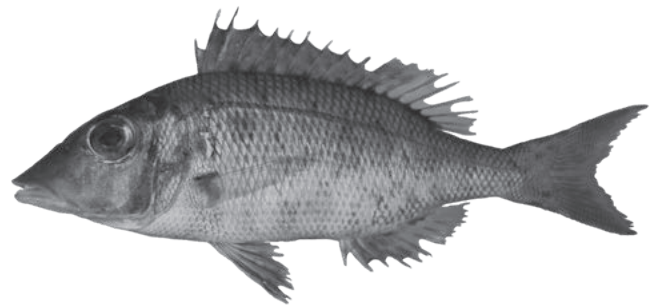
Spotcheek emperor

PLATE 109

*Lethrinus rubrioperculatus* Sato 1978: 58, Pl. 12a (Naha fish market, Okinawa, Japan); Carpenter & Allen 1989\*; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.

Body depth 3–3.4 in SL; interorbital area nearly flat or convex. LL scales 47–49; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils scaleless; transverse scale rows 15 or 16 from anal-fin origin to lateral line.

Body olive-grey or brown, sometimes with scattered irregular dark blotches on sides; red lips and spot on upper margin of opercle; no distinct dark streaks radiating from eyes. Attains 50 cm TL (commonly 30 cm TL).



*Lethrinus rubrioperculatus*, 11 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Kenya to South Africa (Port St Johns), Madagascar, Seychelles, Maldives and Chagos; elsewhere to Indonesia, southern Japan, Marshall Is., Wake Atoll, northern Australia, New Caledonia, throughout much of Oceania (except Hawaii), and Marquesas Is.

**REMARKS** Frequently misidentified in Indian Ocean literature as *L. variegatus* or *L. elongatus*. Found on sandy and rubble areas of outer-reef slopes, to ~160 m deep.

*Lethrinus semicinctus* Valenciennes 1830

Blackblotch emperor

PLATE 109

*Lethrinus semicinctus* Valenciennes in Cuv. & Val. 1830: 294 (Bourou [Buru I., Indonesia?]); Carpenter & Allen 1989\*; Carpenter 2001\*.

Body depth 2.9–3.3 in SL; interorbital area nearly flat or slightly convex. LL scales 46–48; 4–8 scales in supratemporal patch; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils scaleless; transverse scale rows 14 or 15 from anal-fin origin to lateral line.

Body brown or tan; large oblong persistent black blotch on sides below soft-rayed portion of dorsal fin to below lateral line, and sometimes with other scattered irregular dark blotches on sides; no distinct dark streaks radiating from eyes. Attains 35 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Indonesia, Ryukyu Is., Marshall Is., northern Australia, New Caledonia and Fiji.

**REMARKS** Found on sandy and seagrass areas near coral reefs.

*Lethrinus variegatus* Valenciennes 1830

Slender emperor

PLATE 110

*Lethrinus variegatus* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 287 (Massawa, Eritrea, Red Sea); SSF No.185.17\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Goren & Dor 1994; Fricke 1999; Carpenter 2001\*; Manilo & Bogorodsky 2003; Fricke *et al.* 2009.

*Lethrinus latifrons* Rüppell 1838: 118, Pl. 28, Fig. 4. (Al-Muwaylih, Saudi Arabia, Red Sea).

Body depth ~3.9 in SL; interorbital area nearly flat or convex. LL scales 45–47; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils scaleless; transverse scale rows 13 or 14 from anal-fin origin to lateral line.

Body grey or brown, sometimes with scattered irregular dark blotches on sides; often 2 dark bands below eyes; inner surface of pectoral fins never red in life. Attains 20 cm TL.

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Kenya to South Africa (Sodwana Bay), northern Madagascar, Seychelles, Réunion, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Ryukyu Is., Palau, northern Australia and New Caledonia.

**REMARKS** Found on sandy areas near coral reefs, to ~150 m deep.

*Lethrinus xanthochilus* Klunzinger 1870

Yellowlip emperor

PLATE 110

*Lethrinus xanthochilus* Klunzinger 1870: 753 (Al-Qusayr, Egypt, Red Sea); SSF No. 186.18\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Goren & Dor 1994; Fricke 1999; Carpenter 2001\*; Manilo & Bogorodsky 2003; Fricke *et al.* 2009; Fricke *et al.* 2013.

Interorbital area distinctly concave. LL scales 47 or 48; scale rows between lateral line and mid-dorsal-fin spines 4½; 5–8 scales in supratemporal patch; inner surface of pectoral-fin axils scaleless.

Body yellowish grey, with scattered irregular dark spots; lips yellowish; red spot at upper and inner parts of pectoral-fin bases, and innermost pectoral-fin membranes mostly covered with melanophores. Attains 60 cm TL.

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Kenya to South Africa (Kosi Bay), Mozambique Channel, northern Madagascar, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Ryukyu Is., Caroline Is., Marshall Is., eastern Australia and Marquesas Is.

**REMARKS** Found on seagrass beds, sand, rubble and coralline areas of reefs, to possibly ~150 m deep.

*Lethrinus* sp.

Maldives emperor

PLATE 110

*Lethrinus* sp. 1: Carpenter & Allen 1989\*.

Body depth 3–3.3 in SL; interorbital area nearly flat or convex. Dorsal fin 10 spines, 9 rays; anal fin 3 spines, 8 rays; pectoral fins 13 rays. LL scales 47 or 48; cheeks scaleless; 8–11 scales in supratemporal patch; scale rows between lateral line and mid-dorsal-fin spines 4½; inner surface of pectoral-fin axils scaleless; transverse scale rows 15 from anal-fin origin to lateral line.

Body pale grey or tan; pectoral-fin bases, spot on upper rear margin of opercle, rear margin of preopercle, and indistinct area on snout in front of eyes usually reddish; no distinct dark streaks radiating from eyes or persistent black blotch on sides. Attains at least 32 cm SL, probably larger.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives; elsewhere, records from western Indonesia and southern Philippines.

**REMARKS** Found on sandy areas near coral reefs.

GENUS *Monotaxis* Bennett 1830

Dorsal fin 10 spines, 10 rays; anal fin 3 spines, 9 rays; pectoral fins 14 rays. Cheeks with transverse scale rows; inner surface of pectoral-fin axils densely scaly; sides of jaws with round, flat molars; outer surface of maxilla with denticulate longitudinal ridge. One species, *M. grandoculis*, commonly recognised and known from WIO. Another species, *M. heterodon*, recently confirmed as distinct and from the Indian Ocean (Chen & Borsa 2020), but not included here. The two species can be distinguished by transverse scale rows (18 in *M. heterodon*, 19 in *M. grandoculis*), and *M. heterodon* with narrow white bars on sides, and juveniles without black blotches in the dorsal fin and without the vertical dark bar through the eye and on the cheek, compared to *M. grandoculis*.

*Monotaxis grandoculis* (Forsskål 1775)

Humpnose bigeye bream

PLATE 110

*Sciaena grandoculis* Forsskål in Niebuhr 1775: 53, xii (Jeddah, Saudi Arabia, Red Sea).

*Monotaxis grandoculis*: SSF No. 185.19\*; Carpenter & Allen 1989\*; Winterbottom *et al.* 1989; Goren & Dor 1994; Randall 1995\*; Fricke 1999; Carpenter 2001\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009; Fricke *et al.* 2013.

Body depth 2.1–2.7 in SL. Jaw teeth conical anteriorly, with band of villiform teeth behind, and round, flat molars laterally. LL scales 44–47; transverse scale rows on cheeks 4–6; scale rows between lateral line and mid-dorsal-fin spines 4 or 5.

Adults pale brown to pale grey dorsally and paler ventrally; can assume broad dark saddles, separated by thin white bars dorsally, and whitish saddle on peduncle (similar in subadults). Juveniles with 3 dark saddles dorsally and a bar through eyes. Attains 60 cm TL (commonly 40 cm TL).

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Kenya to South Africa, Mozambique Channel, northern Madagascar, Seychelles, Mascarenes and Chagos; not known from Persian/Arabian Gulf; elsewhere to southern Japan, Australia, New Caledonia, Tonga, Line Is., Pitcairn Is. and Hawaii.

**REMARKS** Generally found on or near coral reefs, over sand and rubble, at 3–150 m. Feeds on benthic invertebrates and small fishes.

GENUS *Wattsia* Chan & Chilvers 1974

Dorsal fin 10 spines, 10 rays; anal fin 3 spines, 10 rays; pectoral fins 14 rays. Caudal-fin lobes rounded; cheeks with transverse scale rows; inner surface of pectoral-fin axils scaleless; sides of jaws with conical and villiform teeth; outer surface of maxilla with denticulate longitudinal ridge. One species.

*Wattsia mossambica* (Smith 1957)

Mozambique large-eye bream

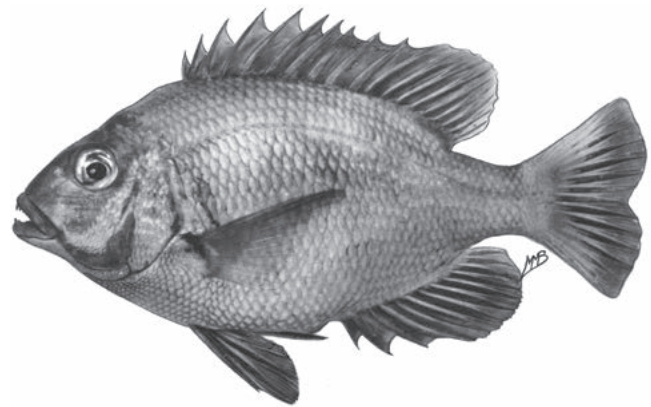
PLATE 111

*Gnathodentex mossambicus* Smith 1957: 122, Pl. 1 (Pinda reef, Mozambique).

*Wattsia mossambica*: SSF No. 185.20\*; Carpenter & Allen 1989\*; Carpenter 2001\*; Manilo & Bogorodsky 2003.

Body deep and roughly rhomboid, its depth 1.9–2.2 in SL. LL scales 41–47; scale rows between lateral line and mid-dorsal-fin spines 5.

Body silvery, yellowish or reddish, with faint irregular black blotches; narrow black bar across outer part of pectoral-fin bases. Attains 55 cm TL (commonly 35 cm TL).



*Wattsia mossambica*, 42 cm TL, holotype (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific (widespread). WIO: East Africa to Mozambique and Maldives; elsewhere to Malaysia, southern Japan, Marshall Is., Australia, New Caledonia and Solomon Is.

**REMARKS** Occurs on outer continental shelf, at 100–180 m. Feeds on benthic invertebrates and small fishes.

## FAMILY NEMIPTERIDAE

### Threadfin breams, monocle breams and dwarf monocle breams

Barry C Russell

Small- to medium-sized spariforms with elongate to moderately deep, compressed body. Mouth terminal, small to moderate; premaxillaries moderately protrusile; teeth in jaws conical, except enlarged canines present anteriorly in *Nemipterus*, and no teeth on vomer and palatines. Dorsal fin single, continuous, with 10 spines, 9 rays (last ray branched at base); anal fin 3 spines, 7 rays; pectoral fins 2 unbranched rays, 12–17 branched rays; pelvic fins thoracic, with 1 spine, 5 rays; caudal fin emarginate, forked, lunate or falcate, and upper and/or lower lobe tips with or without pointed or filamentous extensions. Scales finely ctenoid, moderate. Colour extremely variable, but often pinkish or reddish, with red, yellow or blue markings.

Ascending premaxillary process never as long as alveolar ramus; articular process not fused to ascending process along anterior margin; post-maxillary process present, low, broad-based; palato-premaxillary ligament well-developed; ethmo-maxillary ligament well-developed, Y-shaped, with ventrolateral branch inserting on palatine anterior to insertion of the palato-premaxillary ligament. No tooth plates on 2nd and 3rd epibranchial. Branchiostegal rays 6 (first 5 inserting on ceratohyal, 6th inserting at interspace between ceratohyal and epihyal); gill membranes free from isthmus; gill arches 4, slit behind 4th, and pseudobranch well-developed; gill rakers short, knob-like. Suborbital plate beneath the eye deep, formed by infraorbitals 1+2; infraorbital 3 never deep, and infraorbital 2 typically projecting backward below it (this rear projection developed as an externally visible spine in *Scolopsis*); infraorbital 3 with well-developed subocular shelf; infraorbital 4 often with very small shelf. Two predorsal bones present in the following configuration: 1st predorsal, 1st neural spine, 2nd predorsal, 2nd neural spine, 1st pterygiophore supporting first 2 dorsal-fin spines, plus 2nd pterygiophore supporting 3rd dorsal-fin spine, 3rd neural spine, 3rd pterygiophore supporting 4th dorsal-fin spine, 4th neural spine; last pterygiophore of dorsal fin and anal fin tri-segmented. Opisthotic well-developed. Epipleural ribs 8–12; accessory sub-pelvic keel and post-pelvic process present.

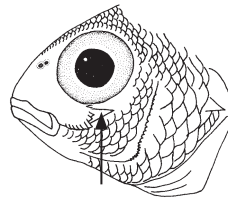
Bottom-dwelling, solitary or schooling, and apparently not territorial. *Nemipterus* (threadfin breams) occur on mud and sand in coastal inshore and offshore waters of the continental shelf, to ~300 m deep, although most species occur in much shallower water. *Parascolopsis* (dwarf monocle breams) occur on mud or sand bottom mainly in offshore waters of the

continental shelf, to ~400 m deep. *Scolopsis* (monocle breams) generally occur on coral reefs or on sand or mud bottom close to reefs, to ~60 m deep. Carnivorous and feed mainly on other small fishes, cephalopods, crustaceans and polychaetes. Many of the species show size-related differences in sex ratios, with small fish being mainly females and larger fish males; in some species this size-related skew in sex ratios appears to be due to higher growth rates in males. However, some species of *Scolopsis* and *Nemipterus* appear to be protogynous hermaphrodites. Spawning seasonality varies widely among species and appears to vary within species between localities. Mature ova are present in species of *Nemipterus* over a prolonged period, inferring a protracted spawning season, with usually one or two periods of increased fecundity. Important food fishes in many areas: threadfin breams, and to a much lesser extent monocle breams, are an important component of commercial and artisanal fisheries of the Indo-Pacific; dwarf monocle breams, because of their usually small size and deeper-water habits, are of minor importance to fisheries.

Five genera and ~69 species; 3 genera and 22 species in WIO.

#### KEY TO GENERA

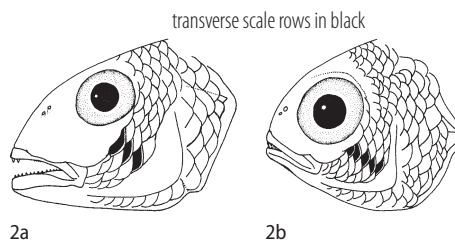
- 1a Suborbital naked, with large backward-pointing spine below eye and series of smaller spines or serrations on rear margin; preopercle margin coarsely denticulate or serrate; no canines ..... *Scolopsis*



- 1b Suborbital scaly or naked, spine weak or absent, and rear margin either smooth, finely serrate, or with a few small denticulations; preopercle margin finely denticulate or smooth; canines in jaws present only anteriorly or absent ..... 2

- 2a No suborbital spine; 3 transverse scale rows on preopercle ..... *Nemipterus*

- 2b Suborbital spine weak or absent; 4–6 transverse scale rows on preopercle ..... *Parascolopsis*



GENUS *Nemipterus* Swainson 1839

Caudal fin forked; upper lobe rounded, pointed, falcate, or produced to form short or very long filamentous extension. Body covered with ctenoid scales; scales on top of head reaching level of middle of eyes; suborbital naked, margin smooth; preopercle scaly, with 3 transverse scale rows, lower limb naked, and margin finely denticulate or smooth; opercle scaly, upper margin with small, flat, embedded spine; LL scales 45–51; transverse scale rows  $3\frac{1}{2}$ – $4\frac{1}{2}$  above lateral line, 9– $12\frac{1}{2}$  below. About 28 species, 6 in WIO.

## KEY TO SPECIES

- 1a Dorsal-fin interspinous membranes deeply incised .... *N. peronii*  
 1b Dorsal-fin interspinous membranes not incised or only slightly incised ..... 2
- 2a Caudal-fin upper lobe with filamentous extension ..... 3  
 2b No filamentous extension on caudal-fin upper lobe ..... 5
- 3a Body elongate, depth 3.8–4.6 in SL; pectoral fins short, extending to or just short of level of vent; caudal-fin upper lobe produced into short filament ..... *N. zysron*  
 3b Body moderately deep, depth 2.7–3.5 in SL; pectoral fins long, extending to or just beyond level of anal-fin origin; caudal-fin upper lobe with long trailing filament ..... 4
- 4a Pelvic fins very long, extending to or beyond level of anal-fin origin; suborbital plate shallow, its least depth 1.7–3.6 in eye diameter; dorsal fin pale bluish, margin red, lower three-fourths of fin with yellow markings; anal fin pale bluish, with yellow medial stripe ..... *N. randalli*  
 4b Pelvic fins moderately long, extending to or just beyond level of vent; suborbital plate moderately deep, its least depth 1–1.9 in eye diameter; dorsal fin whitish, margin yellow and edged with red, and pale yellow stripe near fin base broadening posteriorly; anal fin whitish, with pale yellow broken lines or scribbling pattern over most of fin ..... *N. japonicus*
- 5a Scales below lateral line in ascending rows anteriorly; maxilla reaching to below front half of eye; head rosy red, with 1 or 2 indistinct mauve-blue bands on snout; sides of body with 5 greenish yellow, upwardly curved bands ..... *N. bipunctatus*  
 5b Scales below lateral line in more or less horizontal rows; maxilla reaching to between level of posterior nostril and front margin of eye; head pinkish mauve, with 2 yellow bands on snout, upper lip narrowly edged with yellow, lower lip and chin beneath lip yellow, and yellow colour extending as narrow band to lower margin of opercle; no distinct stripes on body ...  
 ..... *N. flavomandibularis*

*Nemipterus bipunctatus* (Valenciennes 1830)

Delagoa threadfin bream

PLATES 111 &amp; 112

*Dentex bipunctatus* Valenciennes (ex Ehrenberg) in Cuv. & Val. 1830: 247 (Jeddah, Saudi Arabia, Red Sea).

*Synagris bleekeri* Day 1875: 92, Pl. 24, Fig. 1 (Chennai, India).

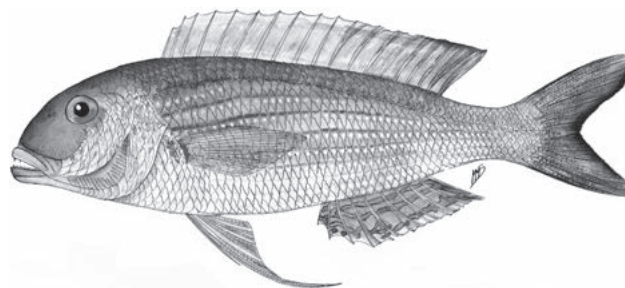
*Nemipterus mulloides* Smith 1939: 219, Fig. 2 (Maputo Bay, Mozambique) [name preoccupied by *Dentex mulloides* Bleeker 1852].

*Nemipterus delagoae* Smith 1941: 450 (Maputo Bay, Mozambique) [replacement name for *Nemipterus mulloides* Smith 1939].

*Nemipterus bipunctatus*: SSF No. 186.1\*; Russell 1990\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003.

Body depth 3.4–3.9 in SL; snout length subequal to or slightly greater than eye diameter; eye diameter 3.1–3.9 in HL; lower margin of eye tangent to or above line from snout tip to upper pectoral-fin base; interorbital width 1.2–1.7 in eye diameter; suborbital depth 1.1–2.5 in eye diameter; line from rear edge of suborbital to dorsal profile ~3–5 scales before dorsal-fin origin. Pectoral fins moderately long, 1.2–1.5 in HL, extending to or just beyond vent; pelvic fins long, 0.9–1.3 in HL, extending to or just beyond level of anal-fin origin; caudal fin forked, upper and lower lobes subequal in length. Upper jaw with 3 or 4 pairs of small recurved canines anteriorly. Scale rows on body below lateral line curved upward. GR 10–14.

Body pinkish dorsally, shading to silvery ventrally, with 5–7 greenish yellow upward-curved stripes on body below lateral line; snout with 2 indistinct bluish or mauve stripes (1st in front of eye; 2nd from upper lip to eye); dorsal fin pale pink, with reddish margin and yellow submarginal stripe (lacking in larger specimens); anal fin pale bluish white, with 2–4 irregular longitudinal yellow stripes; caudal fin yellowish pink; paired fins translucent. Attains 20 cm SL (commonly 15 cm SL).



*Nemipterus bipunctatus*, 22 cm TL, female holotype of *N. delagoae* (S Mozambique). Source: SFSA

**DISTRIBUTION** Indian Ocean. WIO: Persian/Arabian Gulf, Red Sea, Arabian Sea to Mozambique (Maputo Bay), Madagascar, Mauritius and Sri Lanka; elsewhere to Bay of Bengal, Andaman Sea and Strait of Malacca.

**REMARKS** Found on sand and mud bottom. Feeds mainly on crustaceans, squid, small fishes and polychaetes.

## *Nemipterus flavomandibularis*

Russell & Tweddle 2013

Yellow-lip threadfin bream

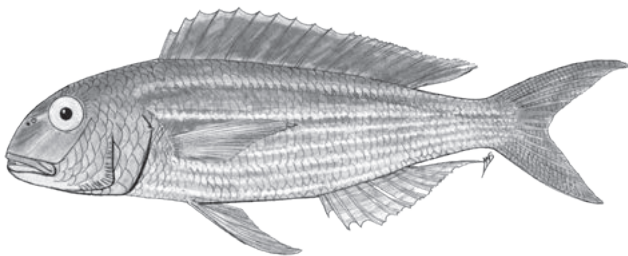
PLATE 111

*Nemipterus flavomandibularis* Russell & Tweddle 2013: 197, Figs. 2, 4 (Saya da Malha Bank).

*Nemipterus peronii* (non Valenciennes in Cuv. & Val. 1830): Smith & Smith 1963.

Body depth 3.2–3.6 in SL; snout length slightly greater than eye diameter; eye diameter 3.1–4.3 in HL; lower margin of eye well above line from snout tip to upper pectoral-fin base; interorbital width 1–1.6 in eye diameter; suborbital depth 1–1.5 in eye diameter; line from rear edge of suborbital to dorsal profile ~2 scale rows before dorsal-fin origin. Pectoral fins moderately long, 1.1–1.3 in HL, extending to about level of vent; pelvic fins very long, 1–1.4 in HL, extending to between level of vent and anal-fin origin; caudal fin forked, upper lobe slightly longer than lower lobe, its tip rounded, not produced. Upper jaw with 4 or 5 pairs of small recurved canines anteriorly. GR 12–14.

Head and upper body pinkish mauve, dorsum darker; snout with 2 narrow yellow bands (upper band from front of eye through nostrils; lower band from just in front of lower margin of eye to anterior edge of suborbital); upper lip narrowly edged with yellow; lower lip and chin yellow, the colour extending as narrow band behind lower margin of opercle; upper part of head behind eyes with golden reflections, and opercle with 2 indefinite oblique yellow bands; yellow band on body extending along scale row just above lateral line, and ~5 longitudinal silvery bands on alternate scale rows beneath lateral line; ventral midline with pale yellow stripe on either side; dorsal fin pinkish, margin red with yellow edge; anal fin transparent, with 3 longitudinal narrow yellow bands, lower 2 of these joining behind 3rd spine of anal fin; pectoral fins transparent, with narrow yellow bar at fin bases; pelvic fins transparent, with yellow band extending length of 1st branched ray; caudal fin reddish; eyes reddish. Attains 20 cm SL (commonly 15 cm SL).



*Nemipterus flavomandibularis*, 20 cm TL (Seychelles).

Source: Smith & Smith 1963

**DISTRIBUTION** WIO: Mascarene Plateau, between Seychelles and Saya da Malha Bank.

**REMARKS** Type specimens collected at ~127 m.

## *Nemipterus japonicus* (Bloch 1791)

Japanese threadfin bream

PLATE 111

*Sparus japonicus* Bloch 1791: 110, Pl. 277, Fig. 1 (Japan).

?*Coryphaena lutea* Bloch & Schneider 1801: 297, Pl. 58 (Tharangambadi, India).

*Cantharus filamentosus* Rüppell 1829: 50, Pl. 12, Fig. 3 (Massawa, Eritrea, Red Sea).

*Dentex tambulus* Valenciennes in Cuv. & Val. 1830: 249, 558 (Puducherry and Tharangambadi, India).

?*Dentex striatus* Valenciennes in Cuv. & Val. 1830: 252 (Tharangambadi, India).

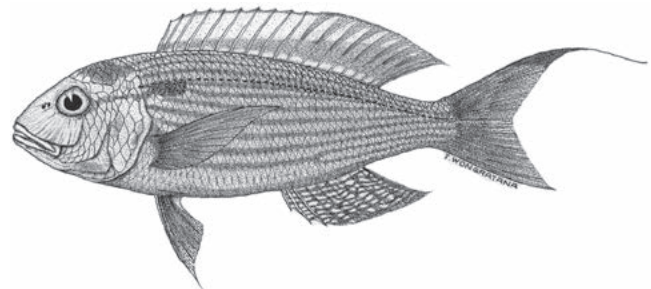
*Synagris grammicus* Day 1865: 14 (Kochi, Malabar coast, India).

*Heterognathodon flaviventris* Steindachner 1866: 778, Pl. 13, Fig. 6 (Zanzibar, Tanzania).

*Nemipterus japonicus*: Russell 1990\*, 1993; Baranes & Golani 1993; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Fricke 1999; Mishra & Srinivasan 1999; Manilo & Bogorodsky 2003; Bogorodsky *et al.* 2014.

Body depth 2.7–3.5 in SL; snout length subequal to or greater than eye diameter; eye diameter 3.2–4.4 in HL; lower margin of eye above line from snout tip to upper pectoral-fin base; interorbital width 1–1.9 in eye diameter; suborbital depth 1–1.9 in eye diameter; line from rear edge of suborbital to dorsal profile 2–4 scale rows before dorsal-fin origin. Pectoral fins very long, 1–1.3 in HL, extending to or just beyond level of anal-fin origin; pelvic fins moderately long, 1.2–1.6 in HL, extending to or just beyond vent; caudal fin moderately forked, upper lobe slightly longer than lower lobe and produced into short or moderately long filament. Upper jaw with 4 or 5 pairs of small recurved canines anteriorly. GR 14–17.

Body pinkish dorsally, silvery below; top of head behind eyes with golden sheen; 11 or 12 pale golden yellow stripes along body, from behind head to caudal-fin base; prominent red-suffused yellow blotch below origin of lateral line; dorsal fin whitish, margin yellow, edged with red; pale yellow stripe near dorsal-fin base, stripe narrow anteriorly and widening on rear part of fin; anal fin whitish, with pale yellow broken lines or scribbling over most of fin; pectoral fins translucent pinkish; pelvic fins whitish, with yellow axillary scale; caudal fin pink, upper tip and filament yellow. Attains 25 cm SL (commonly 15 cm SL).



*Nemipterus japonicus*. Source: Russell 1990 (by T Wongratana)

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea to Madagascar and southwestern India; elsewhere to east coast of India, Philippines, southern Japan and northern Australia.

**REMARKS** Abundant in coastal waters, on mud or sand bottom, usually in schools. Feeds mainly on small fishes, crustaceans, molluscs (mainly cephalopods), polychaetes and echinoderms. Marketed mainly fresh, but also frozen, steamed, dry-salted, dry-smoked, fermented or made into fishballs and fishmeal.

### *Nemipterus peronii* (Valenciennes 1830)

Notchedfin threadfin bream PLATES 111 & 112

*Dentex peronii* Valenciennes in Cuv. & Val. 1830: 245, Pl. 154 [probably northwestern Australia].

*Dentex tolu* Valenciennes in Cuv. & Val. 1830: 248 (Puducherry, India; New Guinea).

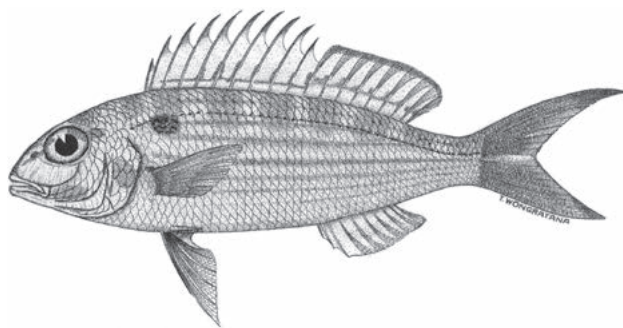
*Cantharus guliminda* Valenciennes in Cuv. & Val. 1830: 344 (Visakhapatnam, India) [based on Fig. in Russell 1803, Pl. 107].

*Dentex (Heterognathodon) smithii* Steindachner 1868: 978 [14], Pl. 3, Fig. 1 (Cape of Good Hope, South Africa).

*Nemipterus peronii*: SSF No. 186.2\*; Russell 1990\*, 2001\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003.

Body depth 3.1–4.1 in SL; snout length subequal to eye diameter; eye diameter 2.8–3.6 in HL; lower margin of eye just above line from snout tip to upper pectoral-fin base; interorbital width 1.4–1.9 in eye diameter; suborbital depth 1.1–2.2 in eye diameter; line from rear edge of suborbital to dorsal profile at or 2 or 3 scale rows before dorsal-fin origin; preopercle naked width 1.5–2.2 in scaly width. Dorsal-fin spines elongate, interspinous membranes deeply incised; pectoral fins short, 1.1–1.7 in HL, not extending to level of vent; pelvic fins moderately long, 1.1–1.5 in HL, extending to level of vent; caudal fin forked, upper lobe pointed and slightly longer than lower lobe. Upper jaw with 3 or 4 pairs of small recurved canines anteriorly. GR 9–12.

Upper body pinkish, with 7 or 8 indistinct darker pink saddles extending to or just below lateral line; lower body silvery, with faint golden lines following each scale row; diffuse pale reddish spot below and just behind origin of lateral line; golden yellow stripe on snout in front of eyes passing through nostrils; upper lip yellow; suborbital region silvery mauve; golden reflections on preopercle and opercle; dorsal fin whitish pink, with pale yellow line or series of spots just above fin base, and tips of spinous part reddish yellow; anal fin whitish pink, suffused with pale yellowish in middle; pectoral fins translucent; pelvic fins whitish, axillary scale yellow; caudal fin pinkish. Attains 27 cm SL (commonly 17 cm SL).



*Nemipterus peronii*. Source: Russell 1990 (by T Wongratana)

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea and Persian/Arabian Gulf to Sri Lanka, southwards to Cape of Good Hope (extralimital); elsewhere to east coast of India, Andaman Sea, Philippines, Taiwan, New Guinea and Australia.

**REMARKS** Occurs on sand or mud bottom, usually in small groups. Feeds on fishes, crustaceans, molluscs and polychaetes. Trawled in commercial quantities in Strait of Malacca and off Terengganu coast of Malaysia, South China Sea.

### *Nemipterus randalli* Russell 1986

Randall's threadfin bream PLATES 111 & 112

*Nemipterus randalli* Russell 1986: 23, Fig. 2 (Bahrain fish market, Persian/Arabian Gulf); Baranes & Golani 1993; Randall 1995; SSF No. 186 [1995]; Russell & Tweddle 2013; Bogorodsky *et al.* 2014.

Body depth 2.9–3.5 in SL; snout length subequal to eye diameter; eye diameter 2.7–3.7 in HL; lower margin of eye tangent to or just above line from snout tip to upper pectoral-fin base; interorbital width 1.4–2 in eye diameter; suborbital depth 1.7–4 in eye diameter; line from rear edge of suborbital to dorsal profile 3–7 scale rows before dorsal-fin origin; preopercle naked width 1.2–3 in scaly width. Pectoral fins and pelvic fins very long, extending to or just beyond level of anal-fin origin: pectoral fins 1–1.4 in HL, pelvic fins 0.9–1.4 in HL; caudal fin forked, upper rays produced into long trailing filament. Upper jaw with 3 or 4 pairs of small recurved canines anteriorly. GR 12–15.

Body silvery pink, with 3 or 4 faint yellow stripes on sides below lateral line; ventral midline with broad yellow stripe on either side; pinkish blotch below origin of lateral line; dorsal fin pale bluish, with closely packed yellow markings on lower three-fourths, and margin red; anal fin pale bluish, with narrow yellow medial stripe; pectoral fins transparent; pelvic fins whitish; caudal fin pink, filament pale reddish; eyes and peritoneum salmon-pink. Attains 19 cm SL (commonly 15 cm SL).



*Nemipterus randalli*, 18 cm SL (Bahrain). © JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: Red Sea (including Gulf of Aqaba), Gulf of Aden, Oman, Persian/Arabian Gulf, Pakistan, and India; elsewhere to Andaman Sea; Lessepsian migrant in Mediterranean Sea (mistakenly reported as *N. japonicus*).

**REMARKS** Found on sand and mud bottom.

***Nemipterus zysron*** (Bleeker 1856)

Slender threadfin bream

PLATES 112 & 113

*Dentex zysron* Bleeker 1856: 219 (Pulau Nias, Sumatra, Indonesia).

*Dentex metopias* Bleeker 1857: 51 (Ambon I., Moluccas, Indonesia).

*Heterognathodon petersii* Steindachner 1864: 37 (Tanzania).

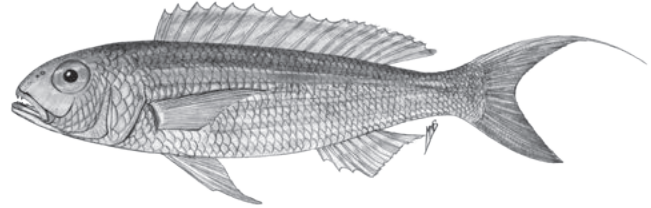
*Nemipterus metopias*: Smith & Smith 1963\*.

*Nemipterus zysron*: Russell 1990\*, 2001\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Anderson *et al.* 1998; Manilo & Bogorodsky 2003; Russell & Tweddle 2013; Bogorodsky *et al.* 2014.

Body depth 3.8–4.6 in SL; snout length subequal to or less than eye diameter; eye diameter 2.6–3.5 in HL; lower margin of eye level with or just above line from snout tip to upper pectoral-fin base; interorbital width 1.5–2.3 in eye diameter; suborbital depth 1.6–3.3 in eye diameter; line from rear edge of suborbital to dorsal profile 2–6 scale rows before dorsal-fin origin; preopercle naked-width 1.5–2.4 in scaly-width. Pectoral fins and pelvic fins short, extending to just short of level of vent: pectoral fins 1.1–1.4 in HL, pelvic fins 1.2–1.7 in HL; caudal fin forked, upper lobe produced into short filament. Upper jaw with 3 or 4 pairs of small recurved canines anteriorly. GR 10–15.

Body reddish dorsally, silvery below; sides below lateral line with indistinct yellow stripes along the middle of each scale row; head pinkish, suffused with mauve on snout; yellow stripes in front of eyes through nostrils, and from upper lip to beneath eyes; less distinct golden stripe from behind eye to origin of lateral line, and across upper part of opercle to pectoral-fin origin; dorsal fin pale yellow, with bright yellow margin; pale mauve submarginal stripe and pale mauve stripe near dorsal-fin base; anal fin pale lilac, with series of elongate yellow spots or yellow stripe submedially; pectoral fins pale

yellow; pelvic fins translucent whitish, fin base and axillary scale pale yellow; caudal fin pinkish, upper and lower lobes pale yellowish, filament yellow. Attains 18.5 cm SL (commonly 16 cm SL).



*Nemipterus zysron*, 25 cm TL (Seychelles). Source: Smith & Smith 1963

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Arabian Sea, Tanzania (Zanzibar), Mozambique, Madagascar, Seychelles and Sri Lanka; elsewhere to Bay of Bengal, Indonesia, Andaman Sea, Malaysia, Taiwan, Japan, Marshall Is., Australia, New Caledonia and Fiji.

**REMARKS** Found over sand bottom near rocks or reefs. Feeds in groups on benthic organisms.

**GENUS** *Parasclopsis* Boulenger 1901

Second spine of anal fin usually longer and more robust than 1st or 3rd spines; caudal fin emarginate. Scales on top of head reaching middle of eyes or to posterior nostrils; suborbital scaly or naked, and rear margin smooth, denticulate or finely serrate, upper corner with small spine or else spine absent; preopercle scaly, with 4 or 5 transverse scale rows, lower limb naked or scaly, margin serrate; opercle scaly, upper margin with small, flat, embedded spine; LL scales 34–40 (usually 35–38); transverse scale rows 2½–5 above lateral line, 11–15 below. Twelve species, 7 in WIO.

**KEY TO SPECIES**

1a	GR 8–10 on 1st arch.....	2
1b	GR 17–19 on 1st arch.....	<i>P. eriomma</i>
2a	Pectoral fins extending to or just short of level of vent; red blotch on dorsal fin between spines 7–10 (spot lost in preservative).....	<i>P. baranesi</i>
2b	Pectoral fins extending to or beyond vent; black spot sometimes present at dorsal-fin base (spot retained in preservative).....	3

Continued...



## KEY TO SPECIES

- 3a Scales on top of head not reaching level of front margin of eyes; suborbital and premaxilla naked; margin of suborbital usually smooth; preopercle with 4–6 transverse scale rows, and broad naked flange ..... 4
- 3b Scales on top of head reaching level of posterior nostrils; suborbital and premaxilla usually with scales posteriorly; margin of suborbital finely denticulate; preopercle with 5–9 transverse scale rows, and narrow naked flange; no black blotch on dorsal fin ..... *P. townsendi*
- 4a Black blotch near middle of dorsal-fin base ..... *P. aspinosa*
- 4a No black blotch at middle of dorsal-fin base ..... 5
- 5a GR 11 or 12 on 1st arch; pectoral-fin bases with diffuse black spot dorsally ..... *P. capitinis*
- 5b GR 8–10 on 1st arch; no black blotch on pectoral-fin bases ... 6
- 6a Dorsal fin with deep red spot between spines 6–10 (spot lost in preservative); 3 vertical dark orange bars on dorsum ..... *P. boesemani*
- 6b No red spot on dorsal fin; 4 broad, dark reddish bars on dorsum ..... *P. inermis*

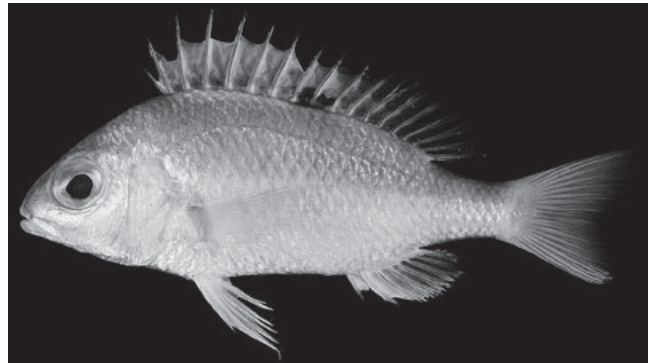
*Parascolopsis aspinosa* (Rao & Rao 1981)

Smooth dwarf monocle bream PLATES 112 &amp; 113

*Scolopsis aspinosa* Rao & Rao 1981: 134, Figs. 1, 3 (off Visakhapatnam, India).*Parascolopsis jonesi* Talwar 1986: 2, Fig. 1 (off Kollam, southwestern India).*Parascolopsis aspinosa*: Russell 1990\*; Russell & Golani 1993; Goren & Dor 1994; Carpenter *et al.* 1997\*; Bogorodsky *et al.* 2014.

Body depth 2.5–3 in SL; snout length less than eye diameter; rear margin of preopercle more or less vertical; lower limb of preopercle naked; rear margin of suborbital smooth or with a few tiny spines; suborbital depth 2.6–4.6 in eye diameter. Head scales reaching to between level of front margin of eyes and posterior nostrils; LL scales 35 or 36. Pectoral fins 2 unbranched, 14 or 15 branched rays; pectoral and pelvic fins long, extending to or beyond level of vent. GR 10 or 11.

Body rosy orange, with 4 pale reddish saddles on back and 2 on peduncle; suborbital and edge of preopercle silvery yellow; black blotch at dorsal-fin base between 8th spine and 1st ray, fin margin orange; anal fin pale rosy; pectoral fins yellowish. Attains 17 cm SL (commonly 10 cm SL).

*Parascolopsis aspinosa*, 11 cm SL (Persian/Arabian Gulf).

© JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, Gulf of Aden, Gulf of Oman, Persian/Arabian Gulf, Arabian Sea and India; elsewhere to Bay of Bengal and Andaman Sea.

**REMARKS** Occurs offshore, on sand and mud bottom. Feeds mainly on benthic invertebrates.

*Parascolopsis baranesi* Russell & Golani 1993

Baranes's dwarf monocle bream

PLATE 112

*Parascolopsis baranesi* Russell & Golani 1993: 341, Fig. 1 (Gulf of Aqaba, Red Sea); Nair *et al.* 2012.

Body depth 2.4–2.8 in SL; snout length less than eye diameter; suborbital depth 4–7.7 in eye diameter. Head scales reaching near level of anterior nostrils; suborbital naked or with a few scales posteriorly, rear and anteroventral margin with denticulations; rear limb of premaxilla naked or with a few scales; preopercle with 7–9 transverse scale rows, rear margin finely denticulate; LL scales 37–42. Pectoral fins 2 unbranched, 13–15 branched rays, fins moderately long and extending to or just short of level of vent; pelvic fins short, not extending near level of vent. GR 8–10.

Body pale pinkish, silvery below midlateral line; pale yellow band beginning beneath lateral line behind upper corner of opercle, extending horizontally to upper part of peduncle; traces of 3 vertical bars on upper half of body (1st before dorsal-fin origin, 2nd mid-dorsally, and 3rd behind dorsal fin); dorsal fin pale yellow on basal half, with large red blotch between 7th and 10th spines; caudal fin pale yellow, reddish near base and with pinkish tinge distally; eyes pinkish. Attains 11 cm SL.

**DISTRIBUTION** WIO: northern Red Sea.

**REMARKS** Known from 160–500 m. Closely resembles *P. boesemani* and the two species may prove to be the same.

*Parascolopsis boesemani* (Rao & Rao 1981)

Redfin dwarf monocle bream

PLATE 113

*Scolopsis boesemani* Rao & Rao 1981: 139, Figs. 2, 4  
(Visakhapatnam, India).

*Parascolopsis boesemani*: Naik *et al.* 2002\*.

Body depth 2.8 in SL; snout length less than eye diameter; suborbital depth 3.8 in eye diameter. Head scales reaching posterior nostrils; preopercle margin more or less vertical, and lower limb naked; suborbital margin finely denticulate; LL scales 36 or 37. Pectoral fins 2 unbranched, 14 branched rays; pectoral fins and pelvic fins long, extending to beyond level of vent. GR 9.

Body rosy yellow, with 3 pale rosy saddles on body and 1 on peduncle; 2 pale green stripes with slight orange tinge below lateral line; dorsal fin silvery yellow, with deep red blotch between spines 7–10; caudal fin silvery yellow, fork margin rosy. Attains 11 cm TL.

**DISTRIBUTION** WIO: India.

*Parascolopsis capitinis* Russell 1996

Large-head threadfin bream

PLATE 113

*Parascolopsis capitinis* Russell 1996: 64, Fig. (Colombo fish market, Sri Lanka); Naik *et al.* 2002.

Body depth 2.8–3.1 in SL; snout length less than eye diameter; suborbital depth 3.1–4.8 in eye diameter. Head scales to about level of rear margin of pupil; suborbital naked, rear edge smooth or with a few denticulations, and small spine at upper corner; preopercle with 5 transverse scale rows, lower limb naked, and rear margin finely denticulate; LL scales 35 or 36. Pectoral fins 2 unbranched, 14 or 15 branched rays, fins long, extending to or beyond level of vent; pelvic fins moderately long, extending to or just short of level of vent. GR 11 or 12.

Body rosy pink, paler ventrally, with indistinct pale pink longitudinal stripe midlaterally from below origin of lateral line to caudal-fin base; indistinct traces of yellowish band on snout in front of eyes; preopercle and opercle with yellow reflections; dorsal fin, anal fin and pelvic fins pale pink; pectoral fins translucent yellowish, upper part of bases with diffuse black spot; upper half of caudal fin pale dusky yellow, lower lobe rosy red. Attains 18 cm SL.

**DISTRIBUTION** WIO: southern India and Sri Lanka.

*Parascolopsis eriomma* (Jordan & Richardson 1909)

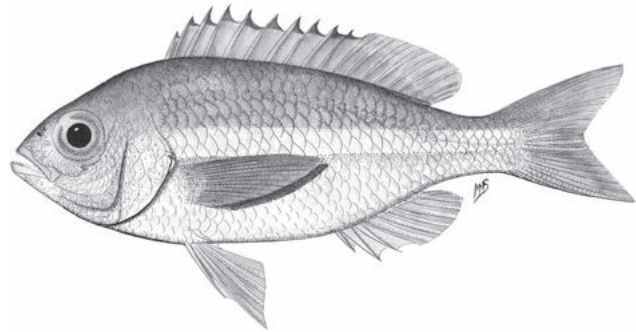
Rosy dwarf monocle bream

PLATES 112 & 113

*Scolopsis eriomma* Jordan & Richardson 1909: 188, Pl. 70 (Takao, Taiwan).  
*Parascolopsis eriomma*: SSF No. 186.3\*; Russell 1990\*, 2001\*; Baranes & Golani 1993; Russell & Golani 1993\*; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003.

Body depth 2.7–3 in SL; snout length less than eye diameter; suborbital depth 2.6–4.8 in eye diameter. Head scales reaching to between middle of eyes; preopercle margin more or less vertical or sloping forward slightly, lower limb naked; suborbital margin serrate, small spine at upper corner; LL scales 34–36. Pectoral fins 2 unbranched, 14 or 15 branched rays, fins long, extending to or almost to level of vent; pelvic fins long, extending to level of vent. GR 17–19.

Body pinkish, darker above, with broad longitudinal yellow stripe along middle of body from above pectoral fins to caudal-fin base; dusky elongate blotch at origin of lateral line; dorsal fin pinkish red, margin of spinous portion reddish; pectoral fins pink, upper axis of fins black; pelvic fins and anal fin translucent yellow; caudal fin pink or pinkish yellow. Attains 26 cm SL (commonly 20 cm SL).



*Parascolopsis eriomma*, 25 cm TL (East Africa). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman, Arabian Sea, Kenya to South Africa (Park Rynie), India and Sri Lanka; elsewhere to Bay of Bengal, Andaman Sea, Indonesia, Philippines, Taiwan and southern Japan.

**REMARKS** Benthic, on sand or mud bottom in offshore waters. Feeds mainly on benthic invertebrates.

*Parascolopsis inermis* (Temminck & Schlegel 1843)

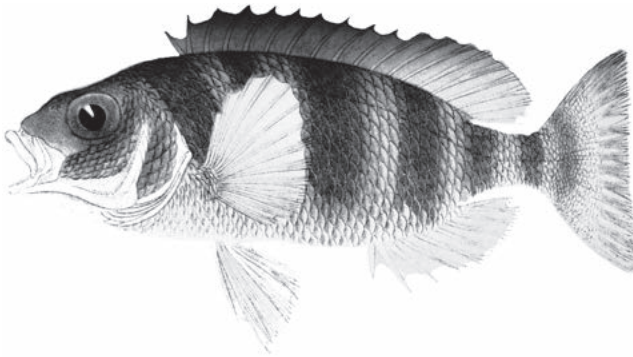
Unarmed dwarf monocle bream

PLATE 113

*Scolopsides inermis* Temminck & Schlegel 1843: 63, Pl. 28, Fig. 1 (Japan).  
*Parascolopsis inermis*: Russell 1990\*, 1996\*, 2001\*; Goren & Dor 1994; Naik *et al.* 2002.

Body depth 2.6–2.9 in SL; snout length subequal to or less than eye diameter; suborbital depth 2.5–3.5 in eye diameter. Head scales reaching to between middle of eyes; preopercle margin sloping forward slightly, lower limb naked; suborbital margin usually finely serrate (sometimes smooth), small spine at upper corner; LL scales 35. Pectoral fins 2 unbranched, 14 branched rays, fins long, extending to or beyond level of vent; pelvic fins long, extending to or almost to level of vent. GR 9 or 10.

Body pale yellowish, silvery ventrally, with 4 broad, dark reddish brown bars on back (1st just in front of dorsal fin and extending down to base of pectoral fin, 2nd below middle of dorsal fin and extending down to midlateral part of body, 3rd just behind dorsal fin and extending almost to ventral surface of peduncle, and 4th extending down caudal-fin base); paler indistinct bars in interspaces between darker bars; dorsal fin yellowish, with numerous red spots. Attains 18 cm SL (commonly 12 cm SL).



*Parascloopsis inermis*, type (Japan).  
Source: Temminck & Schlegel 1843 (by Schlegel)

**DISTRIBUTION** Indo-Pacific. WIO: Lakshadweep and Sri Lanka; elsewhere to Bay of Bengal, Andaman Sea, Indonesia and southern Japan.

**REMARKS** Found in offshore waters over sandy or muddy bottom, usually in small groups, at >50 m deep. Feeds mainly on benthic invertebrates. Caught with deepsea shrimp traps.

### *Parascloopsis townsendi* Boulenger 1901

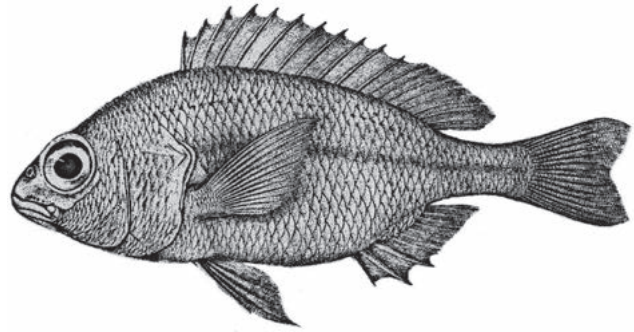
Scaly dwarf monacle bream

*Parascloopsis townsendi* Boulenger 1901: 262, Pl. 6 (Gulf of Oman);  
Russell 1990\*; Russell & Golani 1993\*; Goren & Dor 1994; Randall 1995\*.

Body depth 2.4–2.7 in SL; snout length subequal to or less than eye diameter; suborbital depth 2.8–5.2 in eye diameter. Head scales to level of posterior nostrils; rear margin of preopercle sloping backward slightly, lower limb scaly; suborbital scaly, rear margin finely serrate, no spine at upper corner; LL scales

37–40. Pectoral fins 2 unbranched, 13–15 branched rays, fins long, extending to above anal-fin origin; pelvic fins long, extending to or almost to level of vent. GR 10–13.

Body uniformly reddish, with silvery lateral stripe. Attains 16 cm SL (commonly 10 cm SL).



*Parascloopsis townsendi*, type (Oman). Source: Boulenger 1901

**DISTRIBUTION** WIO: Red Sea, Gulf of Oman, Arabian Sea and Gulf of Aden.

### GENUS *Scolopsis* Cuvier 1814

Second spine of anal fin usually longer and more robust than 1st or 3rd spine; caudal fin emarginate or forked, and upper lobe and/or lower lobe pointed, falcate or produced to form short filamentous extensions. Body covered with ctenoid scales; scales on top of head reaching to level of middle of eyes, to level of nostrils, or to in front of nostrils; suborbital naked, with large backward-pointing spine and series of smaller spines or serrations on rear margin; 4–7 transverse rows of cheek scales; lower limb of preopercle naked or scaly, rear margin serrate or spinous; opercle scaly, upper margin with small, flat, embedded spine; LL scales 35–49; transverse scale rows 3–5½ above lateral line, 12–18 below. Some species with small antorse spine beneath eyes. Nineteen species, 9 in WIO.

#### KEY TO SPECIES

1a Small forward-pointing spine or bony ridge below eyes ..... 2



1b No small forward-pointing spine or bony ridge below eyes ... 5

Continued...

## KEY TO SPECIES

- 2a Scales on top of head reaching to between level of snout and anterior nostrils ..... 3  
 2b Scales on top of head not reaching level of posterior nostrils ..... *S. xenochrous*
- 3a Body depth 2.5–3 in SL; anal fin black anteriorly ..... *S. bilineata*  
 3b Body depth 2–2.7 in SL; anal fin not black anteriorly ..... 4
- 4a Preopercle with distinct serrations on posterior margin; opercular membrane red; black spot present on upper part of pectoral-fin base; scales on sides with yellow tinge; median and paired fins bright yellow ..... *S. kurite*  
 4b Preopercle without distinct serrations on posterior margin; opercular membrane reddish brown; no black spot on upper part of pectoral-fin base; scales on body dark reddish, with dark spot at centre of each; median fins dirty red, pectoral fins with orange tinge ..... *S. vosmeri*
- 5a Head scales reaching only to level of mid-pupil; LL scales 45–47; lower limb of preopercle naked ..... *S. ghanam*  
 5b Head scales reach to or in front of level of front margin of eye; LL scales 42–48 ..... 6
- 6a Large dark ovoid spot, transected by lateral line, on upper body below middle of dorsal fin ..... *S. bimaculata*  
 6b No dark ovoid spot on upper body ..... 7
- 7a Lower margin of eye distinctly below line from snout to upper pectoral-fin base ..... *S. frenata*  
 7b Lower margin of eye level with or above line from snout to upper pectoral-fin base ..... 8
- 8a Head scales reach nearly to level of posterior nostrils; dusky stripe present above lateral line ..... *S. taeniata*  
 8b Head scales not reaching level of posterior nostrils; 4 transverse scale rows between lateral line and 1st spine of dorsal fin; patch of scales on top of head truncated anteriorly ..... *S. aurata*

## *Scolopsis aurata* (Park 1797)

Yellowstripe monocle bream

PLATES 112 & 113

*Perca aurata* Park 1797: 35 (Bengkulu Province, Sumatra, Indonesia).

*Scolopsis auratus*: Russell 1990\*, 2001\*; Fricke 1999.

Body depth 2.9–3.1 in SL; snout length subequal to or slightly greater than eye diameter; suborbital depth 1.8–2.6 in eye diameter. Head scales reach to or just behind level of front margin of eye; scaled area between eyes truncated anteriorly; lower limb of preopercle scaly; LL scales 46–48. No antrorse suborbital spine. Pectoral fins 2 unbranched, 15 or 16 branched rays; pelvic fins long, extending to or just beyond level of vent; caudal fin forked.

Body silvery white, dusky blue dorsally; snout dusky; broad golden yellow midlateral stripe from behind eyes to

caudal-fin base; narrow pale bluish stripe joining eyes behind nostrils; caudal fin golden yellow. Attains 21 cm SL (commonly 18 cm SL).



*Scolopsis aurata*, 21 cm SL (Maldives). © JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: Mascarenes, Maldives and Sri Lanka; elsewhere to southwestern Indonesia.

**REMARKS** Adults found close to reefs, in small loose groups, at 1–30 m; juveniles solitary, often in sheltered bays along reef edges with rubble or coarse sand.

## *Scolopsis bilineata* (Bloch 1793)

Two-lined monocle bream

PLATES 112 & 114

*Anthias bilineatus* Bloch 1793: 3, Pl. 325, Fig. 1 (Japan).

*Perca frenata* Günther 1859: 357 [name not available].

*Lutjanus ellipticus* 1802: 179, 213 (Japan).

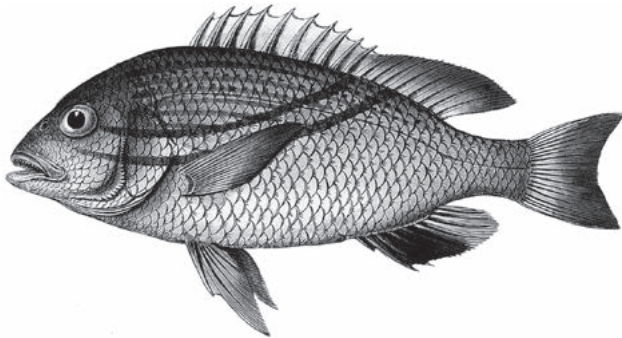
*Scolopsis bleekeri* Günther 1859: 361 ('Sea of Solor', Indonesia).

*Scolopsis bilineata*: Russell 1990\*, 2001\*; Randall 2005\* [as *bilineatus*].

Body depth 2.5–3 in SL; snout length less than eye diameter; suborbital depth 2.8–5.6 in eye diameter. Head scales reaching to or just in front of anterior nostrils; lower limb of preopercle scaly; LL scales 43–47. Antrorse suborbital spine present beneath eyes. Pectoral fins 12 unbranched, 14–16 branched rays; pelvic fins long, extending to or almost to level of anal-fin origin; caudal fin forked.

Head and upper part of body olive or greyish brown, pearly white below; dark red-edged, pearly white stripe from mouth to soft-rayed portion of dorsal-fin base; 2 narrow yellow stripes on head (1st from top of snout through upper part of eyes to beneath middle of spinous portion of dorsal fin; 2nd parallel to 1st, from above eyes to beneath dorsal-fin origin); yellow mid-dorsal stripe from above eyes along dorsal-fin base; whitish patch just below base of rear half of dorsal-fin rays; spinous portion of dorsal fin yellow, soft-rayed portion deep red or black anteriorly, remaining part transparent; anal fin deep red or black anteriorly, remaining part transparent; caudal fin transparent, outer rays reddish. Juveniles with 3 dark brown stripes on upper part of body, interspaces between stripes yellow; ventral half of body silvery white (but specimens from

Fiji uniformly yellow, with only traces of dark stripes on upper part of body); black spot between first 4 dorsal-fin spines. Attains 16 cm SL (commonly 13 cm SL).



*Scolopsis bilineata*, type (Japan). Source: Bloch 1793

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, Lakshadweep, Persian/Arabian Gulf, Pakistan, India and Sri Lanka; elsewhere to Andaman Sea, Indonesia, Ryukyu Is., Australia, New Caledonia and Fiji.

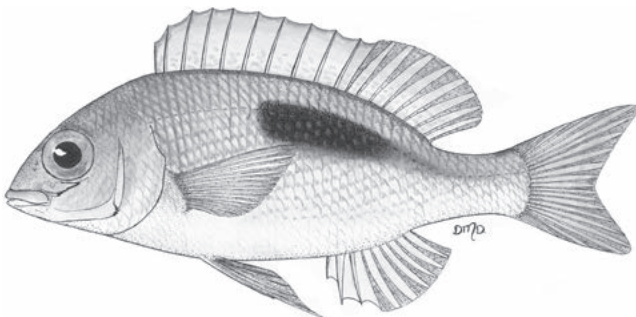
### *Scolopsis bimaculata* Rüppell 1828

Thumbprint monocle bream PLATES 112, 113 & 114

*Scolopsis bimaculatus* Rüppell 1828: 8, Pl. 2, Fig. 2 (Massawa, Eritrea, Red Sea); SSF No. 186.3\*; Russell 1990\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003. *Scolopsis bimaculata*: Psomadakis *et al.* 2015.

Body depth 2.6–3.3 in SL; snout length subequal to eye diameter; suborbital depth 1.5–4.4 in eye diameter. Head scales reach to posterior nostrils; lower limb of preopercle scaly; LL scales 45–48. No antrorse suborbital spine. Pectoral fins 2 unbranched, 15–17 branched rays; pelvic fins long, extending to between level of vent and anal-fin origin; caudal fin forked.

Body pale grey, whitish ventrally; elongate brownish blotch (or pair of blotches) on upper part of sides, beginning beneath 7th or 8th dorsal-fin spine and intersected by lateral line; turquoise stripe from upper lip to lower edge of eyes. Attains 25 cm SL (commonly 13 cm SL).



*Scolopsis bimaculata*, 18 cm TL (S Mozambique). Source: SFSA

**DISTRIBUTION** Indian Ocean. WIO: Persian/Arabian Gulf, Oman, Red Sea to Mozambique (Maputo Bay), Madagascar, Pakistan, India and Sri Lanka; elsewhere to Bay of Bengal.

**REMARKS** Found in inshore waters, usually on coral reefs or sand or mud bottoms close to reefs, to ~60 m deep. Feeds on crustaceans, molluscs, echinoderms and fishes.

### *Scolopsis frenata* (Cuvier 1830)

Bridled monocle bream

PLATE 112

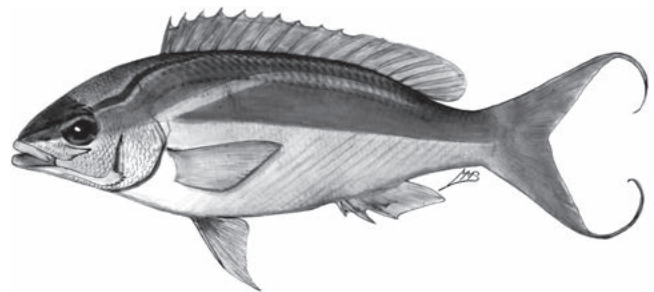
*Scolopsides frenatus* Cuvier in Cuv. & Val. 1830: 343 (Seychelles; Mauritius, Mascarenes).

*Scolopsides phaeops* Bennett 1832: 165 (Mauritius, Mascarenes).

*Scolopsis frenatus*: Smith & Smith 1963\*; Winterbottom *et al.* 1989; Russell 1990\*; Fricke 1999; Heemstra *et al.* 2004; Fricke *et al.* 2009.

Body depth 3–3.5 in SL; snout length subequal to eye diameter; suborbital depth 1.9–5.7 in eye diameter. Head scales reach to front margin of eyes and posterior nostrils; lower limb of preopercle naked; LL scales 42–49. No antrorse suborbital spine. Pectoral fins 2 unbranched, 15 branched rays; pelvic fins long, extending to or just beyond level of vent; caudal fin forked, lobes falcate, upper lobe slightly longer than lower lobe in larger specimens.

Body blue or olive-green on dorsum, white below; snout dusky; narrow blue stripe from snout tip to anteroventral edge of eye; yellow stripe from top of snout, through upper part of eyes, arching on back to upper part of peduncle, stripe edged dark green above from behind eyes to beneath 3rd or 4th dorsal-fin spine; narrow yellow stripe from top of head to along dorsal-fin base (stripe disappearing with age). Juveniles blue on upper half of body, white below; narrow yellow stripe on either side of dorsal midline, and broader yellow stripe from top of snout to upper half of peduncle. Attains 21 cm SL (commonly 17 cm SL).



*Scolopsis frenata*, 25 cm TL (Seychelles). Source: Smith & Smith 1963

**DISTRIBUTION** WIO: Madagascar, Seychelles, Réunion, Mauritius and Chagos.

**REMARKS** Found over sandy bottom near coral reefs, in small groups; juveniles solitary.

## *Scolopsis ghanam* (Fabricius 1775)

Arabian monocle bream

PLATE 114

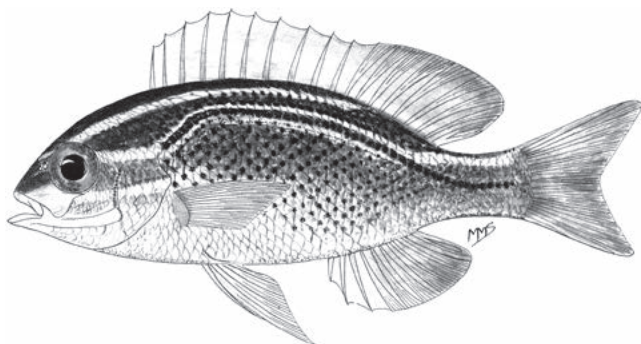
*Sciaena ghanam* Fabricius in Niebuhr (ex Forsskål) 1775: 50, xii (Jeddah, Saudi Arabia, and Al-Luhayya, Yemen, Red Sea).

?*Scolopsis ocellaris* Ehrenberg in Rüppell 1828: 7 [name not available].

*Scolopsis ghanam*: SSF No. 186.5\*; Russell 1990\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Bogorodsky *et al.* 2014; Psomadakis *et al.* 2015.

Body depth 2.9–3.3 in SL; snout length less than eye diameter; suborbital depth 2.8–6.2 in eye diameter. Head scales reach to middle of eyes; lower limb of preopercle naked; LL scales 44–47. No antrorse suborbital spine. Pectoral fins 2 unbranched, 13–16 branched rays; pelvic fins long, extending to or just beyond level of vent; caudal fin forked.

Body silvery grey, with numerous black and dark brown spots on sides; spots above lateral line forming 2 or 3 narrow brown or black stripes with white interspaces; pearly white stripe from below eyes to upper edge of pectoral-fin bases. Attains 15 cm SL (commonly 12 cm SL).



*Scolopsis ghanam*, 20 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Pakistan, Persian/Arabian Gulf, Oman, Red Sea to Mozambique (Maputo Bay), Madagascar and Seychelles; elsewhere to Andaman Is.

**REMARKS** Found inshore, over sandy bottoms, close to coral reefs. Feeds on molluscs, crustaceans, echinoderms and fishes.

## *Scolopsis kurite* Cuvier 1816

Collared monocle bream

PLATE 114

*Scolopsis kurite* Cuvier 1816: 280 (Visakhapatnam, India) [based on Russell 1803, Pl. 6]; Rüppell 1828: 9, Pl. 2, Fig. 3 (Massawa, Eritrea, Red Sea).

*Scolopsis kurita* Cuvier 1829: 178 (Visakhapatnam, India) [based on Russell 1803, Pl. 6].

*Scolopsides ruppelii* Cuvier in Cuv. & Val. 1830: 332, xx (Massawa, Eritrea, Red Sea).

*Scolopsis leucotaenia*: Day 1878.

*Scolopsis vosmeri*: SSF No. 186.6\* [in part]; Russell 1990\* [in part], 2001\*; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Bogorodsky *et al.* 2014.

*Scolopsis torquatus*: Psomadakis *et al.* 2015.

*Scolopsis* sp. B: Psomadakis *et al.* 2019

Body depth 2.1–2.3 in SL; snout length slightly less than eye diameter; suborbital depth 1.7–3.3 in eye diameter. Head scales to anterior nostrils; lower limb of preopercle scaly; LL scales 39–45. Antrorse suborbital spine present beneath eyes. Pectoral fins 2 unbranched, 15–17 branched rays; pelvic fins long, extending to or just beyond level of vent; caudal fin forked.

Body colour somewhat variable, pale reddish yellow to reddish brown, peduncle usually whitish or yellow; scales on sides with darker yellowish green or brown spot at centre; broad, white, vertical bar from top of head onto opercle; opercular membrane red; fins reddish; upper part of pectoral-fin bases with black spot. Attains 16 cm SL (commonly 15 cm SL).

**DISTRIBUTION** Indian Ocean (widespread). WIO: Arabian Sea, Persian/Arabian Gulf, Oman, Red Sea, Kenya to Mozambique (Maputo Bay); elsewhere, Bay of Bengal and Andaman Sea.

**REMARKS** This species has been previously confused with *Scolopsis vosmeri* but is genetically distinct from that species and another closely related form in the western Pacific. Benthic in inshore turbid or weedy waters, usually on sand or mud bottoms close to reefs, as well as offshore, to ~25 m deep. Seen solitary, but may school at depth. Feeds on benthic organisms. Marketed fresh, salted, smoked or processed into fishballs.

## *Scolopsis taeniata* (Cuvier 1830)

Black-streaked monocle bream

PLATE 114

*Scolopsides taeniatus* Cuvier (ex Ehrenberg) in Cuv. & Val. 1830: 340 (Massawa, Eritrea, Red Sea).

*Scolopsis nototaenia* Playfair in Playfair & Günther 1867: 29, Pl. 5, Fig. 2 (Gulf of Aden).

*Scolopsis taeniatus*: Russell 1990\*; Goren & Dor 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003; Bogorodsky *et al.* 2014. *Scolopsis taeniata*: Psomadakis *et al.* 2015.

Body depth 2.8–3.1 in SL; snout length subequal to or slightly greater than eye diameter; suborbital depth 1.3–3.8 in eye diameter. Head scales reach to or just in front of level of front margin of eye; lower limb of preopercle scaly; LL scales 45–48. No antrorse suborbital spine. Pectoral fins 2 unbranched, 15 or 16 branched rays; pelvic fins long, extending to level of vent; caudal fin forked.

Body greenish olive dorsally, whitish below; narrow whitish stripe along dorsal-fin base; beneath this, a prominent dark brown or black streak above lateral line beginning below 3rd or 4th dorsal-fin spine and ending on peduncle; bright blue stripe from eyes to upper jaw and from rear edge of eyes to pectoral-fin bases, ending as blue spot; dorsal fin orange anteriorly, reddish posteriorly, with vivid red margin; other fins yellowish or reddish. Attains 28 cm SL (commonly 15 cm SL).



*Scolopsis taeniata*, 12 cm SL (Bahrain). © JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, Gulf of Aden, Oman, Persian/Arabian Gulf to India, Sri Lanka and Gulf of Mannar.

### *Scolopsis vosmeri* (Bloch 1792)

Vosmer's monocle bream

PLATE 114

*Anthias vosmeri* Bloch 1792: 120, Pl. 321 ('Japanisches Meer' [Nagasaki, Japan]).

*Pomacentrus enneadactylus* Lacepède 1802: 505, 508 [no locality given].

*Scolopsis vosmeri*: SSF No. 186.6\* [in part]; Russell 1990\* [in part], 2001\*  
Psomadakis *et al.* 2015.

*Scolopsis igcarensis* Mishra *et al.* 2013: 444, Figs. 1–2 (Kalpakkam, Tamil Nadu, India).

Body depth 2–2.3 in SL; snout length slightly less than eye diameter; suborbital depth 1.8–2.7 in eye diameter. Pectoral fins 2 unbranched, 16 or 17 branched rays; pelvic fins long, extending to or just beyond level of vent; caudal fin forked. Antrorse suborbital spine present beneath eyes. Head scaly to anterior nostrils; lower limb of preopercle scaly; LL scales 42–44.

Body reddish brown, peduncle whitish; scales on sides with dark spots; broad, white, vertical bar from top of head onto opercle; whitish horizontal stripe below lateral line from opercle to below soft-rayed portion of dorsal fin (absent or indistinct in some specimens); dorsal fin and paired fins dark reddish; no black spot on pectoral-fin bases. Attains 16 cm SL.



*Scolopsis vosmeri*, 8 cm SL, subadult (Sri Lanka). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific. WIO: Arabian Sea and Sri Lanka (not recorded from Red Sea and Persian/Arabian Gulf); elsewhere, Bay of Bengal, Andaman Sea, Malaysia, Indonesia, Philippines, Hong Kong, Taiwan and Ryukyu Is.

**REMARKS** *Scolopsis vosmeri* comprises a complex of three closely related but genetically distinct species, which includes *S. kurite*. *Scolopsis igcarensis* Mishra *et al.* (2013) represents the juvenile and subadult forms of *S. vosmeri*. Benthic in inshore turbid waters or weedy areas, usually on sand or mud bottom close to reefs, as well as offshore to ~25 m deep. Seen solitary, but may school at depth. Feeds on benthic organisms. Marketed fresh, salted, smoked or processed into fishballs.

### *Scolopsis xenochrous* Günther 1872

Oblique-barred monocle bream

PLATE 114

*Scolopsis xenochrous* Günther 1872: 423 (Misol I., Moluccas, Indonesia);

Russell 1990\*, 2001\*; Karuppasamy *et al.* 2020 (Wadge Bank, India).

*Scolopsis xenochroa*: Shen 1997.

Body depth 3.2–3.4 in SL; snout length slightly less than eye diameter; suborbital depth 2.7–3.5 in eye diameter. Head scales reach to between level of front margin of eyes and posterior nostrils; lower limb of preopercle scaly; LL scales 42–45. Antrorse suborbital spine present beneath eyes. Pectoral fins 2 unbranched, 15 branched rays; pelvic fins moderately long, extending to or almost to level of vent; caudal fin forked.

Body greyish brown dorsally, silvery white below; snout dusky; pearly blue streak from behind eyes along dorsal-fin base; oblique brown-edged pearly blue bar above pectoral-fin bases; several short oblique rows of dusky brown spots on sides; elongate white blotch below lateral line on rear half of body, yellowish tinge above this blotch; black blotch on opercle; fins tinged bluish. Attains 17 cm SL (commonly 14 cm SL).

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, Wadge Bank and Sri Lanka; elsewhere to Andaman Sea, Indonesia, Taiwan, Ryukyu Is., New Guinea, northern Australia and Solomon Is.

**REMARKS** Occurs in coastal waters, in lagoons, around rocky rubble and seaweed areas of coral reefs and on outer slopes, to ~50 m deep; usually in small groups but sometimes solitary. Feeds mainly on benthic crustaceans.

#### GLOSSARY

**alveolar ramus** – the tooth-bearing area of the lower jaw.  
**articular process** – the projection of a vertebra that articulates with the adjacent vertebra; also called a zygapophysis.  
**ascending process** – a vertical extension of the anterior of the premaxilla.  
**post-maxillary process** – an extension posterior to the ascending process.  
**protogynous hermaphrodites** – an individual that functions first as a female and then changes to a male.

## FAMILY DICHISTIIDAE

### Galjoen

Phillip C Heemstra

Body deep, compressed; head profile distinctly convex, snout broadly rounded, head length slightly greater than half body depth, HL 3–3.3 in SL. Mouth terminal and small; maxilla reaches below front edge of eye and is mostly covered by suborbital bones; no supramaxilla; lips thick; teeth elongate, compressed, incisiform, 1 row in both jaws, and similar but much smaller inner teeth in gaps between outer incisors; no teeth on vomer, palatines or tongue; pharyngeal bones with numerous molariform teeth. Dorsal fin deeply divided before soft-rayed part, with 10 stout spines, 18–23 segmented soft rays, and anterior rays elongated and forming rounded lobe; anal fin with 3 stout spines, 13 or 14 rays, also forming high lobe anteriorly; pectoral fins 17 or 18 rays, asymmetric: upper rays twice as long as lower rays and subequal to head length; pelvic fins 1 spine, 5 branched rays; caudal fin moderately forked, with 15 branched rays. Scales ctenoid, strongly adherent, covering head, body and fin bases. Vertebrae 10 + 15.

One genus, *Dichistius* Gill 1888, with 2 species endemic to southern Africa.

#### KEY TO SPECIES

- 1a Dorsal fin 18 or 19 rays; body depth 2.2–2.4 in SL; body uniformly coloured (dark grey or silvery) or with 7–9 faint broad dark bars ..... *D. capensis*  
1b Dorsal fin 21–23 rays; body depth 1.6–1.8 in SL; body silvery to pale grey, with 7 broad and 7 narrow dark bars ..... *D. multifasciatus*

### *Dichistius capensis* (Cuvier 1831)

#### Galjoen

PLATE 115

*Dipterodon capensis* Cuvier in Cuv. & Val. 1831: 276, Pl. 188 (Cape of Good Hope, South Africa); Gilchrist & Thompson 1908; Barnard 1927\*.

*Coracinus aper* Gronow in Gray 1854: 57 (Cape of Good Hope, South Africa).

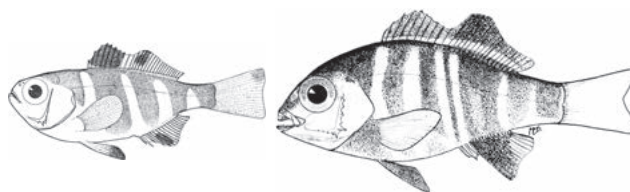
*Dichistius capensis*: Smith 1935\*; Leis & Van der Lingen 1997; Heemstra & Heemstra 2004\*.

*Dichistius falcatus* Smith 1935: 272, Pls. 14, 17 (Great Fish Point, Eastern Cape, South Africa).

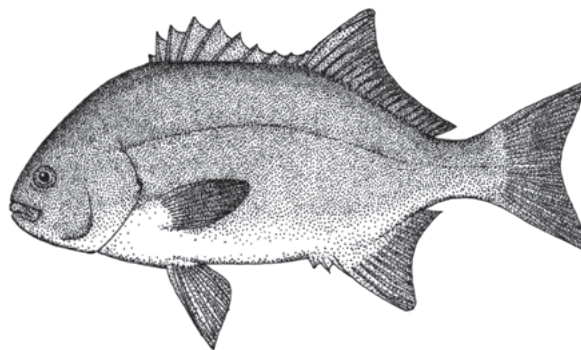
*Coracinus capensis*: SFSa No. 644\*; SSF No. 187.1\* [included *Dichistius falcatus* as a synonym].

Body depth 2–2.2 in SL; peduncle depth 6.7–7 in SL. Dorsal fin 10 spines, 18 or 19 rays. GR 7 or 8/13–15. LL scales 60–65.

Colour variable depending on habitat, and may change in seconds when moving over different substrates: dark grey to black over dark rocks, silvery white on pale sandy bottoms; sometimes mottled or with 7–9 faint dark bars. Attains 80 cm TL, ~6.5 kg (14+ years).



*Dichistius capensis*, 2 cm TL, juvenile; 6 cm TL, juvenile (both South Africa). Source: Smith 1938 (left); SSF (right)



*Dichistius capensis*, ~50 cm TL adult (South Africa). Source: Smale & Buxton 1998



**DISTRIBUTION** Southern Africa: southern Angola in southeastern Atlantic, to South Africa (Kosi Bay) in WIO.

**REMARKS** Found near shore over rocks and sandy areas. Feeds on mussels, gastropods, barnacles, amphipods, isopods, tunicates, polychaetes and algae. Most galjoen stay in one area for long periods, but can also move thousands of kilometres along the coast. Females mature at 34 cm TL (age 6 years), and males at 31 cm TL. Caught in or just beyond the surf line by anglers fishing from shore; strong fighter and excellent food fish.

### *Dichistius multifasciatus* (Pellegrin 1914)

Banded galjoen PLATE 115

*Dipterodon multifasciatus* Pellegrin 1914: 231 (Fort Dauphin, Madagascar).

*Dipterodon capensis*: Barnard 1927 [in part].

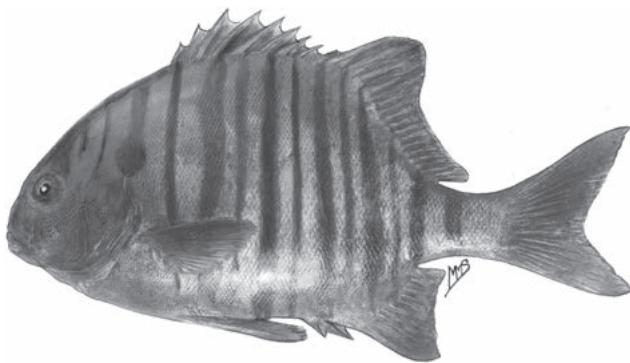
*Drepanoscorpis gilchristi* Fowler 1934: 476, Fig. 42 (Durban, KwaZulu-Natal, South Africa).

*Dichistius multifasciatus*: Smith 1935\*; Leis & Van der Lingen 1997; Heemstra & Heemstra 2004.

*Coracinus multifasciatus*: SSF No. 187.2\*.

Body deep, compressed, and head profile slightly convex; body depth 1.6–1.8 in SL; peduncle depth 7.4–7.6 in SL. Dorsal fin 10 spines, 21–23 rays. GR 8 or 9/14–16. LL scales 65–74.

Head dark and body pale silvery brown, with 7 dark vertical bars (first bar on nape, last on peduncle) about equal in width to pale interspaces which are about equal to eye diameter, and between each pair of dark bars a narrower dark vertical stripe; spinous dorsal-fin membranes black, fin margin paler; anal-fin spines pale, soft-rayed portion of fin dark; caudal-fin margin black. Attains 29 cm SL, 35 cm TL.



*Dichistius multifasciatus*, ~30 cm TL (South Africa).

**DISTRIBUTION** WIO: South Africa (False Bay, Western Cape, to Kosi Bay, KwaZulu-Natal) and Madagascar.

**REMARKS** Found inshore over rocky bottom. Caught from shore by anglers; flesh excellent.

## FAMILY PARASCORPIDIDAE

### Jutjaw

Phillip C Heemstra

Body oval, compressed, covered with small ctenoid scales, including on head, lower jaw, and basal half of soft-rayed portion of dorsal and anal fins. Mouth large, lower jaw projecting, upper jaw not protrusile; maxilla exposed, scaly; no supramaxilla. Teeth on jaws minute, in narrow bands; vomer and palatines with or without microscopic teeth. Preopercle finely serrate; opercle with bluntly rounded flat point posteriorly. Dorsal fin continuous; pelvic fins 1 spine, 5 rays, no basal scaly axillary process; caudal fin forked. Branchiostegal rays 7; membranes free from isthmus; gill rakers very long and numerous, easily visible within mouth. Vertebrae 12 + 15.

Monotypic.

### *Parascorpis typus* Bleeker 1875

Jutjaw

PLATE 115

*Parascorpis typus* Bleeker 1875: 381 [2], Pl. 7 (Cape of Good Hope, South Africa); SFSA No. 407\*; SSF No. 188.1\*; Heemstra & Heemstra 2004\*; Zsilavec 2005\*.

*Atyposoma gurneyi* Boulenger 1899: 379, Pl. 9 (False Bay, South Africa).

Dorsal fin 11 or 12 spines, 15–17 rays; anal fin 3 spines, 13–15 rays; pectoral fins 17 rays. Body depth 2–2.2 in SL; HL 2.7–2.8 in SL. Anterior nostril short and tubular; maxilla reaching below rear margin of eye. GR 18/36–40. LL scales 60–70, obscured by overlying scales.

Body dull grey-brown to silvery; gill cavity and inside of mouth white, tongue dark; juveniles <8 cm TL with dark bars on head and body, and enlarged dark pelvic fins. Attains 60 cm TL. South African spearfishing record 5.4 kg.



*Parascorpis typus*, 35 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Southern Africa: South Africa (Saldanha Bay) in southeastern Atlantic, to Mozambique (Maputo Bay) in WIO.

**REMARKS** Found at ~15–200 m; juveniles sometimes occur in small groups hiding in caves or crevices; adults are solitary, often inquisitive, but rarely caught. Feeds on zooplankton.

## FAMILY KYPHOSIDAE

### Sea chubs or rudderfishes

Phillip C Heemstra

Body oblong, somewhat compressed; head distinctly less than body depth; small, weakly ctenoid scales covering body, head (except snout and interorbital region), caudal fin, and soft-ray portions of median fins. Dorsal fin continuous, with 6–8, 10 or 11 spines; pectoral fins shorter than head; pelvic fins 1 spine, 5 branched rays; caudal fin emarginate or forked. Mouth small; maxilla scaly, not reaching past mid-eye; jaws with outer series of long, curved incisors and fine teeth within (*Kyphosus*), or else a band of setose teeth with outer teeth enlarged and lanceolate (*Neoscorpis*); villiform teeth in band on vomer, palatines and tongue. No spine on opercle; preopercle smooth. Swimbladder divided posteriorly, extending past anus.

Active and free-swimming, generally in small groups on coral or rocky reefs or around wrecks, from shore to ~30 m deep. *Kyphosus* species are often found following ships, hence the common name rudderfish. Omnivorous, but most species feed mainly on algae. Edibility variously reported as excellent or not good.

Worldwide in tropical to warm-temperate seas. The family was revised by Knudsen & Clements (2013). Four genera and ~16 species; 2 genera and 4 species in WIO.

#### KEY TO GENERA

- 1a Dorsal fin with 6–8 short stout spines that fold into deep groove, 20–26 rays; anal fin 3 short spines covered by skin and scales, 23–26 rays ..... *Neoscorpis*
- 1b Dorsal fin 10 or 11 spines, 11–15 rays; anal fin 3 spines, 11–14 rays ..... *Kyphosus*

## GENUS *Kyphosus* Lacepède 1801

Jaws with outer row of lanceolate compressed teeth with horizontal roots, and inner bands of small canines. Spinous

dorsal-fin base subequal to soft dorsal-fin base. LL total scales 56–80, pored scales 50–63. Occur on shallow reefs; juveniles often associate with floating *Sargassum* weed and other flotsam. Feed mainly on benthic algae but *K. vaigiensis* has also been reported to feed on garbage discharged from ships. About 14 species, 3 in WIO.

#### KEY TO SPECIES

- 1a Spinous dorsal-fin base longer than soft-rayed base; anterior dorsal- and anal-fin rays of adults elongated, longest dorsal-fin rays distinctly longer than spines; LL pored scales 49–52 ..... *K. cinerascens*
- 1b Spinous dorsal-fin base shorter than or subequal to soft-rayed base; anterior dorsal- and anal-fin rays of adults not longer than longest spine; LL pored scales 51–55 ..... 2
- 2a Dorsal fin 11–13 rays; anal fin 10–12 rays; lower GR 15–17 ..... *K. bigibbus*
- 2b Dorsal fin 13–15 rays; anal fin 12–14 rays; lower GR 21–24 ..... *K. vaigiensis*

## *Kyphosus bigibbus* Lacepède 1801

Darkfin chub

PLATE 115

*Kyphosus bigibbus* Lacepède (ex Commerson) 1801: 114, 115, Pl. 8, Fig. 1 [Fort Dauphin, Madagascar].

*Dorsuarius nigrescens* Lacepède (ex Commerson) 1803: 482, 483 (Fort Dauphin, Madagascar).

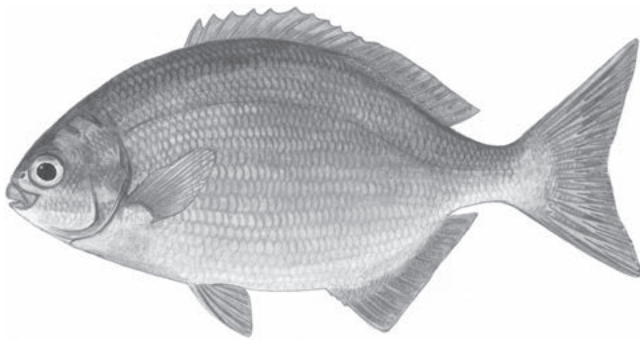
*Xyster fuscus* Lacepède (ex Commerson) 1803: 484, 485 (Fort Dauphin, Madagascar).

*Pimelepterus fallax* Klunzinger 1884: 64 (Al-Qusayr, Egypt, Red Sea).

*Kyphosus bigibbus*: SFSA No. 639\*; SSF No. 189.1\*; Randall 1995\*; Anderson *et al.* 1998; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Sakai & Nakabo 2004\*.

Dorsal fin 11 spines, 11 or 12 rays; anal fin 3 spines, 10–12 rays; pectoral fins 18–20 rays. Body depth 39–52% SL; HL 25–31% SL. GR 5–7/15–17. LL pored scales 51–55. Vertebrae 10 + 16.

Head and body silvery grey, median fins darker; scale edges brown, forming longitudinal dark stripes on body; opercular membrane dark brown or black; often with black spot at base of lower pectoral-fin rays; lower half of head silvery with dark yellowish brown stripe backwards from upper lip and maxilla. Overall colour can change in seconds from dark brown to pale with dark bars; transitory pattern shows a mottled fish with longitudinal lines of pale blue spots following the scale rows, and dark longitudinal stripes, overlain with scattered, poorly defined, pale blue-grey blotches. Attains 75 cm TL.



*Kyphosus bigibbus*, 35 cm SL (South Africa).

**DISTRIBUTION** Atlantic Ocean and Indo-Pacific (apparently antitropical). WIO: Oman to Red Sea, Mozambique (Maputo Bay) to South Africa (False Bay), Madagascar, Mauritius and Rodrigues; elsewhere to Taiwan, Japan, Australia, Pitcairn Is., Hawaii and Easter I.

**REMARKS** Solitary or in schools, often around exposed seaward reefs, to ~25 m. Feeds on *Sargassum* and *Turbinaria* algae.

### *Kyphosus cinerascens* (Forsskål 1775)

Highfin chub

PLATES 115 & 116

*Sciaena cinerascens* Forsskål in Niebuhr 1775: 53, xii (Red Sea).

*Cantharus maculatus* Valenciennes in Cuv. & Val. 1830: 343  
(Indian Ocean).

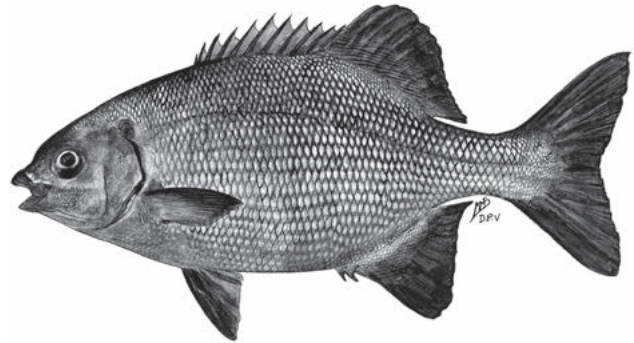
*Pimelepterus altipinnis* Cuvier in Cuv. & Val. 1831: 270 (New Guinea; Réunion, Mascarenes).

*Pimelepterus altipinnoides* Guichenot 1863: 7 (Réunion, Mascarenes); Sauvage 1891\*.

*Kyphosus cinerascens*: SFSA No. 638\*; SSF No. 189.2\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; Fricke 1999; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Sakai & Nakabo 2006\*.

Dorsal fin 10 or 11 spines, 12 or 13 rays; anal fin 3 spines, 11–13 rays; pectoral fins 17–19 rays. Body depth 42–50% SL; HL 26–33% SL. GR 7–9/19–22. LL pored scales 49–60. Vertebrae 10 + 16.

Head, body and fins blue-grey to dark brown; some fish with scattered pale bluish grey scales with dark brown edges, forming longitudinal stripes that persist after preservation. Attains 50 cm TL.



*Kyphosus cinerascens*, 15 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Persian/Arabian Gulf, Gulf of Oman, Kenya to South Africa (Eastern Cape), Madagascar, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Japan, New Guinea, Australia, New Caledonia, Tuamotu Is. and Hawaii.

**REMARKS** In small groups or aggregations, often swimming in midwater over coastal reefs and in lagoons, to at least 24 m; juveniles associated with flotsam. Mainly herbivorous, feeding on algal turf and associated invertebrates. Photographs from the Atlantic Ocean have been identified as this species but this has not been documented by museum specimens.

### *Kyphosus vaigiensis* (Quoy & Gaimard 1825)

Brassy chub

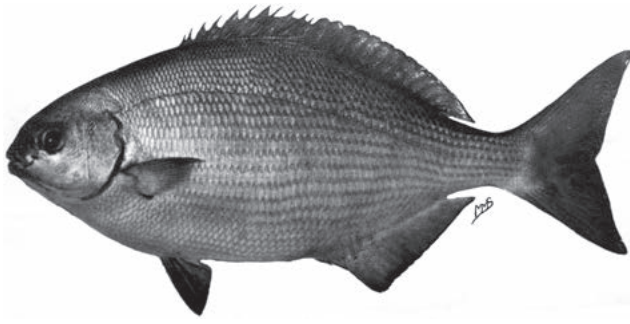
PLATE 116

*Pimelepterus vaigiensis* Quoy & Gaimard 1825: 386, Pl. 61, Fig. 4  
(Waigeo I., Indonesia).

*Kyphosus vaigiensis*: SFSA No. 638a\*; SSF No. 189.3\*; Randall & Anderson 1993; Randall 1995\*; Sakai & Nakabo 1995\*; Winterbottom & Anderson 1997; Heemstra & Heemstra 2004; Fricke *et al.* 2009.

Dorsal fin 11 spines, 13–15 rays; anal fin 3 spines, 13 rays; pectoral fins 18–20 rays. Body depth 37–50% SL; HL 24–35% SL. Base of spinous portion of dorsal-fin shorter than soft-rayed portion. GR 8–10/21–24. LL pored scales 51–55.

Head and body silvery grey, with narrow brassy stripes along scale edges of body; pectoral fins may have orange tinge, and small black spot at base of lower rays. Attains 70 cm TL.



*Kyphosus vaigiensis*, 65 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Mediterranean Sea and Indo-Pacific to eastern Pacific. WIO: Red Sea, Gulf of Oman, Kenya to South Africa (Algoa Bay), Madagascar and Réunion; elsewhere to Indonesia, Philippines, Japan, Marshall Is., Australia, New Zealand, Rapa Iti, Hawaii, Mexico and Panama.

**REMARKS** Solitary or in schools, often in midwater over exposed areas around coastal rocky reefs and exposed hard algal-coated bottom of outer reefs, also in lagoons, to ~25 m. Juveniles (<5 cm TL) found among floating seaweed and feed on small crustaceans. Good food fish.

**GENUS** *Neoscorpis* Smith 1931

Body compressed, ovoid, covered with small, firmly adherent, ctenoid scales, which extend onto head and soft parts of median fins; dorsal-fin spines short, fin deeply notched between spines and rays; anal fin with 3 minute spines covered by skin and scales at front margin of fin. Mouth small, with fine teeth in bands, outer row enlarged and pointed. Preopercle not serrated. Swimbladder divided posteriorly. One species.

*Neoscorpis lithophilus* (Gilchrist & Thompson 1908)

Stonebream

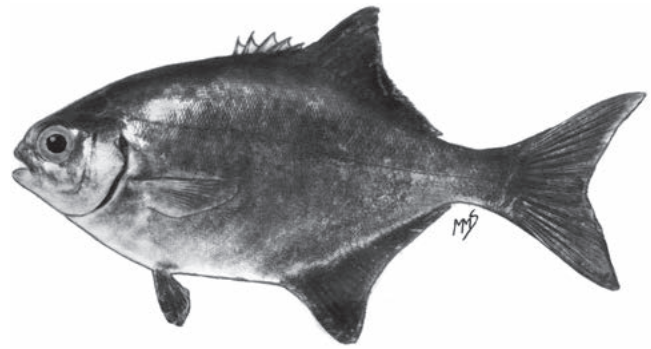
PLATE 116

*Scorpis lithophilus* Gilchrist & Thompson 1908: 162 (KwaZulu-Natal, South Africa).

*Neoscorpis lithophilus*: SFSA No. 646\*; SSF No. 190.1\*; Heemstra & Heemstra 2004\*.

Diagnosis as for genus. Dorsal fin 6–8 spines, 20–25 rays; anal fin 3 spines 23–26 rays; pectoral fins 16–18 rays. GR 6–8/12–15. LL scales 72–76; LSS 90–97.

Body silvery grey; median fins darker; black semicircle on upper rear edge of opercle. Juveniles with pale median fins and 7 or 8 faint bars on body. Attains 50 cm SL.



*Neoscorpis lithophilus*, 21 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: South Africa (False Bay, Western Cape) to southern Mozambique (Inhaca I.) and southeastern Madagascar (Tôlanaro [Fort Dauphin]).

**REMARKS** Found in surf zone over rocky bottom, juveniles in tidepools. Feeds mainly on red algae and associated invertebrates. Matures at 26–30 cm FL; spawns mainly off southern Mozambique and northern KwaZulu-Natal, South Africa, from June to January.

**FAMILY** **MONODACTYLIDAE**

**Moories**

Phillip C Heemstra

Body disc-shaped, compressed, depth 1–2 in SL; HL 2.9–3.2 in SL. Eye diameter greater than snout length. Mouth oblique, upper jaw slightly protrusile; maxilla exposed posteriorly, reaching below front edge of eye; no supramaxilla; jaws with bands of tiny flattened or slender needle-like teeth; villiform teeth in bands on vomer, palatines, pterygoids and tongue. Nostrils small, circular, close together and near front edge of eye. No spine on rear edge of opercle; preopercle edge with few rudimentary serrae. Dorsal fin single, with 8 spines mostly concealed in front margin of fin, 25–30 rays; anal fin 3 spines, also hidden in front margin of fin, 25–30 rays; pectoral fins shorter than HL; caudal fin truncate or slightly concave, with 15 branched rays. Branchiostegal rays 7; gill membranes separate, narrowly joined to sides of isthmus and to one another. Lateral line complete, extending onto caudal fin. Scales small, finely ctenoid, deciduous, extending onto top of head, interorbital area, cheek, opercle, interopercle and subopercle; minute scales covering median fins. Vertebrae 10 + 14.

Small-sized, active schooling fishes found in estuaries, harbours, tidepools, over soft bottoms and on shallow reefs. Juveniles feed on planktonic crustaceans, which they pick from

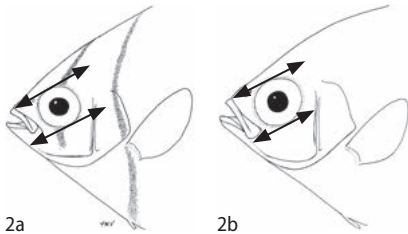
the water; adults also forage at the bottom for small epibenthic crustaceans (mysids, amphipods, isopods), algae and detritus. Occur in Indo-Pacific and eastern Atlantic (coast of West Africa). Two genera and 6 species; 1 genus and 3 species in WIO.

## GENUS *Monodactylus* Lacepède 1801

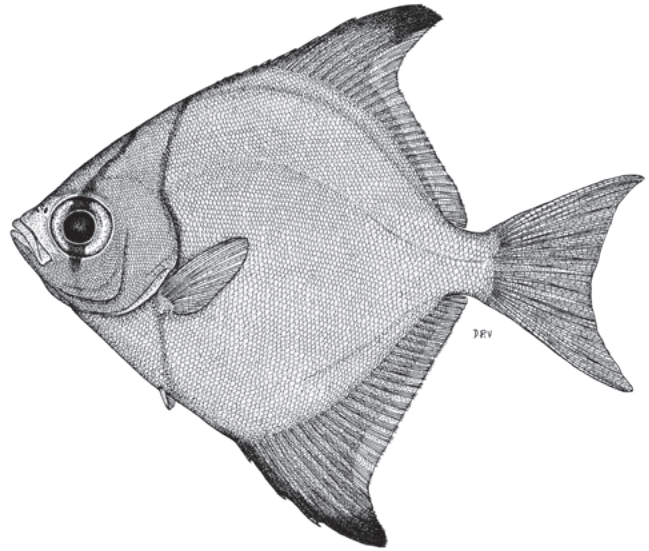
Diagnosis as for family; pelvic fins present in juveniles, rudimentary or absent in adults; swimbladder bifurcate posteriorly. Four species, 3 in WIO.

### KEY TO SPECIES

- 1a Body depth subequal to SL; SL 0.6–0.7 of fish height (from tip of dorsal-fin lobe to tip of anal-fin lobe) ..... *M. kottelati*  
 1b Body depth greater than SL; SL 1–1.2 in fish height ..... 2
- 2a Body depth 1.2–1.6 in SL; GR 8/18–22; maxilla width subequal to least preorbital depth; length of upper jaw less than eye diameter; jaw teeth flattened, tricuspid, middle cusp much longer than other two cusps ..... *M. argenteus*  
 2b Body depth 1.5–2 in SL; GR 7–9/21–24; maxilla width distinctly greater than least preorbital depth; length of upper jaw subequal to or greater than eye diameter; jaw teeth slender, slightly curved, needle-like ..... *M. falciformis*



Body of adults silvery, with dorsal and anal fins often yellow in life, anterior lobes dusky to black; juveniles dusky silvery with curved dark stripe from occiput through eye to isthmus, and another dark stripe from nape across rear margin of opercle to pectoral-fin bases. Attains 25 cm SL.



*Monodactylus argenteus*, 7 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman to India and to Red Sea, and Kenya to South Africa (Breede River, Western Cape), Mozambique Channel, Madagascar, Comoros, Seychelles, Mascarenes, Maldives, Lakshadweep and Sri Lanka; elsewhere to Malaysia, southern Japan, Micronesia, Australia, New Caledonia and Samoa.

**REMARKS** Mature by 13 cm SL. Found in estuaries and lagoons, and in the sea on shallow reefs and along sandy beaches, often in turbid water; spawns at sea.

## *Monodactylus argenteus* (Linnaeus 1758)

Round moony

PLATE 116

*Chaetodon argenteus* Linnaeus 1758: 272 (India).

*Monodactylus argenteus*: SFSA No. 581\*; SSF No. 193.1\*; Pethiyagoda 1991\*; Skelton 1993\*; Randall 1995\*; Anderson *et al.* 1998\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; McKenna & Allen 2005; Fricke *et al.* 2009; Fricke *et al.* 2013.

Dorsal fin 8 spines, 27–30 rays; anal fin 3 spines, 27–30 rays; pectoral fins 16–18 rays; caudal fin truncate to emarginate. Anal-fin base 1.7–1.9 in SL. LL scales 52–58.

## *Monodactylus falciformis* Lacepède 1801

Oval moony

PLATE 116

*Monodactylus falciformis* Lacepède (ex Commerson) 1801: 131, 132

[western Indian Ocean]; SFSA No. 580\*; SSF No. 193.2\*; Skelton 1993\*; Fricke 1999; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

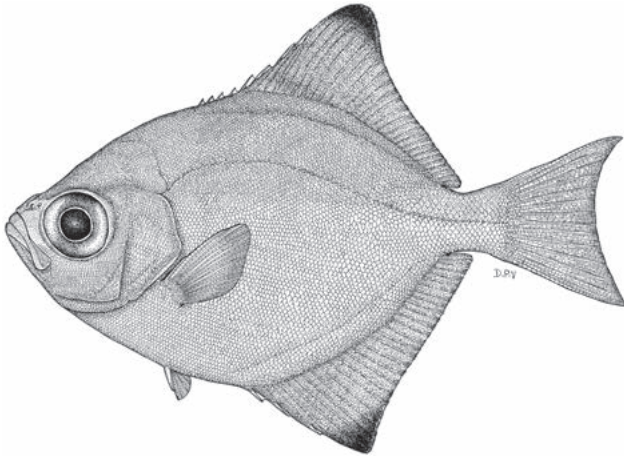
*Stromatoidea layardi* Castelnau 1861: 44 (Algoa Bay and KwaZulu-Natal, South Africa).

*Psettus orbicularis* Guichenot 1866: 136 (Madagascar).

*Psettus falciformis*: Arnoult 1959.

Dorsal fin 8 spines, 25–30 rays; anal fin 3 spines, 25–29 rays; pectoral fins 17 or 18 rays.

Body of adults silvery, with anterior lobes of dorsal and anal fins dusky yellow or blackish; juveniles dusky silvery, yellowish dorsally, and with 11 or 12 narrow dark bars on head and body and a wider black bar on peduncle. Attains 25 cm SL.



*Monodactylus falciformis*, 9 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: Tanzania to South Africa (False Bay, Western Cape), east coast of Madagascar, Réunion and Mauritius; records from the Red Sea and the northern Indian Ocean are unsubstantiated.

**REMARKS** Adults common in estuaries, harbours and in the sea, but occasionally also in rivers; juveniles in freshwater and estuaries, usually in seagrass beds. Mature by 15 cm SL; spawns at sea.

### *Monodactylus kottelati* Pethiyagoda 1991

High moony

PLATE 116

*Monodactylus kottelati* Pethiyagoda 1991: 164, Fig. 3 (Puttalam Lagoon near Kalpitiya, Sri Lanka).

Dorsal fin 8 spines, 28–30 rays; anal fin 3 spines, 28–30 rays; pectoral fins 16 or 17 rays. Teeth in jaws flattened, slender, with single cusp. GR 8/19. LL scales 69.

Head and body silvery grey, with dark brown band (width  $\sim\frac{1}{2}$  eye diameter) curving from dorsal-fin origin through eye to isthmus, and similar band from 1st dorsal-fin spine curving along edge of opercle and over pectoral-fin base to belly, anus and front margin of anal fin; dorsal- and anal-fin tips blackish. Attains at least  $\sim$ 8 cm SL.



*Monodactylus kottelati*, 4 cm SL (aquarium specimen). A Grant © NRF-SAIAB

**DISTRIBUTION** WIO: Sri Lanka.

**REMARKS** Adults and juveniles occur in estuaries and lagoons and in the sea.

## FAMILY GERREIDAE

### Silverbiddies

Yukio Iwatsuki and Phillip C Heemstra

Body slender to deep, compressed; dorsal fin more or less notched, with 9 spines, 10 rays; anal fin with 3 spines and 7 or 8 rays (*Gerres*), or 5 or 6 spines and 12–14 rays (*Pentaprion*); last dorsal- and anal-fin rays split to their base (but counted as 1 ray); dorsal and anal fins generally transparent, naked, but with sheathed row of scales at base; caudal fin forked, lobe tips strongly or weakly pointed, with 15 branched rays. Mouth small and very protrusile, arching downward when protracted; maxilla naked, its rear margin beyond or not beyond vertical through front edge of eyes; no supramaxilla. Teeth on jaws minute; no teeth on vomer, palatines and tongue; pharyngeal teeth conical and/or molariform. Preorbital (lacrimal) and preopercle smooth or weakly serrated. Branchiostegal rays 6; gill rakers developed but short, upper series shorter than lower series, some upper rakers rudimentary, and lowest raker of lower series usually longer than uppermost raker in series. Lateral line complete and continuous. Scales cycloid, moderate to large, deciduous, and present on occipital, frontal and lateral

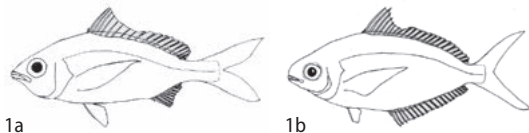
part of head and body; premaxillary groove and preopercle flanges usually without scales but scaly in some species. Swimbladder present. Vertebrae 10 + 14.

Small- to moderate-sized silvery fishes (usually ~10–30 cm TL, some species attain >40 cm TL). Most are circumglobal in shallow (usually <50 m) tropical to temperate waters, but a few species prefer more temperate waters throughout Indo-Pacific; common in estuaries, tidal creeks, lagoons and over shallow coastal sandy and/or muddy bottom influenced by freshwater, and some also occur in freshwater. Feed on a variety of invertebrates, including copepods, crabs, polychaetes, amphipods, gastropods and bivalves. Some large species are of considerable fishery interest as fresh fish, and some abundant species are of commercial importance as dried food fish, duck food and excellent live bait, but usually not of much interest to anglers or commercial fisheries.

The limits and relationships of the Gerreidae are uncertain, and the family urgently needs revision worldwide. Some previous classifications included this family in the Leiognathidae. *Gerres* comprises ~25 species in the Indo-Pacific; *Pentaprion* and *Parequula*, originally monotypic genera, also occur in the region, although a second species of *Parequula* was recently described. Six or 7 genera worldwide, but not well differentiated; only *Gerres* and *Pentaprion* with 12 species (11 and 1, respectively) in WIO.

## KEY TO GENERA

- 1a Anal fin 3 spines, 7 or 8 rays; pelvic-fin spine subequal to eye diameter; anal-fin base shorter than soft-rayed dorsal-fin base ..... *Gerres*
- 1b Anal fin 5 or 6 spines, 12–14 rays; pelvic-fin spine less than eye diameter; anal-fin base greater than soft-rayed dorsal-fin base ..... *Pentaprion*

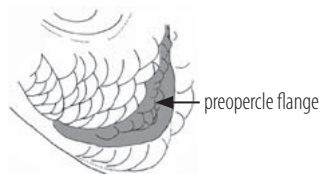
GENUS *Gerres* Quoy & Gaimard 1824

Lateral line continuous; LL scales 32–49; cheek scales in 3 or 4 rows. Body compressed, oblong, elevated or oval; no bony ridges on top of head. Dorsal fin and anal fin with high scaly sheath along base, the former separated by groove from other scales; pectoral fins long, pointed; pelvic-fin origins below or somewhat behind pectoral-fin bases, and fin with long scale-like axillary process. Dorsal-fin membrane around tip of 2nd spine and between 2nd and 3rd spines often with black margin

or patch. First anal pterygiophore without anterior extension. This genus is in need of revision worldwide. About 50 species, 11 in WIO.

## KEY TO SPECIES

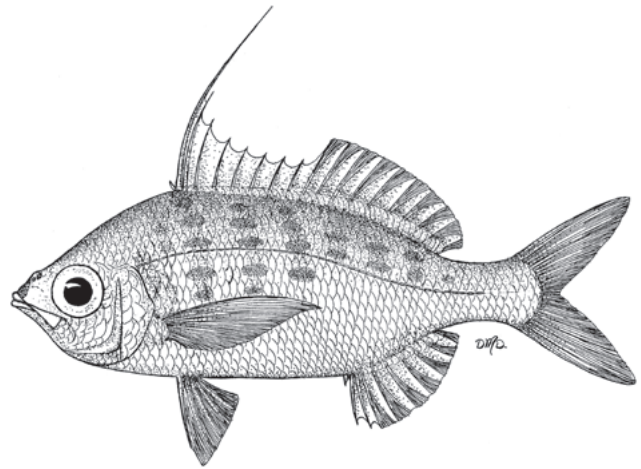
- 1a Anal fin 7 rays; eyes medium to small, diameter >2.4 in HL ... 2
- 1b Anal fin 8 rays; eyes large, diameter ~2.2 in HL; LL scales 40; body depth slender, ~2.3 in SL ..... *G. maldivensis*
- 2a Second spine of dorsal fin elongate, >50% SL (fish >5 cm SL); fish <5 cm often with dusky vertical bars on body ..... 3
- 2b Second spine of dorsal fin not elongate, <50% SL (at all sizes); dusky bars on body faint or absent ..... 5
- 3a Body slender, depth 2.2–2.8 in SL; usually 6–10 faint vertical bars on body (most noticeably in fish >13 cm SL), not broken into ovoid spots ..... *G. macracanthus*
- 3b Body depth 1.9–2.4 in SL; 4–12 faint vertical bars on body of fish <10 cm SL, broken into vertical rows of dark ovoid spots in adults ..... 4
- 4a Juveniles (<9 cm SL) with 6–12 dark bars on body; adults (>10 cm SL) with 4–8 series of vertical ovoid spots dorsally on body; eye diameter 2.9–3.5 in HL; LL scales 43–46 ..... *G. filamentosus*
- 4b No bands of ovoid spots on body (even in fish >10 cm SL), but small fish with 5 or 6 very faint bars; tips of dorsal-fin rays 1–3 yellow in fresh specimens; eye diameter 2.4–2.8 in HL; LL scales 39–42 ..... *G. infasciatus*
- 5a Scale rows usually 2½ from base of dorsal-fin spines 5–7 to lateral line; 4 or 5 diffuse dark saddles along back, extending to midline, but faint or disappearing in fish >7 cm SL ... *G. limbatus*
- 5b Scale rows 3½–4½ from base of dorsal-fin spines 5–7 to lateral line; no diffuse dark saddles along back ..... 6
- 6a Preopercle flange with 5–24 small scales in the first 1–3 scale rows at corner; 2nd spine of dorsal fin subequal to or slightly shorter than 3rd spine; several prominent dark stripes along scale rows above lateral line, and along the 4 or 5 rows immediately below lateral line; LL scales 42–44 ..... *G. methueni*
- 6b No scales on preopercle flange, or scales few and tiny if present; 2nd spine of dorsal fin longer than 3rd spine; no prominent dark stripes along scale rows above lateral line .... 7



Continued ...

## KEY TO SPECIES

- 7a Last spine of dorsal fin subequal to or slightly shorter than 1st ray; LL scales 36–40 (usually 38); caudal-fin lobes generally broadly rounded; 6–10 vertical dusky bars on body, their width  $\sim\frac{1}{2}$  pupil diameter (more apparent in preserved or stressed live specimens) ..... *G. phaiya*
- 7b Last spine of dorsal fin shorter than 1st ray; LL scales 39–44; caudal-fin lobes generally only weakly rounded or else pointed; 6–8 vertical dusky bars on body, their width  $<\frac{1}{2}$  pupil diameter ..... 8
- 8a Body depth 2.1–2.3 in SL; eye diameter 2.4–2.7 in HL; LL scales 43 or 44; caudal-fin lobes short and weakly rounded ..... *G. mozambiquensis*
- 8b Body depth  $>2.4$  in SL ..... 9
- 9a Scale rows usually  $3\frac{1}{2}$  from base of dorsal-fin spines 5–7 to lateral line; 6–8 irregular, faint dusky, oblique bands on body above midline, and faint vertical bands below midline ..... *G. oyena*
- 9b Scale rows  $\geq 4$  from base of dorsal-fin spines 5–7 to lateral line; vertical bands present on body above and below midline ... 10
- 10a Body depth 3.1–3.4 in SL; 2nd spine of dorsal fin noticeably longer than 3rd spine; no distinct dark longitudinal lines along scale rows above lateral line; LL scales 45–49 ..... *G. oblongus*
- 10b Body depth 2.5–2.9 in SL; 2nd spine of dorsal fin subequal to or slightly longer than 3rd spine; caudal-fin margin darker than rest of fin; 5 or 6 dark longitudinal lines along scale rows above lateral line; LL scales 43–46 ..... *G. longirostris*



*Gerres filamentosus*, 15 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Umlazi River mouth), Madagascar, Mascarenes, India and Sri Lanka; elsewhere to east coast of India, Andaman Is., Indonesia, Philippines, Ryukyu Is., Micronesia, New Guinea, Solomon Is., Australia, New Caledonia and Fiji.

**REMARKS** Juveniles often found in brackish mangrove estuaries, and sometimes enter freshwater and tidal creeks; adults found over muddy and/or sandy bottom influenced by freshwater, in 10–15 m. Red Sea and Persian/Arabian Gulf specimens previously identified as *G. filamentosus* are likely to be *G. infasciatus* (Iwatsuki *et al.* 2002).

## *Gerres filamentosus* Cuvier 1829

Whipfin silverbiddy

PLATE 117

*Gerres filamentosus* Cuvier 1829: 188 (Vanikoro I., Santa Cruz Is.); Cuvier in Cuv. & Val. 1830; SSF No. 194.2\* [in part]; Iwatsuki *et al.* 1996\*; Fricke 1999; Woodland 2001\*; Mishra & Krishnan 2003; Heemstra & Heemstra 2004; Fricke *et al.* 2009.  
*Gerres punctatus* Cuvier in Cuv. & Val. 1830: 480 (Puducherry, India).

Dorsal fin 9 spines (2nd spine elongate), 10 rays; anal fin 3 spines, 7 rays; pectoral fins 15 or 16 rays. Body depth 2–2.4 in SL; HL 3–3.4 in SL; eyes large, diameter 2.9–3.9 in HL, slightly shorter than snout length; 2nd spine of dorsal fin very long, sometimes reaching slightly beyond base of last ray; 2nd spine of anal fin 12–20% SL, 3rd spine 12–17% SL. GR usually  $5/8$ . LL scales 43–46; scale rows  $4\frac{1}{2}$  or  $5\frac{1}{2}$  between base of 5th spine of dorsal fin and lateral line; scale rows  $6\frac{1}{2}$  or  $7\frac{1}{2}$  above lateral line,  $10\frac{1}{2}$  or  $11\frac{1}{2}$  below. Supraneurals 3 (0/0/0+2/).

Body silvery, with 6–12 faint vertical bars in fish  $<10$  cm SL (bars 4–8 most distinct), and forming vertical rows of dusky ovoid spots in larger fish (more apparent in preserved specimens). Attains 30 cm TL.

## *Gerres infasciatus* Iwatsuki & Kimura 1998

Nonbanded whipfin silverbiddy

PLATE 117

*Gerres filamentosus* (non Cuvier 1829): Amaoka *et al.* 1976; Dor 1984 [?in part: Red Sea].  
*Gerres infasciatus* Iwatsuki & Kimura 1998: 79, Fig. 1 (Samut Prakan fish market, Thailand, northern Gulf of Thailand); Fukuhara *et al.* 2006.

Dorsal fin 9 spines (2nd spine elongate), 10 rays; anal fin 3 spines, 7 rays; pectoral fins 15 or 16 rays. Body depth 2.1–2.2 in SL; HL 2.9–3.2 in SL; eye diameter 2.4–2.8 in HL, 1.2–1.3 in snout length; 2nd spine of dorsal fin very long, often reaching slightly beyond base of last ray, 48–69% SL; 2nd spine of anal fin 12–20% SL, 3rd spine 12–17% SL. GR usually  $5/8$ . LL scales 39–42; scale rows  $4\frac{1}{2}$  or  $5\frac{1}{2}$  between base of 5th spine of dorsal fin and lateral line; scale rows  $6\frac{1}{2}$  or  $7\frac{1}{2}$  above lateral line,  $10\frac{1}{2}$  or  $11\frac{1}{2}$  below. Supraneurals 3 (0/0/0+2/).

Body yellowish silvery, usually without bars (fresh and preserved fish), rarely with 5 or 6 faint bars visible in dorsal view; tips of dorsal-fin rays 1–3 yellow; pelvic fins white distally between rays 1–5 (for  $\frac{1}{3}$ – $\frac{1}{2}$  length of each ray). Attains 25 cm TL.



**DISTRIBUTION** Indian Ocean. WIO: southern Red Sea, Oman, Persian/Arabian Gulf, Pakistan, India; elsewhere, northern Gulf of Thailand.

**REMARKS** Red Sea specimens were previously identified as *G. filamentosus*. Occurs over muddy and/or sandy coastal bottom.

### *Gerres limbatus* Cuvier 1830

Saddleback silverbiddy

PLATE 117

*Gerres limbatus* Cuvier in Cuv. & Val. 1830: 476 (Malabar coast, India); Day 1865, 1875, 1889; Mishra & Srinivasan 1999; Iwatsuki *et al.* 2001\*; Manilo & Bogorodsky 2003.

*Gerres lucidus* Cuvier in Cuv. & Val. 1830: 477 (Puducherry, India); Bleeker 1853; Day 1875\*; Fowler 1928, 1931, 1933\*; Jones & Kumaran 1980\*; Woodland 1983\*; Talwar & Jhingran 1992.

?*Gerres setifer* (non Hamilton 1822): Chaudhuri 1923 [?in part].

Dorsal fin 9 spines (2nd spine slightly shorter than 3rd, rarely subequal), 10 rays; anal fin 3 spines (2nd spine more robust than 3rd), 7 rays; pectoral fins 15 or 16 rays. Body depth 2.3–2.8 in SL; HL 2.8–3.4 in SL; eye diameter 2.2–2.7 in HL. LL scales 34–36; usually 2½ scale rows between base of 5th spine of dorsal fin and lateral line; scale rows 4–5½ above lateral line, 7½–9½ below. Supraneurals 3 (0/0/0+2/).

Body silvery, with 4 or 5 diffuse dark saddles mainly along back visible in dorsal view (especially noticeable in fish <6.5 cm SL), extending down sides to midline: 1st saddle on nape, 2nd under dorsal-fin spines 2–7, 3rd below beginning of soft-rayed dorsal fin, 4th below rear of soft-rayed dorsal fin, and 5th on upper peduncle (sometimes absent); dorsal fin faint yellowish, with prominent dark patch on tip of spinous portion (from middle of 2nd spine to tip of 6th spine) but becoming less distinct with growth. Attains at least 14 cm SL (commonly <10 cm TL).



*Gerres limbatus*, 14 cm SL (Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf (Iran and Iraq), Mozambique, southern India and Sri Lanka (common); elsewhere to east coast of India, northern Gulf of Thailand, Indo-Malaysian Archipelago, China and Taiwan.

**REMARKS** Occurs in estuaries and on shallow muddy or sandy coastal bottom influenced by freshwater.

### *Gerres longirostris* (Lacepède 1801)

Longtail silverbiddy

PLATE 117

*Labrus longirostris* Lacepède (ex Commerson) 1801: 427, 468, Pl. 19, Fig. 1 (Madagascar).

*Sparus britannus* Lacepède 1802: 41, 135 (Mauritius, Mascarenes).

*Gerres acinaces* Bleeker 1854: 194 (Jakarta, Java, Indonesia); SFSA No. 631; SSF No. 194.1\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995; Whitfield 1998\*; Fricke 1999 [as *oeyena*]; Iwatsuki *et al.* 1999.

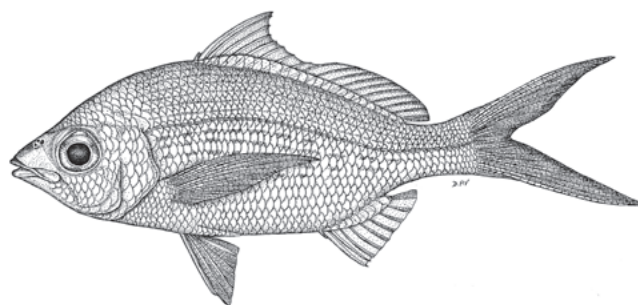
*Gerres lineolatus* Günther in Playfair & Günther 1867: 110, Pl. 16, Fig. 2 (Aden, Yemen, Gulf of Aden; Zanzibar, Tanzania).

*Gerres rueppellii* Klunzinger 1884: 48 [not Pl. 5, Fig. 6] (Massawa, Eritrea, Red Sea).

*Gerres longirostris*: Iwatsuki *et al.* 2001\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Randall 2005\*; Fricke *et al.* 2009; Fricke *et al.* 2013; Bogorodsky *et al.* 2014.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays; caudal-fin lobes longer than head. Body depth 2.5–2.9 in SL; HL 2.8–3.4 in SL; eye diameter 1.2–4.6 in HL; upper jaw extends beyond front edge of eyes, sometimes reaching vertical at rear edge. LL scales 43–46; scale rows 5–6½ between base of 5th spine of dorsal fin and lateral line; scale rows 7–8½ above lateral line, 11½ or 13½ below.

Body silvery; caudal fin dusky with broad darker margin; generally prominent dusky stripes along scale rows above lateral line, and 6–9 somewhat oblique dusky bars or columns of dark ovoid spots immediately below lateral line in fish >10 cm SL (dusky bars only in fish <10 cm SL). Attains 50 cm TL.



*Gerres longirostris*, 13 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea, Gulf of Aden to South Africa (Sodwana Bay), Mozambique Channel, Madagascar, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Indonesia, Ryukyu Is., Australia and New Caledonia.

**REMARKS** Adults most often seen in clear coastal waters, to ~50 m deep; juveniles often occur in estuaries or lagoons influenced by freshwater.

## *Gerres macracanthus* Bleeker 1854

Longspine silverbiddy PLATES 117 & 118

*Gerres macracanthus* Bleeker 1854: 195 (Jakarta, Java, Indonesia);

Günther 1862, 1880; Macleay 1882; Weber 1895; Bean & Weed 1912; De Beaufort 1913; Weber & De Beaufort 1931; Herre 1953; Talwar & Jhingran 1992; Iwatsuki *et al.* 1996\*; Woodland 2001\*; Heemstra & Heemstra 2004\*; Bogorodsky *et al.* 2014.

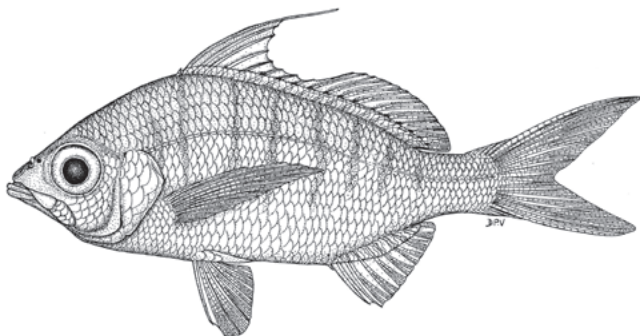
*Gerres filamentosus* (non Cuvier 1829): Fowler 1933 [in part]; Montilla 1935; Kuronuma & Abe 1972\*; Kühlmorgen-Hille 1974 [in part];

Woodland 1983 [in part]; Sainsbury *et al.* 1985\*; SSF No. 194.2\* [in part].

*Gerres punctatus* (non Cuvier 1830): SFSA No. 628\* [in part].

Dorsal fin 9 spines (2nd spine elongate), 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 or 17 rays. Body depth 2.2–2.8 in SL; HL 3–3.6 in SL; eye diameter 3.1–4.1 in HL; 2nd spine of dorsal fin very long, sometimes reaching beyond base of last ray; 2nd spine of anal fin 12–20% SL, 3rd spine 12–17% SL. GR 5/8. LL scales 41–44; scale rows 4½–5½ between base of 5th spine of dorsal fin and lateral line. Supraneurals 3 (0/0/0+2/).

Body silvery, with 6–10 faint vertical bars (4th–8th bars most distinct), not broken into ovoid spots even in larger fish, and also apparent in preserved specimens. Attains 30 cm TL.



*Gerres macracanthus*, 7 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea, Mozambique, South Africa (Swartkops River), Madagascar, India and Sri Lanka; elsewhere to east coast

of India, Andaman Is., Thailand, Indonesia, Ryukyu Is. and northern Australia.

**REMARKS** Smaller fish often found in estuaries and tidal creeks, and larger fish found on coastal muddy or sandy bottoms, often affected by freshwater.

## *Gerres maldivensis* Regan 1902

Maldives silverbiddy PLATE 118

*Gerres maldivensis* Regan 1902: 279 (Landu, Miladamadulu Atoll, Maldives); Iwatsuki & Heemstra 2007\*; Iwatsuki *et al.* 2007.

*Gerres abbreviatus* (non Bleeker 1850): Randall & Anderson 1993.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 8 rays; pectoral fins 15 rays. Body depth 2.3 in SL; HL 2.8 in SL; eyes large, diameter 2.2 in HL, nearly equal to snout length; 2nd spine of dorsal fin long, sometimes reaching slightly beyond base of last ray; 2nd spine of anal fin short and robust, 12–20% SL; 3rd spine of anal fin 12–17% SL. GR 4/8. LL scales 40; scale rows 3½ between base of 7th spine of dorsal fin and lateral line; scale rows 6½ or 7½ above lateral line, 10½ or 11½ below. Supraneurals 3 (0/0/0+2/).

Body silvery, with indistinct vertical bars. Attains at least 6.5 cm SL.

**DISTRIBUTION** Known only from the holotype collected from the Maldives.

**REMARKS** Holotype taken from a freshwater pool surrounded by mangroves at the centre of an atoll. Randall & Anderson (1993) suggested the species was a synonym of *Gerres erythrourus* (Bloch 1791) (as *G. abbreviatus*) but it differs in having a more slender body, 8 anal-fin rays, and supraneural formula 0/0/0+2/ (cf. 0/0+0/2 in *G. erythrourus*) (Iwatsuki *et al.* 1999; Iwatsuki & Heemstra 2007).

## *Gerres methueni* Regan 1920

Striped silverbiddy PLATE 118

*Gerres longirostris* Günther (ex Rapp) 1861 (non Lacepède 1801): 142,

Pl. 24 [?in part: Cape of Good Hope, South Africa, as questionable

locality but plate definitely showing *G. methueni*; invalid name, senior

synonym of *G. methueni* but secondary homonym of *Gerres longirostris*

Lacepède 1801: see Iwatsuki & Kimura 1997]; Günther 1861; Gilchrist &

Thompson 1908, 1917; Fowler 1925.

*Gerres methueni* Regan 1920: 420 (lagoons at Ambilo, eastern Madagascar);

Iwatsuki & Kimura 1997\*; Whitfield 1998\*; Iwatsuki *et al.* 1999;

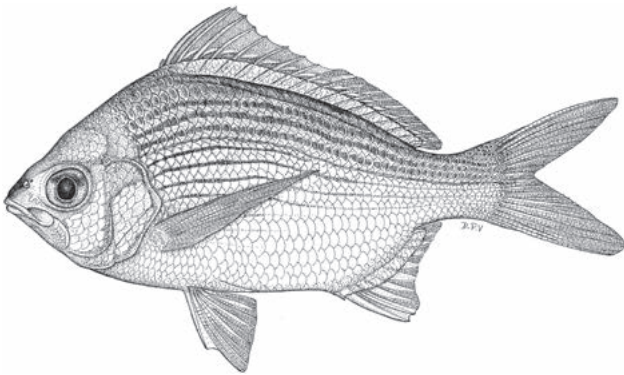
Iwatsuki & Heemstra 2001; Heemstra & Heemstra 2004\*.

*Xystaema rappi* Barnard 1927: 630, Fig. 21 (KwaZulu-Natal, South Africa).

*Gerres rappi*: Fowler 1933; SFSA No. 632\*; Blaber 1978; SSF No. 194.5\*.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 rays. Body depth 1.9–2.3 in SL; HL 2.8–3.2 in SL; eye diameter 2.7–3.5 in HL; 2nd spine of dorsal fin subequal to or slightly shorter than 3rd spine; 2nd spine of anal fin robust (ratio of its greatest width/greatest width of 3rd spine = 1.7–1.8). Preopercle flange with scales (in specimens 4–5 cm SL); LL scales 42–44; scale rows 4–4½ between base of 5th spine of dorsal fin and lateral line; scale rows 5½–6½ above lateral line, 9½–10½ below. Supraneurals 3 (0/0/0+2/).

Body silvery, olive-brown dorsally, with several prominent dark stripes along scale rows above lateral line, and along the 4 or 5 rows immediately below it. Attains 35 cm TL.



*Gerres methueni*, 12 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** WIO: southern Mozambique to South Africa (KwaZulu-Natal, rarely to Cape Point) and Madagascar.

**REMARKS** Smaller specimens often occur in estuaries, and larger specimens found on coastal muddy or sandy bottoms, often influenced by freshwater.

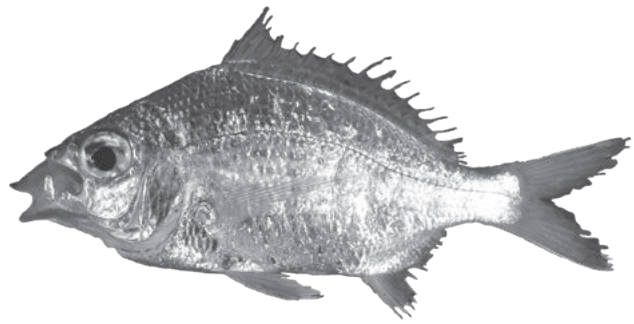
### *Gerres mozambiquensis* Iwatsuki & Heemstra 2007

Mozambique silverbiddy PLATE 118

*Gerres mozambiquensis* Iwatsuki & Heemstra 2007: 86, Figs. 1–2a  
(southern Nampula, upper reaches of Larde Estuary, Mozambique).

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 rays; caudal-fin lobes short and weakly rounded. Body depth 2.1–2.3 in SL; HL 2.8–3.1 in SL; eye diameter 2.4–2.7 in HL; 2nd spine of dorsal fin longest; 2nd spine of anal fin robust (ratio of its greatest width/greatest width of 3rd spine = 1.7–1.8). GR on 1st arch 4 or 5/1/7 = 12 or 13. LL scales 43 or 44; scale rows 4–4½ between base of 5th spine of dorsal fin and lateral line; scale rows 5½–6½ above lateral line, 9½–10½ below. Supraneurals 3 (0/0/0+2/).

Body silvery, with 6–8 indistinct vertical bars (about half pupil width) on sides; dorsal-fin spines 2–5 with black margin. Attains at least 21 cm SL.



*Gerres mozambiquensis*, 14 cm SL (Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Currently known only from 6 specimens collected from northern Mozambique.

**REMARKS** Taken from upper reaches of an estuary and trawled at 29 m. The species may be more widely distributed in estuarine or shallow waters along the coast of East Africa.

### *Gerres oblongus* Cuvier 1830

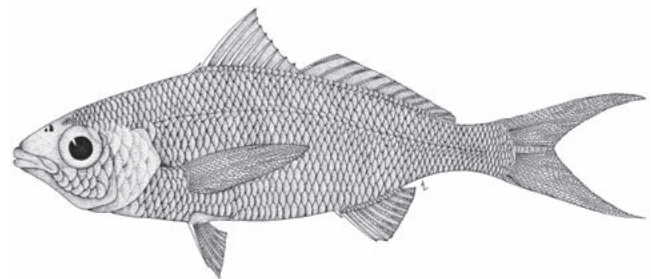
Slender silverbiddy

PLATE 118

*Gerres oblongus* Cuvier in Cuv. & Val. 1830: 479 (Trincomalee, Sri Lanka); Dor 1984; SSF No. 194.3\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Iwatsuki *et al.* 1999; Iwatsuki *et al.* 2001\*; Woodland 2001\*; Nakabo 2002\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004. *Gerres acinaces* (non Bleeker 1854): Gloerfelt-Tarp & Kailola 1986.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 17 or 18 rays. Body slender, depth 3.1–3.4 in SL; HL 2.9–3.8 in SL; eye diameter 2.2–3.5 in HL; upper jaw extending almost to level of front edge of eyes; 2nd spine of dorsal fin 19–26% SL. LL scales 45–49; scale rows 4–4½ between base of 5th spine of dorsal fin and lateral line; scale rows 5½–6½ above lateral line, 9½–12½ below. Supraneural bones 3 (0/0/0+2/).

Body silvery, without dusky stripes or with very faint stripes along scale rows above lateral line (sometimes 4–9 slightly oblique dusky bars or columns of dark or brownish ovoid spots immediately below lateral line (more obvious in preserved or stressed live specimens); lower edge of caudal fin usually distinctly whitish hyaline in life. Attains 40 cm TL.



*Gerres oblongus*, 13 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania to South Africa (Umlazi River, KwaZulu-Natal), Seychelles, Maldives, southern India and Sri Lanka; elsewhere to Andaman Sea, Indonesia, Philippines, Ryukyu Is., New Guinea, Australia, New Caledonia and Tonga.

**REMARKS** Adults most often seen in clear coastal waters, to ~50 m deep; juveniles found in estuaries or lagoons influenced by freshwater.

## *Gerres oyena* (Fabricius 1775)

Common silverbiddy

PLATE 119

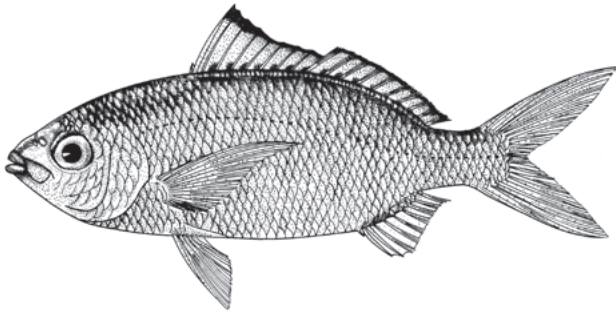
*Labrus oeyena* Fabricius in Niebuhr (ex Forsskål) 1775: 35 (Al-Luhayya, Yemen; Suez, Egypt, Red Sea; Jeddah, Saudi Arabia, Red Sea).

*Gerres socotranus* Steindachner 1902: 316 (Kor Garrieh, Socotra).

*Gerres oyena*: Cuvier in Cuv. & Val. 1830; Günther 1859; Playfair in Playfair & Günther 1867; Dor 1984; SSF No. 194.4\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Fricke 1999; Heemstra & Heemstra 2004; Fricke *et al.* 2009 [as *oeyena*]; Fricke *et al.* 2013; Bogorodsky *et al.* 2014.

Dorsal fin 9 spines, 10 rays; anal fin 3 spines, 7 rays; pectoral fins 17 or 18 rays. Body depth 2.4–3.3 in SL; HL 2.9–3.6 in SL; eye diameter 2.3–3.2 in HL; upper jaw extending almost to level of front edge of eyes. Percentage SL: body depth at base of 1st anal-fin spine 33%; peduncle depth 11%; 2nd and 3rd dorsal-fin spines 21% and 19%, respectively; 2nd and 3rd anal-fin spines 10% and 11%, respectively. U-shaped premaxillary groove mostly naked, but tiny scales anteriorly in fish >13 cm TL; LL scales 35–40; scale rows 3½ between base of 5th spine of dorsal fin and lateral line. Supraneurals 3 (0/0/0+2/).

Body silvery, with 6–8 irregular faint oblique and vertical dusky bars dorsolaterally and ventrolaterally (usually more apparent in preserved specimens or young stressed fish); caudal fin uniformly dusky. Attains 30 cm TL.



*Gerres oyena*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, Socotra, Kenya to South Africa

(Kosi Bay, KwaZulu-Natal), Mozambique Channel, Madagascar, Mascarenes, southern India and Sri Lanka; elsewhere to Andaman Sea, Ryukyu Is., Marshall Is., Australia, New Caledonia, Tonga and Samoa.

**REMARKS** Found in coastal saltwater lagoons and estuaries, singly or in groups. Feeds on small benthic organisms taken from sandy bottom.

## *Gerres phaiya* Iwatsuki & Heemstra 2001

Strong-spined silverbiddy

PLATE 119

*Gerres poieti* (non Cuvier 1829): Cuvier in Cuv. & Val. 1830 [as *poieti*]; Day 1875\* [as *poieti*]; Woodland 1983\*; Bauchot & Desoutter 1989 [true *G. poieti* Cuvier 1829 is a junior synonym of *G. longirostris* Lacepède 1801].

*Gerres phaiya* Iwatsuki & Heemstra 2001: 1044, Figs. 1–2 (Mangalore, Karnataka, India).

*Gerres oyena* (non Fabricius): Day 1875\*.

Dorsal fin 9 spines (2nd spine longest, robust), 10 rays; anal fin 3 spines, 7 rays; pectoral fins 16 rays; caudal-fin lobes short and broadly rounded. Body depth 2.1–2.3 in SL; HL 2.9–4.3 in SL; eye diameter 2.1–3 in HL; 2nd spine of anal fin robust (ratio of its greatest width/greatest width of 3rd spine = 1.7–1.8). LL scales 36–40 (usually 38); scale rows 4–4½ between base of 5th spine of dorsal fin and lateral line; scale rows 5½–6½ above lateral line, 9½–10½ below. Supraneurals 3 (0/0+0/2/).

Body silvery golden-brown dorsally on head and trunk, grading to silvery on abdomen; ~6–10 vertical dusky bars (width about half pupil diameter) on body (more distinct in stressed fish and preserved specimens); dorsal-fin margin black along rays 2–5; dorsal fin and pectoral fins yellowish hyaline; pelvic fins and anal fin yellow, but tips of first few pelvic-fin rays white or whitish hyaline; caudal fin dusky yellow, lower margin more whitish. Attains possibly 25 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: southwestern India and Sri Lanka; elsewhere to Andaman Sea and western Malay Peninsula (Singapore).

## GENUS *Pentaprion* Bleeker 1850

Body compressed, oblong, without bony ridges on top of head; body covered with deciduous, cycloid scales of moderate size, also present on occipital, frontal and sides of head. Mouth small, protractile, descending downward when protruded. Preopercle lower margin slightly denticulate, its angle rounded.

## FAMILY DREPANEIDAE

## Sicklefishes

Phillip C Heemstra

Preorbital (lachrymal) with serrated edges. Pectoral fins long, pointed; pelvic fins short, inserted below pectoral-fin bases, with scale-like axillary process; caudal fin deeply incised, with 15 branched rays. Lateral line complete and continuous. First anal pterygiophore with long anterior extension. This genus is in need of revision. One species.

*Pentaprion longimanus* (Cantor 1849)

Longfin silverbiddy

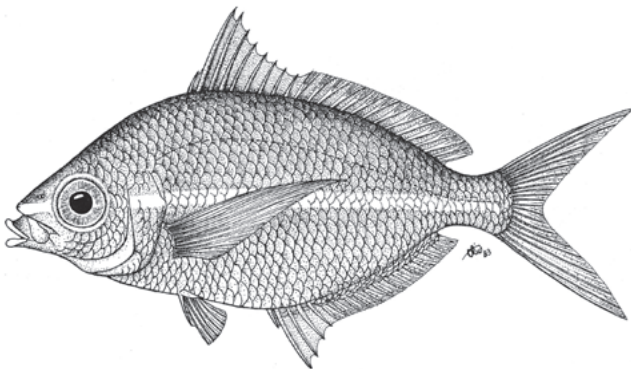
PLATE 119

*Equula longimana* Cantor 1849: 1134 [152] (sea and islands of Malayan Peninsula).

*Pentaprion longimanus*: Kyushin *et al.* 1982\*; Randall 1995\*; Manilo & Bogorodsky 2003.

Diagnosis as for genus. Dorsal fin 9 or 10 spines, 14 or 15 rays; anal fin 5 or 6 spines, 12–14 rays; pectoral fins 15 or 16 rays. Head and body compressed, ovoid, moderately deep. Body depth 2.3–3 in SL; HL 2.8–3.3 in SL; eye diameter 2.6–3.1 in HL; anal fin base longer than soft-rayed dorsal-fin base. GR 5 or 6/12–14. LL scales 43–46; cheek scales in 3 or 4 rows. Supraneurals 3 (0/0/0+2/).

Body silvery, with mirror-like stripe from snout to peduncle; body usually whitish grey when scales lost, and muscle somewhat transparent; lower 2–5 caudal-fin rays pale pink, upper 10–13 rays dusky yellow. Attains possibly 20 cm TL.



*Pentaprion longimanus*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Persian/Arabian Gulf and southern India; elsewhere to Indonesia (Sulawesi), Malaysia, South China Sea, Taiwan, Ryukyu Is. and northern Australia.

**REMARKS** Inhabits inshore areas and estuaries, on muddy-sand bottom, to ~80 m deep. Caught in large numbers by shallow bottom trawls; dried for fishmeal or duck food.

Very deep-bodied, orbicular or rhomboidal and strongly compressed, depth 1–1.4 in SL; ventral body profile straight from lower jaw to anal-fin origin. Head short, its length less than half body depth; eyes well above horizontal axis through mouth; snout subequal to or longer than eye diameter. Mouth small; maxilla exposed posteriorly, reaching past vertical at front edge of eye; upper jaw highly protrusile; anterior maxillary processes produced, joined over the elongate ascending processes of the premaxillae; jaws with bands of setiform teeth, no teeth on vomer or palatines. Dorsal fin single, with 8 or 9 spines, 19–23 rays, 4th spine longest, and procumbent dorsal-fin ‘spine’ (antrorse process of 1st dorsal-fin pterygiophore) visible in juveniles, but hidden by skin and scales in adults; anal fin 3 spines, 17–19 rays; pectoral fins falciform, much longer than head, reaching peduncle; pelvic fins 1 spine, 5 rays, scaly axillary process present; dorsal-, anal- and pelvic-fin spines striated; caudal-fin margin convex, slightly convex or double emarginate. Anterior nostrils circular, medial to posterior nostrils which are elliptical and close to eyes. Opercle without spines; lower edge of preopercle serrate in juveniles. Branchiostegal membranes separate, narrowly joined to sides of isthmus and to each other. Lateral line complete. Scales small, finely ctenoid, extending onto top of head and median-fin bases; snout, interorbital region and broad preopercle flange naked; opercle scaly dorsally. Vertebrae 10 + 14.

Moderate-sized; found in estuaries and harbours, over soft bottom, and on coral reefs. Feed on benthic invertebrates, mainly crustaceans and worms, often by ingesting sediment with their prey.

One genus, *Drepane* Cuvier 1831, with 3 species, 2 in WIO.

## KEY TO SPECIES

- 1a Body usually with 4–10 subvertical faint dusky bars dorsally; preopercle without dermal flap reaching lower edge of gill cover; swimbladder thick, with 11 pairs of lateral branches ..... *D. longimana*
- 1b Body with up to ~10 vertical series of small evenly spaced black spots; preopercle with dermal flap reaching lower edge of gill cover; swimbladder thin, with single pair of long, lateral branches (each branch bearing many shrub-like branchlets), the main branches arise at rear end of swimbladder and extend to anterior end of swimbladder ..... *D. punctata*

*Drepane longimana* (Bloch & Schneider 1801)

Sicklefish or concertina fish

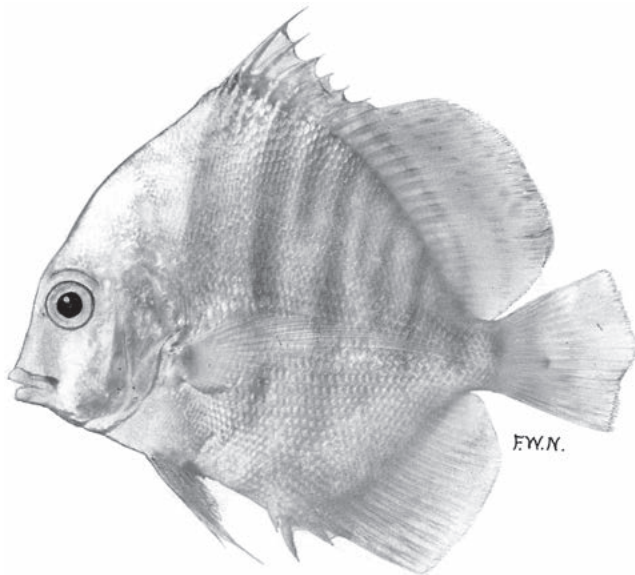
PLATE 119

*Chaetodon longimanus* Bloch & Schneider 1801: 229 (Tharangambadi, India).

*Drepane longimana*: SSF No. 195.1\*; Randall 1995\*; Heemstra 2001\*; Kuitert & Debelius 2001\*; Heemstra & Heemstra 2004\*.

Body depth 1.1–1.4 in SL; adults more oblong and with bony bump on interorbital region. Dorsal fin 8 or 9 spines, 19–23 rays; anal fin 3 spines, 17–19 rays; pectoral fins 16–18 rays. GR 3–6/10–12, slender and stiff. LL scales 44–55. No pyloric caeca; intestine about twice SL.

Body silvery with purple or yellow reflections; head bluish grey or brown; dorsal-fin soft rays with 2 or 3 longitudinal rows of tiny dark spots (1 on each interradial membrane). Juveniles with 4–9 narrow dark bars on body. Attains ~50 cm TL.



*Drepane longimana*, 15 cm TL, juvenile. Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman to India and Sri Lanka, Red Sea, Kenya to South Africa (Algoa Bay) and Madagascar; elsewhere to east coast of India, Indonesia, Philippines, Taiwan, Japan, New Guinea and Australia.

**REMARKS** Found inshore, over sand or mud bottom, on reefs, in estuaries and harbours, in <50 m. Breeds close inshore during spring. Feeds on benthic invertebrates.

*Drepane punctata* (Linnaeus 1758)

Spotted sicklefish

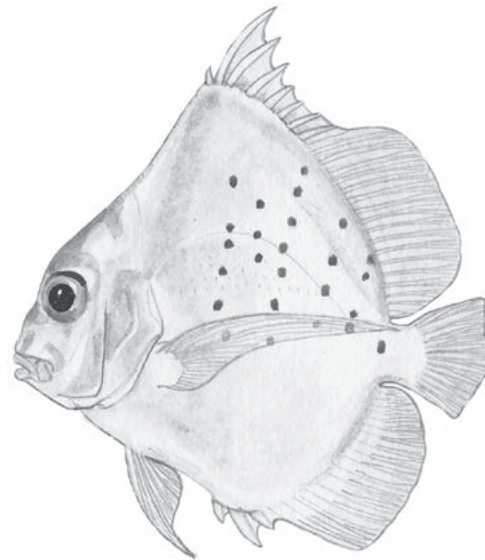
PLATE 119

*Chaetodon punctatus* Linnaeus 1758: 273 (Asia).

*Drepane punctata*: Winterbottom *et al.* 1989; Randall 1995\*; Fricke 1999; Heemstra 2001\*; Kuitert & Debelius 2001\*.

Body depth 1–1.3 in SL; dorsal fin 8 or 9 spines, 19–22 rays; anal fin 3 spines, 17–19 rays; pectoral fins 17–19 rays. GR 4–6/10–12. LL scales 47–55.

Head and body silvery, upper body from below dorsal fin to peduncle with up to ~10 vertical series of evenly spaced black spots; fins dusky yellow; dorsal-fin soft rays with 2 or 3 longitudinal rows of tiny dark spots (1 on each interradial membrane). Attains ~50 cm TL.



*Drepane punctata*, 10 cm SL, juvenile (Indonesia).

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman to India, Red Sea, Kenya to South Africa (Algoa Bay, Eastern Cape) and Chagos; elsewhere to Indonesia, Philippines, Taiwan, Japan, northern Australia and Samoa.

**REMARKS** Occurs in various inshore habitats, near coral and rocky reefs, over sand or mud bottom, and in estuaries and harbours, in 10–49 m. Feeds on invertebrates and benthic fishes.

## FAMILY MULLIDAE

## Goatfishes

Franz Uiblein and John E Randall

Small- to moderately-sized (to ~40 cm SL), body elongated; chin with pair of long, unbranched sensory barbels that can be folded into median groove between the lower jaw bones. Mouth low on head, upper jaw slightly protrusile, lower jaw inferior, cleft slightly oblique; jaw teeth conical or villiform, in 1 series or 2 or more irregular rows. Two well-separated dorsal fins: 1st dorsal fin 7 or 8 slender spines (1st spine often very small in species with 8 spines), 2nd dorsal fin 9 rays (1st ray unbranched; segments sometimes difficult to see, giving appearance of a spine); anal fin 1 spine (sometimes reduced or closely fused with adjacent ray), 7 (or 6) rays; pelvic fins 1 spine, 5 rays; pectoral fins 12–18 rays; caudal fin forked, middle 13 rays branched. Lateral line complete, following dorsal curve of body, with 27–39 pored scales to caudal-fin base. Scales finely ctenoid, entirely covering head and body (except preorbital region in some species of *Upeneus*). Body often whitish to pale red in life (preserved specimens usually pale brown), and most species with distinctive markings (usually only the darkest markings, such as caudal-fin bars and stripes on sides, are retained in preservative).

Common on or above sand or mud bottom or adjacent hard bottom, in relatively shallow water, but a few species at depths of >200 m; juveniles mostly found on soft bottom and/or in vegetation. Species of *Parupeneus* and *Mulloidichthys* are often associated with coral reefs or rocky substrata and adjacent sand; several species of *Upeneus* may also occur on or near coral reefs, but mostly on sand or mud bottom, often well away from reefs. Body colouration can be considerably altered, especially while resting, in relation to habitat or in association with conspecifics or other species; the colour patterns may have various ecological functions including inter- and intraspecific communication, concealment from visual predators, and mimicry. Carnivorous and feeding on a wide variety of prey types, including small crustaceans, various worms, and occasionally smaller fishes; food is searched out vigorously using the hyoid barbels to skim the substratum or by thrusting them into fine sediments or hard-bottom crevices, or by rooting with the mouth deep into sandy or muddy substrate (Uiblein 1991). Some species have been observed to wriggle their barbels during encounters with conspecifics, probably in relation to courtship or territoriality. Goatfishes are encountered singly or in shoals of one or more species; other fish species (particularly wrasses, doctorfishes, parrotfishes and jacks) may follow them to feed on prey items that become available through the goatfishes' foraging activities. Food search and selection, habitat

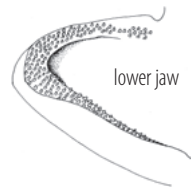
use, shoaling behaviour, and association with other species can change considerably with growth, as does body form.

Goatfishes have been found to be indicators for coastal habitat monitoring and management (Uiblein 2007). Human-induced pressures such as fisheries and habitat modification affect their local abundance or size, and temperature changes influence their reproductive and growth rates; longer warming periods induce goatfishes to migrate to higher latitudes. Many of the species act as 'ecosystem engineers' by turning over sediments and making nutrients freely available during vigorous food searches; and they play a key role in the formation of multispecies foraging associations, especially near coral reefs. Caught by trawls, hook and line, gillnets, traps and spearing; mostly marketed fresh, as the flesh of many species is of good quality and highly esteemed in some countries.

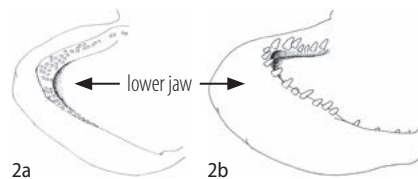
Occur in all major oceans, in tropical to subtropical waters, with a few species extending to approximately 41° S or 60° N. Six genera and 99 species; 3 genera and 48 species in WIO. Three recently described WIO species, *P. sinai* Uiblein 2021, *U. gubal* Uiblein 2019 and *U. floras* Uiblein & Gouws 2020, are not included in this chapter – see Uiblein *et al.* (2019, 2020) and Uiblein (2021).

## KEY TO GENERA

- 1a Dorsal fin 8 spines; no teeth on vomer or palatines; jaw teeth conical, in 1 or several rows; no small scales on basal portion of fins except for caudal fin; snout length mostly longer than postorbital length in adults ..... 2
- 1b Dorsal fin 7 or 8 spines; jaw teeth villiform, and teeth present on vomer and palatines; often small scales on basal portion of 2nd dorsal fin and anal fin; snout length shorter than or subequal to postorbital length ..... *Upeneus*



- 2a Teeth on jaws in several irregular rows, small, conical; LL scales 33–39; 4 or 5 scales between dorsal fins ..... *Mulloidichthys*
- 2b Teeth on jaws in 1 row, well-spaced, moderately large, bluntly conical; LL scales 27–29; 2 or 3 scales between dorsal fins ..... *Parupeneus*



## GENUS *Mulloidichthys* Whitley 1929

Franz Uiblein

First dorsal fin 8 spines; pectoral fins 14–18 rays. GR 6–10/18–27 = 25–35. Lateral line complete; LL scales 33–39, plus 3 or 4 on caudal fin. Teeth on both jaws small and conical. Barbel length in adults (fish >9 cm SL) 4.2–5.7 in SL; snout length 6.1–9.1 in SL, mostly longer than postorbital length (8.2–11 in SL). Body silvery white to yellow or reddish, with or without yellow longitudinal stripes bordered by narrower bluish to pale blue stripes (colours mostly not retained in preservative). Seven species, 4 in WIO.

### KEY TO SPECIES

#### [Adult fish >12.5 cm SL]

- 1a Upper jaw length 8.1–9.3 in SL; peduncle depth >3 times in body depth at 1st dorsal-fin origin; peduncle width 1.5–1.8 in peduncle depth; body reddish orange, without stripes ..... *M. pfluegeri*
- 1b Upper jaw length 8.8–12 in SL; peduncle depth 2.4–3.0 in body depth at 1st dorsal-fin origin; peduncle width 1.9–3.3 in peduncle depth; body with wide yellow and narrow bluish longitudinal stripes in life ..... 2
- 2a Body and head not deep, body depth at anus 4.6–6.1 in SL; head depth 4.5–5.5 in SL; GR on lower limb 18–22; dark oval or rectangular blotch mid-laterally on body below 1st dorsal fin, sometimes weak or absent in life or preservative ..... *M. flavolineatus*
- 2b Body and head moderately deep, body depth at anus 3.7–4.8 in SL; head depth 3.9–4.8 in SL; GR on lower limb 19–26; no dark blotch on sides ..... 3
- 3a GR on lower limb 23–26; body depth at anus 4.0–4.8 in SL; 2nd dorsal-fin base 1.1–1.4 in its height; conspicuous yellow stripe on body from upper end of gill opening to caudal-fin base, its width equal to or less than pupil diameter; any bluish stripes weak, not retained in preservative ..... *M. vanicolensis*
- 3b GR on lower limb 19–23; body depth at anus 3.9–4.4 in SL; 2nd dorsal-fin base 0.8–1.1 in its height; yellow stripe on body at level of upper end of gill opening inconspicuous, its width larger than pupil diameter; bluish body stripes conspicuous, frequently retained in freshly preserved fish ..... *M. ayliffe*

## *Mulloidichthys ayliffe* Uiblein 2011

Ayliffe's goatfish

PLATE 121

*Mulloidichthys ayliffe* Uiblein 2011: 56, Figs. 2–3, Pls. 1–2 (Mellow Yellow Reef, Sodwana Bay, KwaZulu-Natal, South Africa); Allen & Erdmann 2012\*; Fricke *et al.* 2013; Fernandez-Silva *et al.* 2016\*; Zajonz *et al.* 2019; Uiblein *et al.* 2020.

*Mulloidichthys vanicolensis*: Randall 1995\* [in part: photograph showing mixed school of *M. ayliffe* and *M. vanicolensis*].

*Mulloidichthys mimicus*: Taquet & Diringier 2007\*.

Pectoral fins 16 or 17 rays. GR 7 or 8/19–23 = 27–31. LL scales 35–37. In SL: body depth at 1st dorsal-fin origin 3.4–3.9, body depth at anus 3.9–4.4, head depth 4.0–4.5, HL 3.2–3.6, barbel length 4.4–5.2, 1st dorsal-fin height 4.2–4.8, 2nd dorsal-fin height 5.8–7.2, peduncle depth 9.3–10, and peduncle width 19–25.

Body and fins yellow, more orangish on snout; up to 5 narrow blue stripes on sides (2 or 3 middle stripes widest, the uppermost and lowermost stripes faint or may be absent); yellow space between the 2nd and 3rd blue stripes wider than pupil diameter, crossed by lateral line at 55–60% SL; barbels white. Preserved specimens usually uniformly pale brown to brown, but bluish stripes on sides sometimes retained. Attains 25 cm SL.



*Mulloidichthys ayliffe*, 16 cm SL paratype (Tanzania).

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**DISTRIBUTION** Indian Ocean. WIO: Oman, Socotra, Kenya to South Africa (Sodwana Bay), Mozambique Channel, Seychelles, Sri Lanka; elsewhere to Andaman Is.

**REMARKS** Found at 5–19 m.

## *Mulloidichthys flavolineatus* (Lacepède 1801)

Yellowstripe goatfish

PLATES 120 & 121

*Mullus flavolineatus* Lacepède (ex Commerson) 1801: 384, 406 [no locality given].

*Mulloidichthys flavicaudus non* Fernandez-Silva & Randall 2016:

Golani & Fricke 2018.

*Mulloides flavolineatus*: SSF No. 196.1\*.

*Mulloidichthys flavolineatus*: Randall 1995\*, 2005\*; Heemstra *et al.* 2004;

Heemstra & Heemstra 2004\*; Taquet & Diringier 2007\*; Fricke *et al.* 2009;

Uiblein 2011\*; Fricke *et al.* 2013; Fernandez-Silva *et al.* 2016\*; Fricke *et al.*

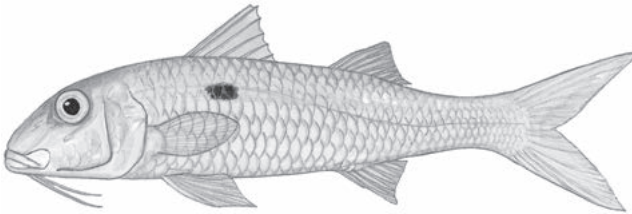
2018; Arndt & Fricke 2019; Zajonz *et al.* 2019; Uiblein *et al.* 2020\*.

Pectoral fins 15–18 rays. GR 7–10/18–22 = 25–31. LL scales 33–38. In SL: body depth at 1st dorsal-fin origin 3.8–4.8, body depth at anus 4.6–6.2, head depth 4.5–5.5, HL 3.0–3.6, barbel length 4.3–5.7, 1st dorsal-fin height 4.1–5.6, 2nd



dorsal-fin height 6.1–8.6, peduncle depth 10–13, and peduncle width 22–37.

Body pale greenish grey dorsally, scale edges darker, body silvery white on sides and ventrally; yellow stripe on sides at level of eye, containing dark oval to rectangular blotch below 1st dorsal fin; fins whitish or yellowish; barbels white. Preserved specimens pale brown, sometimes dorsally darker. Attains 34 cm SL.



*Mulloidichthys flavolineatus*, 18 cm TL (South Africa). Source: CFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (northern Eastern Cape), Mozambique Channel, Madagascar, Maldives and Mascarenes, and to Pakistan, India and Sri Lanka; elsewhere to Japan, Australia, New Caledonia, Lord Howe I., New Zealand, Line Is., Pitcairn Is. and Hawaii.

**REMARKS** Found in shallow water to 99 m. Two subspecies: *Mulloidichthys flavolineatus flavicaudus* Fernandez-Silva & Randall 2016 in Fernandez-Silva *et al.* (2016; Red Sea and NW Indian Ocean) and *Mulloidichthys flavolineatus flavolineatus* (Lacepede 1801) (remaining distribution area).

### *Mulloidichthys pfluegeri* (Steindachner 1900)

Pflueger's goatfish

PLATES 120 & 121

*Mulloides pfluegeri* Steindachner 1900: 174 (Oahu I., Hawaii).

*Mulloidichthys pfluegeri*: Myers 1989\* [as *pfluegeri*]; Fricke 1999; Heemstra *et al.* 2004; Randall 2005\*; Taquet & Diringer 2007\*; Fricke *et al.* 2009; Uiblein 2011\*; Uiblein *et al.* 2020.

Pectoral fins 17 or 18 rays. GR 6 or 7/19–22 = 26–29. LL scales 35–37. In SL: body depth at 1st dorsal-fin origin 3.5–3.9, body depth at anus 4.2–4.7, head depth 3.9–4.1, HL 3.2–3.6, barbel length 4.9–5.2, 1st dorsal-fin height 4.7–5.8, 2nd dorsal-fin height 7.7–8.2, peduncle depth 11–12, and peduncle width 17–22.

Head and body greyish red-orange dorsally, shading to pinkish or orangish white ventrally; fins mostly reddish orange; barbels pinkish to yellowish white; occasionally displays 4 broad red bars on sides of body in life. Preserved specimens uniformly pale brown or brown. Attains 40 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Mascarenes; elsewhere to Ryukyu Is., Tonga, Marquesas Is. and Hawaii.

**REMARKS** Found at 6–25 m.

### *Mulloidichthys vanicolensis* (Valenciennes 1831)

Yellowfin goatfish

PLATES 120 & 121

*Upeneus vanicolensis* Valenciennes in Cuv. & Val. 1831: 521 (Vanikoro I., Santa Cruz Is.).

*Mulloides vanicolensis*: SSF No. 196.2\*.

*Mulloidichthys vanicolensis*: Winterbottom *et al.* 1989; Randall 1995\*

[in part: colour photo showing mixed school of *M. ayliffe* and *M. vanicolensis*]; Fricke 1999; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Randall 2005\*; Taquet & Diringer 2007\*; Uiblein 2011\*; Fricke *et al.* 2013, 2018; Psomadakis *et al.* 2015\*; Golani & Fricke 2018; Arndt & Fricke 2019; Zajonz *et al.* 2019; Uiblein *et al.* 2020.

Pectoral fins 15–17 rays. GR 7–10/23–26 = 31–35. LL scales 36–38. In SL: body depth at 1st dorsal-fin origin 3.3–4.1, body depth at anus 4.0–4.8, head depth 4.0–4.8, HL 3.2–3.5, barbel length 4.2–5.2, 1st dorsal-fin height 4.0–5.0, 2nd dorsal-fin height 5.5–6.5, peduncle depth 9.2–11, and peduncle width 20–33.

Body generally yellowish grey-brown dorsally, silvery white ventrally, but may be suffused with pink, especially ventrally; yellow stripe on sides, often edged in pale blue, from above eyes to caudal-fin base (may be visible as brown in recently preserved specimens); fins yellow, except pectoral fins hyaline; barbels white. Preserved specimens uniformly pale brown, sometimes darker dorsally. Attains 31 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (Sodwana Bay), Mozambique Channel, Comoros, Mascarenes and Chagos, and to Pakistan, India and Sri Lanka; elsewhere to southern Japan, Wake Atoll, Australia, Santa Cruz Is., New Caledonia, Lord Howe I., Kermadec Is., Pitcairn Is., Line Is. and Hawaii.

**REMARKS** Found in shallow water to 113 m.

### GENUS *Parupeneus* Bleeker 1863

John E Randall

First dorsal fin 8 spines; pectoral fins 14–18 rays. GR 5–10/18–33 = 24–42. Lateral line complete; LL scales 27–29, plus 3 on caudal-fin base. Teeth on both jaws bluntly conical, in 1 row, well-spaced; no teeth on vomer or palatines. Body depth

2.5–4.25 in SL; barbel length in adults ~½ HL to slightly longer than head; snout length 1.6–2.3 in HL, longer than postorbital length in adults. Colour pattern on head and body often

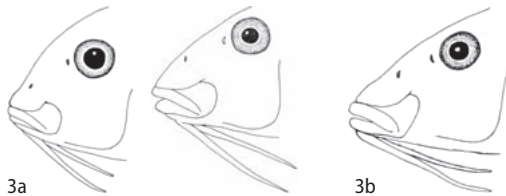
diagnostic; fins usually without dark brown or black markings (markings on 2nd dorsal fin in a few species). Thirty-five species, 20 in WIO.

**KEY TO SPECIES**

- 1a Large black spot (as large as or larger than eye) centred on lateral line below rear of 1st dorsal fin, with large white blotch behind and adjacent to it ..... *P. pleurostigma*
- 1b Colour not as above; black spot, if present, on peduncle ..... 2

- 2a Two narrow vertical black bars, one below each dorsal fin, nearly reaching ventral margin of body; faint 3rd dark bar sometimes present dorsally on peduncle ..... *P. trifasciatus*
- 2b Colour not as above ..... 3

- 3a Rear end of maxilla symmetrical ..... 4
- 3b Rear end of maxilla not symmetrical, either with broad dorsoposterior lobe, or slanting forward ventrally ..... 10



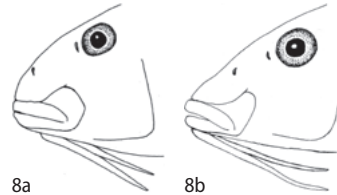
- 4a Cheek depth 1.9–2.1 in HL; dorsal profile of snout steep, forming angle of ~60° to horizontal axis of body; 2 pale yellow longitudinal stripes in life, above and below lateral line ..... *P. procerigena*
- 4b Cheek depth 2.2–3.5 in HL; dorsal profile of snout forming angle of 35–50° to horizontal axis of body; if present, yellow stripe on lateral line ..... 5

- 5a Pectoral fins long, 1.2–1.3 in HL; small brown spot (~½ pupil size) at upper end of gill opening ..... *P. fraserorum*
- 5b Pectoral fins not long, 1.3–1.6 in HL; no small brown spot at upper end of gill opening ..... 6

- 6a Barbels relatively long, 1–1.3 in HL; GR on lower limb 21–23; small dark red or brown spot usually present at LL scales 7–8; interorbital space convex ..... *P. heptacanthus*
- 6b Barbels not as long, 1.2–1.5 in HL; GR on lower limb 18–22; no small dark red or brown spot at LL scales 7–8; interorbital space convex or medially flat ..... 7

- 7a Interorbital space convex; body depth 3.1–3.5 in SL; barbel length 1.2–1.4 in HL; pelvic fins 1.4–1.5 in HL; GR on lower limb 18–21; red spots on scales create striped pattern on upper body ..... *P. seychellensis*
- 7b Interorbital space medially flat; body depth 3.6–4.3 in SL; barbel length 1.35–1.45 in HL; pelvic fins 1.5–1.7 in HL; GR on lower limb 20–23; no striped pattern on upper body ..... 8

- 8a Rear end of maxilla slightly wedge-shaped; longest dorsal-fin spine 1.6–1.8 in HL; GR on lower limb 20 ..... *P. angulatus*
- 8b Rear end of maxilla smoothly convex; longest dorsal-fin spine 1.8–2 in HL; GR on lower limb 21–23 ..... 9



- 9a Body depth 3.6–3.9 in SL; snout length 1.9–2.1 in HL; lower half of caudal fin with 3 red to deep pink spots in triangular pattern ..... *P. nansen*
- 9b Body depth 4–4.3 in SL; snout length 2.1–2.3 in HL; no red or pink spots on caudal fin ..... *P. minys*

- 10a Body with large elliptical yellow spot between lateral line and interdorsal space in life; roundish black spot larger than eye on side of rear half of peduncle, more above than below lateral line; peritoneum of adults dark brown; GR on lower limb 18–21 ..... *P. indicus*
- 10b Colour not as above (though a blackish spot may be present on peduncle or at caudal-fin base); peritoneum pale (except dark brown in *P. barberinus*); GR on lower limb 21–27 ..... 11

- 11a Scales below lateral line with distinct white to pale blue spot in life; mouth small, upper-jaw length 3–3.6 in HL; large elliptical white spot anteriorly on upper part of peduncle ..... *P. margaritatus*
- 11b Scales below lateral line without white to pale blue spot; upper-jaw length 2.3–3 in HL (except *P. forsskali* with jaw length 2.8–3.2 in HL); large white spot present or absent dorsally on peduncle ..... 12

- 12a Basal ½–½ of 2nd dorsal fin black, with dark pigment extending to distal end of last membrane ..... 13
- 12b Basal ~½ of 2nd dorsal fin not black ..... 14

- 13a Oblique dark red to black band from upper end of gill opening to below rear of 2nd dorsal fin; no large black spot on sides of peduncle; barbel length 1.4–1.6 in HL; penultimate ray of dorsal fin 1.1–1.2 in length of last ray ..... *P. diagonalis*
- 13b Black blotchy stripe from upper end of gill opening following lateral line to peduncle; large black spot on upper half of peduncle; barbel length 1.1–1.3 in HL; penultimate ray of dorsal fin 1.3–1.6 in last ray ..... *P. macronemus*

Continued ...

## KEY TO SPECIES

- 14a One or 2 dark brown to red stripes on head and body, uppermost passing through eye; barbels not long, 1.4–1.6 in HL ..... 15
- 14b No dark brown to red stripes on body; barbels relatively long, from ~1.2 in HL to longer than head ..... 18
- 15a Single dark brown or red stripe from front of snout through eyes to below 2nd dorsal-fin origin or beyond; roundish black spot (as large as or larger than eye) posteriorly on peduncle ..... 16
- 15b Two red to brown stripes on head and body, uppermost passing through eye and following anterior part of lateral line, bordered above and below by whitish stripe; saddle-like blackish spot on peduncle preceded by whitish blotch ..... 17
- 16a Pectoral fins 16–18 rays; peritoneum dark brown or black; caudal fin bluish in life ..... *P. barberinus*
- 16b Pectoral fins 14–17 (usually 16) rays; peritoneum pale; caudal fin yellow in life ..... *P. forsskali*
- 17a Pectoral fins 14–16 (usually 15) rays; barbels relatively short, 1.5–1.8 in HL; GR on lower limb 21–25 ..... *P. ciliatus*
- 17b Pectoral fins 15–17 (usually 16) rays; barbels not short, 1.4–1.6 in HL; GR on lower limb 19–22 ..... *P. rubescens*
- 18a Peduncle greyish blue with saddle-like yellow spot, or body entirely yellow; GR on lower limb 22–26; pectoral fins 1.5–1.7 in HL ..... *P. cyclostomus*
- 18b Peduncle red with deeper red bar posteriorly; GR on lower limb 27–30; pectoral fins 1.3–1.5 in HL ..... *P. posteli*

*Parupeneus angulatus* Randall & Heemstra 2009

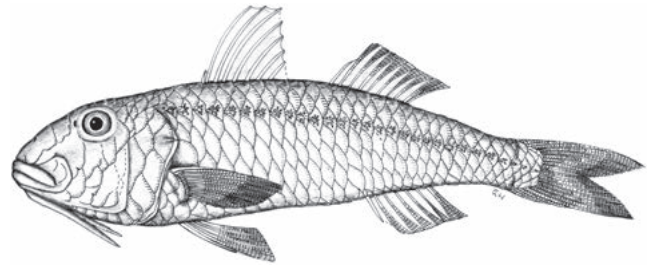
## Wedge-jaw goatfish

*Parupeneus angulatus* Randall & Heemstra 2009: 41, Figs. 3–4 (SW of Denis I., Seychelles Bank); Uiblein *et al.* 2017, 2018.

*Parupeneus heptacanthus* (Lacepède 1802): Randall 2004.

Pectoral fins 15 or 16 rays. GR 6/20 = 26. Body elongate, depth 3.8 in SL; HL ~3 in SL. In HL: snout length ~2, barbel length 1.4, longest dorsal-fin spine 1.6–1.8, pectoral-fin length 1.5–1.6, and pelvic-fin length 1.6. Rear end of maxilla symmetrical but angular, forming ~135° angle; width of maxilla 4.6–4.8 in HL. Interorbital space flat.

Colour in life unknown. Preserved specimens uniformly pale brown, and fins pale yellowish, except caudal fin pale brown and pale yellowish distally. Attains 14 cm SL.



*Parupeneus angulatus*, 14 cm SL, holotype (Seychelles).

Source: Randall & Heemstra 2009

**DISTRIBUTION** Known only from two type specimens from the Seychelles Bank.

**REMARKS** Found at 57 m.

*Parupeneus barberinus* (Lacepède 1801)

## Dot-dash goatfish

PLATES 120 & 121

*Mullus barberinus* Lacepède 1801: 383, 406, Pl. 13, Fig. 3 (near Moluccas, Indonesia).

*Parupeneus barberinus*: SSF No. 196.3\*; Winterbottom *et al.* 1989\*; Randall 1995\*, 2004\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009; Fricke *et al.* 2013; Fricke *et al.* 2018; Arndt & Fricke 2019.

Pectoral fins 16–18 rays. GR 6 or 7/20–25 = 26–31. Body moderately elongate, depth 3.3–3.7 in SL; HL 2.6–3.0 in SL. In HL: snout length 1.5–2.1 (snout relatively longer with growth), barbel length 1.4–1.6, longest dorsal-fin spine 1.6–1.8 (longer with growth), pectoral-fin length 1.5–1.8, and pelvic-fin length 1.4–1.6. Penultimate ray of dorsal fin subequal to last ray in young, 1.2 in last ray in large adults.

Body whitish, with dark brown to black stripe (red on fish in deeper water) from upper lip through eyes to below rear of 2nd dorsal fin; body above stripe yellow or yellowish grey; body below stripe whitish, scale edges narrowly grey to brownish red; some large adults with centres of scales pale blue below dark stripe, and scale edges yellow or with yellow spots, especially posteriorly; mid-caudal-fin base with black or red spot (larger than eye); peritoneum dark brown. Attains 41 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden to South Africa (KwaZulu-Natal), Mozambique Channel, Madagascar, Comoros, Mascarenes, Chagos, Maldives and India; elsewhere to Indonesia, South China Sea, southern Japan, Australia, New Caledonia, Lord Howe I., French Polynesia, Marquesas Is. and Line Is.

**REMARKS** Found at 1–100 m.

## *Parupeneus ciliatus* (Lacepède 1802)

Whitesaddle goatfish

PLATES 120 & 121

*Sciaena ciliata* Lacepède 1802: 308, 311 [no locality given].

*Upeneus fraterculus* Valenciennes in Cuv. & Val. 1831: 524 (Mahé, Seychelles).

*Upeneus cyprinoides* Valenciennes in Cuv. & Val. 1831: 526 (Mauritius, Mascarenes).

*Mullus pleurotaenia* Playfair in Playfair & Günther 1867: 41, Pl. 5,

Fig. 3 [mislabelled Fig. 4] (Zanzibar, Tanzania).

*Parupeneus ciliatus*: Heemstra *et al.* 2004; Heemstra & Heemstra 2004;

Randall 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009;

Fricke *et al.* 2018; Arndt & Fricke 2019.

Pectoral fins 15 rays. GR 6–8/23–27 = 30–34. Dorsal profile of snout straight to slightly concave; caudal-fin margin convex. Body depth 2.9–3.5 in SL; HL 2.9–3.3 in SL. In HL: snout length 1.9–2.1, barbel length 1.5–1.8 (relatively short), longest dorsal-fin spine 1.6–1.9, pectoral-fin length 1.4–1.6, and pelvic-fin length 1.2–1.6. Penultimate ray of dorsal fin slightly shorter than last ray.

Body brown to reddish, slightly paler ventrally; scale edges darker and scale centres with or without white or pale blue spot; darker brown or brownish red stripe on sides, broadly bordered in white, from snout through eyes, becoming indistinct midway on body, and with small dark brown blotch within stripe just behind eyes; 2nd dark stripe across cheek parallel to 1st stripe, bordered below by white band extending to pectoral-fin base; white or pale pink saddle blotch on peduncle, followed by black or dusky saddle spot; fins pale red to reddish grey; 2nd dorsal fin and anal fin often with small pale spots. Attains 34 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Tanzania, Madagascar, Seychelles, Mascarenes and India; elsewhere to southern Japan, Micronesia, Australia, New Caledonia, Lord Howe I., French Polynesia and Pitcairn Is.

## *Parupeneus cyclostomus* (Lacepède 1801)

Goldsaddle goatfish

PLATES 120 & 122

*Mullus cyclostomus* Lacepède (ex Commerson) 1801: 383, 404, Pl. 14, Fig. 3 [Mauritius, Mascarenes].

*Mullus chryserydros* Lacepède (ex Commerson) 1801: 384, 406 (Mauritius, Mascarenes).

*Mullus radiatus* Shaw 1803: 618 ('Indian seas').

*Upeneus immaculatus* Bennett 1831: 60 (Mauritius, Mascarenes).

*Upeneus luteus* Valenciennes in Cuv. & Val. 1831: 521 (Mauritius, Mascarenes).

*Mullus (Upeneus) microps* Bliss 1883: 49 (Mauritius, Mascarenes).

*Parupeneus cyclostomus*: SSF No. 196.6\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*, 2004\*; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009; Randall & Heemstra 2009; Fricke *et al.* 2013; Fricke *et al.* 2018; Golani & Fricke 2018; Arndt & Fricke 2019.

Pectoral fins 16 rays. GR 6 or 7/22–26 = 29–33. Body depth 3.3–3.8 in SL (deeper with growth); HL 2.9–3.1 in SL. In HL: snout length 1.6–1.8, eye diameter 5.3–9.0 (fish ~12–40 cm SL), barbel length >1.2 (to longer than head), longest dorsal-fin spine 1.5–1.7, pectoral-fin length 1.5–1.7, and pelvic-fin length 1.4–1.6. Penultimate ray of dorsal fin 1.1–1.2 in last ray.

Body of large adults yellowish grey (may be largely pink when taken in deeper water), edges of scales bright blue except ventrally, and edges more broadly blue posteriorly; region around eyes yellow, with short radiating narrow blue lines; 2nd dorsal fin and anal fin with oblique narrow blue bands; large, hemispherical, saddle-like yellowish blotch covering upper half of peduncle; caudal fin with longitudinal blue bands. Juveniles and females entirely yellow, and saddle spot on peduncle sometimes brighter yellow than rest of body. Attains 41 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania to South Africa (Sodwana Bay), Mozambique Channel, Madagascar, Comoros, Maldives, Seychelles and Mascarenes, and to Pakistan and India; elsewhere to Ryukyu Is., Australia, New Caledonia, French Polynesia, Pitcairn Is., Line Is. and Hawaii.

**REMARKS** Found at 5–125 m.

## *Parupeneus diagonalis* Randall 2004

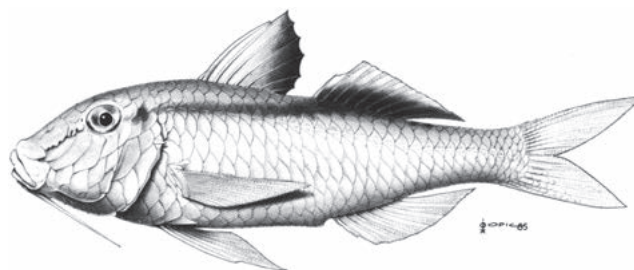
Slant-stripe goatfish

PLATE 122

*Parupeneus diagonalis* Randall 2004: 25, Fig. 5, Plate 4b (Réunion, Mascarenes); Taquet & Diringer 2007\*; Fricke *et al.* 2009; Randall & Heemstra 2009.

Pectoral fins 15 or 16 rays. GR 6 or 7/23 or 24 = 29–31. Body depth 3.3–3.7 in SL; HL 2.8–2.9 in SL. In HL: snout length 1.7–2.1, barbel length 1.4–1.6, longest dorsal-fin spine 1.8–1.9, pectoral-fin length 1.2–1.4, and pelvic-fin length 1.3–1.4. Penultimate ray of dorsal fin 1.1–1.2 in last ray.

Body pink, with black or deep red band, bordered in white, from eyes to below end of 2nd dorsal fin; broad black band at 2nd dorsal-fin base; orangish band from eyes to snout; barbels pale yellow. Attains 17 cm SL.



*Parupeneus diagonalis*, 12 cm SL (Réunion). Source: Randall 2004 (by P Opic)

**DISTRIBUTION** WIO: Réunion and Mauritius.

**REMARKS** Found at 5–100 m.

### *Parupeneus forsskali* (Fourmanoir & Guézé 1976)

Red Sea goatfish

PLATE 120 & 122

*Mullus auriflamma* Forsskål 1775: 30, x (Jeddah, Saudi Arabia, Red Sea).

*Parupeneus barberinus* (Lacepède 1801): Klauswitz & Nielsen 1965.

*Pseudupeneus forsskali* Fourmanoir & Guézé [ex Forsskål] 1976: 45,

Fig. (Jeddah, Saudi Arabia, Red Sea) [replacement name for mistakenly suppressed *Mullus auriflamma* Forsskål 1775].

*Parupeneus forsskali*: Uiblein 1991\*; Goren & Dor 1994; Manilo & Bogorodsky 2003; Randall 2004\*; Randall & Heemstra 2009; Bogorodsky *et al.* 2014; Golani & Fricke 2018; Zajonz *et al.* 2019.

Pectoral fins 14–17 rays. GR 7–9/23–26 = 30–34. Body relatively elongate, depth 3.7–4.2 in SL; HL 2.9–3.3 in SL. In HL: snout length 1.7–1.9, barbel length 1.4–1.5, longest dorsal-fin spine 1.5–1.7, pectoral-fin length 1.4–1.7, and pelvic-fin length 1.4–1.6. Penultimate ray of dorsal fin 1.2–1.3 in last ray.

Body whitish, with broad blackish stripe from sides of upper lip through eyes and along upper sides to beneath rear part of 2nd dorsal fin; body above stripe greyish green, scale edges yellow; body below stripe white, scale edges narrowly reddish; 2nd dorsal fin and anal fin with narrow pale blue and yellow stripes; peduncle yellow dorsally, with irregular black spot mostly above lateral line; caudal fin yellow; peritoneum pale. Attains 22 cm SL.

**DISTRIBUTION** WIO: Red Sea, Gulf of Aden and Socotra; Lessepsian migrant to Mediterranean Sea.

**REMARKS** Found at 1–30 m.

### *Parupeneus fraserorum* Randall & King 2009

Fraser's goatfish

PLATE 122

*Parupeneus fraserorum* Randall & King 2009: 31, Figs. 1–6 (reef off

Pumula, near Hibberdene, KwaZulu-Natal, South Africa);

Randall & Heemstra 2009; Uiblein *et al.* 2017; Uiblein *et al.* 2018\*.

Pectoral fins 16 or 17 rays. GR 6/21 or 22. Body depth 2.8–2.9 in SL; HL 2.8–2.9 in SL. In HL: snout length 1.8–1.9, barbel length 1.3–1.4, 3rd (longest) spine of dorsal fin 1.8–2.0, longest dorsal-fin ray 3.2–3.3, pectoral-fin length 1.2–1.3, and pelvic-fin length 1.4–1.5. Penultimate ray of dorsal fin only slightly shorter than last ray. Rear margin of maxilla symmetrically convex.

Body pale pinkish or orangish brown dorsally, white ventrally, with pale blue iridescence in centre of each scale, and scale edges dark; orange-yellow stripe following lateral line; oblique faint blue lines in front of and behind eyes; small brown spot (~½ pupil diameter) at upper end of gill opening; pale red bar at pectoral-fin bases; 2nd dorsal fin and anal fin with wavy pale blue lines; iridescent blue longitudinal streaks on caudal fin; barbels white. Attains 17 cm SL.



*Parupeneus fraserorum*, 17 cm TL (Mozambique). © Alvheim © IMR

**DISTRIBUTION** WIO: South Africa (KwaZulu-Natal), southern Mozambique and southeastern Madagascar.

**REMARKS** Known from 27–81 m.

### *Parupeneus heptacanthus* (Lacepède 1802)

Cinnabar goatfish

PLATES 122 & 123

*Sciaena heptacantha* Lacepède 1802: 308, 311 [no locality given; probably Indonesia].

*Upeneus cinnabarinus* Cuvier in Cuv. & Val. 1829: 475 (Trincomalee, Sri Lanka).

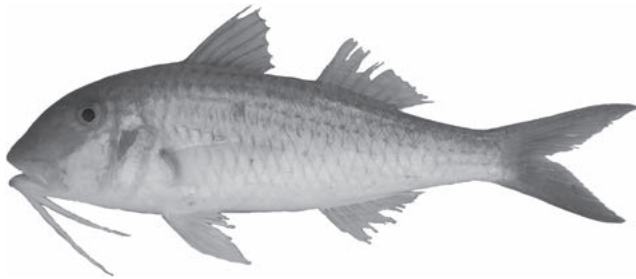
*Pseudupeneus xanthopurpureus* Fourmanoir 1957: 69, Fig. 51 (Berafia I., Mozambique Channel).

*Parupeneus heptacanthus*: Randall 1995\*, 2004\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Randall & Heemstra 2009\*; Bogorodsky *et al.* 2011; Psomadakis *et al.* 2015\*; Uiblein *et al.* 2017\*; Uiblein *et al.* 2018\*; Arndt & Fricke 2019; Zajonz *et al.* 2019.

Pectoral fins 16 rays. GR 6 or 7/21–23 = 27–30. Body depth 3–3.5 in SL; HL 2.9–3.3 in SL. In HL: snout length 1.8–2.1, barbel length 1.2–1.4, longest dorsal-fin spine 1.5–1.8, pectoral-fin length 1.3–1.4, and pelvic-fin length 1.3–1.5. Penultimate ray of dorsal fin 1.1–1.3 in last ray. Rear end of maxilla evenly convex.

Body brownish yellow to pale reddish orange (deeper-dwelling fish more red), scale edges darker, and upper body scales often with pale blue or pearly spot, body silvery white

ventrally; indistinct narrow yellow-orange stripe often visible above lateral line (more evident in juveniles and subadults); adults with small reddish brown spot on upper sides just below LL scales 7–8; faint iridescent blue lines extending from eyes (anteroventrally and dorsoposteriorly), and often parallel blue lines on cheeks below eyes; 2nd dorsal fin and anal fin with narrow faint blue or pink bands alternating with pale yellowish bands. Attains 29 cm SL.



*Parupeneus heptacanthus*, 23 cm TL (Mozambique). © Alvheim © IMR

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, Red Sea, Kenya to South Africa (KwaZulu-Natal), Mozambique Channel, Madagascar and Seychelles, and to Pakistan, India and Sri Lanka; elsewhere to southern Japan, Caroline Is., Marshall Is., New Guinea, Australia, New Caledonia, Lord Howe I. and Fiji.

**REMARKS** Found at 4–104 m.

### *Parupeneus indicus* (Shaw 1803)

Indian goatfish

PLATES 120 & 123

*Mullus indicus* Shaw 1803: 614 (Vishakhapatnam, India) [based on 'Rahtee goolvinda' of Russell 1803: 42, Pl. 157].

*Mullus russelii* Cuvier 1829: 157 (footnote 2) [as '*M. russelii*?'] (Visakhapatnam, India).

*Upeneus malabaricus* Cuvier in Cuv. & Val. 1829: 467 (Malabar coast, India).

*Parupeneus indicus*: Goren & Dor 1994; SSF No. 196.7\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Randall 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009; Psomadakis *et al.* 2015\*; Fricke *et al.* 2018; Arndt & Fricke 2019; Zajonz *et al.* 2019.

Pectoral fins 15–17. GR 5–7/18–21 = 24–27. Body depth 3.3–3.8 in SL; HL 2.9–3.3 in SL. In HL: snout length 1.7–2, barbel length 1.3–1.5, longest dorsal-fin spine 1.5–1.8, pectoral-fin length 1.4–1.6, and pelvic-fin length 1.3–1.5. Penultimate ray of dorsal fin subequal to last ray in juveniles, 1.1–1.2 in length of last ray in adults.

Body greenish brown to reddish brown dorsally; scale edges dark, body shading to whitish or pale pink ventrally;

large, elongate, yellow spot on lateral line below interdorsal space; nearly round black spot (as large as or larger than eye) on sides of peduncle, two-thirds of spot above lateral line; irregular pale blue lines radiating from eyes (anteroventrally and dorsoposteriorly); 2nd dorsal fin and anal fin with oblique pale blue lines; caudal fin yellowish grey, with faint blue lines parallel to rays; barbels white; peritoneum dark brown. Attains 30 cm SL.



*Parupeneus indicus*, 12 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Kenya to South Africa (KwaZulu-Natal), Madagascar and Mascarenes, and to Pakistan and India; elsewhere to east coast of India, southern Japan, Caroline Is., Marshall Is., New Guinea, Australia and Samoa.

**REMARKS** Inhabits shallow water, generally in <10 m.

### *Parupeneus macronemus* (Lacepède 1801)

Long-barbel goatfish

PLATES 120 & 123

*Mullus macronemus* Lacepède (ex Commerson) 1801: 383, 404, Pl. 13, Fig. 2 [no locality given: Indo-Pacific].

*Parupeneus macronemus*: SSF No. 196.8\*; Winterbottom *et al.* 1989\*; Goren & Dor 1994; Randall 1995\*, 2004\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Randall & Heemstra 2009; Fricke *et al.* 2013.

Pectoral fins 15–17 rays. GR 7–9/27–30 = 34–39. Body moderately elongate, depth 3.3–3.7 in SL; HL 2.8–3.2 in SL. In HL: snout length 1.7–1.9, barbel length 1.1–1.3, longest dorsal-fin spine 1.5–1.8, pectoral-fin length 1.3–1.5, and pelvic-fin length 1.2–1.5. Penultimate ray of dorsal fin of adults 1.3–1.6 in last ray, last ray relatively longer with growth.

Body grey to greyish red dorsally, pinkish to whitish ventrally; broad black stripe from eyes along lateral line to below 2nd dorsal fin, followed by equally broad white zone, and then roundish black spot (larger than eye) on sides of peduncle, spot about two-thirds above lateral line; pale blue vertical line or spot often present on scales below black stripe; snout often with dusky band from eyes to sides of upper lip;

1st dorsal fin and caudal fin reddish grey; basal  $\frac{1}{3}$ – $\frac{1}{2}$  of 2nd dorsal fin black, dark pigment continuing to end of last ray and adjacent membrane, outer part of fin with narrow pale blue and yellow stripes; anal fin may be dusky yellow, with narrow faint blue stripes; barbels white. Attains 25 cm SL.



*Parupeneus macronemus*, 13 cm TL (Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, Gulf of Oman, Red Sea, Kenya to South Africa (Aliwal Shoal), Mozambique Channel, Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and India; elsewhere to Cocos (Keeling) Is., Christmas I., Indonesia and Philippines.

**REMARKS** Found at 3–40 m.

### *Parupeneus margaritatus* Randall & Guézé 1984

Pearly goatfish

PLATE 123

*Parupeneus margaritatus* Randall & Guézé 1984: 12, Pl. 1, Figs. A–C (Bahrain fish market, Persian/Arabian Gulf); Manilo & Bogorodsky 2003; Randall 2004\*; Randall & Heemstra 2009.

Pectoral fins 15–17 rays. GR 6–8/22–25 = 29–33. Body moderately elongate, depth 3.5–4.1 (to 4.4 in juveniles) in SL; HL 2.8–3.0 in SL. In HL: snout length 1.8–2.3, upper jaw 3.0–3.5, barbel length 1.4–1.7, 3rd (longest) spine of dorsal fin 1.7–2.0, pectoral-fin length 1.5–1.7, and pelvic-fin length 1.5–1.8. Penultimate ray of dorsal fin slightly shorter than last ray.

Body grey to brownish red dorsally, whitish to pale red ventrally; small pearly white to pale blue spot on each scale below lateral line, and centre of scales on upper body whitish but not as distinct spots; brown band on snout, from upper lip through eyes and often continuing posteriorly (band usually not evident in preservative); peduncle with elongate white spot dorsoanteriorly, sometimes followed by similarly sized dusky spot. Attains 19 cm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf to western Pakistan.

**REMARKS** Found at 1–55 m.

### *Parupeneus minys* Randall & Heemstra 2009

Dwarf goatfish

PLATE 123

*Parupeneus minys* Randall & Heemstra 2009: 45, Figs. 5–6 (Poivre Atoll, Amirantes Is., Seychelles); Uiblein *et al.* 2017; Uiblein *et al.* 2018.

*Parupeneus janseni* (Bleeker 1856): Randall & Van Egmond 1994.

*Parupeneus heptacanthus* (Lacepède 1802): Randall 2004.

Pectoral fins 15 or 16 rays. GR 6/21 or 22. Body elongate, depth 4.0–4.3 in SL; HL 2.9–3.1 in SL. In HL: snout length 2.1–2.3, width of maxilla 5.5–5.8, barbel length 1.4–1.5, longest dorsal-fin spine 1.8–2.0, pectoral-fin length 1.3–1.4, and pelvic-fin length 1.5–1.7. Interorbital space flat. Rear edge of maxilla symmetrically convex.

Body pink dorsally, pale pink to white ventrally; indistinct pale yellow stripe along lateral line; some lateral-line scales with bluish white dash; bluish white line around lower part of eye, continuing obliquely to upper lip; 3 small bluish white blotches dorsally on head, one directly above eye; barbels white; median fins and pelvic fins translucent blotchy yellow, with small pale blue to whitish spots along rays, outlining faint yellowish transverse bands. Preserved specimens uniformly tan, except some specimens from Seychelles with areas of white on head below eyes and on lower two-fifths of body; no dark markings on body; fins translucent yellowish. Attains 11 cm SL.

**DISTRIBUTION** WIO: Mozambique, Seychelles and southwestern India.

**REMARKS** Found at 43–55 m.

### *Parupeneus nansen* Randall & Heemstra 2009

Nansen goatfish

PLATE 123

*Parupeneus nansen* Randall & Heemstra 2009: 47, Figs. 7–8 (southern Mozambique); Uiblein *et al.* 2017; Uiblein *et al.* 2018\*.

Pectoral fins 15 or 16 rays. GR 6 or 7/21–23. Body moderately elongate, depth 3.6–3.9 in SL; HL 2.9–3.0 in SL. In HL: snout length 1.9–2.1, width of maxilla 5.1–5.3, barbel length 1.4–1.5, longest dorsal-fin spine 1.9–2.0, pectoral-fin length 1.4, and pelvic-fin length 1.5–1.6. Interorbital space flat medially; maxilla symmetrically rounded posteriorly.

Body pale yellowish grey dorsally, scale edges narrowly red, grading to silvery grey below, red edges of scales progressively fainter ventrally; head broadly red dorsally, grading to silvery white on cheek and opercle; barbels white; caudal fin with 3 large deep pink to red spots (spot on each lobe and at midbase). Preserved specimens pale tan, edges of scales slightly darker; faint orangish brown stripe following lateral line; no dark spot on 8th LL scale; fins translucent yellowish. Attains 16 cm SL.



*Parupeneus nansen*, 17 cm TL (S Mozambique). © Alvheim © IMR

**DISTRIBUTION** WIO: Somalia, Tanzania and southern Mozambique.

**REMARKS** Known from 10–51 m.

### *Parupeneus pleurostigma* (Bennett 1831)

Side-spot goatfish

PLATES 120 & 124

*Upeneus pleurostigma* Bennett 1831: 59 (Mauritius, Mascarenes).

*Parupeneus pleurostigma*: SSF No. 196.9\*; Winterbottom *et al.* 1989\* [as *pleurostigmus*]; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Randall 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009; Fricke *et al.* 2013; Fricke *et al.* 2018; Zajonz *et al.* 2019.

Pectoral fins 15–17 rays. GR 6–8/21–25 = 28–32. Body depth 3.5–4 in SL; HL 2.9–3.1 in SL. In HL: snout length 1.7–2.1, barbel length 1.3–1.6, longest dorsal-fin spine 1.4–1.7, pectoral-fin length 1.3–1.5, and pelvic-fin length 1.3–1.5. Last dorsal-fin ray of adults longer than penultimate ray, latter ray 1.1–1.3 in former. Dorsal profile of snout straight to slightly convex; caudal-fin margin straight to slightly convex.

Body pinkish to yellowish grey, scale edges dark; black spot (width ~3–4 scales) on lateral line below rear of 1st dorsal fin, followed by large pale pink to white spot; blue spot often present on each scale above lateral line, always present on scales posteriorly; pale blue spots, one per scale, ventrally on body (but often not visible); short blue lines radiating from eyes except not ventrally; barbels pale pink to white; basal third of 2nd dorsal fin with broad blackish band or large black spot, and outer part of fin with narrow blue and yellow bands; anal fin with faint blue and yellow bands; other fins varying from yellowish grey to pale red. Attains 26 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (KwaZulu-Natal), Mozambique Channel, Madagascar, Comoros, Seychelles, Mascarenes, Chagos and India; elsewhere to Andaman Sea, southern Japan, Australia, New Caledonia, Lord Howe I., French Polynesia, Pitcairn Is., Line Is. and Hawaii.

**REMARKS** Found at 1–75 m.

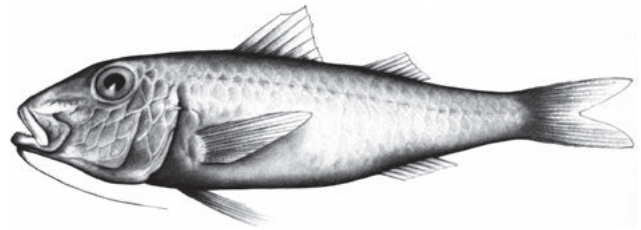
### *Parupeneus posteli* Fourmanoir & Guézé 1967

Postel's goatfish

*Parupeneus posteli* Fourmanoir & Guézé 1967: 47, Fig. I/a (Réunion, Mascarenes); Fricke 1999; Randall 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009; Uiblein 2021\*.

Pectoral fins 15–18 (mostly 15 or 16). GR 7–9/27–30 = 35–38. Body depth 3.6–4.0 in SL; HL 2.8–3.1 in SL. In HL: snout length 1.9–2.1, eye diameter 4.0–4.7 (specimens >10 cm SL), barbel length 0.9–1.1, longest dorsal-fin spine 1.6–1.9, pectoral-fin length 1.3–1.5, and pelvic-fin length 1.2–1.5. Last 2 rays of dorsal fin subequal.

Body dorsally pale red, with vermilion bar (its greatest width 3 scales) encircling rear of peduncle; fins red, caudal fin yellow, or pink. Attains 15 cm SL.



*Parupeneus posteli*, 15 cm SL (Réunion). Source: Randall 2004 (by N Gasco)

**DISTRIBUTION** WIO: Réunion, Mauritius and southern Mascarene plateau.

**REMARKS** Found at 58–250 m.

### *Parupeneus procerigena* Kim & Amaoka 2001

Deep-cheek goatfish

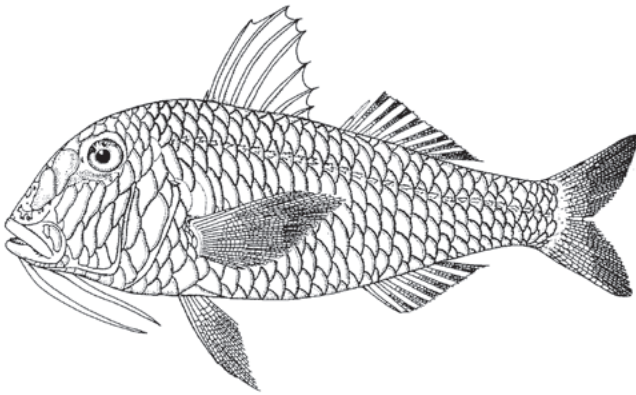
PLATE 124

*Parupeneus procerigena* Kim & Amaoka 2001: 45, Figs. 1–2 (Saya de Malha Bank); Randall 2004\*; Randall & Heemstra 2009; Uiblein *et al.* 2017; Uiblein *et al.* 2018\*.

Pectoral fins 15–17 rays. GR 6 or 7/22–24 = 29–31. Body depth of adults greatest at or slightly before dorsal-fin origin, 2.6–3.1 in SL; HL 2.8–3.1 in SL; cheek depth (lower edge of eye vertically to ventral margin of preopercle) in adults 5.4–6.6 in SL. In HL: snout length 1.7–2.0, barbel length 1.1–1.4, longest dorsal-fin spine 1.4–1.7, pectoral-fin length 1.1–1.3, and pelvic-fin length 1.2–1.6.

Body yellow dorsally, pale pink ventrally, with longitudinal rows of lavender-pink spots (on scale centres); upper half of head orange with violet-pink bands; fins pink, except caudal fin yellow centrally. Juvenile specimen (~7 cm SL) pink, with yellow stripe on sides (on lateral line anteriorly, passing above lateral line posteriorly). Attains 20 cm SL.





*Parupeneus procerigena*, 17 cm SL, male holotype (Saya de Malha Bank).  
Source: Kim & Amaoka 2001

**DISTRIBUTION** WIO: Seychelles, Saya de Malha Bank, Nazareth Bank and Mauritius (St Brandon Shoals).

**REMARKS** Found at 40–236 m.

### *Parupeneus rubescens* (Lacepède 1801)

Rosy goatfish PLATES 120 & 124

*Mullus rubescens* Lacepède (ex Commerson) 1801: 384, 406 (Réunion, Mascarenes).

*Mullus dispilurus* Playfair in Playfair & Günther 1867: 41, Pl. 5, Fig. 4 [mislabelled Fig. 3] (Zanzibar, Tanzania).

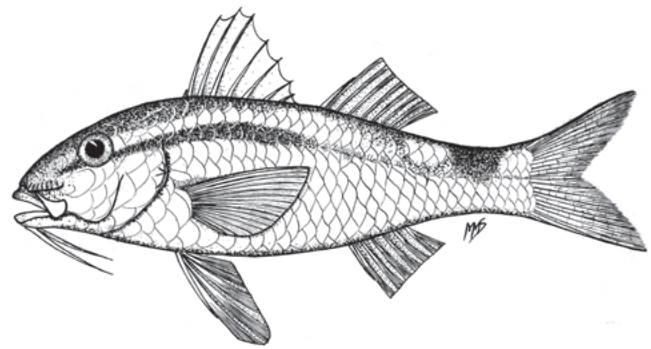
*Parupeneus notospilus* Klunzinger 1884: 51, Pl. 5, Fig. 3 (Al-Qusayr, Egypt, Red Sea).

*Upeneus natalensis* Gilchrist & Thompson 1909: 229 (KwaZulu-Natal, South Africa).

*Parupeneus rubescens*: SSF No. 196.10\*; Baranes & Golani 1993; Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Randall 2004\*; Fricke *et al.* 2009; Randall & Heemstra 2009; Psomadakis *et al.* 2015\*; Fricke *et al.* 2018; Golani & Fricke 2018; Zajonz *et al.* 2019.

Pectoral fins 15–17 rays. GR 6 or 7/21–25 = 29–32. Body depth 3–3.5 in SL; HL 2.9–3.2 in SL. In HL: snout length 1.9–2.2, barbel length 1.4–1.6, upper jaw 2.6–3.2, longest dorsal-fin spine 1.6–1.9, pectoral-fin length 1.3–1.5, and pelvic-fin length 1.2–1.4. Last ray of dorsal fin slightly longer than penultimate ray.

Body pale red to reddish brown, scale edges darker brown; large black saddle spot on peduncle, its lower edge on lateral line; white to pale pink spot preceding black spot, not reaching lateral line and often not extending dorsally on peduncle; dark brown to reddish brown stripe, bordered by white, from front of snout through eyes and fading below 2nd dorsal fin; another shorter brown stripe below, broadening and less pigmented as it passes above pectoral-fin bases; fins pale red to whitish, without markings. Attains 33 cm SL.



*Parupeneus rubescens*, 23 cm TL (WIO). Source: Smith & Smith 1963

**DISTRIBUTION** WIO: Pakistan, Gulf of Oman, Red Sea, Kenya to South Africa (Eastern Cape), Madagascar, Seychelles, Réunion and Mauritius.

**REMARKS** Found at 2–200 m.

### *Parupeneus seychellensis* (Smith & Smith 1963)

Seychelles goatfish

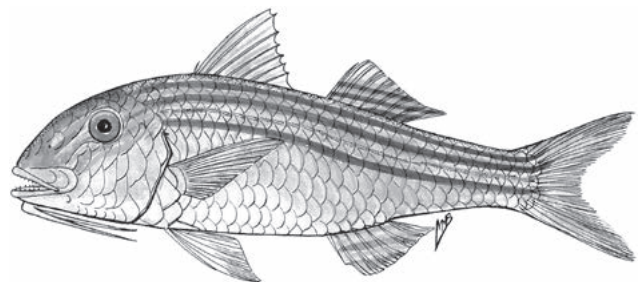
PLATE 124

*Pseudupeneus seychellensis* Smith & Smith 1963: 22, Pl. 88b (Seychelles).

*Parupeneus seychellensis*: Randall & Heemstra 2009\*; Uiblein *et al.* 2017; Uiblein *et al.* 2018.

Pectoral fins 16 rays. GR 6/18–21. Body depth 3.1–3.5 in SL; HL 3.0–3.2 in SL. In HL: snout length 1.8–2.0, barbel length 1.2–1.4, width of maxilla 5.2–5.5, longest dorsal-fin spine 1.6–1.8, pectoral-fin length 1.3–1.4, and pelvic-fin length 1.4–1.5. Interorbital space convex.

Preserved specimens tan, with indistinct midlateral yellowish brown stripe, beginning as broad as eye above pectoral-fin base, narrowing posteriorly, then broadening on peduncle (stripe not present in life); striped pattern on body dorsally created from red spot on each scale of first 3 longitudinal scale rows. Attains 23 cm SL.



*Parupeneus seychellensis*, 25 cm TL, holotype (Seychelles).  
Source: Smith & Smith 1963

**DISTRIBUTION** WIO: Seychelles.

**REMARKS** Found at 12–17 m.

**Parupeneus trifasciatus** (Lacepède 1801)

Doublebar goatfish

PLATES 120 & 124

*Mullus bifasciatus* Lacepède (ex Commerson) 1801: 383, 404, Pl. 14, Fig. 2 [no locality given].

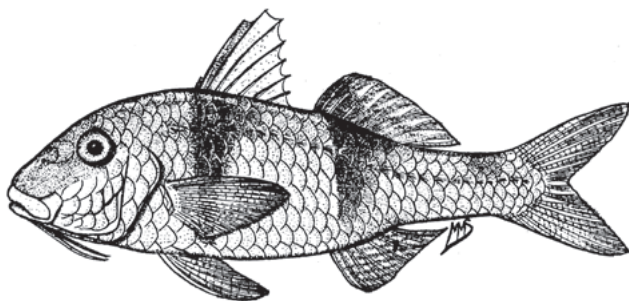
*Mullus trifasciatus* Lacepède (ex Commerson) 1801: 383, 404, Pl. 15, Fig. 1 [no locality given; probably Réunion or Mauritius, Mascarenes].

*Parupeneus bifasciatus*: Winterbottom *et al.* 1989\*; Fricke 1999.

*Parupeneus trifasciatus*: SSF No. 196.4\*; Randall 1995\*, 2004\*; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Randall & Heemstra 2009; Fricke *et al.* 2013; Fricke *et al.* 2018; Arndt & Fricke 2019; Zajonz *et al.* 2019.

Pectoral fins 15–17 rays. GR 7–9/28–30 = 36–39. Body depth 2.8–3.4 in SL; HL 2.9–3.3 in SL. In HL: snout length 1.8–2.1, barbel length 1.6–1.9, longest dorsal-fin spine 1.5–1.6, pectoral-fin length 1.3–1.5, and pelvic-fin length 1.2–1.4. Last ray of dorsal fin only slightly longer than penultimate ray.

Body whitish to pale red (but body sometimes red with rear two-thirds of peduncle and caudal-fin base white), with 2 black to blackish bars beneath dorsal fins: first bar ~4 scales in width, centred under 1st dorsal-fin origin, narrowing as it passes under pectoral fins; 2nd bar below anterior ~2/3 of 2nd dorsal fin; sometimes with 3rd bar present on peduncle above lateral line; head pinkish grey, with broad dusky band from upper lip to eyes; cheek and opercle with irregular yellow-edged blue spots; fins whitish to pale red. Attains 27 cm SL.



*Parupeneus trifasciatus*, 24 cm TL (Mozambique). Source: Smith 1955

**DISTRIBUTION** Indian Ocean (widespread). WIO: Pakistan, southern Oman to South Africa, Mozambique Channel, Madagascar, Comoros, Seychelles, Mascarenes, Chagos and India; elsewhere to Andaman Sea, Cocos (Keeling) Is., Christmas I. and Indonesia (Bali).

**REMARKS** Found at 1–80 m.

**GENUS** *Upeneus* Cuvier 1829

Franz Uiblein

First dorsal fin 7 or 8 spines; pectoral fins 12–17 rays. GR 4–9/13–24 = 18–33. Lateral line complete; LSS 28–39; small scales present basally on 2nd dorsal fin and anal fins. Snout length 7.1–11 in SL, subequal to or shorter than postorbital length (7.1–10 in SL); barbel length in adults 3.8–7.7 in SL. Teeth on jaws villiform; small teeth present on vomer and palatines. Body usually with one to several longitudinal stripes, varying from yellow to dark brown or black in life; oblique bars often present on caudal-fin lobes, usually retained in preservative when darkly pigmented, and their number, colour and form of diagnostic importance (see caudal-fin pattern drawings at the end of this chapter). Forty-seven species, 23 in WIO (including 3 new species not described here).

**KEY TO SPECIES**

- 1a First dorsal fin 7 spines, first 3 spines usually longest; pectoral fins 12–15 rays; total GR 22–29; oblique bars on caudal fin present in life (but present or absent on lower lobe) ..... 2
- 1b First dorsal fin 8 spines, first spine minute, partly hidden by skin and scales; pectoral fins 13–17 rays; total GR 18–33; oblique bars on caudal fin present or absent ..... 5
- 2a Pectoral fins 12–14 rays; total GR 22–26; 1st dorsal-fin height 4.1–5.1 in SL; body mottled red dorsally in life, pale brown in preservative, not darker dorsally, barbels mostly yellow in life ..... *U. guttatus*
- 2b Pectoral fins 13–15 rays; total GR 25–29; 1st dorsal-fin height 4.5–5.6 in SL; body grey, reddish brown or red dorsally in life, pale brown in preservative, darker dorsally, barbels white or pale reddish in life ..... 3
- 3a Body depth at anal-fin origin 4.5–5.4 in SL and 1.2–1.5 in head length; oblique bars on lower caudal-fin lobe present.... *U. pori*
- 3b Body depth at anal-fin origin 5.2–6.1 in SL and 1.5–1.8 in head length; oblique bars on lower caudal-fin lobe absent..... 4
- 4a Total gill rakers 29; snout length 9.0–10 in SL; postorbital length 7.6–8.0 in SL; barbels white in life..... *U. saiab*
- 4b Total gill rakers 25–26; snout length 8.2–9.1 in SL; postorbital length 8.3–9.6 in SL; barbels pale reddish in life .... *U. seychellensis*
- 5a Pelvic-fin length 0.8–1.1 in pectoral-fin length; total GR 18–25; pectoral fins 13–15 rays; oblique bars on caudal fin present in life, present or absent in preservative ..... 6
- 5b Pelvic-fin length 1.1–1.5 in pectoral-fin length; total GR 25–33; pectoral fins 14–17 rays; oblique bars on caudal fin present or absent ..... 12
- 6a No dark blotch around or on 1st dorsal-fin tip; 0–2(3) yellowish or pale brown lateral stripes on body in fresh fish, mostly not retained in preservative; barbels white or yellow in fresh fish ... 7
- 6b Dark blotch close to or on 1st dorsal-fin tip; 1 dark (red, brown or black) midlateral stripe on body in fresh and preserved fish; barbels yellow or pale brown in fresh fish ..... 8

Continued...

## KEY TO SPECIES

- 7a LL scales 36–39; pectoral fins 5.1–6.0 in SL; at least 2 lateral body stripes in fresh fish: pale brown midlateral body stripe and weaker, more yellowish, stripe below; caudal fin with 9–14 dark bars in adult fish, well-retained in preserved fish, maximum size 30 cm SL ..... *U. taeniopterus*
- 7b LL scales 28–34; pectoral fins 4.2–5.5 in SL; 1 yellow or pale brown midlateral body stripe in fresh fish, or stripe absent; caudal fin with 4–13 red or grey bars in adult fish, weak or not retained in preserved fish, maximum size 17 cm SL ..... **10**
- 8a Caudal-fin lower lobe with 3–5 bars (3 bars in subadults <7 cm SL); postorbital length 1.2–1.4 in anal-fin height; caudal-fin length 3.5–4.1 in SL, 1.0–1.3 in HL; pelvic-fin length 4.6–6.0 in SL ..... *U. oligospilus*
- 8b Caudal-fin lower lobe with 4–10 bars (4 or 5 bars in subadults <7 cm SL); postorbital length 1.4–2.0 in anal-fin height; caudal-fin length 2.9–3.7 in SL, 0.8–1.1 in HL; pelvic-fin length 4.2–5.4 in SL ..... **9**
- 9a Caudal fin with 8 bars (3 or 4 on upper lobe); barbel length 4.5–4.7 in SL; upper jaw 9.6–10 in SL ..... *U. niebuhri*
- 9b Caudal fin with 9–12 bars (4–6 bars on upper lobe); barbel length 5.0–6.7 in SL; upper jaw 7.5–10 in SL ..... *U. heemstra*
- 10a Total GR 18–22; LL scales 31–34; 1st dorsal-fin height 3.7–4.5 in SL; peduncle depth 7.7–9.1 in SL; barbels frequently yellow in fresh fish ..... *U. sundaicus*
- 10b Total GR 21–25; LL scales 28–30; 1st dorsal-fin height 4.3–5.6 in SL; peduncle depth 8.7–11 in SL; barbels white ..... **11**
- 11a Total GR 21–24; peduncle width 17–29 in SL, 4.9–8.6 in HL; pectoral-fin width 19–24 in SL, 5.3–6.8 in HL; caudal-fin lower lobe with broad red, brown or grey band, covering up to 5 or 6 red or brown bars, the latter best visible along ventral margin in fresh fish (WIO); midlateral body stripe running through eye: red or orange from snout tip to eye, yellow or beige from behind eye to caudal-fin base (stripe absent in preserved fish) ..... *U. margarethae*
- 11b Total GR 23–25; peduncle width 27–34 in SL, 7.5–10 in HL; pectoral-fin width 23–27 in SL, 6.5–7.6 in HL; caudal-fin lower lobe with 6–8 dark red bars, bars not covered by a band; midlateral body stripe only vaguely visible in fresh fish, absent in preserved fish ..... *U. randalli*
- 12a No oblique bars on caudal-fin lower lobe (some species with oblique bars on upper lobe, retained in preservative) ..... **13**
- 12b Oblique bars on both caudal-fin lobes (retained in preservative) ..... **15**
- 13a Caudal-fin upper lobe with 6–8 red oblique bars (usually visible in preservative), no bars on lower lobe; tip of 1st dorsal fin brown to black; body depth at anus 3.6–4.5 in SL (fish >7 cm SL); peduncle depth 9.8–12 in SL; head depth 3.5–3.7 in SL ..... *U. moluccensis*
- 13b No oblique bars on caudal-fin lobes; tip of 1st dorsal fin black or pale brown to yellowish in life (may be lost in preservative); body depth at anus 4.0–5.3 in SL (fish >7 cm SL); peduncle depth 8.6–9.8 in SL; head depth 3.2–3.5 in SL ..... **14**
- 14a Total GR 29–33, 22–24 on lower limb; tip of 1st dorsal fin pale brown to yellowish in life (colour faint or not retained in preservative); narrow, eye-level, yellow stripe on body in life; anal-fin height 6.7–7.0 in SL; 1st dorsal-fin height 4.5–5.0 in SL ..... *U. doriae*
- 14b Total GR 27–28, 19–21 on lower limb; tip of 1st dorsal fin black; 2 narrow yellow stripes on midside of body; anal-fin height 5.4–6.4 in SL; 1st dorsal-fin height 3.7–4.5 in SL ..... *U. sulphureus*
- 15a Oblique bars on caudal fin pale brown to brown, mostly uniformly coloured, pale spaces between bars subequal, bars on upper lobe curved; 2 narrow yellow or pale brown lateral body stripes in life; body depth at anus 3.7–4.6 in SL; pectoral fins 3.5–4.5 in SL, 1.1–1.4 in HL; total GR 26–32 ..... **16**
- 15b Oblique bars on caudal fin at least partly black or dark brown, frequently varying in colour intensity, bars or spaces between them often unequal in width, bars on upper lobe not curved; 0 or >2 yellow or pale brown stripes on body in life; body depth at anus 4.1–5.5 in SL; pectoral fins 3.8–4.9 in SL, 1.3–1.6 in HL; total GR 25–29 ..... **18**
- 16a LSS 36; body depth at anus 3.7–3.9 in SL; pectoral-fin length 4.2–4.5 in SL, ~1.3 in maximum body depth; stripes on midbody not connecting to oblique bars on caudal fin ..... *U. indicus*
- 16b LSS 34–35 (rarely 36); body depth at anus 3.8–4.6 in SL; pectoral-fin length 3.5–4.4 in SL, and 1.0–1.2 in maximum body depth; stripes on midbody connect to oblique bars on caudal fin ..... **17**
- 17a Total GR 26–28; HL 3.2–3.5 in SL; barbel length 4.7–6.5 in SL; pectoral-fin length 3.9–4.4 in SL [South Africa to Red Sea] ..... *U. suahelicus*
- 17b Total GR 27–32 (mostly 29–31); HL 3.0–3.3 in SL; barbel length 4.3–6.0 in SL; pectoral-fin length 3.5–4.3 in SL [southern Iran to Sri Lanka and east coast of India] ..... *U. supravittatus*
- 18a Head depth through eyes 4.1–5.0 in SL; postorbital length 6.7–7.4 in SL; pectoral-fin length 3.8–4.3 in SL; no stripes on body ..... *U. davidaromi*
- 18b Head depth through eyes 4.9–6.3 in SL; postorbital length 7.3–9.3 in SL; pectoral-fin length 4.1–4.9 in SL; 0 or >2 stripes on body in life ..... **19**
- 19a Body depth at anus 4.7–5.5 in SL; peduncle depth 11–12 in SL; 1st dorsal-fin height 4.4–5.4 in SL; height of black tip of 1st dorsal fin and width of largest oblique bar and/or interspace between distal oblique bars of caudal-fin lower lobe less than eye diameter; no stripes on body in life ..... *U. mascareinsis*
- 19b Body depth at anus 4.1–4.9 in SL; peduncle depth 8.6–10 in SL; 1st dorsal-fin height 3.6–4.6 in SL; height of black tip of 1st dorsal fin and width of largest oblique bar and/or interspace between distal oblique bars of caudal-fin lower lobe subequal to or greater than eye diameter; 3 or 4 narrow yellow or bronzy stripes on body in life ..... *U. vittatus*

## *Upeneus davidaromi* Golani 2001

Darom's goatfish

PLATE 125

*Upeneus davidaromi* Golani 2001: 112, Figs. 1–4 (Eilat, Israel, Gulf of Aqaba, Red Sea); Baranes & Golani 1993\*; Uiblein & Heemstra 2010\*, 2011; Uiblein & McGrouther 2012\*; Uiblein & Causse 2013; Uiblein *et al.* 2016; Golani & Fricke 2018; Uiblein *et al.* 2020.  
*Upeneus subvittatus* (Temminck & Schlegel 1843): Ben-Tuvia & Kissil 1988\*.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 7/19 or 20 = 26 or 27. LL scales 33–35. In SL: body depth at 1st dorsal-fin origin 3.6–4.1, body depth at anus 4.4–5.0, head depth 3.8–4.2, HL 2.8–3.1, barbel length 4.0–5.0, 1st dorsal-fin height 4.1–4.9, anal-fin height 5.8–6.8, peduncle depth 10–12, caudal-fin length 3.3–3.6, pectoral-fin length 3.8–4.3, and pelvic-fin length 4.9–5.6.

Head and body silvery laterally, without stripes, white ventrally; snout and dorsal part of head and body reddish; tip of 1st dorsal fin black; total oblique bars on caudal fin 7–10: upper lobe with 4–6 bars (including one close to end of lateral line), bars pale brown proximally and dark brown or black at margin and lobe tip; lower lobe with 3 or 4 oblique bars, slightly increasing in width distally, narrowest bar usually at tip, and distalmost 2 or 3 bars almost entirely dark brown or black; barbels white. Preserved specimens darker dorsally; black tip of 1st dorsal fin and oblique bars on caudal fin retained. Attains 24 cm SL.



*Upeneus davidaromi*, 16 cm SL (Gulf of Aqaba).

**DISTRIBUTION** WIO: northern Red Sea, possibly endemic to Gulf of Aqaba.

**REMARKS** Found at ~200–600 m.

## *Upeneus doriae* (Günther 1869)

Gilded goatfish

PLATE 125

*Upeneoides doriae* Günther 1869: 445 (Bandar Abbas, Iran, Persian/Arabian Gulf).  
*Mulloidichthys auriflamma* (non Forsskål 1775): Blegvad & Løppenthin 1944\*.  
*Upeneus doriae*: Randall 1995\*; Carpenter *et al.* 1997\*; Kim & Nakaya 2003\*; Uiblein & Heemstra 2010\*, 2011; Uiblein *et al.* 2016; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 7–9/22–24 = 29–33. LL scales 33–36. In SL: body depth at 1st dorsal-fin origin 3.3–3.7, body depth at anus 3.6–4.2, head depth 4.1–4.4, HL 2.9–3.5, barbel length 4.8–6.6, 1st dorsal-fin height 4.5–5.0, anal-fin height 6.7–7.0, peduncle depth 8.6–9.6, caudal-fin length 3.5–3.8, pectoral-fin length 3.6–4.0, and pelvic-fin length 5.1–5.7.

Body silvery white laterally and ventrally, dark grey with purple iridescence dorsally; narrow yellow stripe on sides at level of upper edge of eye; tip of 1st dorsal fin pale brown to yellowish; no oblique bars on caudal fin; barbels white. Preserved specimens pale to dark brown, sometimes darker dorsally; pale yellow stripe on sides usually not retained, and yellowish pigmentation on 1st dorsal-fin tip may be lost. Attains 20 cm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf and Gulf of Oman.

**REMARKS** Found in shallow water to ~45 m.

## *Upeneus guttatus* (Day 1868)

Two-tone goatfish

PLATE 125

*Upeneoides guttatus* Day 1868: 938 (Chennai, India).  
*Upeneus crosnieri* Fourmanoir & Guézé 1967: 52, Fig. 1/c (Mitsio, Pracel Bank, Madagascar).  
*Upeneus bensasi* (non Temminck & Schlegel 1843): De Bruin *et al.* 1994\*.  
*Upeneus taeniopterus* non Cuvier in Cuvier & Valenciennes 1829: Taquet & Diringer 2007.  
*Upeneus guttatus*: Randall & Kulbicki 2006\*; Uiblein & Heemstra 2010\*, 2011\*; Motomura *et al.* 2012; Uiblein & Lisher 2013\*; Bogorodsky *et al.* 2014; Uiblein & Gledhill 2014\*; Psoadakis *et al.* 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2017\*; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2020\*.

Dorsal fin 7 spines, 9 rays; pectoral fins 12–14 rays. GR 5–8/16–19 = 22–26. LL scales 28–31. In SL: body depth at 1st dorsal-fin origin 3.9–4.7, body depth at anus 4.5–5.5, head depth 4.5–5.5, HL 3.4–3.9, barbel length 5.0–6.3, 1st dorsal-fin height 4.1–5.1, anal-fin height 5.2–6.9, peduncle depth 9.1–11, caudal-fin length 3.2–3.7, pectoral-fin length 4.5–5.3, and pelvic-fin length 4.4–5.3.

Body silvery white on sides and ventrally, sometimes mottled dark red above lateral line; total oblique bars on caudal fin 7–16: upper lobe with 5–6 (rarely 4) reddish bars of similar width or narrower than pale interspaces; lower lobe with 2–10 faint, irregular, red bars, sometimes extending onto dorsal half of lobe or merging to create a red stripe from fin base to margin; barbels mostly yellow. Preserved specimens uniformly pale brown; tip of 1st dorsal fin pale; traces of oblique bars on caudal fin usually not retained. Attains 16 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to Mozambique (off South Africa replaced by *Upeneus floros* Uiblein & Gouws 2020), Madagascar, Seychelles, Réunion, India and Sri Lanka; elsewhere to Myanmar, Vietnam, Philippines, Japan, Australia and New Caledonia.

**REMARKS** Found at 8–165 m.

## *Upeneus heemstra* Uiblein & Gouws 2014

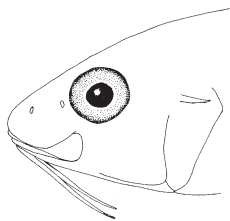
Heemstras' goatfish

PLATE 125

*Upeneus heemstra* Uiblein & Gouws 2014: 667, Figs. 4–8 (Kipini, Kenya); Bogorodsky *et al.* 2014; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2019\*; Zajonz *et al.* 2019; Uiblein *et al.* 2020. *Upeneus tragula* (Richardson 1846): Smith 1965; Kumaran & Randall 1984\*; SSF No. 196.12\*; Ben-Tuvia & Kissil 1988\*; Winterbottom *et al.* 1989\*; De Bruin *et al.* 1994\*; Randall 1995\*; Uiblein & Heemstra 2010\*, 2011.

Dorsal fin 8 spines, 9 rays; pectoral fins 13 or 14 rays. GR 4–8/14–18 = 19–24. LL scales 28–30. In SL: body depth at 1st dorsal-fin origin 3.8–4.6, body depth at anus 4.3–5.2, head depth 4.5–5.4, HL 3.2–3.7, barbel length 5.0–6.7, 1st dorsal-fin height 4.4–5.3, anal-fin height 5.4–6.2, peduncle depth 8.9–10, caudal-fin length 3.4–3.7, pectoral-fin length 4.7–5.2, and pelvic-fin length 4.5–5.0.

Head and body white or beige, slightly darker above lateral line, with irregular red, brown or black spots and/or blotches; pale brown or dark brown midlateral stripe, from snout tip through eyes to caudal-fin base; all fins with red, brown or black stripes, bars or blotches; 1st dorsal fin with large blotch at tip; total oblique bars on caudal fin 9–12 or more (8–10 bars in juveniles <7 cm SL); 4–6 bars on upper lobe and 5–6 bars on lower lobe; barbels yellow or pale brown. Preserved specimens with fin and body pigmentation mostly retained as in life. Attains 15 cm SL.



*Upeneus heemstra*, 12 cm SL, head of holotype (Kenya).  
Source: Uiblein & Gouws 2014

**DISTRIBUTION** WIO: central Red Sea to Mozambique (Inhaca I.), Seychelles, Pakistan, India and Sri Lanka.

**REMARKS** Found at 0–12 m.

## *Upeneus indicus* Uiblein & Heemstra 2010

Cochin goatfish

PLATE 125

*Upeneus indicus* Uiblein & Heemstra 2010: 43, Pls. 1, 3 (fisherman's catch, Kochi, southwestern India); Uiblein & Heemstra 2011; Uiblein & Gouws 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 15 or 16 rays. GR 9/20–22 = 29–31. LL scales 36. In SL: body depth at 1st dorsal-fin origin 3.2–3.4, body depth at anus 3.7–3.9, head depth 3.9–4.0, HL 3.2–3.3, barbel length 5.1–5.3, 1st dorsal-fin height 4.4–4.6, anal-fin height 6.5–6.7, peduncle depth 8.9–9.0, caudal-fin length 3.5–3.7, pectoral-fin length 4.2–4.5, and pelvic-fin length 5.1–5.3.

Head and body reddish dorsally, silvery pink on sides and ventrally, including anterior part of caudal fin; 3 narrow pale brown stripes on sides (1 at eye level, 1 from pectoral-fin bases, and 1 short and weak stripe below dorsal fins), with 2 bars at midbody not connecting to oblique bars on caudal fin; tip of 1st dorsal fin dark; total oblique bars on caudal fin 8 or 9, pale brown and wider than interspaces: 4 or 5 bars on upper lobe (proximal 3 slightly curved), 4 bars on lower lobe; barbels white. Preserved specimens uniformly pale brown, stripes on sides not retained; oblique bars on caudal fin weak or not retained. Attains 14 cm SL.

**DISTRIBUTION** WIO: southwestern India.

## *Upeneus margarethae* Uiblein & Heemstra 2010

Margaretha's goatfish

PLATE 125

*Upeneus margarethae* Uiblein & Heemstra 2010: 44, Pls. 1, 3 (Mozambique); Uiblein & Heemstra 2011; Bogorodsky *et al.* 2014; Uiblein & Gouws 2014; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2019\*; Uiblein *et al.* 2020.

*Upeneus bensasi*: Bauchot & Bianchi 1984 [in part]; Fischer *et al.* 1990 [in part].

Dorsal fin 8 spines, 9 rays; pectoral fins 13–15 rays. GR 5–7/15–18 = 21–24. LL scales 28–30. In SL: body depth at 1st dorsal-fin origin 3.7–4.6, body depth at anus 4.1–5.1, head depth 4.3–5.4, HL 3.2–3.8, barbel length 5.0–6.7, 1st dorsal-fin height 4.3–5.5, anal-fin height 5.4–7.1, anal-fin base 7.2–10, peduncle depth 8.7–11, caudal-fin length 3.2–3.7, pectoral-fin length 4.2–5.1, and pelvic-fin length 4.2–5.1.

Body mottled reddish or brown above lateral line, white laterally with red dots or blotches; head and body white ventrally; orange-red stripe on sides from front of snout to eyes, continuing as yellow or orange stripe to caudal-fin base, stripe sometimes covered with 1–4 horizontal series of

dark brown or black dots; tip of 1st dorsal fin pale, minute spine of fin frequently dark, forming small spot at fin origin; total oblique bars on caudal fin 9–15: upper lobe with 4 or 5 (rarely 6) bars (with 1 at lobe base), lower lobe with broad red band on dorsal two-thirds, and with 6–9 thin red oblique bars in narrow pale ventral zone, covered by or crossing the red band; barbels white. Preserved specimens uniformly pale brown, stripes on sides lost, and remains of bars and band on caudal fin often retained. Attains 13 cm SL.



*Upeneus margarethae*, 11 cm TL (Mozambique). © Alvheim © IMR

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Somalia to Mozambique, Madagascar, southwestern India and Sri Lanka; elsewhere to northern Australia and Arafura Sea.

**REMARKS** Found at 8–105 m.

### *Upeneus mascareinsis* Fourmanoir & Guézé 1967

Mascarene goatfish

PLATE 125

*Upeneus mascareinsis* Fourmanoir & Guézé 1967: 50, Fig. I/b (Réunion, Mascarenes); Letourneur *et al.* 2004; Uiblein & Heemstra 2010\*, 2011; Uiblein & McGrouther 2012\*; Uiblein & Causse 2013; Uiblein *et al.* 2016; Fricke *et al.* 2018; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 7–9/20–22 = 27–30. LL scales 34–37. In SL: body depth at 1st dorsal-fin origin 3.8–4.7, body depth at anus 4.7–5.5, head depth 4.2–5.0, HL 2.9–3.3, barbel length 4.2–5.6, 1st dorsal-fin height 4.4–5.4, anal-fin height 6.2–7.9, peduncle depth 11–12, caudal-fin length 3.4–3.8, pectoral-fin length 4.1–4.7, and pelvic-fin length 5.0–5.8.

Body dark orangish red dorsally with some gold iridescence, mottled red laterally (no stripes on sides), and white ventrally; tip of 1st dorsal fin dark; total oblique bars on caudal fin 7–10: 3–6 bars on upper lobe, pale brown proximally and dark brown or black at margin; 3 or 4 bars on lower lobe, brown but darker distally (last 2 bars entirely dark brown or black), increasing slightly in width distally (bar at lobe tip smallest, and width of widest bar and/or space between distalmost bars less than eye diameter); barbels white. Preserved specimens uniformly brown or slightly darker dorsally; dark tip of 1st dorsal fin and oblique bars on caudal fin retained. Attains 18 cm SL.

**DISTRIBUTION** WIO: Mozambique, Madagascar and Réunion.

**REMARKS** Found at ~100–400 m.

### *Upeneus moluccensis* (Bleeker 1855)

Goldband goatfish

PLATE 126

*Upeneoides moluccensis* Bleeker 1855: 409 (Ambon I., Moluccas, Indonesia). *Upeneus moluccensis*: Kumaran & Randall 1984\*; Ben-Tuvia & Kissil 1988\*; De Bruin *et al.* 1994\*; Uiblein & Heemstra 2010\*, 2011; Bogorodsky *et al.* 2014; Psomadakis *et al.* 2015\*; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 14–16 rays. GR 7–9/18–21 = 26–29. LL scales 33–36. In SL: body depth at 1st dorsal-fin origin 3.7–4.3, body depth at anus 4.4–4.8, head depth 4.3–4.9, HL 3.4–3.7, barbel length 5.6–6.7, 1st dorsal-fin height 4.4–5.3, anal-fin height 6.7–7.8, peduncle depth 9.8–12, caudal-fin length 3.3–3.8, pectoral-fin length 3.9–4.3, and pelvic-fin length 4.9–6.0.

Body silvery rose, with conspicuous yellow or gold stripe on sides from eyes to upper part of caudal-fin base, body darker above stripe; tip of 1st dorsal fin dark; caudal-fin upper lobe with 6–8 oblique, thin red bars, no bars on lower lobe, but with broad red band covering entire lower lobe except distal inner margin, which is somewhat darker; barbels white. Preserved specimens pale brown, slightly darker dorsally; stripe on sides faint or not retained; dark tip of 1st dorsal fin faint; oblique bars on caudal-fin upper lobe retained, but most pigmentation lost on lower lobe. Attains 18 cm SL.



*Upeneus moluccensis*, 11 cm SL (Kenya). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (northern KwaZulu-Natal), Madagascar and Réunion, and to Pakistan and India; Lessepsian migrant to eastern Mediterranean Sea; elsewhere to Indonesia, Taiwan, southern Japan, Caroline Is., New Guinea, Australia and New Caledonia.

**REMARKS** Found at 1–99 m.

*Upeneus niebuhri* Guézé 1976

Niebuhr's goatfish

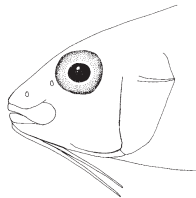
PLATE 126

*Upeneus niebuhri* Guézé 1976: 596 (Gulf of Suez, northern Red Sea); Ben-Tuvia & Kissil 1988; Uiblein & Gouws 2014\*; Golani & Fricke 2018 [in part]; Uiblein *et al.* 2020.

*Upeneus tragula* (non Richardson 1846): Bauchot *et al.* 1985; Ben-Tuvia & Golani 1989.

Dorsal fin 8 spines, 9 rays; pectoral fins 13 or 14 rays. GR 6/16 or 17 = 22 or 23. LL scales 29 or 30. In SL: body depth at 1st dorsal-fin origin 3.9–4.5, body depth at anus 4.5–5.3, head depth 4.9–5.1, HL 3.3–3.5, barbel length 4.5–4.7, 1st dorsal-fin height 5.3, peduncle depth 10, caudal-fin length 3.4, pectoral-fin length 4.8–4.9, and pelvic-fin length 4.7.

Head and body beige, darker above lateral line, with irregular red, brown or black spots and blotches; brown midlateral stripe from behind opercle to caudal-fin base; all fins with brown or black stripes, bars or blotches; tips of both dorsal fins with dark brown blotches; caudal fin with 8 oblique bars: 3 or 4 bars on upper lobe, 4 or 5 bars on lower lobe; barbels pale brown. Preserved specimens retain fin and body pigmentation. Attains at least 11 cm SL.



*Upeneus niebuhri*, 7 cm SL, head (Gulf of Suez). Source: Uiblein & Gouws 2014

**DISTRIBUTION** WIO: northern Red Sea, possibly endemic to Gulf of Suez.

**REMARKS** Found in relatively shallow water.

*Upeneus oligospilus* Lachner 1954

Short-fin goatfish

PLATE 126

*Upeneus oligospilus* Lachner 1954: 525, Pl. 14d (Tarut Bay, Persian/Arabian Gulf); Uiblein & Heemstra 2010\*, 2011; Uiblein & Gouws 2014; Uiblein *et al.* 2016; Uiblein *et al.* 2020.

*Upeneus tragula* (non Richardson 1846): Kuronuma & Abe 1972\*; Randall & Kulbicki 2006.

Dorsal fin 8 spines, 9 rays; pectoral fins 13 or 14 rays. GR 4–7/15–18 = 20–24. LL scales 29–31. In SL: body depth at 1st dorsal-fin origin 3.8–4.6, body depth at anus 4.6–5.4, head depth 4.3–5.3, HL 3.0–3.5, barbel length 4.5–6.4, 1st dorsal-fin height 4.5–5.6, anal-fin height 5.8–6.8, peduncle depth 9.4–10, caudal-fin length 3.5–4.1, pectoral-fin length 4.6–5.7, and pelvic-fin length 4.6–6.

Body greenish grey dorsally, white or beige ventrally, with irregular dark reddish brown spots and blotches on body and paired fins; brown or dark brown stripe on sides, from snout tip to eyes and caudal-fin base; dark marks on or near tips of both dorsal fins; total oblique bars on caudal fin 6–10 in adults ( $\leq 6$  bars in juveniles  $< 7$  cm SL): upper lobe with 3–5 dark brown or black bars, lower lobe with 3–5 brown to black bars; barbels yellow. Preserved specimens retain most of body colouration, including brown stripe on sides, dark dorsal-fin tips, and dark oblique bars on caudal fin. Attains 17 cm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf.

**REMARKS** Found at 0–13 m.

*Upeneus pori* Ben-Tuvia & Golani 1989

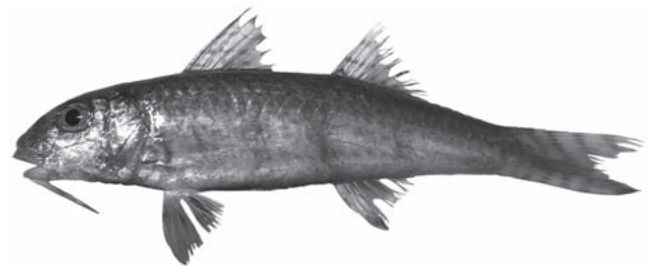
Por's goatfish

PLATE 126

*Upeneus pori* Ben-Tuvia & Golani 1989: 105, Figs. 1–2 (Eilat, Israel, Gulf of Aqaba, Red Sea); Randall 1995\*; Kim & Nakaya 2002\*; Uiblein & Heemstra 2010\*, 2011; Yamashita *et al.* 2011; Uiblein & Lisher 2013\*; Uiblein & White 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2017; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2020\*.

Dorsal fin 7 spines, 9 rays; pectoral fins 13–15 rays. GR 7 or 8/18–21 = 25–29. LL scales 28–30. In SL: body depth at 1st dorsal-fin origin 4.1–4.7, body depth at anus 4.5–5.4, head depth 4.7–5.6, HL 3.4–3.9, barbel length 5.2–6.2, 1st dorsal-fin height 4.5–5.1, anal-fin height 5.2–6.4, peduncle depth 9.5–11, caudal-fin length 3.4–3.8, pectoral-fin length 4.5–5.7, and pelvic-fin length 4.4–5.4.

Body greyish or red-brown, darker dorsally, with grey to reddish brown spots extending to midsides; 1st dorsal fin not pigmented; total oblique bars on caudal fin 11–16: 5–6 red-brown bars on upper lobe, 5–9 red-brown or grey bars on ventral half of lower lobe, extending to broad brown or dark grey stripe along middle of lobe, and 3 or 4 brownish red or grey bars on inner dorsal half of lower lobe; barbels white or creamy white. Preserved specimens darker dorsally, dark caudal-fin markings often retained. Attains 14 cm SL.



*Upeneus pori*, 9 cm SL (Madagascar). J Escobar-Porras © NRF-SAIAB

**DISTRIBUTION** WIO: northern Red Sea, and Madagascar; Lessepsian migrant to Mediterranean Sea.

**REMARKS** Known from shallow littoral to 52 m.

### *Upeneus randalli* Uiblein & Heemstra 2011

Randall's goatfish

PLATE 126

*Upeneus randalli* Uiblein & Heemstra 2011: 589, Figs. 1–2 (off southern Kuwait, Persian/Arabian Gulf); Uiblein & Heemstra 2011; Uiblein & Gouws 2014; Uiblein *et al.* 2016; Uiblein *et al.* 2019\*; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 14 rays. GR 6 or 7/17–19 = 23–25. LL scales 28–30. In SL: body depth at 1st dorsal-fin origin 4.1–4.4, body depth at anus 4.6–5.4, head depth 4.7–5.3, HL 3.3–3.7, barbel length 4.9–6.1, 1st dorsal-fin height 4.5–5.3, anal-fin height 5.3–6.8, anal-fin base 8.9–11, peduncle depth 9.4–10, caudal-fin length 3.3–3.7, pectoral-fin length 4.6–4.9, and pelvic-fin length 4.5–5.0.

Body marbled reddish dorsally, white ventrally; weak beige stripe on sides at eye level, from upper rear margin of opercle to peduncle, and 3 horizontal series of black dots at level of lateral line; tip of 1st dorsal fin pale; total oblique bars on caudal fin 11–13: upper lobe with 4 or 5 red bars, and lower lobe with 6–8 red bars; barbels white. Preserved specimens uniformly pale brown, dots on body not retained; stripe on sides vague; oblique bars on caudal fin not retained apart from traces on lower lobe. Attains 11 cm SL.

**DISTRIBUTION** WIO: Persian/Arabian Gulf and inner Gulf of Oman (Iran).

**REMARKS** Found at 15–20 m.

### *Upeneus saiab* Uiblein & Lisher 2013

SAIAB goatfish

PLATE 126

*Upeneus saiab* Uiblein & Lisher 2013: 86, Figs. 1–2 (Angoche, Mozambique); Uiblein & White 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2017; Uiblein *et al.* 2020\*.

Dorsal fin 7 spines, 9 rays; pectoral fins 13 or 14 or 15 rays. GR 8 or 9/20 or 21 = 29. LL scales 29 or 30. In SL: body depth at 1st dorsal-fin origin 4.2–4.9, body depth at anus 5.2–6.1, head depth 5.0–5.5, HL 3.3–3.4, barbel length 4.6–5.3, 1st

dorsal-fin height 4.6–5.2, anal-fin height 6.2–7.1, peduncle depth 11, caudal-fin length 3.4–3.7, pectoral-fin length 4.7–5.0, and pelvic-fin length 4.7–4.9.

Body and postorbital region ochre dorsally, white ventrally, bordered at midbody by faint ochre lateral stripe from behind eyes to caudal-fin base; head ochre from snout to cheek and white ventrally; both dorsal fins pale with reddish stripes; caudal-fin upper lobe with 5 oblique red bars (with 1 at lobe tip and 1 close to lobe base); caudal-fin lower lobe mostly covered with red pigmentation, and lobe tip black; barbels white. Preserved specimens pale brown; traces of caudal-fin oblique bars and dark lower-lobe tip may be retained. Attains 10 cm SL.

**DISTRIBUTION** Known only from the type specimens collected from northern Mozambique.

**REMARKS** Found at 29–40 m.

### *Upeneus seychellensis* Uiblein & Heemstra 2011

Tailstripe goatfish

PLATES 126 & 127

*Upeneus seychellensis* Uiblein & Heemstra 2011: 641, Fig. 1 (Seychelles Bank); Uiblein & Lisher 2013\*; Uiblein & White 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2017; Uiblein *et al.* 2020\*.

Dorsal fin 7 spines, 9 rays; pectoral fins 14 or 15 rays. GR 7/18 or 19 = 25 or 26. LL scales 29–31. In SL: body depth at 1st dorsal-fin origin 4.5–5.0, body depth at anus 5.4–5.5, head depth 5.1–5.5, HL 3.3–3.7, barbel length 4.5–6.0, 1st dorsal-fin height 4.9–5.3, anal-fin height 6.5–7.0, peduncle depth 10–11, caudal-fin length 3.4–3.5, pectoral-fin length 4.7–4.8, and pelvic-fin length 4.8–5.0.

Head and body reddish dorsally, white on sides and ventrally; both dorsal fins pale with reddish stripes; caudal-fin upper lobe with 5 oblique red bars (4 bars distal to fork and 1 bar close to lobe base); caudal-fin lower lobe with broad carmine stripe, bordered by thin white margin dorsally and wider pale margin ventrally, and lobe tip black; barbels pale reddish. Preserved specimens pale beige, brown stripe on sides weak, and traces of caudal-fin oblique bars and dark lower-lobe tip; dorsal-fin pigmentation not retained. Attains 12 cm SL.

**DISTRIBUTION** Known only from the type specimens collected from the Seychelles Bank.

**REMARKS** Found at 60 m.



*Upeneus suahelicus* Uiblein & Heemstra 2010

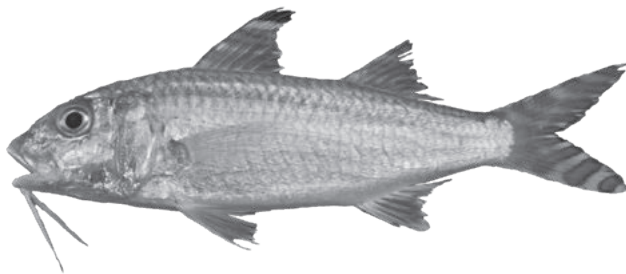
Swahili goatfish

PLATE 127

*Upeneus suahelicus* Uiblein & Heemstra 2010: 50; Pls. 2–3 (off Malindi, Kenya); Uiblein & Heemstra 2011; Uiblein & Gouws 2015\*; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 13–17 rays. GR 6–8/18–21 = 26–28. LL scales 33–35. In SL: body depth at 1st dorsal-fin origin 3.3–4.0, body depth at anus 3.8–4.6, head depth 3.9–4.8, HL 3.2–3.5, barbel length 4.7–6.5, 1st dorsal-fin height 3.8–4.8, anal-fin height 5.7–6.8, peduncle depth 8.6–10, caudal-fin length 3.3–3.8, pectoral-fin length 3.9–4.4, and pelvic-fin length 4.7–5.6. Caudal-fin lower lobe sometimes considerably shorter than upper lobe in adults.

Head and body reddish brown dorsally, silvery white laterally, white ventrally; 2 yellow or pale brown stripes on midsides, each connecting to oblique bar on caudal fin; tip of 1st dorsal fin dark; total oblique bars on caudal fin 7–11, widths of pale brown bars and white interspaces nearly equal: 4–6 bars on upper lobe (upper 3 bars slightly curved proximally), and 3–5 bars on lower lobe (distalmost bar widest); barbels white. Preserved specimens pale brown, sometimes darker dorsally; stripes on sides lost; dark tip of 1st dorsal fin and oblique bars on caudal fin entirely retained. Attains 15 cm TL.



*Upeneus suahelicus*, 10 cm SL (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: southern Red Sea, Kenya to South Africa (KwaZulu-Natal) and Madagascar.

**REMARKS** Found at 20–99 m.

*Upeneus sulphureus* Cuvier 1829

Sulphur goatfish

PLATE 127

*Upeneus sulphureus* Cuvier in Cuv. & Val. 1829: 450 (Java, Indonesia); Kumaran & Randall 1984\*; Ben-Tuvia & Kissil 1988\*; De Bruin *et al.* 1994\*; Uiblein & Heemstra 2010\*, 2011; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 7 or 8/19–22 = 27–30. LL scales 34–37. In SL: body depth at 1st dorsal-fin origin 3.0–3.9, body depth at anus 3.8–4.2, head depth 4.0–4.4, HL 3.2–3.6, barbel length 4.7–6.5, 1st dorsal-fin height 3.7–4.5, anal-fin height 5.3–6.4, peduncle depth 8.6–9.5, caudal-fin length 3.3–3.7, pectoral-fin length 3.8–4.6, and pelvic-fin length 4.5–5.6.

Body pale brown dorsally, silvery white on sides and ventrally; 2 conspicuous yellow stripes on sides; tip of 1st dorsal fin black; no oblique bars on caudal-fin lobes, upper lobe grey at base and lower lobe yellowish at base, margins of both lobes dark; barbels white. Preserved specimens pale brown, with darker reddish or brown area at midbody, but stripes generally not retained; black tip of 1st dorsal fin retained; caudal-fin pigmentation partly retained. Attains at least 14 cm SL.



*Upeneus cf. sulphureus*, 13 cm TL (Mozambique). © Alvheim © IMR

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, Persian/Arabian Gulf, Red Sea, Kenya to South Africa (Thukela Bank, KwaZulu-Natal), Madagascar, Mascarenes, India and Sri Lanka; elsewhere to Indonesia, Philippines, southern Japan, Australia, New Caledonia and Fiji.

**REMARKS** Found at ~20–60 m. Probably occurs together with a 2nd, very similar species in the WIO (F Uiblein, unpub. data).

*Upeneus sundaicus* (Bleeker 1855)

Ochre-banded goatfish

PLATE 127

*Upeneoides sundaicus* Bleeker 1855: 411 (Ambon I., Moluccas, Indonesia). *Upeneus sundaicus*: Kumaran & Randall 1984\*; De Bruin *et al.* 1994\*; Randall 1995\*; Uiblein & Heemstra 2010\*, 2011; Uiblein & Gouws 2014; Uiblein *et al.* 2016; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 13–15 rays. GR 4–6/13–17 = 18–22. LL scales 31–34. In SL: body depth at 1st dorsal-fin origin 3.6–4.5, body depth at anus 4.2–4.8, head depth 4.2–5.3, HL 3.3–3.8, barbel length 4.8–6.3, 1st dorsal-fin height 3.7–4.5, anal-fin height 5.6–6.7, peduncle depth 7.7–9.1, caudal-fin length 3.2–3.8, pectoral-fin length 4.5–5.3, and pelvic-fin length 4.3–5.3.

Body reddish or dark grey dorsally, silvery on sides, pinkish ventrally; very pale brown or ochre stripe on sides, from behind eyes to caudal-fin base; tip of 1st dorsal fin not dark; caudal-fin upper lobe with 5 or 6 weak red or grey bars; caudal-fin lower lobe without bars, but fully or partly covered with reddish or greyish band parallel to margin; barbels yellow. Preserved specimens pale brown, sometimes darker dorsally; stripe on sides sometimes retained; caudal-fin pigmentation not retained. Attains at least 17 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, India, Sri Lanka and Mauritius; elsewhere to Vietnam, Indonesia, Philippines, Australia and New Guinea.

**REMARKS** Found at 3–20 m.

### *Upeneus supravittatus* Uiblein & Heemstra 2010

Longfin goatfish

PLATE 127

*Upeneus supravittatus* Uiblein & Heemstra 2010: 53, Pls. 2–3 (Slave Island market, Colombo, Sri Lanka); Uiblein & Heemstra 2011; Psomadakis *et al.* 2015\*; Uiblein & Gouws 2015\*; Uiblein *et al.* 2016; Uiblein *et al.* 2019; Uiblein *et al.* 2020.

*Upeneus taeniopterus*: Kumaran & Randall 1984\*; Winterbottom *et al.* 1989\*.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 7–9/19–23 = 27–32. LL scales 34–36. In SL: body depth at 1st dorsal-fin origin 3.3–4.0, body depth at anus 4.0–4.5, head depth 3.8–4.5, HL 3.0–3.3, barbel length 4.3–6.0, 1st dorsal-fin height 3.9–4.6, anal-fin height 5.8–6.7, peduncle depth 8.9–10, caudal-fin length 3.2–3.7, pectoral-fin length 3.5–4.3, and pelvic-fin length 4.7–5.6. Caudal-fin lower lobe sometimes considerably shorter than upper lobe in adults.

Head and body brassy or silvery grey, slightly darker dorsally, pale rose laterally and pale ventrally; 2 pale brown stripes on sides (from upper rear margin of opercle and from pectoral-fin base to caudal-fin base), each connecting to oblique bar on caudal fin; tip of 1st dorsal fin dark; total oblique bars on caudal fin 8–11, widths of brown bars and pale interspaces nearly equal: 4–6 bars on upper lobe (upper 3 bars strongly curved proximally, distalmost bar widest), 3–5 bars on lower lobe; barbels white. Preserved specimens uniformly brown, sometimes darker dorsally; stripes on sides lost; dark tip of 1st dorsal fin and oblique bars on caudal fin retained. Attains 19 cm SL.

**DISTRIBUTION** Indian Ocean. WIO: southern Iran (Gulf of Oman) to India, Sri Lanka; elsewhere to east coast of India and Myanmar.

**REMARKS** Found to ~40 m.

### *Upeneus taeniopterus* Cuvier 1829

Bandtail goatfish

PLATE 127

*Upeneus taeniopterus* Cuvier in Cuvier & Valenciennes 1829: 451 (Trincomalee, Sri Lanka); Winterbottom *et al.* 1989\*; Uiblein & Heemstra 2010, 2011; Uiblein & Gouws 2014; Uiblein *et al.* 2016\*; Uiblein *et al.* 2020.

*Upeneus arge* Jordan & Evermann 1903: 187 (Honolulu, Oahu I., Hawaii); Randall 2001\*.

Dorsal fin 8 spines, 9 rays; pectoral fins 13–15 rays. GR 5–7/15–18 = 21–24. LL scales 36–39. In SL: body depth at 1st dorsal-fin origin 3.9–4.6, body depth at anus 4.4–5.0, head depth 4.5–5.4, HL 3.5–4.0, barbel length 4.5–5.8, 1st dorsal-fin height 4.3–5.0, anal-fin height 5.8–6.9, peduncle depth 8.7–11, caudal-fin length 3.1–3.6, pectoral-fin length 5.1–6.0, and pelvic-fin length 5.1–6.0.

Body pale grey, slightly darker dorsally, with red scale markings and faint red patches dorsally and laterally; 2 stripes on sides: pale brown upper stripe from snout or eyes to caudal-fin base, and shorter, fainter, more yellowish lower stripe from pectoral-fin base to peduncle, and sometimes a very weak 3rd yellow stripe below; tip of 1st dorsal fin pale; total oblique bars on caudal fin 9–14 (7–9 in fish <10 cm SL), bars mostly red or brown becoming black at margin and lobe tips: upper lobe with 5–8 bars (slightly curved proximally), and lower lobe with 4–6 bars; barbels yellow. Preserved specimens uniformly pale brown, stripes on sides lost; black parts of oblique bars on caudal fin retained. Attains 30 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique (Pinda Bank), oceanic islands and atolls including Laccadives, Maldives, Seychelles, Rodrigues and Chagos, and Sri Lanka; elsewhere to French Polynesia, Ryukyu Is., and Hawaii.

**REMARKS** Found at 0–50 m, but mostly on shallow sandy bottom of less than 10 m.

### *Upeneus vittatus* (Forsskål 1775)

Yellow-striped goatfish

PLATE 127

*Mullus vittatus* Forsskål in Niebuhr 1775: 31, x (Jeddah, Saudi Arabia, Red Sea [probably off Eritrea, Red Sea]).

*Upeneus vittatus*: Blegvad & Løppenthin 1944; Smith 1965\*; SSF No. 196.13\*; Kumaran & Randall 1984\*; Ben-Tuvia & Kissil 1988\*; Heemstra *et al.* 2004; Fricke *et al.* 2009; Uiblein & Heemstra 2010\*, 2011; Uiblein & Gouws 2015\*; Uiblein *et al.* 2016; Fricke *et al.* 2018; Golani & Fricke 2018; Arndt & Fricke 2019; Uiblein *et al.* 2020.

Dorsal fin 8 spines, 9 rays; pectoral fins 15–17 rays. GR 5–9/18–21 = 25–29. LL scales 35–37. In SL: body depth at 1st dorsal-fin origin 3.3–4.2, body depth at anus 4.1–4.9, head depth 3.8–4.7, HL 3.1–3.4, barbel length 4.8–6.4, 1st dorsal-fin height 3.6–4.6, anal-fin height 5.5–6.9, peduncle depth 8.6–10, caudal-fin length 3.2–3.7, pectoral-fin length 4.2–4.9, and pelvic-fin length 5.0–5.7.

Body white to silvery on sides, reddish brown dorsally, white ventrally; 2 yellow or pale brown stripes on sides (from eyes to caudal-fin base, and from pectoral-fin base to peduncle), each connecting to oblique bar on caudal fin; another 2 brown or pale brown stripes dorsally (from upper rear margin of opercle to behind 2nd dorsal fin, and the other below 1st dorsal fin indistinct and shorter); tip of 1st dorsal fin dark (height of pigmented area similar to widest bar on caudal-fin lower lobe); faint yellowish patches along pelvic- and anal-fin bases; total oblique bars on caudal fin 7–10: upper lobe with 4–6 brown or dark brown bars, lower lobe with 3 (rarely 4) bars, increasing in width distally, distalmost bar black or dark brown, other bars paler brown, width of largest bar and/or pale interspace between distalmost bars on lower lobe equal

to or greater than eye diameter, and tip of lower lobe pale; barbels white. Preserved specimens pale brown, slightly darker dorsally; all stripes on sides lost; dark tip of 1st dorsal fin and oblique bars on caudal fin retained. Attains 28 cm SL.

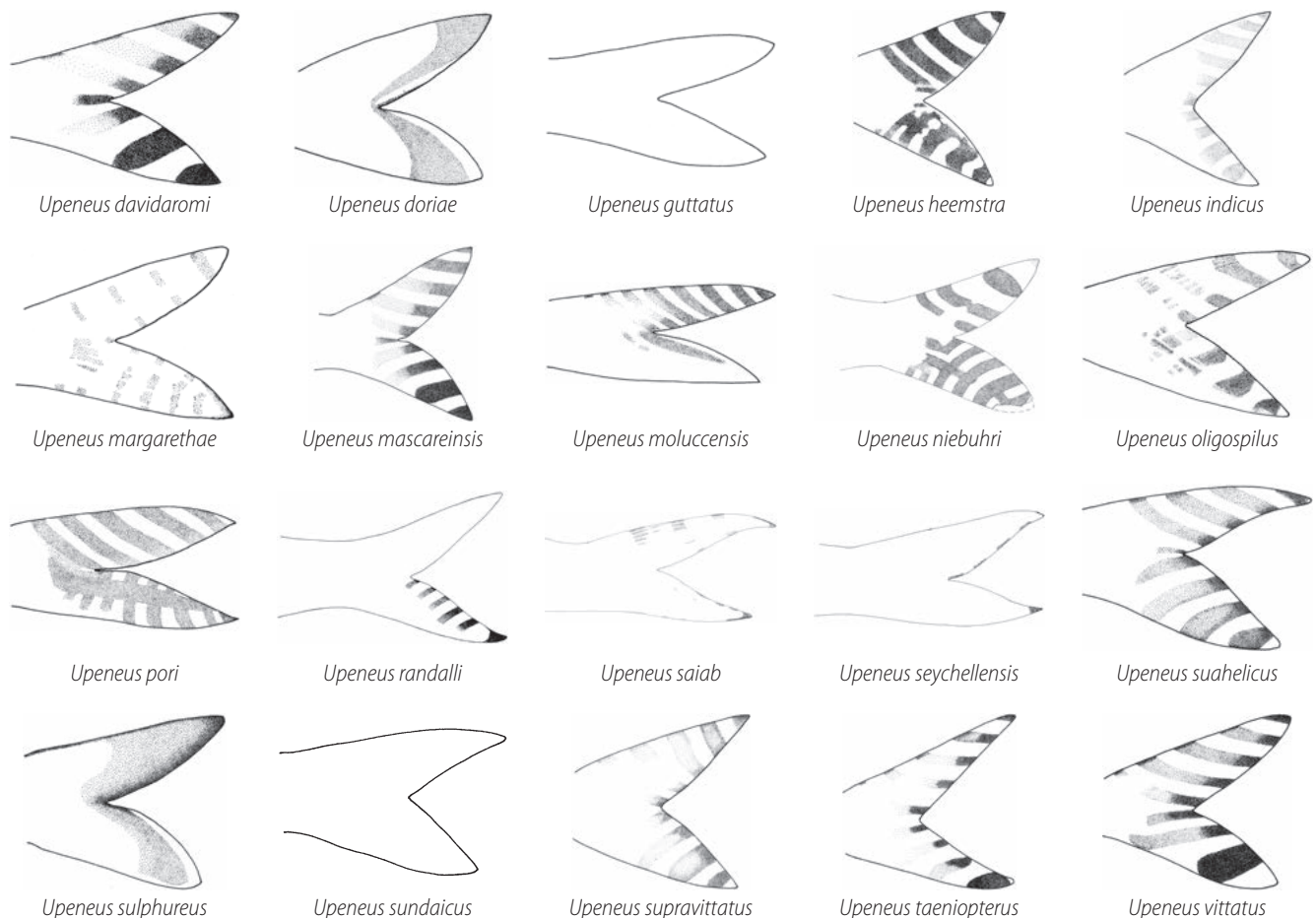


*Upeneus vittatus*, 14 cm SL (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Tanzania to South Africa (Eastern Cape), Madagascar, Mascarenes, Pakistan and India; elsewhere to southern Japan, Australia, New Caledonia, Samoa, Marquesas Is., Line Is. and Hawaii.

**REMARKS** Found to at least 100 m.

The caudal-fin patterns of *Upeneus* species are often diagnostic and retained after preservation. Source: Uiblein & Heemstra 2010



## FAMILY BRANCHIOSTEGIDAE

### Tilefishes and sand-tilefishes

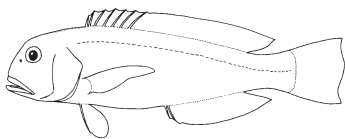
James K Dooley

For systematic consistency only (*sensu* Eschmeyer 1990), fishes of the family Branchiostegidae (= Malacanthidae) are treated here as a single family with 2 subfamilies. However, some authors (e.g., Dooley 1978; Marino & Dooley 1982) consider these 2 subfamilies morphologically distinct enough to be treated as separate families: the Malacanthidae and Branchiostegidae. An ongoing biochemical and morphological phylogenetic study of this group by the author will hopefully further test these hypotheses; two molecular clades initially indicated using three genes.

Members of *Caulolatilus* (from western North Atlantic, Caribbean Sea and eastern Pacific) and *Lopholatilus* (from western Atlantic) inhabit self-constructed burrows in the substrate; this habit has not yet been confirmed for members of *Branchiostegus* (from eastern Atlantic, Red Sea and Indo-Pacific) although it is probable. Members of *Malacanthus* and *Hoplostilatus*, largely from the Indo-Pacific, similarly construct mounds or burrows. The Branchiosteginae (*Lopholatilus*, *Caulolatilus* and *Branchiostegus*) are deep-bodied and generally deep-dwelling (usually at 200–300 m), whereas the Malacanthinae (*Malacanthus* and *Hoplostilatus*) are elongate and usually inhabit shallower water (commonly in <60 m). Gonadal sex reversal (protogynous) has been documented for some species within the Branchiosteginae and is suspected for some members of the Malacanthinae; although sexual dimorphism is not obvious, larger specimens of a species are usually male. Hybridisation is also known among several species of *Branchiostegus* from the Sea of Japan and the East China Sea.

#### KEY TO SUBFAMILIES

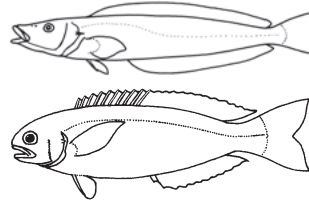
- 1a Predorsal ridge present; body shape quadriform, body depth 25–29% SL (usually <4 in SL); total dorsal-fin elements 22; total anal-fin elements 13 or 14; length of dorsal-fin base plus anal-fin base 84–97% SL (usually <90% SL); opercle spine blunt, tab-like; preopercle finely serrate, but without spine at angle..... **Branchiosteginae**



Continued...

#### KEY TO SUBFAMILIES

- 1b No predorsal ridge; body slender, elongate or fusiform, body depth 12–26% SL (usually >4 in SL); total dorsal-fin elements 23–64; total anal-fin elements 14–56; length of dorsal-fin base plus anal-fin base 84–137% SL (>100% SL in *Malacanthus*; 80–90% SL in *Hoplostilatus*); opercle spine sharp; preopercle serrated (*Hoplostilatus*) or smooth (*Malacanthus*); preopercle spine absent (*Malacanthus*) or preopercle with reduced or pronounced spine (*Hoplostilatus*)..... **Malacanthinae**



## SUBFAMILY BRANCHIOSTEGINAE

### Tilefishes

Body shape quadriform, head rounded to square; body depth 25–29% SL; dorsal fin and anal fin each long and continuous. Predorsal ridge (raised seam on top of head) present. Preopercle upper margin finely serrated to angle or just below; lower (horizontal) margin with few or no serrae; no enlarged spine at angle. Opercle with single, soft, blunt spine. Dorsal fin 6 or 7 spines, 15 or 16 rays; anal fin 2 spines, 11 or 12 rays; caudal fin 17 principle rays, fin truncate to slightly rounded or doubly emarginate (never lunate or forked), dorsal and ventral margins may have rays with slightly elongated tips. Mouth terminal or slightly inferior and somewhat oblique, reaching to under or just past vertical at rear margin of pupil. Gill rakers well-developed, total on 1st arch 18–21. Lateral line slightly arched anteriorly and reaching to just past hypural plate on caudal fin. Scales mostly ctenoid, some cycloid scales on head, with a number of replacement scales also on head region; LL pored scales 47–51. Important internal diagnostic characters include: (1) vertebrae 10 + 14 (*Branchiostegus*); (2) 1st and sometimes 2nd haemal spines with fused parapophysis forming concave process enclosing rear portion of a well-developed swimbladder; (3) anteroposteriorly compressed skull with well-elevated supraoccipital crest; and (4) highly complex adductor mandibulae musculature with 5 major subdivisions. Pelagic larvae with numerous serrated ridges on head, but no elongate spines on head or fins.

Adults and juveniles relatively deep-dwelling (45–612 m; usually >200 m) and bottom-dwelling, over sand, clay or mud. Important food fish in Indo-Pacific areas, but apparently not

in WIO. The subfamily consists of 3 genera (*Lopholatilus*, *Caulolatilus* and *Branchiostegus*) and ~27 species, plus 3 hybrids, worldwide in tropical to cold-temperate waters; only *Branchiostegus* represented in WIO.

## GENUS *Branchiostegus* Rafinesque 1815

Occur mostly in Indo-Pacific, generally near the edge of the continental shelf, and not usually found around small oceanic islands, which lack the required deep, soft bottom of mud, silt or sand. About 16 species worldwide (at least 1 undescribed), and at least 3 hybrids found in the Sea of Japan and East China Sea; 2 species in WIO.

### KEY TO SPECIES

- 1a Dorsal fin 6 spines, 16 rays; ventral mandible surface with 6 pores on each side; body with 18 or 19 distinctly dark (blue-violet) tapering vertical bars, shorter anteriorly and posteriorly; opercle with dark spot; no rows of dark spots on scales surrounding pectoral fins; no dark markings along membranes of dorsal-fin base; caudal fin with upper and lower portions dusky, and 7–9 central yellow-orange stripes (no yellow spots), one stripe beginning as large area over peduncle and narrowing near the caudal-fin margin; predorsal ridge not darkly pigmented ..... *B. doliatus*
- 1b Dorsal fin 7 spines, 15 rays; ventral mandible surface with 5 pores on each side; no dark tapering vertical bars on sides; midbody with 7–9 rows of dark spots on scales under to above pectoral fins; dorsal-fin base with series of dark markings on membranes; caudal fin gold above and olive-brown below, with vivid yellow-gold areas and spots; predorsal ridge darkly pigmented; no dark spot on opercle ..... *B. sawakinensis*

## *Branchiostegus doliatus* (Cuvier 1830)

Ribbed tilefish

PLATE 128

*Latilus doliatus* Cuvier in Cuv & Val. 1830: 371, Pl. 130 (Mauritius, Mascarenes); Swainson 1839 [as *doleatus*].

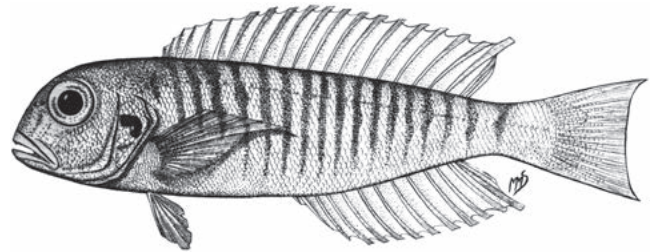
*Branchiostegus japonicus* (non Houttuyn 1782): Fowler 1925.

*Branchiostegus doliatus*: Barnard 1927; Smith 1949; Barnard 1950; Fourmanoir & Guézé 1962; SSF No. 197.1\*; Dooley & Kailola 1988; Fricke 1999; Heemstra & Heemstra 2004; Fricke *et al.* 2009.

Dorsal fin 6 spines, 16 rays; anal fin 2 spines, 12 rays; pectoral fins 18 rays; caudal fin 17 rays. Body depth 3.6–4 in SL; HL 3.7–4.2 in SL; suborbital depth (allometric) 6.3–10 in HL; eye diameter (allometric) 2.8–3.7 in HL; dorsal-fin height 11.1 in SL, length 1.7–1.9 in SL. Preopercle margin with fine serrae

only as far as angle, lower limb smooth; opercle with broad, blunt spine. Branchiostegal rays 6; GR 19–21 on 1st arch. LL scales 49–53, continuous, pored; 6 mandibular pores to preopercle; cheek scale rows 9–14; opercle scale rows 5–9; scale rows 7–10 above lateral line, 20–30 below.

Body rose-pink, with 16–18 dark (violaceous) tapering bars on body; area above eyes darkly pigmented, but predorsal ridge not darkly pigmented; characteristic dark spot on opercle; all fins except caudal fin transparent, and no markings on dorsal-fin membrane; no dark spot in pectoral-fin axil; caudal fin with dusky upper and lower portions and 7–9 central yellow-orange stripes (no yellow spots), one stripe beginning as large area over peduncle and narrowing near the caudal-fin margin. Attains 36 cm SL, 43 cm TL.



*Branchiostegus doliatus*, 26 cm TL. Source: SSF

**DISTRIBUTION** WIO: Mozambique (Xai-Xai) to South Africa (KwaZulu-Natal), Madagascar, Mauritius and Réunion (may be more widespread).

**REMARKS** One of the few species of *Branchiostegus* found off islands and not restricted to the edge of the continental shelf; known from 9–600 m.

## *Branchiostegus sawakinensis* Amirthalingam 1969

Freckled tilefish

PLATE 128

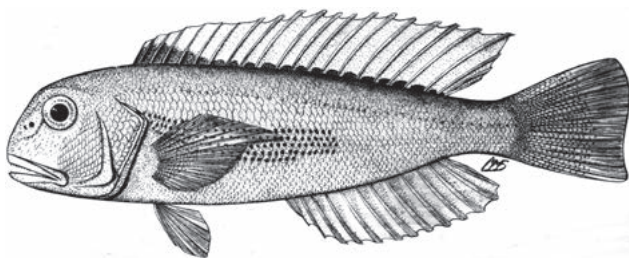
*Branchiostegus japonicus* (non Houttuyn 1782): Barnard 1927; Fowler 1934; SFSA No. 415.

*Branchiostegus sawakinensis* Amirthalingam 1969: 129, Pls. 1–3 (Suakin, Sudan, Red Sea); Dor 1984; SSF No. 197.2\*; Baranes & Golani 1993; Goren & Dor 1994.

Dorsal fin 7 spines, 15 rays; anal fin 2 spines, 11 or 12 rays; pectoral fins 18 or 19 rays; caudal fin 17 rays. Body depth 3.2–3.6 in SL; HL 3.2–3.3 in SL; suborbital depth (allometric) 3.5–4.2 in HL; eye diameter (allometric) 4.4–5.3 in HL; dorsal-fin height 10.3–18 (usually 16–18) in SL, length ~1.8 in SL. Preopercle upper margin with fine serrae to angle or just below, lower margin smooth; opercle with broad, blunt spine. Branchiostegal rays 6; GR 18–21 on 1st arch. LL scales 47–50,

continuous, pored; 5 mandibular pores to preopercle; cheek scale rows 8–11; opercle scale rows 6–8; scale rows 7–9 above lateral line, 17–22 below.

Upper body, top of head and snout reddish brown; lower body silvery white, without dark tapering bars; predorsal ridge darkly pigmented; no dark pigmentation on opercle; 7–9 rows of scales on sides with dark spots; dorsal-fin base with series of dark spots along membrane, and mid-membrane dusky with faint yellow; pectoral and anal fins transparent; pectoral-fin axil with small dark spot; pelvic fins milky white; upper half of caudal fin pale gold-yellow, lower half olive-brown, occasionally with pale yellow spots and 2 thin yellow bands. Attains 39 cm SL, 44 cm TL.



*Branchiostegus sawakinensis*, 31 cm TL. Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, including Gulf of Aqaba (possibly seasonally), East Africa to South Africa (KwaZulu-Natal); elsewhere, Arafura Sea, Philippines and northwestern Australia (but probably throughout the region).

**REMARKS** Caught in Red Sea at 80–100 m over mud bottom; possibly thought to be poisonous and rare in Sudan fish markets; popular in Philippines (Cebu City) where it is caught by trawl over sandy bottom, at 120–200 m.

## SUBFAMILY MALACANTHINAE

### Sand-tilefishes

Body elongate, fusiform or cylindrical; body depth 12–26% (usually ~16%) SL; dorsal fin and anal fin each long and continuous. No predorsal ridge on head. Preopercle margin smooth (*Malacanthus*) or finely serrated (*Hoplolatilus*). Gill rakers short (*Malacanthus*) to well-developed (*Hoplolatilus*); total GR 6–28 on 1st arch. Dorsal fin 1–5 or 10 spines, and

22–34, 43–47 or 52–60 rays, or 10 spines, 13 or 22 rays; caudal fin 17 principal rays, fin forked or truncate and may have elongate rays at upper margin. Mouth terminal or slightly inferior and somewhat oblique, jaws in front of eyes (*M. latovittatus*) or reaching to under pupil or just past vertical at rear margin of eyes. Lateral line arched anteriorly and reaching just past hypural plate. Scales mostly ctenoid, some cycloid scales in head region, and a number of replacement scales also in head region; LL pored scales 89–92 or 113–140 in *Hoplolatilus*, and 116–181 in *Malacanthus*. Mandibular series of pores 5 or 6 unilaterally to preopercle.

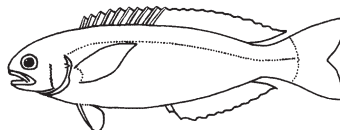
Usually occur in tropical to subtropical regions. Larvae are pelagic, with numerous serrated head ridges and often with short or elongate spines on head (on snout, above opercle, and at preopercle angle). The unusual larvae of *Malacanthus*, when first discovered, were described as a new genus and species (*Dikellorhynchus incredibilis*) by Smith (1956). As far as is known, all members of the subfamily live either in self-constructed mounds or burrows in sandy-rubble areas, or in crevices or burrows under coral or rocks; social/reproductive system is either monogamous (rare in fishes) or polygynous. Not important food fishes, but economically important in the tropical aquarium fish trade because of their bright colours. The subfamily consists of 2 genera (*Malacanthus* and *Hoplolatilus*) and 16 nominal species worldwide, 7 in WIO.

#### KEY TO GENERA

- 1a Preopercle margin smooth, without enlarged spine at angle; opercle with spine sharp, strong spine, its length equal to or greater than pupil diameter; total anal-fin elements 37–40 (*M. latovittatus*) or 46–55 (*M. brevirostris*); anal-fin origin below anterior to mid-dorsal-fin base ..... *Malacanthus*



- 1b Preopercle margin finely serrated to angle or just below, and may have reduced or enlarged spine at angle; opercle with reduced spine, its length usually less than pupil diameter; total anal-fin elements 14 (*H. fronticinctus*) or 20–22 (*H. cuniculus* and *H. oreni*); anal-fin origin below just anterior to mid-dorsal-fin base ..... *Hoplolatilus*



GENUS *Hoplolatilus* Günther 1887

Dorsal fin 3–10 spines, 13–34 rays; anal fin 1 spine (rarely, in *H. cuniculus*) or usually 2 spines, 12–20 rays; pectoral fins 15–19 (usually 16 or 17) rays; caudal fin truncate, emarginate or forked, may have produced upper rays. Body elongate, fusiform, depth 15–29% SL; HL 19–32% (usually 21–29%) SL; head depth 57–86% HL; suborbital depth shallow, 3–7% HL; eye diameter (allometric) 22–31% HL; reduced supraoccipital crest, no cutaneous predorsal ridge. Mouth terminal to slightly inferior, extending back to well under eyes. Preopercle margin finely serrated, may have broad, enlarged or sharp spine at angle; opercle with single sharp spine. LL pored scales 88–141. Vertebrae 10 or 11 + 14.

Found at 15–116 m (usually 25–60 m); inhabit mounds in sand or burrows in rubble bottom. About 13 species recognised (*H. luteus* considered a junior synonym of *fourmanoiri* by Dooley & Jimenez 2008); 4 or 5 species in WIO (*Hoplolatilus geo* described only from a photograph taken from a submersible at 80 m in the Red Sea).

## KEY TO SPECIES

- |    |  |                         |
|----|--|-------------------------|
| 1a | Caudal fin emarginate or forked .....  | 2                       |
| 1b | Caudal fin truncate, but upper rays slightly elongated; dorsal fin 10 spines, 22 rays; anal fin 2 spines, 20 rays; LL pored scales 82; preopercle margin with numerous (~50) fine serrae, and broad (not sharp) spine at angle ..... | <i>H. oreni</i>         |
| 2a | Caudal fin black (or red – see Remarks for species) .....  | <i>H. geo</i>           |
| 2b | Caudal fin colour not as above .....   | 3                       |
| 3a | Caudal fin bright yellow .....   | 4                       |
| 3b | Caudal-fin upper and lower lobes yellow, green or blue, with centre between lobes transparent; dorsal fin 10 spines, 13 rays; anal fin 2 spines, 12 rays; LL pored scales 90–97; preopercle angle without enlarged spine .....       | <i>H. chlupatyi</i>     |
| 4a | Dorsal fin 3–5 (usually 4) spines, 29–34 (usually 32) rays; anal fin 1 spine, 19 or 20 rays; LL pored scales 113–140; preopercle margin with 30–50 fine serrae, and spine at angle smaller than pupil diameter .....                 | <i>H. cuniculus</i>     |
| 4b | Dorsal fin 10 spines, 13 rays; anal fin 2 spines, 12 rays; LL pored scales 89–92; preopercle margin with 15–19 fine serrae, angle with sharp enlarged spine (<½ pupil diameter) .....  | <i>H. fronticinctus</i> |

*Hoplolatilus chlupatyi*

Klausewitz, McCosker, Randall & Zetzsche 1978

## Chameleon sand-tilefish

PLATE 128

*Hoplolatilus chlupatyi* Klausewitz, McCosker, Randall & Zetzsche 1978: 42, Figs. 1–14 (Indo-Australian Archipelago [probably Cebu, Philippines]); Randall 1981.

*Hoplolatilus* sp. 2 (= *Hoplolatilus chlupatyi*): Anderson *et al.* 1998\*.

Dorsal fin 10 spines, 13 rays; anal fin 2 spines, 12 rays; caudal fin forked. Body shallow, depth 5.1–5.6 in SL. Preopercle margin with 14–16 coarse serrae, but no enlarged spine at angle. GR 20 or 21 on 1st arch. LL pored scales 90–97; cheek scales 12; opercle scales 8. Vertebrae 10 + 14.

Body salmon-pink dorsally, white or bluish white ventrally; yellow longitudinal stripe may appear along dorsal-fin base, extending to peduncle; snout and upper head olive (may have some yellow); yellow-orange bar from eyes to mouth; cheek with 2 irregular, wavy, longitudinal, blue bands separated by pale yellow bands; dorsal fin and anal fin pale yellow; pectoral fins pale yellow; caudal-fin upper and lower lobes variously coloured yellow, green or blue, centre transparent: colour can undergo very rapid changes when frightened (~24 colours in 15 seconds); interior of clavicle (under opercle) with white palp of skin near pectoral-fin base (as in *H. fronticinctus*). Attains 13 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, Maldives (photograph only: see *Hoplolatilus* sp. 2 of Anderson *et al.* 1998); elsewhere, Indonesia (Bali), Philippines and southern Japan.

**REMARKS** Probably inhabits areas of sand, silt, or rubble bottom at the bases of reefs, at 30–55 m.

*Hoplolatilus cuniculus* Randall & Dooley 1974

## Dusky tilefish

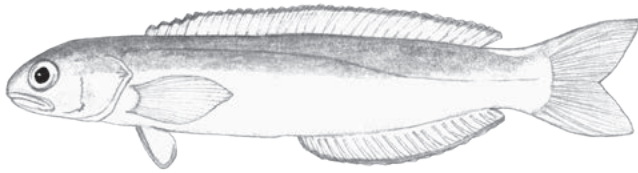
PLATE 128

*Hoplolatilus cuniculus* Randall & Dooley 1974: 466, Figs. 1d, 9 (Popote Bay, Tahiti, Society Is.); Anderson *et al.* 1998\*; Fricke 1999.

Dorsal fin 3–5 spines, 29–34 rays; anal fin 1 spine, 19 or 20 rays. Body shallow, depth 5.2–6.3 in SL; caudal fin forked. Preopercle margin with 30–50 fine serrae, and spine at angle smaller than pupil diameter. GR 21–23 on 1st arch. LL pored scales 113–140; cheek scales 9–12; opercle scales 8–11. Vertebrae 10 + 14.

Body pale olive-brown on dorsum, fading to pale yellow ventrally; blue area on dorsal and rear orbital areas of head (fades quickly upon death); dorsal-fin base coloured like upper

body, remainder of fin bluish; peduncle and caudal-fin upper and lower lobes bright yellow (some regional slight colour variations); interior of clavicle (under opercle) without white palp of skin near pectoral-fin base. Attains 15 cm TL.



*Hoplolatilus cuniculus*, 9 cm SL (South Africa).

**DISTRIBUTION** Indo-Pacific. WIO (probably widespread in tropical waters, 22–27 °C): South Africa (Sodwana Bay), Madagascar, Mauritius and Maldives; elsewhere to Indonesia, Ryukyu Is., Marshall Is., Great Barrier Reef, New Caledonia and Society Is.

**REMARKS** Burrows in muddy or sand rubble, or coral rubble on outer-reef slopes, at 25–115 m; observed to hover ~1 m above substrate, retreating to burrow when threatened; sometimes lives in loose groups. Feeds largely on zooplankton, including calanoid copepods, larvae, siphonophores and fish eggs.

### *Hoplolatilus fronticinctus* (Günther 1887)

Pastel tilefish

PLATE 128

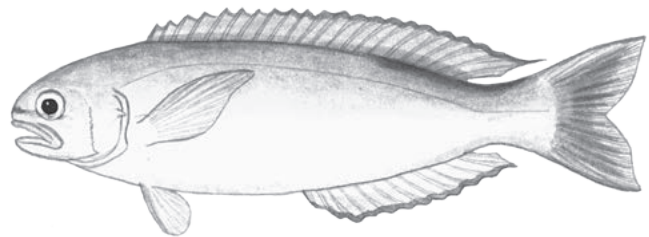
*Latilus fronticinctus* Günther 1887: 550, Pl. 48 (Mauritius, Mascarenes).

*Hoplolatilus fronticinctus*: Talbot 1969; Randall & Dooley 1974; Dooley 1978; Randall 1981; SSF No. 197.3\*; Clark *et al.* 1998; Fricke 1999.

Dorsal fin 10 spines, 13 rays; anal fin 2 spines, 12 rays; pectoral fins 17 rays; caudal fin 17 rays, fin forked. Body elongate, depth 3.3–4.1 in SL; HL 3.5–3.8 in SL; snout short, 3.4–5 in HL; jaws of adults extend to vertical below rear rim of orbit; suborbital depth (allometric) 18–30 in HL; eye diameter (allometric) 4.3–4.5 in HL; dorsal fin low, height ~18 in SL. Distinctive elongate palp of skin (may appear as flat pad in some specimens) along inner edge of clavicle near pectoral-fin base. Branchiostegal rays 6; total GR 26–28 on 1st arch, well-developed. LL scales 89–92 continuous, pored; mandibular pore series 5 unilaterally to preopercle; cheek scale rows 13 or 14; opercle scale rows 10; scale rows 14–20 above lateral line, 38–44 below; cephalic LL pores in distinct pattern (Randall & Dooley 1974); mandibular pores 5 unilaterally (other species of *Hoplolatilus* with 6 pores). Preopercle margin with 15–19 serrae, including enlarged spine at angle (spine relatively large

among *Hoplolatilus*, but <½ pupil diameter); opercular spine slightly longer than preopercular spine. Larvae (~15 mm SL) with very long spines projecting from snout, preopercle angle, and along upper margin of opercle, and 10 or 11 concentric serrated ridges on top of head; transforming larvae (~42 mm SL) with reduced, but still evident, larval spination and serrated ridges; spination lost by ~50 mm SL.

Body mauve-greenish yellow shading to pale yellow on belly; lower head, jaws, preopercle and lower portion of opercle to belly brilliant blue; snout tip with bright yellow band to below and just past eyes; dorsal fin pale yellow, spinous portion darker; lower part of pectoral fins pale yellow, upper rays bluish white, with some bright blue on upper edge of fin; pelvic fins and anal fin milky yellow, and anal fin with narrow orange margin; large bright blue saddle-shaped patch covering peduncle to upper edge of caudal fin, caudal-fin lobes bright yellow; iris golden yellow, with brilliant blue patches above and below pupil. Juveniles (~50 mm SL) with more yellow on body and fins, more electric blue on head and peduncle. Attains at least 17 cm SL.



*Hoplolatilus fronticinctus*, 15 cm TL (South Africa).

**DISTRIBUTION** Indian Ocean. WIO: South Africa (Kosi Bay, Sodwana Bay), Mauritius and Maldives; elsewhere to east coast of India (Chennai).

**REMARKS** Rare; inhabits sandy areas at bases of reefs, to ~70 m deep; schools above huge mounds of rubble that it apparently builds (mounds up to 5.5 m long, 3 m wide and >1 m high). The Pacific form, largely different in colouration, was described as a new species, *H. randalli*; however, the validity of this species is under study.

### *Hoplolatilus geo* Fricke & Kacher 1982

*Hoplolatilus geo* Fricke & Kacher 1982: 247, Figs. 1–2 (Ras um Sid, Sinai coast, Red Sea).

**REMARKS** No specimen collected or examined. Described only from a photograph by Fricke & Kacher (1982), taken from a research submersible at 80 m deep in the northern Red Sea.



Body whitish, olive to sandy dorsally; pale blue elongate mark beneath rear end of dorsal-fin base; diffuse blue mark on pectoral-fin bases; caudal fin black (but may be red, colour lost in deep water), deeply forked. Estimated length 15–18 cm SL. Observed to build large mounds.

*Hoplostilus oreni* (Clark & Ben-Tuvia 1973)

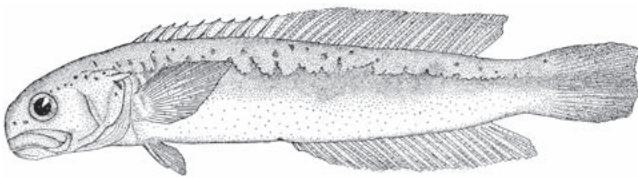
PLATE 128

*Asymmetrus oreni* Clark & Ben-Tuvia 1973: 70, Figs. 6–8 (near Massawa, Eritrea, Red Sea).

*Hoplostilus oreni*: Randall & Dooley 1974; Dooley 1978; Randall 1981; Clark *et al.* 1998.

Dorsal fin 10 spines, 22 rays; anal fin 2 spines, 20 rays; pectoral fins 16 rays; caudal fin 17 rays. Body elongate, depth 6.8 in SL; HL 3.9 in SL; snout short, 3.8 in HL; maxilla width equal to pupil diameter; jaws extend back to vertical below rear rim of orbit; suborbital region shallow, 27 in HL; eye diameter 4.6 in HL; dorsal fin low, height 25 in SL; anal fin low, height 23 in SL, fin origin below vertical just behind anterior third of dorsal-fin base. Preopercle with ~30 fine serrae and short broad-based spine at angle (similar to *H. starcki*); opercle with large sharp spine, its length larger than pupil diameter. Branchiostegal rays 6; total GR 17 on 1st arch. LL scales 92, pored and continuous; 5 mandibular pores unilaterally on each dentary (not including preopercle); 11 scale rows above lateral line, 37 below. Vertebrae 11 + 14.

Preserved specimen: body pale brown, with narrow dark stripe on sides from above pectoral-fin bases to mid-caudal fin; irregular pattern of small dark spots along upper edge of dark stripe. Attains at least 14 cm SL.



*Hoplostilus oreni*, 14 cm SL, holotype (Red Sea). Source: Clark & Ben-Tuvia 1973

**DISTRIBUTION** WIO: endemic to Red Sea. See Remarks below.

**REMARKS** Known only from the type locality, and also from the southern Red Sea, at ~73 m. A tilefish that appears to be *H. oreni* has recently been photographed in ~47 m at Sodwana Bay, South Africa. If confirmed, it is a significant range extension from its described habitat in the Red Sea and is the first known live photograph.

GENUS *Malacanthus* Cuvier 1829

Dorsal fin and anal fin both long and continuous; dorsal fin 1–5 spines, 43–60 rays; anal fin 1 spine, 37–55 rays; pectoral fins 15–17 rays; caudal fin truncate, may have produced upper rays. Body elongate, fusiform, depth 12–20% SL (usually 14–17%); HL 19–32% SL (usually 21–29%); head depth 49–64% HL; suborbital depth 5–20% HL; eye diameter 13–27% HL; reduced supraoccipital crest, no cutaneous predorsal ridge. Mouth terminal to slightly inferior, extending to mid-snout in *M. latovittatus* and to under eyes in *M. brevirostris*. Preopercle margin smooth, no enlarged spine at angle; opercle with single sharp spine. LL pored scales 116–181. Vertebrae 10 + 14. Three species, 2 in WIO.

KEY TO SPECIES

- 1a Snout length 29–37% HL; jaws extend to under eyes; dorsal-fin elements (spines + rays) 53–65; total GR 9–20 (usually 15) on 1st arch; caudal fin with 2 median parallel dark bands ..... *M. brevirostris*
- 1b Snout length 37–47% HL; jaws extend to only under anterior nostrils (mid-snout), well in front of eyes; dorsal-fin elements 46–51; total GR 6–14 on 1st arch; broad band along midbody from opercle to caudal-fin tip, widening to include most of middle and lower portions of caudal fin, with small white rectangular area on lower portion; juveniles with very different colouration, mimicking adult cleaner wrasse *Labroides dimidiatus* ..... *M. latovittatus*

*Malacanthus brevirostris* Guichenot 1848

Quakerfish

PLATE 129

*Malacanthus a caudale tricolore* Liénard 1842: 80 (Mauritius, Mascarenes) [invalid: not a binomial name].

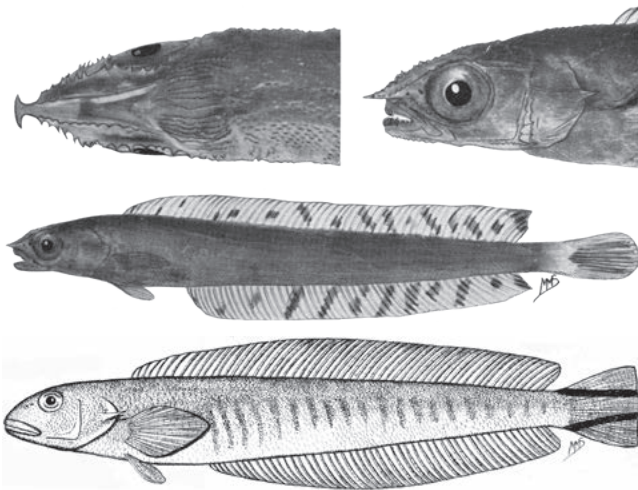
*Malacanthus brevirostris* Guichenot 1848: 14 (Madagascar); Dooley 1978; SSF No. 197.4\*; Winterbottom *et al.* 1989; Fricke 1999; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Dikellorhynchus incredibilis* Smith 1956: 54, Pl. 1 (Mpekweni, Eastern Cape, South Africa); Berry 1958; Hubbs 1958 [= *Malacanthus hoedtii* juvenile]; SFSA No. 384b\*.

Dorsal fin 1–5 spines, 52–60 rays; anal fin 1 spine, 46–55 rays; pectoral fins 15–17 rays; caudal fin 17 rays. Body elongate, depth 6.3–8.3 in SL; HL 4.2–5.3 in SL; snout length 2.7–3.4 in HL; jaws extend to under between eye rim and pupil; suborbital depth (allometric) 9–20 in HL; eye diameter (allometric) 3.4–5.3 in HL; dorsal-fin height ~20 in SL, length 1.3–1.4 in SL. Preopercle margin smooth; opercle with sharp stout spine subequal to pupil diameter. Branchiostegal rays 6;

total GR 9–20 (rudimentary) on 1st arch. LL scales 146–181, continuous, pored; 4 or 5 mandibular pores (unilaterally) to preopercle; cheek scale rows 7–9; opercle scale rows 5–9; scale rows 7–10 above lateral line, 31–36 below. Larvae and prejuveniles with lateral, backward-curving spines on rostrum, and keeled scales and patches of serrated ridges on head (spinous characters seen on prejuveniles up to 7 cm TL).

Body pale olive-green dorsally, belly silvery white; dorsal fin translucent or faint pink, with narrow yellow margin; pectoral fins and anal fin translucent; pelvic fins white; caudal-fin upper and lower lobes yellow, separated by central white band bordered by 2 dark, narrow, longitudinal bands; iris golden. Attains ~39 cm SL (commonly 15–30 cm SL).



*Malacanthus breviostris*, 7 cm TL, juvenile holotype of *Dikellorhynchus incredibilis*, and dorsal and lateral views of head (top) (South Africa); 25 cm TL (bottom) (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific to eastern Pacific, and Caribbean Sea (Costa Rica, Panama and Colombia). WIO: Red Sea (including Gulf of Aqaba), Mozambique to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Ryukyu Is., Mariana Is., Wake Atoll, New Guinea, Australia, New Caledonia, northern New Zealand, Austral Is., Marquesas Is., Hawaii and Panama.

**REMARKS** Adults are possibly protogynous hermaphrodites and polygynous, unlike its monogamous relative *M. latovittatus* (Clark & Pohle 1992). Unusual spinous pelagic larvae of *M. breviostris* prompted its discoverer (Smith 1956) to describe it as a new genus and species (*Dikellorhynchus incredibilis*). Adults found in relatively shallow water over coral rubble or on sand bottom adjacent to reefs, at 5–33 m; constructs a burrow in sand or beneath ledges of large rocks, into which it will dive head first when frightened.

## *Malacanthus latovittatus* (Lacepède 1801)

Blue tilefish

PLATE 129

*Labrus latovittatus* Lacepède (ex Commerson) 1801: 455, Pl. 28, Fig. 2 ('Grand Océan équatorial' [Indo-Pacific]); Shaw 1803.

*Taenianotus latovittatus* Lacepède 1802: 303, 304 [not Pl. 3] (Mauritius, Mascarenes) [name secondarily preoccupied].

*Malacanthus latovittatus*: Bleeker 1875, 1879; Smith 1939; SFSA No. 384\*; Mendis 1954; Smith 1955; Smith & Smith 1963\*; Clark & Ben-Tuvia 1973\*; SSF No. 197.5\*; Randall 1986\*, 1995\*; Winterbottom *et al.* 1989; Fricke 1999; Heemstra & Heemstra 2004; Fricke *et al.* 2009; Fricke *et al.* 2013.

*Oceanops latovittata*: Jordan & Seale 1906.

Dorsal fin 3 or 4 spines, 43–47 rays; anal fin 1 spine, 36–39 rays; pectoral fins 15–17 rays; caudal fin 17 rays. Body elongate (modally 5.9) in SL; HL 3.1–4 in SL; snout pointed, long, 2.1–2.7 (modally 5.9) in SL; jaws extend only to below nostrils; suborbital depth (allometric) 5–13 (modally 5.6) in HL; eye diameter (allometric, juvenile eye 3.5 in HL) 4.2–7.7 (modally 6.3) in HL; soft dorsal fin low, 19 in SL; dorsal fin base 1.4–1.6 in SL. Preopercle margin entirely smooth; opercle with sharp spine, its length subequal to eye diameter. Branchiostegal rays 6; total GR (reduced in size) 6–14 (usually 9) on 1st arch. LL scales 116–132, continuous, pored; 4 mandibular pores (unilaterally) to preopercle; cheek scale rows 6–10; opercle scale rows 6–9; scale rows 10–15 above lateral line, 32–40 below.

Adults: head bluish, body olive-grey to violet-blue dorsally, whitish blue ventrally; midbody with broad, dark longitudinal stripe from opercle to caudal fin; dorsal fin grey-brown basally, margin pale; pectoral, pelvic and anal fins bluish white; caudal fin dark in centre, with white area above and bluish white area below, ventral portion of fin dark; iris pale yellow. Preserved specimens lose blue colour but retain dark colour pattern. Juveniles (<10 cm SL) quite unlike adult colour pattern, with lower body to snout mostly dark, belly to chin white, and upper body white through mid-eye level to snout; fins mostly transparent, except dorsal fin and anal fin with dusky margins, pectoral fins with dark base, and caudal fin with white ventral edge and lower two-thirds of fin dark purple-brown and white and transparent areas dorsally (Randall & Randall [1960] discussed the juvenile colouration as an example of mimicry of the cleaner wrasse *Labroides dimidiatus*). Attains ~47 cm SL (commonly 15–25 cm SL).



*Malacanthus latovittatus*, 38 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Red Sea, Kenya to South Africa (KwaZulu-Natal), Mozambique Channel, Madagascar, Aldabra, Seychelles, Mauritius, Réunion, Chagos, Maldives, Sri Lanka and Gulf of Mannar; elsewhere to Andaman Is., Indonesia, Taiwan, Ryukyu Is., New Guinea, Australia, New Caledonia, Samoa and Tonga.

**REMARKS** Probably occurs throughout most of WIO, although rare in some areas; found in hyposaline waters of New Guinea. Does not usually construct sand burrows in the open as do other species of *Malacanthus*. Adults form close monogamous pairs and live under rocks or coral overhangs, using them as a shelter or burrow, at 6–30 m. Spawns as pairs in midwater after sunset, and then retires to its burrow for the night. The larvae are spinous and pelagic.

#### GLOSSARY

**adductor mandibulae** – main muscle that closes the jaw.

**allometric** – differential changes with growth, e.g., eyes become larger relative to head length.

**calanoid copepods** – small crustacea belonging to Order Calanoida, and found in the plankton.

**gonadal sex reversal** – when the gonads change from male (testicular) to female (ovarian) tissue, or the other way around.

**hyposaline** – with salinities higher than that of sea water, i.e., more than 35 parts per thousand (ppt), or 35 g of salt in a litre of water.

**keeled scales** – scales with a narrow ridge along the middle.

**polygynous** – a male with many females.

**protogynous hermaphrodites** – an individual that functions first as a female and then changes to a male.

**replacement scales** – tilefishes inhabit mounds and burrows. As they move in and out of a burrow they apparently rub against the walls of the mound or burrow losing scales in the process. The scales that grow back lack the early annuli ('growth rings'), and are called replacement scales to differentiate them from the original scales.

**rostrum** – a projecting snout or beak.

## FAMILY SILLAGINIDAE

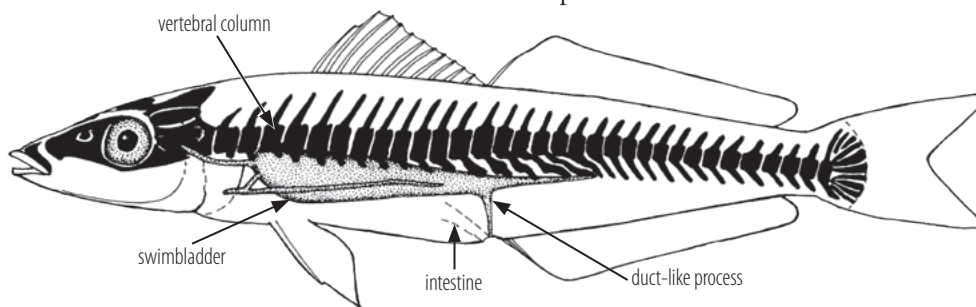
### Sillagos, smelts or Indo-Pacific whiting

Phillip C Heemstra

Body elongate, subcylindrical, depth less than HL, 5–6 in SL; snout conical, distinctly longer than eye diameter. Mouth terminal; preorbital bone covers part of maxilla; jaws with band of setiform or villiform teeth; vomer with curved band of small teeth; palatines edentate. Two dorsal fins: 1st dorsal fin with 10–13 slender spines; 2nd dorsal fin with 1 slender spine, 16–24 rays; anal fin similar to and opposite 2nd dorsal fin, with 2 small slender spines, 17–26 rays; pectoral fins pointed, shorter than head, with 15–17 rays; pelvic fins with 1 slender spine, 5 branched rays (except *Sillaginopodys chondropus* with short hidden spine and enlarged 1st ray). Opercle margin with single weak spine; preopercle margin smooth, lower edge bent inwards. Branchiostegal rays 6; gill membranes separate; gill rakers short, 7 or 8 plus a few rudiments on lower limb of 1st arch. Lateral line continuous, extending onto caudal fin; head with extensive *lateralis* system. Body covered with weakly ctenoid, deciduous scales; cheek scales cycloid or ctenoid. Many species are similar in shape and morphology, and some uniformly coloured species can only be identified from vertebral counts and examination of the swimbladder.

Demersal, schooling fishes, with most species found in shallow water over sand or mud bottom, with some species well into estuaries and lower reaches of rivers. Juveniles frequently associated with mangrove areas and seagrass beds; adults usually occur in deeper water (to ~200 m). Feed mainly on benthic invertebrates: small crustaceans (amphipods, shrimps, crabs), worms and molluscs. The pointed conical snout is used for probing the bottom, and the sensory receptors of the highly developed *lateralis* system on the snout and underside of the head can pick up vibrations of burrowing prey. Sillaginids can also dive under sand to escape predators. Caught with hook and line, beach seines and trawls; the flesh of most species is excellent.

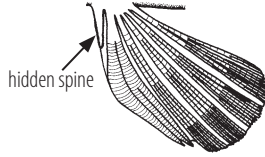
Restricted to tropical and warm-temperate waters of the Indo-Pacific. Five genera and ~34 species; 2 genera and 12 species in WIO.



Position of swimbladder in relation to vertebral column of a sillago.

**KEY TO GENERA**

- 1a Pelvic fins with 1 small spine (mostly hidden at base of 1st ray), 5 rays, 1st ray enlarged, thickened and bifurcate ..... *Sillaginopodys*



- 1b Pelvic fins with 1 slender spine at leading edge of fin, 5 rays, 1st ray not enlarged ..... *Sillago*

**GENUS** *Sillaginopodys* Fowler 1933

Snout and head conical, not depressed; no elongated dorsal-fin spine; 1st ray of pelvic fins thickened and club-like; eye diameter 19–22% HL. LL scales 66–73. Swimbladder reduced in size, no duct-like process. One species.

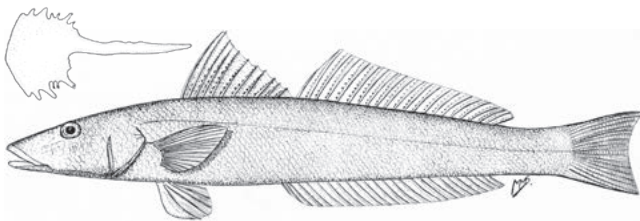
*Sillaginopodys chondropus* (Bleeker 1849)

Clubfoot sillago PLATE 129

*Sillago chondropus* Bleeker 1849: 61 (Jakarta, Indonesia); SSF No. 198.1\*; McKay 1992\*, 1999\*; Randall 1995\*; Heemstra & Heemstra 2004.  
*Sillago (Sillaginopodys) chondropus*: McKay 1985\*.  
*Sillaginopodys chondropus*: Kaga 2013.

Diagnosis as for genus. First dorsal fin 11 or 12 spines; 2nd dorsal fin 1 spine, 20 or 21 rays; anal fin 2 spines, 22 or 23 rays; pectoral fins 15 or 16 rays; pelvic fins with 1st ray enlarged, thickened and bifurcate, spine mostly hidden at base of 1st ray. HL ~25% SL; snout length 32–35% HL. LL scales 66–73; 6 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder small, anterior end expanded, with short lateral extensions, but no ventral stem near anus. Vertebrae 12 or 13 + 22 or 23 = 35; haemal spines not modified to form haemal funnel.

Head and body pale brown dorsally, with silvery midlateral stripe; tip of 1st dorsal fin dusky. Attains 35 cm SL.



*Sillaginopodys chondropus*, 25 cm TL (South Africa). Source: SFSA  
 Ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Somalia to South Africa, and Pakistan to India; elsewhere to east coast of India, Indonesia, Philippines and Taiwan.

**REMARKS** Inhabits shallow coastal waters and estuaries.

**GENUS** *Sillago* Cuvier 1817

Snout and head conical, not depressed; no elongated dorsal-fin spine; eye diameter 14–29% HL. LL scales 54–84. Swimbladder well developed, with duct-like process from ventral surface to urogenital aperture. Thirty species, 11 in WIO.

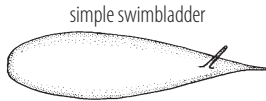
**KEY TO SPECIES**

- 1a Second dorsal fin pale, with 5–7 rows of black spots; length of 1st dorsal-fin spine subequal to or longer than 1st dorsal-fin base ..... *S. vincenti*
- 1b Second dorsal fin entirely unmarked or with 1 or 2 rows of dark spots; length of 1st dorsal-fin spine shorter than 1st dorsal-fin base ..... 2
- 2a Body with conspicuous irregular dark blotches; 1st dorsal fin with broad black margin, and pectoral-fin bases with dark spot; 1st dorsal fin 11 spines; 2nd dorsal fin 18–20 rays; anal fin 17–19 rays; body deep, 20–22% SL ..... *S. aeola*
- 2b No conspicuous irregular dark blotches on body, but some faint dusky spots present or absent; no broad black margin on 1st dorsal fin, and no dark spot on pectoral-fin bases; 1st dorsal fin 10–13 spines; 2nd dorsal fin 17–24 rays; anal fin 17–24 rays; body depth ≤21% SL ..... 3
- 3a Body with row of dusky spots just below lateral line and several dusky saddle blotches below dorsal fins; 6 or 7 scale rows from 1st dorsal-fin origin to lateral line; head large, HL 30–31% SL; swimbladder with 2 rear extensions and 2 anterolateral extensions ..... *S. intermedia*
- 3b No dusky saddle blotches below dorsal fins; 3–5 scale rows from dorsal-fin origin to lateral line ..... 4
- 4a Second dorsal fin 1 spine, 17 rays; anal fin 2 spines, 17 rays; 3 or 4 scale rows from 1st dorsal-fin origin to lateral line ..... *S. ingenuua*
- 4b Second dorsal fin 1 spine, 18–24 rays; anal fin 2 spines, 18–24 rays ..... 5
- 5a Second dorsal fin and anal fin each with 22–24 rays; snout length 31–38% HL; HL 20–24% SL ..... *S. arabica*
- 5b Second dorsal fin 19–22 rays; anal fin 18–24 rays; snout length 35–43% HL; HL 26–28% SL ..... 6

Continued...

## KEY TO SPECIES

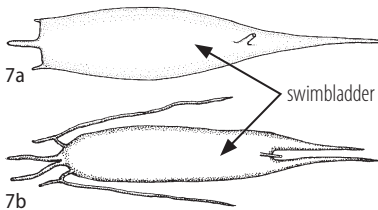
- 6a First dorsal fin 12 or 13 spines; anal fin 18–20 rays; LL scales 73–77; swimbladder simple, rounded anteriorly and tapering to single short rear extension ..... *S. attenuata*



- 6b First dorsal fin 10–12 spines; anal fin 20–24 rays; LL scales 66–72; swimbladder complex, with several extensions ..... 7

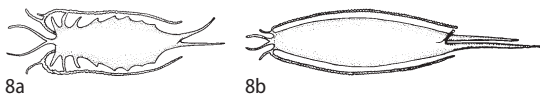
- 7a Swimbladder with single rear extension and short simple median anterior extension ..... *S. lutea*

- 7b Swimbladder with 2 slender rear extensions; front end of swimbladder with median bifurcate extension that extends forward to contact each side of basioccipital above auditory bulla (inner-ear cavity at rear of skull); anterolateral extensions of swimbladder each give rise to long slender appendage that runs back along each side of swimbladder ..... 8



- 8a Body with dark stripe on sides, sometimes broken into blotches from above opercle to caudal-fin base; swimbladder with 8 or 9 lateral processes spanning entire lateral side of main body ..... *S. indica*

- 8b No dark stripe along midbody; no lateral extensions on swimbladder ..... 9



- 9a HL 32–38% SL; anal fin 18–22 rays; LL scales 63–74 ..... *S. suezensis*

- 9b HL 24–30% SL; anal fin 21–24 rays; LL scales 66–72 ..... 10

- 10a Body silvery yellow-brown dorsally, silvery white below; silvery midlateral stripe from head to caudal fin; HL 24–30% SL ..... *S. sihama*

- 10b Body and head silvery, but dark grey-brown dorsally and grading to white ventrally, these parts separated by white midlateral band with series of 9–11 faint brown pupil-sized spots; HL 29–30% SL ..... *S. caudicula*

*Sillago aeola* Jordan & Evermann 1902

## Oriental sillago

PLATE 129

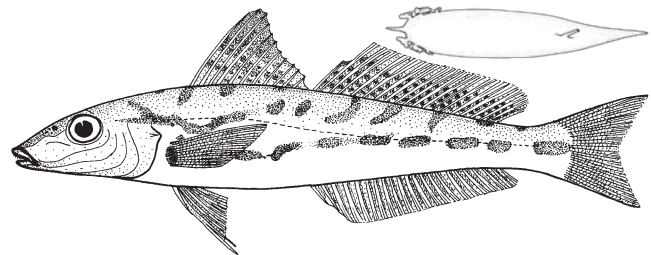
*Sillago aeolus* Jordan & Evermann 1902: 360, Fig. 24 (Keelung, Taiwan); McKay 1992\*, 1999\*; Heemstra & Heemstra 2004.

*Sillago (Parasillago) maculata aeolus*: McKay 1985\*.

*Sillago maculata*: SSF No. 198.2\*.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 18–20 rays; anal fin 2 spines, 17–19 rays. HL 27–31% SL; snout length 36–40% HL. LL scales 67–72; 5 or 6 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with single rear extension, short median anterior extension, and 3 rudimentary anterolateral extensions (often convoluted) on each side. Vertebrae 13 or 14 + 4–7 modified + 14–16 = 34.

Body silvery, pale brown dorsally, with 2 longitudinal rows of short ill-defined brown bars, anterior bars inclined (especially above lateral line), and rear bars generally parallel and below lateral line; 1st dorsal fin black distally; 2nd dorsal fin with longitudinal brown bands; anal fin hyaline. Attains 30 cm SL.



*Sillago aeola*, lateral view. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission  
Ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to Mozambique (Maputo Bay) and Sri Lanka; elsewhere to Thailand, Indonesia, Vietnam, Taiwan, China, Philippines and southern Japan.

**REMARKS** Occurs in inshore coastal waters, commonly in embayments on silty bottom, to ~60 m. Juveniles sometimes burrow in the sand. Caught in small local fisheries throughout its range.

## *Sillago arabica* McKay & McCarthy 1989

Arabian sillago

PLATE 129

*Sillago (Parasillago) arabica* McKay & McCarthy 1989: 552, Fig. 1 (Tanajib Bay, Persian/Arabian Gulf); McKay 1992\*; Randall 1995\*.

First dorsal fin 12 or 13 spines; 2nd dorsal fin 1 spine, 22–24 rays; anal fin 2 spines, 22–24 rays. HL 24–29% SL; snout length 31–38% HL. LL scales 75–80; 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with single short rear extension, and no anterior extensions. Vertebrae 15 or 16 + 0 or 1 modified + 22–25 = 38–40.

Head and body silvery, without dark markings. Attains 20 cm TL.



*Sillago arabica*, 20 cm TL (Mozambique). © Alvheim © IMR  
Ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** WIO: Persian/Arabian Gulf and northern Mozambique.

**REMARKS** Occurs in shallow coastal waters over soft bottom to at least 21 m deep.

## *Sillago attenuata* McKay 1985

Slender sillago

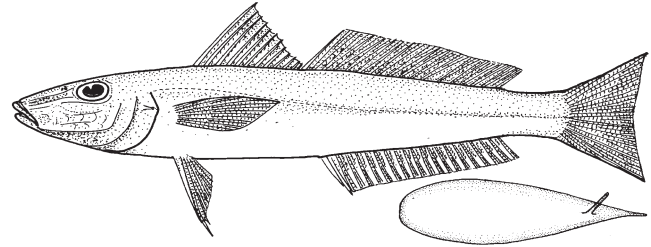
PLATE 129

*Sillago (Parasillago) attenuata* McKay 1985: 36, Figs. 12–13 (Tarut Bay, Zaal I., Persian/Arabian Gulf); McKay & McCarthy 1989; McKay 1992\*; Randall 1995\*; Kaga 2013.

First dorsal fin 12 or 13 spines; 2nd dorsal fin 1 spine, 19–21 rays; anal fin 2 spines, 18–20 rays. HL 26–28% SL; snout length 38–42% HL. LL scales 73–77; 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder elongate oval, rounded anteriorly and tapering to single short rear extension, with duct-like process; almost transparent in juveniles. Vertebrae 15 + 22.

Head and body silvery, with 2 lateral series of faint dark spots: upper row of 8 or 9 spots over midlateral series of 10 spots. Juveniles with well-defined midlateral horizontal row of 9 elongate dark spots just below lateral line, horizontal row of ~12 small spots between lateral line and dorsal-fin bases (spots

ending before last dorsal-fin ray), longitudinal row of very small spots along dorsal midline, 2 spots before dorsal fin, and 4 spots below dorsal fin and on peduncle. Attains at least 22 cm SL.



*Sillago attenuata*, lateral view; ventral view of swimbladder.

Source: McKay 1992

**DISTRIBUTION** WIO: Persian/Arabian Gulf and Gulf of Oman.

## *Sillago caudicula* Kaga, Imamura & Nakaya 2010

Spotted sillago

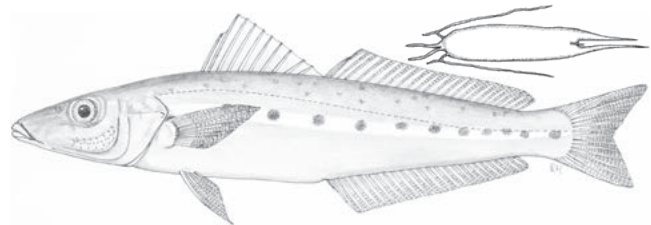
PLATE 129

*Sillago indica* (non McKay *et al.* 1985): Randall 1995.

*Sillago caudicula* Kaga, Imamura & Nakaya 2010: 368, Figs. 1–3 (Salalah fish market, Oman, Gulf of Oman); Kaga 2013\*; Kaga & Heemstra 2013.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 21–23 rays; anal fin 2 spines, 22–24 rays; pectoral fin 15 or 16 rays. HL 29–30% SL; snout length 11–13% HL. LL scales 70–72; 4 or 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder large, with multiple extensions: 2 posterior extensions, 2 anterior extensions that extend forward to basioccipital, and 2 anterolateral extensions, one on each side, giving rise to long rear branch. Vertebrae 35 or 36.

Head and body silvery, but dark grey-brown dorsally, grading to white ventrally, these parts separated by white midlateral stripe containing row of 9–11 faint brown pupil-sized spots; snout dark purplish grey. Attains 18 cm SL.



*Sillago caudicula*, ~18 cm SL (SE Madagascar).

Ventral view of swimbladder (redrawn). Source: Kaga *et al.* 2010, composite

**DISTRIBUTION** WIO: Gulf of Oman and southeastern coast of Madagascar.

*Sillago indica* McKay, Dutt & Sujatha 1985

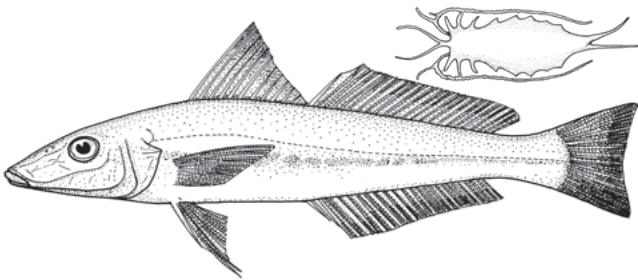
Indian sillago

PLATE 130

*Sillago (Parasillago) indica* McKay, Dutt & Sujatha in McKay 1985: 38, Fig. 5e (Visakhapatnam, India); McKay 1992\*; Kaga & Ho 2012\*.

First dorsal fin 11 or 12 spines; 2nd dorsal fin 1 spine, 21 or 22 rays; anal fin 2 spines, 21–23 rays. HL 28–29% SL; snout length 37–40% HL. LL scales 68–71; 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with complicated extensions: bifurcate posteriorly, anterior end with V-shaped median extension, and 2 anterolateral extensions with long slender branch extending back, each anterolateral extension with at least one blind tubule and covered with many small bulbs. Vertebrae 34, 3 or 4 modified.

Body with dark band from upper end of opercle curving to below lateral line for two-thirds its length, continuing slightly below or on lateral line as broken band or series of elongate spots and blotches to caudal-fin base; minute melanophores densely covering belly, 1st dorsal fin and lower sides; 2nd dorsal fin and anal fin blackish. Attains 17 cm SL.



*Sillago indica*, lateral view; ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indo-Pacific. WIO: northwestern India; elsewhere, northeastern coast of India and Vietnam.

**REMARKS** Found on soft bottom, from shore to ~30 m deep.

*Sillago ingenuua* McKay 1985

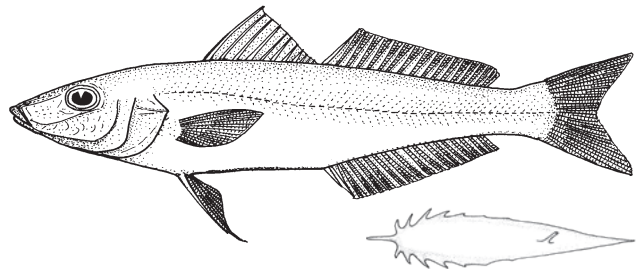
Bay sillago

PLATE 130

*Sillago (Parasillago) ingenuua* McKay 1985: 44, Figs. 8c, 14p (Chantaburi, Gulf of Thailand); McKay 1992\*, 1999\*; De Bruin *et al.* 1994\*; Kaga 2013.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 17 rays; anal fin 2 spines, 17 rays. HL 27–29% SL; snout length 37–42% HL. LL scales 66–70; 3 or 4 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with short median anterior extension, ~5 short anterolateral extensions, and rear end tapering to single point. Vertebrae 13 + 20.

Head and body buff, without silvery midlateral band or dark spot at pectoral-fin bases. Attains 20 cm SL.



*Sillago ingenuua*, lateral view; ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Bay of Bengal, Gulf of Thailand, Taiwan and northern Australia.

**REMARKS** Benthic on soft bottom of inshore coastal waters, in 20–50 m.

*Sillago intermedia* Wongratana 1977

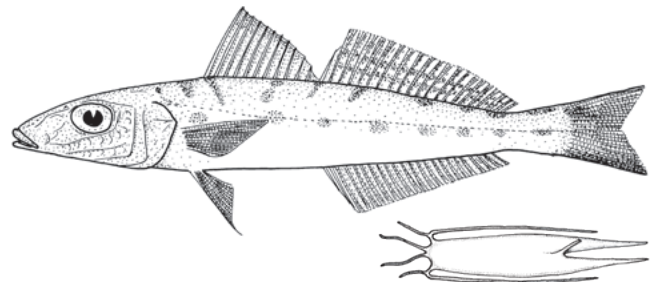
Blotchy sillago

PLATE 130

*Sillago intermedius* Wongratana 1977: 257, Pls. 9–10 (east coast of Gulf of Thailand); McKay 1985\*, 1992\*, 1999; De Bruin *et al.* 1994; Kaga 2013.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 21 or 22 rays; anal fin 2 spines, 21 or 22 rays. HL 30–31% SL; snout length 37–40% HL. LL scales 67–70; 6 or 7 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder bifurcate posteriorly, anterior end with V-shaped median extension, and 2 anterolateral extensions with long slender branch extending posteriorly to median stem. Vertebrae 14 + 5 modified + 15 = 34.

Body silvery, with series of saddle-like blotches below dorsal fins and midlateral row of dusky black spots just below lateral line; 2 longitudinal series of dark spots on 2nd dorsal fin. Attains 20 cm SL.



*Sillago intermedia*, lateral view. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission. Ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indian Ocean. WIO: India and Sri Lanka; elsewhere to east coast of India, Andaman Sea and Gulf of Thailand.

**REMARKS** Found inshore on open silty bottom, to ~10 m deep.

### *Sillago lutea* McKay 1985

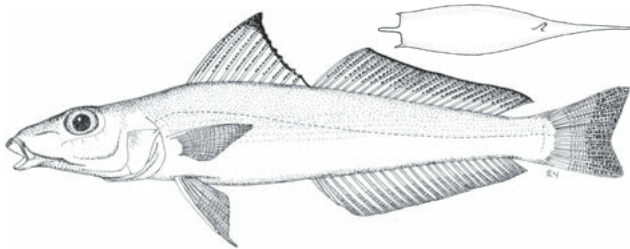
Mud sillago

PLATE 130

*Sillago (Parasillago) lutea* McKay 1985: 40, Figs. 10, 13 (Exmouth Gulf, Western Australia); McKay 1992\*, 1999; De Bruin *et al.* 1994; Kaga 2013.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 20–22 rays; anal fin 2 spines, 21–24 rays. HL 27–29% SL; snout length 37–43% HL. LL scales 67–72; 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with single rear extension, median anterior extension, and with or without rudimentary anteriorly directed anterolateral projections. Vertebrae 13 or 14 + 4–11 modified + 10–17 = 33–35.

Body pale brown dorsally, pale brown to whitish below, with faint silvery midlateral stripe; scale rows below lateral line with faint dark line formed by concentration of melanophores at centre of each scale. Attains 16 cm SL.



*Sillago lutea*, 14 cm SL (Seychelles); ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indian Ocean. WIO: Seychelles, southern India and Sri Lanka; elsewhere to southeastern coast of India and northwestern Australia.

**REMARKS** Occurs most abundantly on muddy or very silty bottom, to ~60 m deep.

### *Sillago sihama* (Fabricius 1775)

Silver sillago

PLATE 130

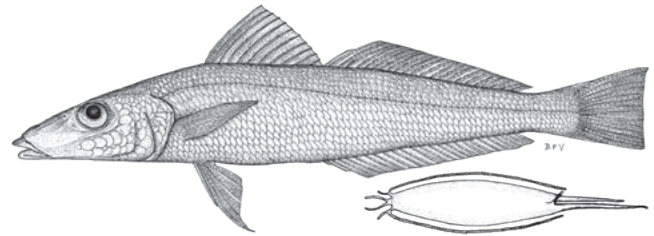
*Atherina sihama* Fabricius in Niebuhr (ex Forsskål) 1775: 70, xiii (Al-Luhayya, Yemen).

*Sillago erythraea* Cuvier in Cuv. & Val. 1829: 409 [in part: Massawa, Eritrea, Red Sea, based on lectotype].

*Sillago sihama*: McKay 1985\*, 1992\*, 1999\*; SSF No. 198.3\*; Randall 1995\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009; Kaga 2013; Bogorodsky *et al.* 2014.

First dorsal fin 11 spines; 2nd dorsal fin 1 spine, 20–23 rays; anal fin 2 spines, 21–23 rays. HL 24–30% SL; snout length 35–42% HL. LL scales 66–72; 4 or 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder complex, with 2 anterior extensions, 2 long slender anterolateral extensions (without blind tubules), and 2 slender rear extensions. Vertebrae 14 + 20.

Head and body buff to silvery, paler ventrally; scales above lateral line with faint dark edge and mauve spots; silvery pale yellow midlateral band usually present; caudal and dorsal fins dusky distally; 2nd dorsal fin sometimes with 2 longitudinal rows of dark spots; pelvic fins with pale yellow leading edge; no dark blotch at pectoral-fin bases. Attains 31 cm SL.



*Sillago sihama*, 16 cm SL (S Mozambique). Source: Whitfield 1998  
Ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Persian/Arabian Gulf, Oman, Red Sea, Gulf of Aden to South Africa (Knysna), Madagascar, Comoros, Seychelles and Réunion; elsewhere to Indonesia, China, Philippines, Japan, Australia and Solomon Is.

**REMARKS** Matures at 13–14 cm SL, age 1 year. Common in large schools along beaches, sandbars, mangrove creeks and estuaries, and also recorded from freshwater. Adults feed mainly on polychaetes, small prawns, shrimp and amphipods; pelagic larvae and juveniles feed on zooplankton (mainly copepods). An important food fish.

### *Sillago suezensis* Golani, Fricke & Tikochinski 2013

Suez sillago

PLATE 130

*Sillago erythraea* Cuvier in Cuv. & Val. 1829: 409 [in part: Gulf of Suez, Red Sea, based on paralectotype].

*Sillago suezensis* Golani, Fricke & Tikochinski 2013: 415, Figs. 1–4 (Abu Zanima, Egypt, Gulf of Suez, Red Sea).

First dorsal fin 10–12 spines; 2nd dorsal fin 1 spine, 19–22 rays; anal fin 2 spines, 18–22 rays. HL 32–38% SL; snout length 35–42% HL. LL scales 63–74; 4 or 5 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder complex, with 2 anterior extensions, 2 slender anterolateral extensions (each with blind tubule), and 2 slender rear extensions. Vertebrae 13 + 3 modified + 18 = 34.



Head and body silvery beige, silvery white ventrally; silvery midlateral band usually present; dorsal fins hyaline, dusky distally, with or without rows of dark brown spots on 2nd dorsal fin; pelvic fins and anal fin whitish; pectoral fins hyaline, no dark blotch at fin base; caudal fin with faint brown blotch on both lobes and often with dusky margin. Attains 19 cm SL.

**DISTRIBUTION** WIO: northern Red Sea (Gulf of Suez); elsewhere, Lessepsian migrant to southeastern Mediterranean Sea and southeastern Aegean Sea.

**REMARKS** Common along beaches and sandbars, to ~40 m deep, with juveniles and subadults <12 cm TL preferring shallow water. Feeds mainly on polychaetes and some crustaceans. Spawns from April to September. A commercial food fish in Israel.

### *Sillago vincenti* McKay 1980

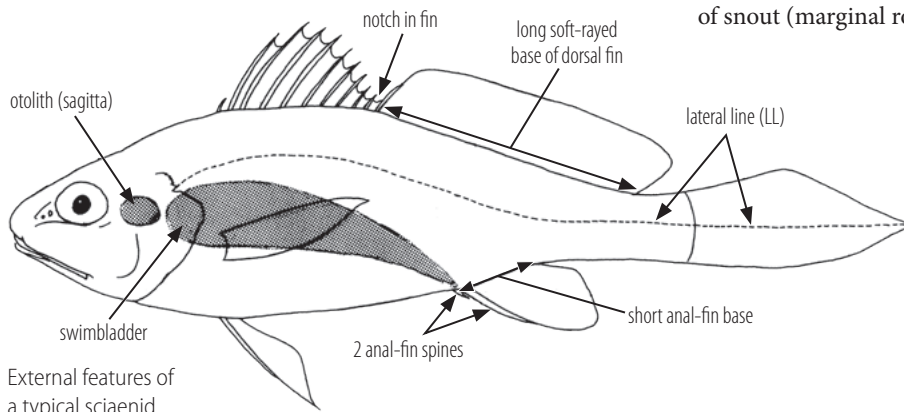
Spottyfin sillago

PLATE 130

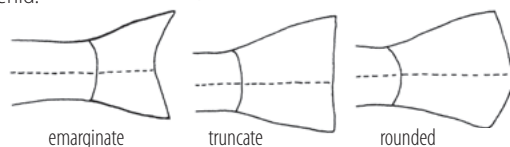
*Sillago vincenti* McKay 1980: 378, Fig. 1a–c (Kavand, near Neendakara, Kerala, India); McKay 1985\*, 1992\*; De Bruin *et al.* 1994\*.

First dorsal fin 11 spines (1st spine longer than fin base); 2nd dorsal fin 1 spine, 21–23 rays; anal fin 2 spines, 22–24 rays. HL 26–29% SL; snout length 40–46% HL. LL scales 70–74; 5 or 6 scale rows from 1st dorsal-fin origin to lateral line. Swimbladder with single rear extension, short bulbous median extension anteriorly, and 1–3 lobate anterolateral extensions. Vertebrae 14 + 4–6 modified + 14–20 = 34.

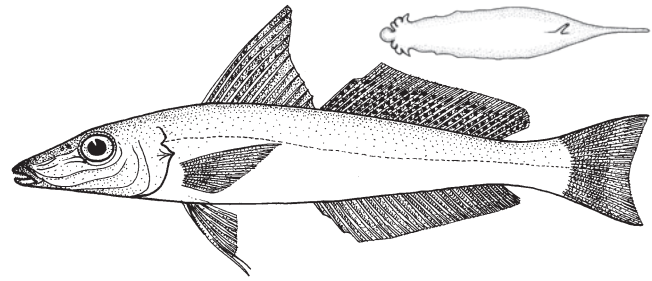
Head and body uniformly silvery buff; 2nd dorsal fin with 5–7 rows of small black spots. Attains 30 cm SL.



External features of a typical sciaenid.



Typical caudal-fin shapes.



*Sillago vincenti*, lateral view; ventral view of swimbladder. Source: McKay 1992

**DISTRIBUTION** Indian Ocean: southwestern and east coasts of India.

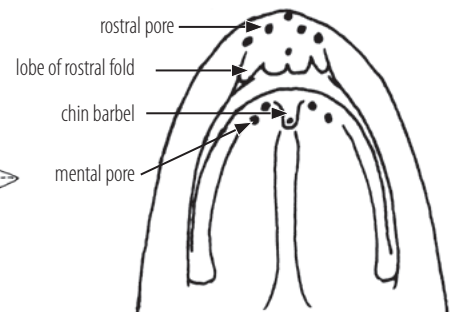
**REMARKS** Apparently occurs in mixed schools with *S. sihama*, on muddy substrates and well into estuaries, to ~10 m deep.

## FAMILY SCIAENIDAE

### Croakers, drums and kob

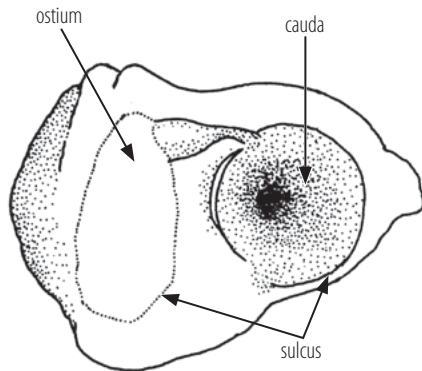
Kunio Sasaki

Body oblong to moderately elongate and compressed; dorsal fin long and deeply notched before last spine, anterior part of fin with 5–12 (usually 10) slender spines, posterior part with 1 short spine and 20–44 (usually 24–35) rays, and base of soft-rayed portion much longer than anal-fin base. Anal fin 2 spines, 5–12 (usually 7) rays. Caudal fin rounded to truncate, slightly emarginate to pointed, or margin rhomboid or S-shaped, but fin never deeply forked (usually pointed in juveniles, rhomboidal in adults). Sensory pores often conspicuous on snout tip (upper rostral pores), lower edge of snout (marginal rostral pores) and chin (mental pores);



Ventral view of head.

pores usually distinct in bottom-feeders, with inferior to subterminal mouth, but indistinct in midwater-feeders, with terminal to oblique mouth. Some species with 1 barbel or patch of small barbels on chin. Teeth differentiated into large and small on both jaws or on upper jaw only; no teeth on vomer and palatines. Entire head and body (except tip of snout) scaly; scales cycloid, ctenoid or a mixture of both. Lateral line reaching caudal-fin margin. Swimbladder well-developed, with thick wall used as resonating chamber, carrot- or hammer-shaped, and with horn-like, tube-like or arborescent appendages, which may spread behind transverse septum at front of abdomen or enter head beyond septum. Drumming muscles usually thick in males, thin or absent in females. Otoliths exceptionally large: sagitta thick, with tadpole-shaped sulcus on inner surface; shape of sagitta and sulcus variable (species identification often requires examination of the sagitta and swimbladder). (The sagittae are located in the ear capsule or *otic bulla* of the skull, behind the eyes and above the gills: with the operculum opened wide, expose the *otic bulla* by cutting several muscle bundles joining the skull and gill arches, then cut a hole in the bony lateral wall of the *bulla* and extract the sagitta.) Body more or less silvery and drably coloured, a few species with distinct stripes or variably sized blotches.



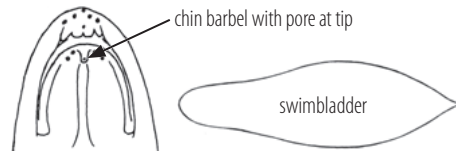
Typical *Johnius* sagittal otolith.

Worldwide, commonly in shallow coastal waters of tropical to temperate seas, abundantly over sand or mud substrate, and many also occur in estuaries and rivers, especially during the breeding season and as juveniles. Several species attain >1 m TL. Important in commercial, artisanal and recreational fisheries, and many species are highly esteemed as food fish; caught with bottom trawls, bottom-set gillnets, spears, and hook and line.

About 70 genera and at least 300 species; 16 genera and 47 species in WIO, including 2 as anti-Lessepsian migrants from the Mediterranean Sea.

#### KEY TO GENERA

- 1a Single, thick, chin barbel, with pore at tip; swimbladder simple, without appendages ..... *Umbrina*



- 1b No barbels on chin, or if present (single or pair) without pore at tip; swimbladder with appendages ..... 2

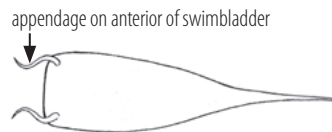
- 2a Pair of small barbels present on chin; caudal fin cuneate; length of 2nd anal-fin spine  $\sim \frac{1}{2}$  HL ..... *Daysciaena*

- 2b Single barbel present on chin, or barbels absent ..... 3

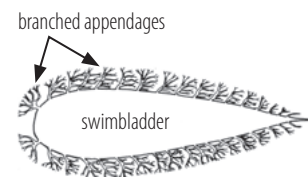
- 3a Anal fin 9 rays; LL  $\sim 70$ – $80$  scales; caudal fin emarginate; no chin pores ..... *Atractoscion*

- 3b Anal fin 7 or 8 (mostly 7) rays; LL  $\sim 50$  scales; caudal fin pointed, sinuous, rounded, truncate or only slightly emarginate ..... 4

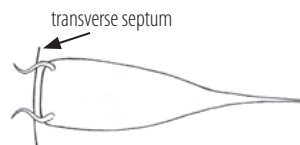
- 4a Swimbladder with horn- or tube-like appendages attached at either front or rear ..... 5



- 4b Swimbladder with branched appendages along entire sides ... 8



- 5a Pair of small horn-like appendages at front end of swimbladder, penetrating transverse septum; 2nd spine of anal fin stout, nearly as long as rays, and about twice length of anal-fin base, and fin with 6 or 7 rays ..... 6



- 5b Swimbladder with pair of tube-like appendages parallel to swimbladder wall ..... 7



Continued ...

KEY TO GENERA

- 6a Lower GR ~20 ..... *Kathala*
- 6b Lower GR ~10 ..... *Macropsinosa*

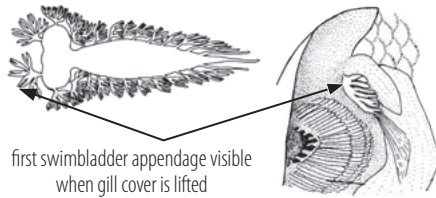
- 7a Swimbladder appendages attached to front of swimbladder ..... *Panna*



- 7b Swimbladder appendages attached to rear of swimbladder ..... *Otolithoides*



- 8a Swimbladder hammer-shaped; lateral branch of 1st appendage extending to lateral surface of pectoral-fin skeleton at junction of cleithrum and supracleithrum, visible under gill cover ..... *Johnius*



- 8b Swimbladder carrot-shaped, and no appendage visible under gill cover ..... 9

- 9a Chin with single, slender, pointed barbel; mouth inferior, snout projecting slightly over upper jaw ..... *Dendrophysa*

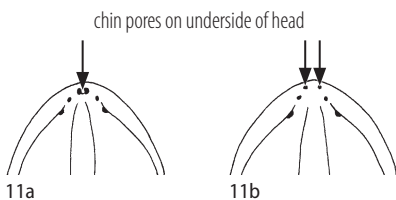
- 9b No barbel on chin ..... 10

- 10a Upper jaw or both jaws with 1 or 2 pairs of large canines; mouth strongly oblique, at ~45° angle to horizontal axis; body slender, cylindrical ..... *Otolithes*

- 10b No canines in upper jaw; mouth at ~35° angle, to horizontal or inferior (under protruding snout); body more or less compressed ..... 11

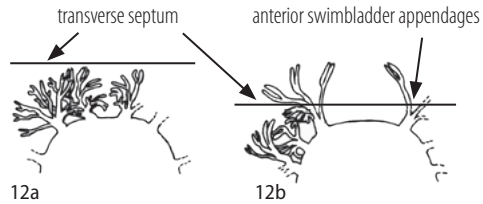
- 11a First pair of chin pores close-set and united by crescent-shaped groove just behind symphysis ..... 12

- 11b Front of chin with 2 separate pores, one on each side of jaw tip, not united by groove ..... 14



- 12a Dorsal fin 22–24 rays; anterior appendages of swimbladder branching posterior to transverse septum and not entering head; scattered black spots on body, dorsal fin and caudal fin ..... *Megalonibea*

- 12b Dorsal fin 24–32 rays; anterior appendages of swimbladder penetrating transverse septum and branching between skull and gill arches ..... 13



- 13a Lips thick and papillose; pelvic fins and anal fin very dark ..... *Paranibea*

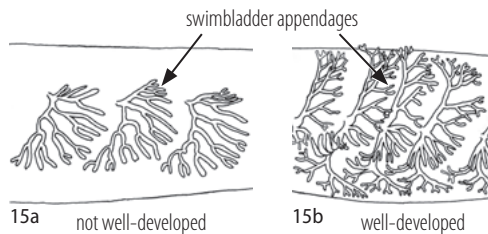
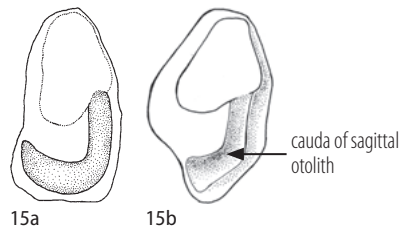
- 13b Lips thin, without papilla; pelvic fins and anal fin pale to dusky ..... *Nibea*

- 14a Dorsal fin 22–24 rays; swimbladder appendages 17–22; caudal fin truncate; cauda of sagittal otolith only slightly curved ..... *Pennahia*

- 14b Dorsal fin 24–33 (rarely 24) rays; swimbladder appendages 21–45; caudal fin variously shaped; cauda of sagittal otolith J-shaped or only slightly curved ..... 15

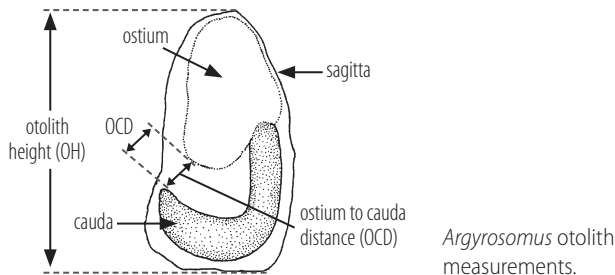
- 15a Cauda of sagitta J-shaped; swimbladder appendages with short dorsal and ventral limbs, none enveloping swimbladder; oral cavity pale to dusky ..... *Argyrosomus*

- 15b Cauda of sagitta only slightly curved; swimbladder appendages with well-developed dorsal and ventral limbs, some or most appendages enveloping swimbladder; oral cavity usually dark ..... *Atrobucca*



GENUS **Argyrosomus** De la Pylaie 1835

Mouth terminal, without large canine teeth; 1st pair of mental pores on front of chin, one on each side of jaw tip, not united by groove; swimbladder carrot-shaped, with branched appendages along its sides and posterior to transverse septum, appendages without well-developed dorsal limbs; cauda of sagittal sulcus usually J-shaped. Measurements of the otolith are the ostium to cauda distance (OCD) and otolith height (OH). Genus reviewed by Griffiths & Heemstra (1995). Nine species, 7 in WIO. *Argyrosomus amoyensis* (Bleeker 1863), although reported from off northwestern India, is not included here as its identity is ambiguous, with the species likely being a junior synonym of *A. japonicus*.



KEY TO SPECIES

- 1a Dorsal fin 31–33 rays; caudal fin truncate to slightly emarginate ..... *A. heinii*
  - 1b Dorsal fin 25–30 rays; caudal-fin margin either pointed, S-shaped, bi-concave or slightly rounded ..... 2
  - 2a Snout length 4.7–5 in HL, less than eye diameter ..... *A. beccus*
  - 2b Snout length 3.2–4.1 in HL, greater than eye diameter ..... 3
  - 3a Axillary skin fold above pectoral-fin base scaly; anterior part of lateral line strongly curved; peritoneum with fine black dots ..... *A. thorpei*
  - 3b Pectoral-fin axillary skin fold naked; anterior part of lateral line slightly curved; peritoneum unpigmented ..... 4
  - 4a Peduncle depth 1.3–1.7 in peduncle length; sagittal otolith ostium to cauda distance (OCD) 1.6–2.7 in otolith height (OH); drumming muscles present in males only; swimbladder appendages 31–42 ..... *A. inodorus*
- 
- 4b Peduncle depth 1–1.5 in peduncle length; OCD 2.9–4.3 in OH; drumming muscles present in adults (>27 cm SL) of both sexes ..... 5

Continued ...

KEY TO SPECIES

- 5a Interorbital width 3.4–4.2 in HL; swimbladder appendages 36–45 ..... *A. regius*
  - 5b Interorbital width 4.2–5 in HL; swimbladder appendages 21–36 ..... 6
  - 6a Suborbital width 8.3–9.5 in HL; swimbladder appendages 34–36 ..... *A. hololepidotus*
- 
- 6b Suborbital width 9.5–11.9 in HL; swimbladder appendages 21–31 ..... *A. japonicus*

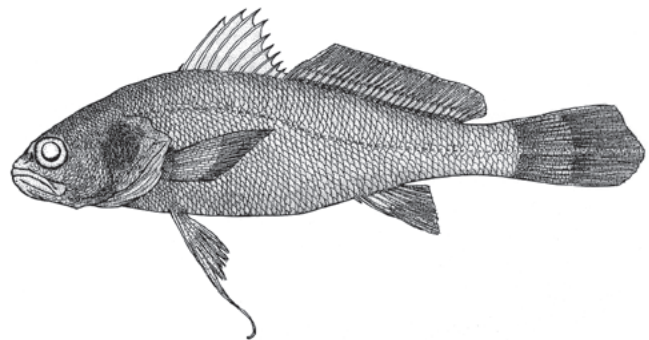
**Argyrosomus beccus** Sasaki 1994

Beck meagre

*Argyrosomus beccus* Sasaki 1994: 35, Figs. 1–2 (sandbar off Harbour Inlet, Durban, KwaZulu-Natal, South Africa).

Dorsal fin 10 + 1 spines, 27 or 28 rays; anal fin 2 spines, 7 rays; pectoral fins 16 or 17 rays. In SL: body depth 3.5–3.9, HL ~3.3, pectoral fins 4.2–4.3, and 2nd anal-fin spine 10–13. In HL: snout length 4.8–5, eye diameter 3.7–4.2, interorbital width 6.4–6.6, suborbital width 9.5–11.8, and lower jaw length 2–2.2. Snout short, less than eye diameter, its dorsal profile medially concave, appearing beak-like. GR 3–5/8 or 9. Swimbladder appendages 23. Vertebrae 11 + 14.

Preserved specimens brown, paler ventrally; peritoneum unpigmented. Attains at least 28 TL.



*Argyrosomus beccus*, 18 cm SL, holotype (South Africa). Source: Sasaki 1994

**DISTRIBUTION** Known only from three type specimens from South Africa.

**REMARKS** Specimens may have been of a cohort affected by some environmental pollutant in Durban Harbour, and hence aberrant. If so, the species would be a junior synonym of *A. japonicus*, which it otherwise resembles.

### *Argyrosomus heinii* (Steindachner 1902)

Arabian Sea meagre

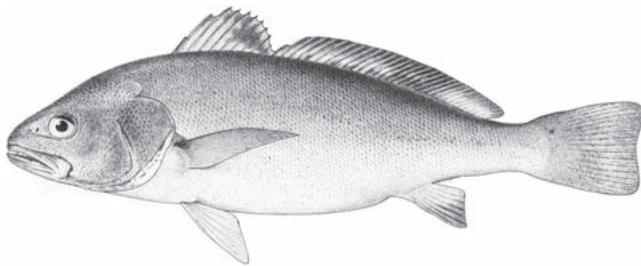
PLATE 131

*Sciaena heinii* Steindachner 1902: 317 (Qishn, Yemen, Gulf of Aden); Steindachner 1903\*.

*Argyrosomus heinii*: Lal Mohan 1984\*; Griffiths & Heemstra 1995\*; Randall 1995\*; Sasaki 1996\*; Manilo & Bogorodsky 2003.

Dorsal fin 9 or 10 + 1 spines, 31–33 rays; anal fin 2 spines, 7 rays; pectoral fins 18 rays. Caudal fin truncate to slightly emarginate. In SL: body depth 3.5–3.9, HL 3–3.1, 2nd anal-fin spine ~13, and pectoral fins 4.3–4.8. In HL: snout length 3.1–3.6, eye diameter 5.3–6.1, interorbital width ~3.9, suborbital width 8.3–14, and lower jaw length 2–2.1. GR 6 or 7/10–12. Swimbladder appendages 36. Vertebrae 12 + 13.

Body grey dorsally, silvery on sides and ventrally; black spot at upper end of pectoral-fin base; peritoneum unpigmented. Attains 60 cm TL.



*Argyrosomus heinii*, 42 cm TL, holotype. Source: Steindachner 1903

**DISTRIBUTION** WIO: northern Arabian Sea and Gulf of Aden.

### *Argyrosomus hololepidotus* (Lacepède 1801)

Madagascar meagre

PLATE 131

*Labrus hololepidotus* Lacepède (ex Commerson) 1801: 448, 518, Pl. 21,

Fig. 2 (Grand Océan équatorial [Fort Dauphin, Madagascar]).

*Sciaena hololepidota*: Smith 1842.

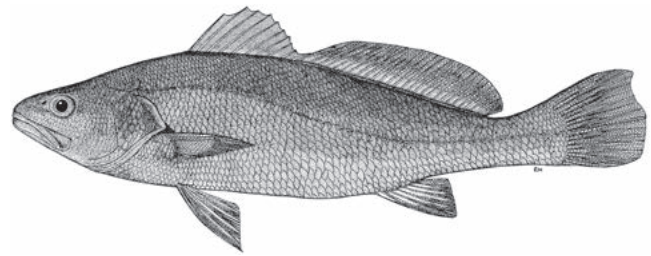
*Sciaena margaritifera* Haly 1875: 269 (off KwaZulu-Natal, South Africa).

*Argyrosomus hololepidotus*: SSF No. 199.1\*; Griffiths & Heemstra 1995\*; Talwar 1995\*; Fricke 1999.

Dorsal fin 10 + 1 spines, 27 or 28 rays; anal fin 2 spines, 7 rays; pectoral fins 16 or 17 rays. In SL: body depth 3.7–3.8, HL 3.3–3.4, 2nd anal-fin spine 12–15, pectoral fins 5.6–5.9,

and peduncle length 7.7–8.3 (peduncle depth ~1.3 in peduncle length). In HL: snout length 3.7–3.8, eye diameter 5.6–6.1, interorbital width 4.3–4.5, suborbital width 8.3–9.5, and lower jaw length 6.7–7.1. Pectoral-fin axillary fold naked; anterior part of lateral line moderately curved. GR 4 or 5/9. Swimbladder appendages 34–36; drumming muscles present in both sexes. OCD 2.9–3.6 in OH. Vertebrae 11 + 14.

Body silvery grey, darker and bluish dorsally, flanks and dorsal surface with distinctly bronze sheen, white ventrally; pelvic fins and anal fin almost white, with streak of grey; dorsal, pectoral and caudal fins brownish grey; peritoneum unpigmented. Attains 135 cm TL.



*Argyrosomus hololepidotus*, 47 cm SL, neotype (Madagascar).

Source: Griffiths & Heemstra 1995

**DISTRIBUTION** WIO: Madagascar, South Africa (KwaZulu-Natal) and Mauritius.

### *Argyrosomus inodorus* Griffiths & Heemstra 1995

Silver kob

PLATE 131

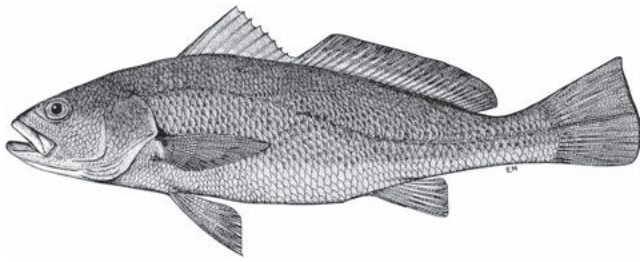
*Argyrosomus hololepidotus* (non Lacepède 1801): SSF No. 199.1 [not Figs].

*Argyrosomus inodorus* Griffiths & Heemstra 1995: 21, Figs. 21–22

(False Bay, South Africa); Heemstra & Heemstra 2004\*.

Dorsal fin 9 or 10 + 1 spines, 25–29 rays; anal fin 2 spines, 7 rays; pectoral fins 16 or 17 rays. In SL: body depth 3.6–4.2, HL 3–3.6, pectoral fins 4.3–5.3, 2nd anal-fin spine 19–20, and peduncle length 6.7–8.3 (peduncle depth 1.4–1.8 in peduncle length). In HL: snout length 3.3–4.2, eye diameter 4.2–9.1, interorbital width 4–5, suborbital width 9.4–12, and lower jaw length 2–2.1. Pectoral-fin axillary fold naked; anterior part of lateral line slightly curved. GR 4–6/10–12. Swimbladder appendages 31–41; drumming muscles present in males only. OCD 1.6–2.7 in OH; sagitta elongate, with pronounced bulge in rear third of ventral margin. Vertebrae 11 + 14.

Body largely silvery, green-brown dorsally with coppery to bronzy sheen (sometimes pronounced on head), white ventrally; dorsal fin and caudal fin pale yellow-grey or grey-brown; anal, pelvic and pectoral fins whitish to brown-grey, but fins occasionally reddish (particularly caudal fin); peritoneum unpigmented. Attains 145 cm TL (commonly 115 cm TL), 36 kg.



*Argyrosomus inodorus*, 45 cm SL, holotype (South Africa).  
Source: Griffiths & Heemstra 1995

**DISTRIBUTION** Southern Africa: Namibia in southeastern Atlantic, to South Africa (south coast, at least to Kei River mouth, Eastern Cape) in WIO.

**REMARKS** Males mature at ~31 cm TL, and females at ~34 cm TL. Rarely found in inshore habitats; caught mainly by skiboat anglers and trawls in 50–100 m. As implied by the name, *inodorus*, fresh fish lack the strong metallic odour typical of *A. japonicus* from South African waters.

***Argyrosomus japonicus*** Temminck & Schlegel 1843

Japanese meagre or dusky kob PLATE 131

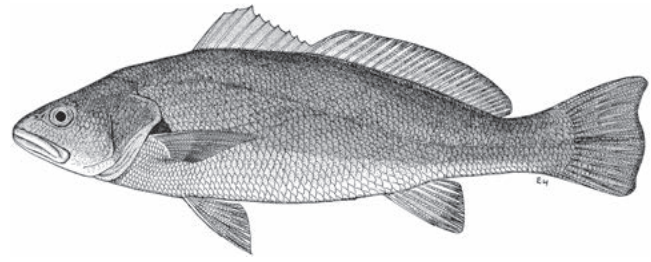
*Sciaena japonica* Temminck & Schlegel 1843: 58, Pl. 24, Fig. 1 (Miyazaki Prefecture, Kyushu, Japan).

*Argyrosomus hololepidotus* (*non* Lacepède 1801): SSF No. 199.1\* [in part]; Randall 1995\*.

*Argyrosomus japonicus*: Griffiths & Heemstra 1995\*; Johnson 1999\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 9 or 10 + 1 spines, 25–30 rays; anal fin 2 spines, 7 rays; pectoral fins 15–17 rays. In SL: body depth 3.3–4, HL 3–3.6, pectoral fins 4.8–5.9, 2nd anal-fin spine 8.3–18, and peduncle length 7.7–9 (peduncle depth 1.1–1.4 in peduncle length). In HL: snout length 3.3–3.8, eye diameter 4.3–7.7, interorbital width 4.2–4.8, suborbital width 9.5–12, and lower jaw length 1.9–2.1. Pectoral-fin axillary fold naked; anterior part of lateral line slightly curved. GR 4 or 5/9–12. Swimbladder appendages 21–31; drumming muscles present in both sexes. OCD 2.4–4.3 in OH. Vertebrae 11 + 14.

Body silvery grey, darker dorsally and paler ventrally; dorsal surface with bluish bronze sheen, sometimes coppery on head, and large fish (>80 cm TL) becoming golden brown; dorsal and caudal fins grey-brown, becoming darker with age, often with reddish hue; peritoneum unpigmented. Attains 180 cm TL, 75 kg.



*Argyrosomus japonicus*, 45 cm SL (South Africa).  
Source: Griffiths & Heemstra 1995

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Oman, Pakistan to northwestern India, Mozambique to South Africa (False Bay); elsewhere, China, South Korea, Japan and Australia.

**REMARKS** In South African waters males mature at ~95 cm TL, and females at ~110 cm TL. Juveniles confined to estuaries; adults often occur in estuaries but also in the surf zone, near shore, and on wrecks and high-profile reefs, to ~50 m deep.

***Argyrosomus regius*** (Asso y del Rio 1801)

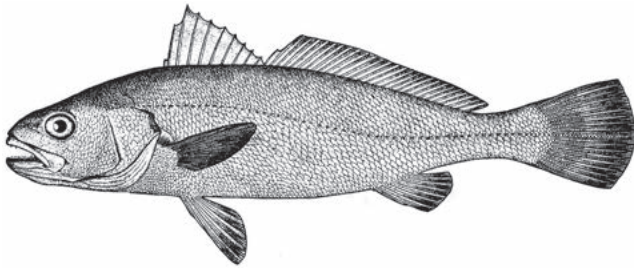
Meagre PLATE 131

*Perca regia* Asso y del Rio 1801: 42, Pl. 35, Fig. 3 (Bay of Biscay, France).

*Argyrosomus regius*: Trewavas 1977\*; Goren & Dor 1994; Griffiths & Heemstra 1995\*.

Dorsal fin 9 or 10 + 1 spines, 26–30 rays; anal fin 2 spines, 7 rays; pectoral fins 16–18 rays. In SL: body depth 2.8–4.2, HL 2.9–3.7, pectoral fins 4.3–5.6, 2nd anal-fin spine 11–17, and peduncle length 7.7–9.1 (peduncle depth 1.2–1.5 in peduncle length). In HL: snout length 3.2–3.8, eye diameter 5.3–10, interorbital width 3.4–4.8, suborbital width 9.1–12, and lower jaw length 2–2.4. GR 3–5/8–10. Pectoral-fin axillary fold naked; anterior part of lateral line slightly curved. Swimbladder appendages 36–45; drumming muscles present in both sexes. OCD 3.1–3.8 in OH; sagitta typical of *Argyrosomus*. Vertebrae 11 + 14.

Body silvery, darker dorsally, with bronze reflection on sides; fins greyish; peritoneum unpigmented. Attains 180 cm TL, 103 kg.



*Argyrosomus regius*, adult (North Sea). Source: Smitt 1892

**DISTRIBUTION** Eastern Atlantic (Norway to Congo), North Sea, western Baltic Sea, Black Sea, Mediterranean Sea, and anti-Lessepsian migrant to Red Sea.

**REMARKS** Adults found mainly beyond the surf zone, but occasionally nearer inshore; juveniles occur only inshore and enter estuaries and coastal lagoons. An important food fish.

### *Argyrosomus thorpei* Smith 1977

Squaretail kob

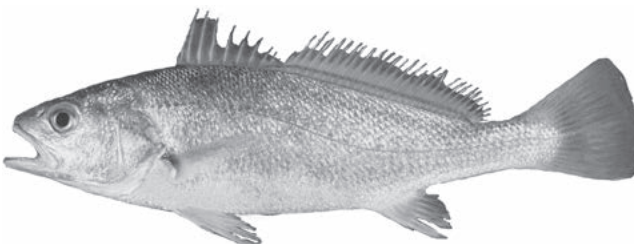
PLATE 131

*Argyrosomus thorpei* Smith 1977: 562, Pls. 1c, 2 (off KwaZulu-Natal, South Africa); SSF No. 199.2\*; Griffiths & Heemstra 1995\*; Heemstra & Heemstra 2004\*.

*Afroscom thorpei*: Trewavas 1977\*.

Dorsal fin 10 + 1 spines, 26–30 rays; anal fin 2 spines, 7 rays; pectoral fins 15–17 rays. Caudal fin truncate. In SL: body depth 3.3–4.2, HL 3.1–3.4, pectoral fins 4.3–5, 2nd anal-fin spine 13–23, and peduncle length 7.1–8.3 (peduncle depth 1.3–1.5 in peduncle length). In HL: snout length 3.4–3.8, eye diameter 4.8–6.7, interorbital width 3.8–5.3, suborbital width 8.3–10, and lower jaw length 1.9–2.1. GR 4–6/10–12. Pectoral-fin axillary fold scaly; anterior part of lateral line strongly curved. Swimbladder appendages 25–33; drumming muscles present in both sexes. OCD 2.3–2.9 in OH; cauda of sagittal sulcus with distal part expanded and tip truncate. Vertebrae 11 + 14.

Body silvery grey, darker and bluish with coppery sheen dorsally, paler ventrally; fins yellow-grey to orange-brown, occasionally reddish, particularly caudal fin; peritoneum pigmented. Attains 110 cm TL.



*Argyrosomus thorpei*, 21 cm SL (S Mozambique). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Mozambique (Maputo Bay) to South Africa (Algoa Bay).

**REMARKS** Juveniles found on sand or mud, adults predominantly on reefs. Reports of this species from Madagascar are unsubstantiated.

### GENUS *Atractoscion* Gill 1863

Body elongate, fusiform; caudal fin emarginate. Mouth terminal, lower jaw projecting, maxilla reaches vertical at rear edge of eye; no canine teeth; all teeth depressible. 2nd anal-fin spine very short and slender. Scales very small, LL scales ~70–80. Swimbladder carrot-shaped, anterior end with pair of horn-like appendages not penetrating transverse septum. Genus reviewed by Song *et al.* (2017). Five species, 2 in WIO.

#### KEY TO SPECIES

- |    |   |
|----|---|
| 1a | Dorsal-fin 27–28 rays; LL scales 74–76 (mode 76) ... <i>A. aequidens</i>  |
| 1b | Dorsal-fin 25–26 rays; LL scales 76–82 (mode 78) ... <i>A. microlepis</i> |

### *Atractoscion aequidens* (Cuvier 1830)

Geelbek

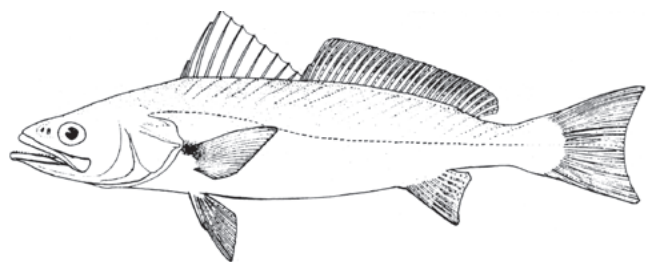
PLATES 131 & 132

*Otolithus aequidens* Cuvier in Cuv. & Val. 1830: 66 (Cape of Good Hope, South Africa).

*Atractoscion aequidens*: Trewavas 1977 [in part]\*; SSF No. 199.3\*; Bianchi *et al.* 1993\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 9 + 1 spines, 27–28 rays; anal fin 2 spines, 9 or 10 rays; pectoral fins 16–18 rays. In SL: body depth 4.5–5.2, HL 3.2–3.5, and pectoral fins 5.6–6.5. In HL: eye diameter 5.9–6.7, interorbital width 3.9–4.3, lower jaw length 1.6–1.8, and 2nd anal-fin spine 5.6–9.1 (very short and slender). All teeth depressible. GR 3–5/7–9–10. LL scales 74–76 (mode 76).

Body iridescent blue and purple; edges of jaws and inside of gill cover bright yellow; pectoral-fin axil with black blotch. Attains 130 cm TL, 25 kg.



*Atractoscion aequidens*, 72 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: South Africa (False Bay) to Mozambique (Pinda).

**REMARKS** Feeds mainly on schooling fishes (*Sardinops sagax*, *Trachurus trachurus* and *Scomber japonicus*). Adults occur in schools offshore over sandy bottom, on rocky reefs, and near wrecks and pinnacles, in 15–200 m; juveniles occasionally found in estuaries. A highly esteemed food fish in South Africa.

***Atractoscion microlepis*** Song, Kim & Kang 2017

Small scale lunate caudal fin croaker

*Atractoscion microlepis* Song, Kim & Kang 2017: 231 (Gulf of Oman).

Dorsal fin 9 or 10 + 1 spines, 25–26 rays; anal fin 2 spines, 9 rays; pectoral fins 18–19 rays. In SL: body depth 3.6–5.0, HL 3.1–3.6, and pectoral fins 5.7–6.7. In HL: eye diameter 5.5–6.6, interorbital width 3.5–4.3, lower jaw length 1.7, and 2nd anal-fin length 6.2. GR 4 or 5/7–9. LL scales 76–82 (mode 78).

Dorsal surface of body dark grey; head silvery-white; pectoral-fin axil with black blotch. Attains 80 cm TL.

**DISTRIBUTION** WIO: Gulf of Aden and Gulf of Oman.

**GENUS *Atrobuca*** Chu, Lo & Wu 1963

Body moderately elongate. Mouth terminal, oblique; 1st pair of mental pores on front of chin, one on each side of jaw tip, not united by groove. Swimbladder carrot-shaped, with numerous arborescent appendages along its length, 1st appendage not entering head, and each appendage with well-developed dorsal and ventral limbs. Cauda of sagittal sulcus only slightly curved. Mouth lining and peritoneum usually dark. Ten species, 5 in WIO.

**KEY TO SPECIES**

- 1a Inner row of teeth on lower jaw weakly differentiated; dorsal fin 9 + 1 spines ..... *A. bengalensis*
- 1b Inner row of teeth on lower jaw strongly differentiated; dorsal fin 10 + 1 (rarely 11 + 1) spines ..... 2



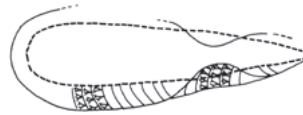
- 2a HL 2.6–2.7 in SL; gill filaments 18–22 in SL ..... *A. alcocki*
- 2b HL 2.7–3.3 in SL; gill filaments 29–42 in SL ..... 3

Continued ...

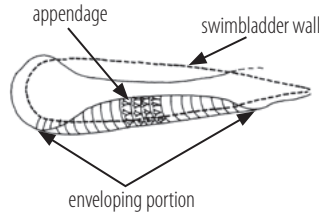
**KEY TO SPECIES**

- 3a Dorsal fin 24–27 rays; HL 2.7–2.8 in SL; interorbital width 4.9–5 in HL ..... *A. geniae*
- 3b Dorsal fin 27–33 rays; HL 2.9–3.3 in SL; interorbital width 3.6–4.3 in HL ..... 4

- 4a Swimbladder enveloped only by 4 or 5 appendages ..... *A. marleyi*



- 4b Swimbladder enveloped by many appendages along its entire length ..... *A. nibe*



***Atrobuca alcocki*** Talwar 1980

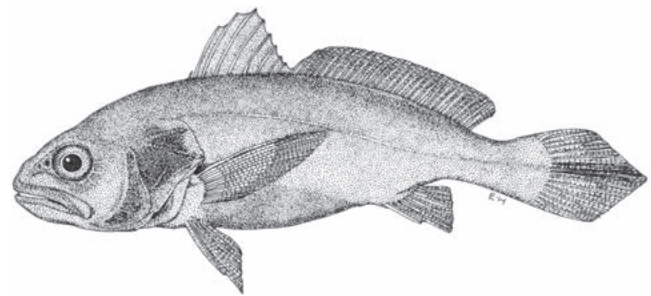
Largehead croaker

PLATE 132

*Atrobuca alcocki* Talwar 1980: 23, Fig. 1 (off Mumbai, India); Sasaki & Kailola 1988; Talwar 1995; Sasaki 1996; Manilo & Bogorodsky 2003.

Dorsal fin 9–11 + 1 spines, 24–28 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. In SL: body depth 3.1–4.1, HL 2.6–2.7, pectoral fins 3.2–3.4, 2nd anal-fin spine 3–5.5, gill filaments 18–22, and peduncle length 3.8–4.5. In HL: eye diameter 3.7–5.9, interorbital width 3.7–5.2, lower jaw length 1.9–2.3, and gill filaments 5.7–8.1. Inner row of teeth on lower jaw strongly differentiated, widely spaced. GR 5–8/10–12. Vertebrae 10 + 15.

Live colour unknown; body drab brown in preservative. Attains 35 cm TL.



*Atrobuca alcocki*, 15 cm SL, holotype (off NW India).

Drawn from photograph



**DISTRIBUTION** WIO: Gulf of Aden to India (Mumbai).

**REMARKS** Rare; found in relatively deep water, known from 60–280 m.

### *Atrobuca bengalensis* Sasaki 1995

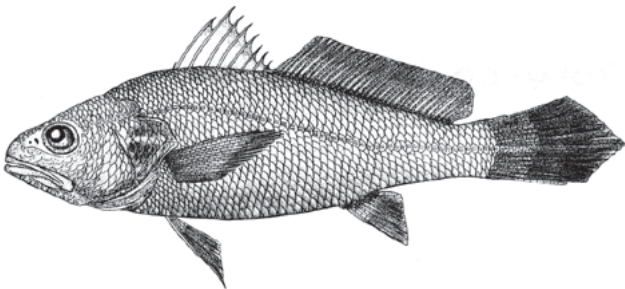
Bengal blackmouth croaker

PLATE 132

*Atrobuca bengalensis* Sasaki 1995: 272, Figs. 2–5 (St John's fish market, Trincomalee, Sri Lanka).

Dorsal fin 9 + 1 spines, 30 or 31 rays; anal fin 2 spines, 7 rays; pectoral fins 19 rays. In SL: body depth 3.3–3.7, HL 2.9–3.1, pectoral fins 3.9–4.2, 2nd anal-fin spine 4.1–4.5, peduncle length 3.8–3.9, and gill filaments 20–21. In HL: eye diameter 4.2–4.7, interorbital width 4.6–5.2, lower jaw length 2–2.1, and gill filaments 6.9–7.1. Inner row of teeth on lower jaw weakly differentiated, closely spaced. GR 7 or 8/12. Vertebrae 10 + 15.

Body dark brown dorsally and on sides, with broadly dark-margined scale pockets, and slightly paler ventrally; peritoneum and lining of mouth and gill cavities dark brown. Attains at least 23 cm SL.



*Atrobuca bengalensis*, 23 cm SL. Source: Sasaki 1995

**DISTRIBUTION** Known only from three type specimens from the fish market at Trincomalee, Sri Lanka.

**REMARKS** Probably more widespread along coast of India.

### *Atrobuca geniae* Ben-Tuvia & Trewavas 1987

Aqaba blackmouth croaker

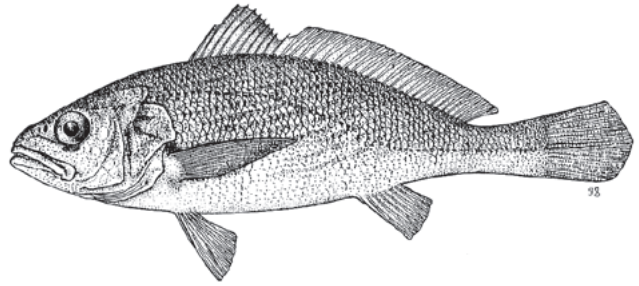
PLATE 132

*Atrobuca geniae* Ben-Tuvia & Trewavas 1987: 17, Figs. 1–4 (Eilat, Israel, Gulf of Aqaba, Red Sea); Baranes & Golani 1993; Goren & Dor 1994.

Dorsal fin 10 or 11 + 1 spines, 24–27 rays; anal fin 2 spines, 6 or 7 rays; pectoral fins 17 or 18 rays. In SL: body depth 3.3–3.7, HL 2.7–2.8, pectoral fins 3.6–4, 2nd anal-fin spine 4.6–6, peduncle length 3.8–4.3, and gill filaments 29–32.

In HL: eye diameter 4–4.6, interorbital width 4.2–5, lower jaw length 1.9–2, and gill filaments 10–11. Inner row of teeth on lower jaw enlarged, widely spaced. GR 6 or 7/11. Vertebrae 10 + 15.

Colour in life unknown; mouth lining dark; opercle membrane between spines paler posteriorly. Attains 40 cm TL.



*Atrobuca geniae*, 15 cm SL, type (Red Sea). Source: Ben-Tuvia & Trewavas 1987

**DISTRIBUTION** WIO: northern Red Sea.

**REMARKS** Found in relatively deep water; known from 200–750 m.

### *Atrobuca marleyi* (Norman 1922)

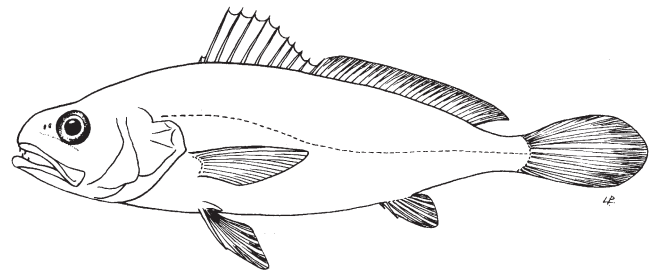
African blackmouth croaker

*Sciaena marleyi* Norman 1922: 319 (off Umzimkulu River, KwaZulu-Natal, South Africa).

*Atrobuca marleyi*: Trewavas 1977\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 30 rays; anal fin 2 spines, 7 rays; pectoral fins 18 rays. In SL: body depth 3.7, HL 3, pectoral fins 3.6, 2nd anal-fin spine 13, peduncle length 4, and gill filaments 32. In HL: eye diameter 4.2, interorbital width 4.1, lower jaw length 1.9, and gill filaments 11. Inner row of teeth on lower jaw enlarged, widely spaced. GR 7/12. Swimbladder enveloped by 4 or 5 appendages. Vertebrae 10 + 15.

Colour in life unknown; buccal cavity black. Attains at least 16 cm SL.



*Atrobuca marleyi*, 13 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Known only from the holotype collected from South Africa.

**REMARKS** Taken at ~73–91 m.

### *Atrobuca nibe* (Jordan & Thompson 1911)

Japanese blackmouth croaker

PLATE 132

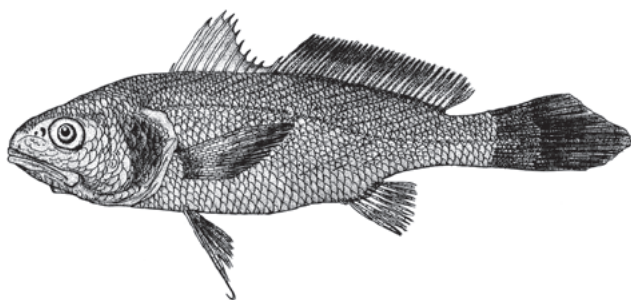
*Pseudolithus brunneolus* Jordan & Richardson 1909: 191, Pl. 71 (Kaohsiung, Taiwan) [name unavailable].

*Sciaena nibe* Jordan & Thompson 1911: 258, Fig. 4 (Wakanoura, Wakayama Prefecture, Japan, Inland Sea).

*Atrobuca nibe*: Trewavas 1977\*; SSF No. 199.4\*; Sasaki & Kailola 1988; Hussain & Jawad 2014.

Dorsal fin 9–11 + 1 spines, 27–33 rays; anal fin 2 spines, 7 rays; pectoral fins 16–19 rays. In SL: body depth 3.2–4.3, HL 2.9–3.3, peduncle length 3.7–4.3, pectoral fins 3.2–3.9, 2nd anal-fin spine 12–15, and gill filaments 29–42. In HL: eye diameter 3.4–5, interorbital width 3.1–4.6, lower jaw length 1.8–2, and gill filaments 7.4–13. Lower jaw not projecting, with 3 pairs of pores (1st pair on front of chin minute). Caudal fin cuneate. GR 5–7/10–13. Scales cycloid on head, ctenoid on body; LL scales 50 or 51. Swimbladder of adults strongly enveloped in many appendages along its length (rather weakly so in young). Vertebrae 10 + 15.

Body dusky silvery, whitish ventrally; lining of mouth, gill chamber and peritoneum black. Attains 45 cm TL.



*Atrobuca nibe*, 16 cm SL (Australia). Source: Sasaki 2001

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf (Iraq), Kenya (Lamu I.), Mozambique, South Africa (KwaZulu-Natal) and India; elsewhere, Indonesia, Philippines, China, Japan and northern Australia.

**REMARKS** Found in coastal waters, often on gravel and seaweed beds, to >200 m deep. An important food fish.

### GENUS *Daysciaena* Talwar 1970

Mouth terminal or slightly inferior; 1 pair of minute barbels at lower jaw symphysis. Second anal-fin spine subequal to peduncle length. Swimbladder carrot-shaped, with 17–19 pairs of arborescent appendages along sides, 1st pair fan-like, partly cephalic, with some small branches entering head beyond transverse septum. One species.

### *Daysciaena albida* (Cuvier 1830)

Two-bearded croaker

PLATE 132

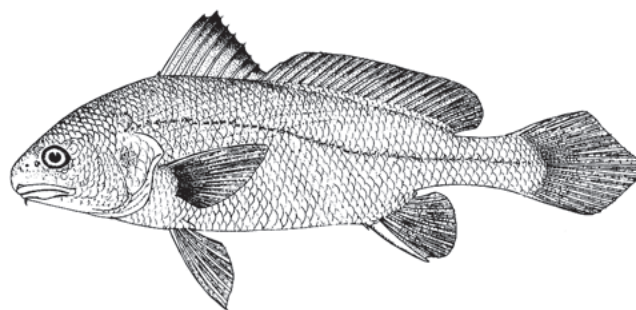
*Corvina albida* Cuvier in Cuv. & Val. 1830: 93 (Puducherry and Mahé, India).

*Corvina neilli* Day 1865: 55 (Kochi, India).

*Daysciaena albida*: Trewavas 1977\*; Talwar & Jhingran 1991; Talwar 1995; Bijukumar & Sushama 2000\*; Manilo & Bogorodsky 2003.

Dorsal fin 8–10 + 1 spines, 23–26 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19. In SL: body depth 3.3–4.3, HL 3.1–3.4, pectoral fins 4.3–5.3, and 2nd anal-fin spine 5.7–9.4. In HL: eye diameter 4–7.9, interorbital width 4–5.1, and lower jaw length 2.1–2.3. GR 5 or 6/8–13.

Body grey dorsally, silvery ventrally; faint dark oblique line along scale series. Attains 90 cm TL.



*Daysciaena albida*, 21 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indian Ocean. WIO: Pakistan to Sri Lanka; elsewhere to east coast of India and Bangladesh.

**REMARKS** Found in coastal waters and estuaries. An important food fish.

### GENUS *Dendrophysa* Trewavas 1964

Mouth inferior; chin with single, pointed barbel; teeth on upper jaw in villose band, outer row slightly enlarged, teeth on lower jaw uniformly small. Second anal-fin spine strong.

Swimbladder carrot-shaped, with 14–17 pairs of arborescent appendages along sides, 1st appendage fan-like, wholly or partly entering head and branching under skull. One species.

## *Dendrophysa russelii* (Cuvier 1829)

Goatee croaker

PLATE 132

*Umbrina russelii* Cuvier 1829: 174 (Visakhapatnam, India [Andaman Is.]);

Cuv. & Val. 1830\* [inadvertent error, should be *U. russelii*].

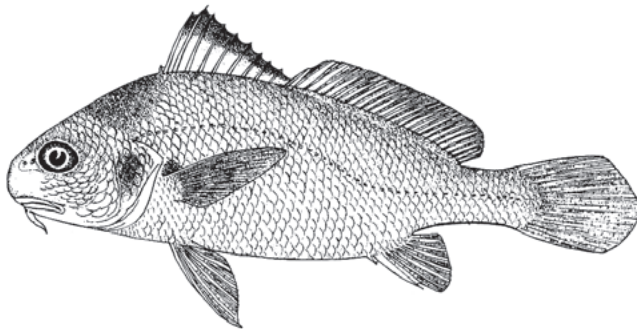
*Dendrophysa russelii* Trewavas 1977\*; Lal Mohan 1984\*; Talwar & Jhingran

1991; Talwar 1995; Bijukumar & Sushama 2000\* [in *Dendrophis*];

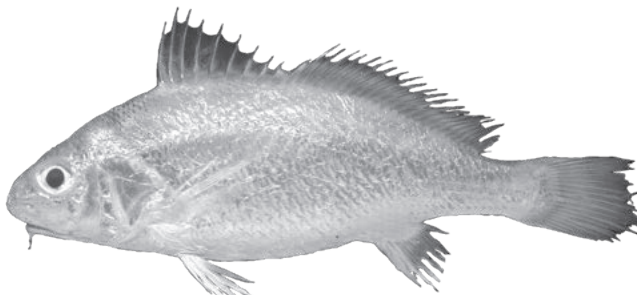
Manilo & Bogorodsky 2003.

Diagnosis as for genus. Dorsal fin 10 or 11 + 1 spines, 25–28 rays; anal fin 2 spines, 7 rays; pectoral fins 16–18 rays. In SL: body depth 2.9–3.7, HL 2.9–3.4, pectoral fins 3.9–5, and 2nd anal-fin spine 6.6–8.8. In HL: eye diameter 3.5–4.5, interorbital width 4.2–5.1, and lower jaw length 2.6–3. GR 3–6/6–10.

Body grey dorsally, silvery white ventrally; dark brown band on nape; opercle with deep blue blotch. Attains 25 cm TL.



*Dendrophysa russelii*, 12 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission



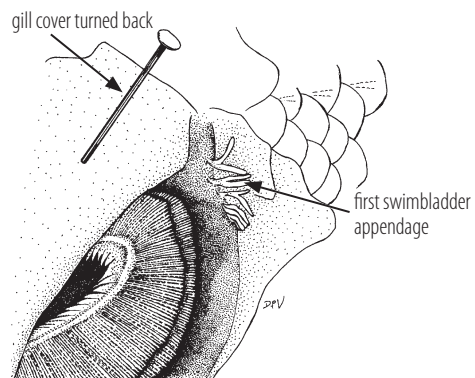
*Dendrophysa russelii*, 11 cm SL (Thailand). © S Kimura, FRLM

**DISTRIBUTION** Indo-Pacific. WIO: southwestern India and Sri Lanka; elsewhere to east coast of India, Andaman Is., Thailand, Indonesia, Philippines and southern China.

**REMARKS** Inhabits coastal waters; adults often in estuaries.

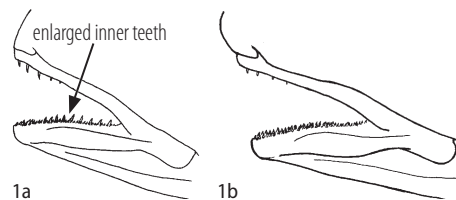
## GENUS *Johnius* Bloch 1793

Generally small-sized (to ~30 cm TL). Distinguished by hammer-shaped swimbladder, with 12–20 pairs of arborescent appendages along sides, 1st (anteriormost) pair piercing transverse septum and sending palmate branch to lateral sides of pectoral arch (junction of supracleithrum and cleithrum) where it is visible on the upper rear edge of the gill cavity. Sagittal otolith triangular, ostium of sulcus with long axis lying obliquely to that of sagitta, and cauda expanded and deepened as hollow cone. The largest and most taxonomically difficult sciaenid genus in Indo-Pacific, with 2 subgenera and ~30 species; possibly 14 species in WIO. Two subgenera do not necessarily imply two monophyletic groups (see Lo *et al.* 2017).



### KEY TO SUBGENERA

- 1a Mouth terminal to subterminal; inner row of teeth on lower jaw more or less enlarged and spaced; outer teeth of upper jaw widely spaced; lower GR 9–20 ..... *Johnius* (*Johnieops*)
- 1b Mouth inferior; lower jaw teeth uniformly sized or a few rear inner teeth molariform; outer teeth of upper jaw not widely spaced ..... *Johnius* (*Johnius*)

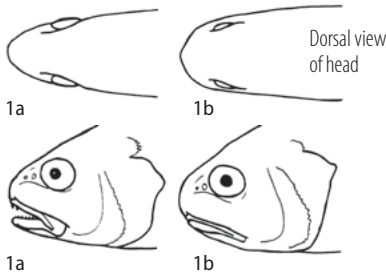


**SUBGENUS** *Johnieops* Lal Mohan 1972

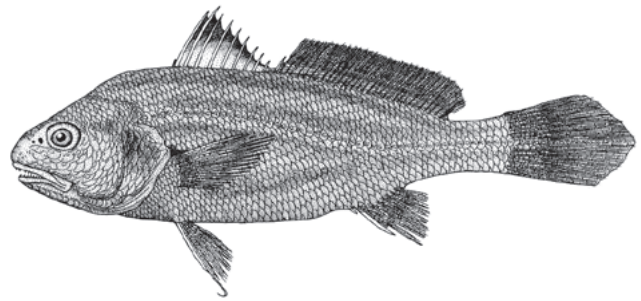
See key for diagnosis.

**KEY TO SPECIES**

- 1a Snout pointed when seen from above; upper jaw usually with 2 or 3 pairs of strong anterior teeth ..... *J. borneensis*  
 1b Snout broadly rounded when seen from above; upper jaw without strong anterior teeth ..... 2



- 2a Spinous dorsal fin covered with small scales; scales above LL 5–8, below LL 8–12, above + below 13–19 ..... *J. dorsalis*  
 2b Spinous dorsal fin without scales; scales above LL 6–8, below LL 9–14, above + below 15–22 ..... *J. dussumieri*



*Johnieops borneensis*, 14 cm SL. Source: Sasaki 2001

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf to India; elsewhere to Indonesia, southern China, Australia and New Guinea.

**REMARKS** Inhabits shallow coastal waters, estuaries and rivers. In India matures at 14–16 cm TL. Juveniles feed on crustaceans.

*Johnieops dorsalis* (Peters 1855)

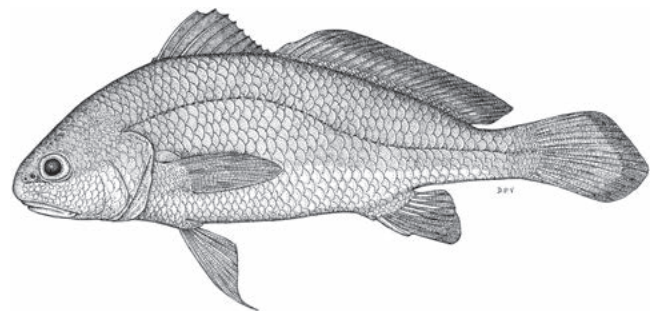
African croaker

PLATE 133

*Corvina dorsalis* Peters 1855: 434 (Quelimane, Mozambique).  
*Sciaena parva* Gilchrist & Thompson 1908: 183 (off south head of Thukela River, KwaZulu-Natal, South Africa).  
*Johnieops dussumieri* (non Cuvier 1830): Trewavas 1977\* [in part]; SSF No. 199.6\*.  
*Johnieops dorsalis*: Sasaki 1997\*.

Dorsal fin 9 or 10 + 1 spines, 24–31 rays; anal fin 2 spines, 7 or 8 rays; pectoral fins 16–20 rays. In SL: body depth 2.8–3.8, HL 3–3.4, pectoral fins 3.8–5.2, and 2nd anal-fin spine 8.2–12.7. In HL: eye diameter 3.5–5.3, interorbital width 2.9–3.9, and lower jaw length 2.2–2.8. Outer row of teeth on upper jaw enlarged but without strong teeth anteriorly. GR 6–9/12–19. Scales above LL 5–8, below LL 8–12, above + below 13–19; spinous dorsal fin entirely scaly.

Body silvery, darker dorsally; spinous dorsal fin blackish; dark spot at pectoral-fin axil. Attains 23 cm TL.



*Johnieops dorsalis*, 18 cm SL (South Africa). Source: Whitfield 1998

*Johnieops borneensis* (Bleeker 1851)

Sharpnose hammer croaker

PLATE 133

*Otolithus borneensis* Bleeker 1851: 268 (Bandjarmasin, Borneo, Indonesia).  
*Johnieops (Johnieops) vogleri*: Trewavas 1977\*.  
*Johnieops vogleri*: Randall 1995\*; Talwar 1995\*.  
*Johnieops borneensis*: Sasaki 1996; Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003.

Dorsal fin 9–11 + 1 spines, 26–32 rays; anal fin 2 spines, 7 rays; pectoral fins 17–20 rays. In SL: body depth 3.1–3.6, HL 3–3.3, pectoral fins 3.8–5.1, and 2nd anal-fin spine 6.6–12. In HL: eye diameter 3.2–5.1, interorbital width 3.3–4, and lower jaw length 2.1–2.4. GR 4–8/7–16. Scales above LL 7–13, below LL 10–16, above + below 18–29; spinous dorsal fin scaly only basally.

Head and body dusky mauve dorsally, silvery white ventrally; 2 dusky streaks usually present along midsides; fins pale yellow or cream, outer two-thirds of spinous dorsal fin black (occasionally dusky), and sometimes dusky streak along soft-rayed portion. Attains ~30 cm TL.

**DISTRIBUTION** WIO: Kenya to South Africa and Madagascar.

**REMARKS** The validity of this species was re-established by Sasaki (1997).

## *Johnius dussumieri* (Cuvier 1830)

Bare-fin croaker

PLATE 133

*Corvina dussumieri* Cuvier in Cuv. & Val. 1830: 119 (Malabar coast, India).

*Corvina sina* Cuvier in Cuv. & Val. 1830: 122 (Malabar coast and Pudukcherry, India; Japan).

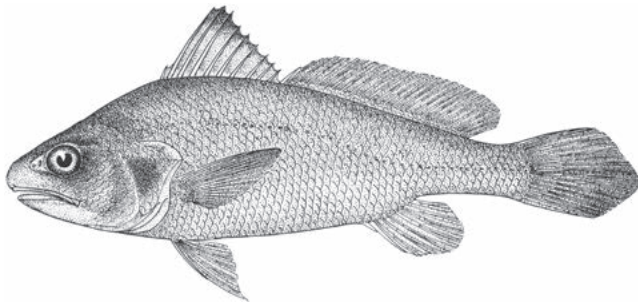
*Johnius (Johnieops) dussumieri*: Trewavas 1977\* [in part].

*Johnius (Johnieops) sina*: Trewavas 1977\* [in part].

*Johnius dussumieri*: SSF No. 199.6\*; Sasaki 1996; Manilo & Bogorodsky 2003.

Dorsal fin 9–11 + 1 spines, 25–30 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. In SL: body depth 3.2–4.3, HL 2.9–3.3, pectoral fins 3.9–5.1, and 2nd anal-fin spine 7.9–13.2. In HL: eye diameter 4.2–5.3, interorbital width 2.9–3.7, and lower jaw length 2–2.4. Snout obtusely rounded when seen from above; outer row of teeth on upper jaw enlarged, but without strong teeth anteriorly. GR 19–27. Scales above LL 6–8, below LL 9–14, above + below 15–22; no scales on spinous dorsal fin.

Body greyish dorsally, silvery with golden gloss on flanks and belly; distal third of spinous dorsal fin dusky; anal fin and paired fins yellowish. Attains 30 cm TL.



*Johnius dussumieri*, 15 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

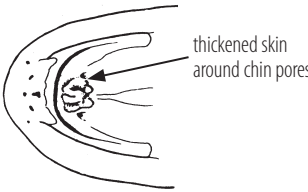
**DISTRIBUTION** Indian Ocean. WIO: Pakistan and southwestern India; elsewhere to east coast of India and Andaman Is.

**REMARKS** Coastal; enters estuaries. Feeds on invertebrates and small fishes. Marketed fresh and dried-salted.

## SUBGENUS *Johnius* Bloch 1793

See key for diagnosis.

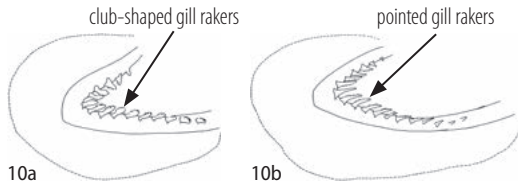
### KEY TO SPECIES

- |    |   |                         |
|----|---|-------------------------|
| 1a | Chin with single barbel .....   | 2                       |
| 1b | Chin without barbel .....   | 5                       |
| 2a | Scales cycloid on head and dorsal part of body .....  | 3                       |
| 2b | Scales ctenoid on head and body .....   | 4                       |
| 3a | Pectoral fins 18 or 19 rays; scales above LL 6–8, below LL 11–15, above + below 18–22; front part of dorsal fin not elongated, 2nd spine >5 in SL .....                 | <i>J. fuscolineatus</i> |
| 3b | Pectoral fins usually 17 or 18 rays; scales above LL 7–12, below LL 13–18, above + below 21–28; anterior spines of dorsal fin elongated, 2nd spine 3.3–5 in SL .....    | <i>J. amblycephalus</i> |
| 4a | Dorsal fin 27–30 rays; pectoral fins 15–18 rays; scales above LL 6–9, below LL 12–15, above + below 19–23; all scales on head cycloid .....                             | <i>J. mannarensis</i>   |
| 4b | Dorsal fin 29–33 rays; pectoral fins 17–19 rays; scales above LL 4–6, below LL 9–12, above + below 14–17; scales ctenoid on interorbital region, nape and opercle ..... | <i>J. macropterus</i>   |
| 5a | Pectoral-fin axil with black blotch .....   | <i>J. majan</i>         |
| 5b | Pectoral-fin axil without black blotch .....  | 6                       |
| 6a | Scales on body cycloid (at least upper anterior part) ...   | <i>J. carutta</i>       |
| 6b | Scales on body ctenoid .....  | 7                       |
| 7a | Chin pores surrounded by thickened skin, with the outer layers sometimes produced into irregular tags or flaps .....  | <i>J. elongatus</i>     |
|    |   |                         |
| 7b | Chin pores not surrounded by thickened skin .....   | 8                       |
| 8a | Inner row of teeth on lower jaw enlarged posteriorly, molariform; lower GR 6–10, short, some club-shaped .....  | <i>J. macrorhynchus</i> |
| 8b | Lower jaw teeth uniformly sized; lower GR 9–14 .....  | 9                       |
| 9a | Eyes small, diameter 4.3–7.9 (usually >5) in HL; vertebrae 26 .....   | <i>J. coitor</i>        |
| 9b | Eye diameter 3.4–4.8 in HL; vertebrae 25 .....  | 10                      |

Continued ...

**KEY TO SPECIES**

- 10a Gill rakers club-shaped, lower GR 9–11; pelvic fins usually dark distally ..... *J. belangerii*
- 10b Gill rakers pointed, not club-shaped, lower GR 11–14; pelvic fins pale ..... *J. carouna*



***Johnius amblycephalus*** (Bleeker 1855)

Bearded croaker

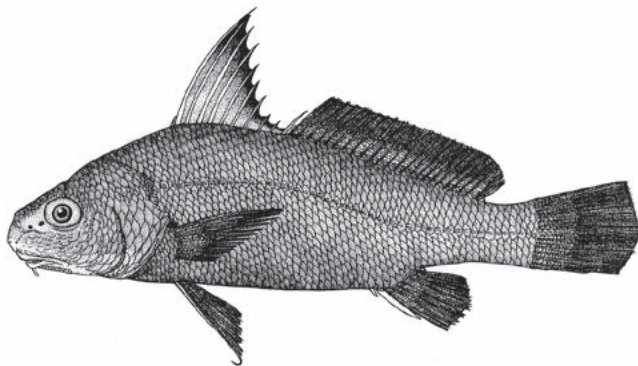
PLATE 133

*Umbrina amblycephalus* Bleeker 1855: 412 (Ambon I., Moluccas, Indonesia).

*Johnius amblycephalus*: Trewavas 1977\* [in part]; SSF No. 199.5\*; Sasaki 1996\*, 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 23–26 rays; anal fin 2 spines, 7 rays; pectoral fins 16–19 rays. Caudal-fin margin truncate, slightly rhomboidal or S-shaped. In SL: body depth 3.1–4, HL 3–3.2, pectoral fins 3.7–4.6, and 2nd anal-fin spine 8.2–12. In HL: eye diameter 3.7–5.1, interorbital width 3.2–3.7, and lower jaw length 3–3.3. Dorsal-fin spines 2–5 elongated, 2nd spine 3.3–5 in SL. Chin with stout, blunt barbel. GR 3–5/7–10. Scales small, cycloid; scales above LL 7–12, below LL 13–18, above + below 21–28.

Body black or dark brown dorsally and on flanks, belly whitish or pale yellow; spinous dorsal fin black distally. Attains 30 cm TL.



*Johnius amblycephalus*, 10 cm SL (Australia). © K Sasaki, BSKU

**DISTRIBUTION** Indo-Pacific. WIO: South Africa to Pakistan and India; elsewhere to Indonesia, South China Sea, New Guinea and northwestern Australia.

**REMARKS** Inhabits shallow coastal waters and estuaries, to ~40 m deep.

***Johnius belangerii*** (Cuvier 1830)

Belanger's croaker

PLATE 133

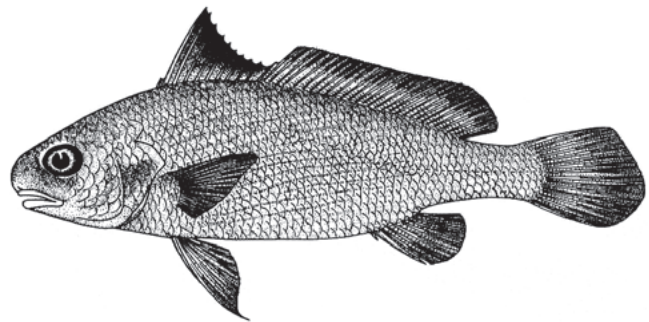
*Corvina belangerii* Cuvier in Cuv. & Val. 1830: 120 (Malabar coast, India).

*Corvina lobata* Cuvier in Cuv. & Val. 1830: 122, Pl. 107 (Malabar coast, India).

*Johnius belangerii*: Trewavas 1977\* [in part]; Randall 1995\*; Talwar 1995\*; Mishra & Srinivasan 1999 [as *belangerii*]; Manilo & Bogorodsky 2003.

Dorsal fin 9 or 10 + 1 spines, 27–31 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal fin rhomboidal. In SL: body depth 3–3.6, HL 3.2–3.6, pectoral fins 4.5–5.5, and 2nd anal-fin spine 6.6–9.2. In HL: eye diameter 3.2–4.8, interorbital width 3.7–4.6, and lower jaw length 2.7–3. Lower jaw teeth uniformly sized. GR 3–5/9–11, short, club-shaped. Scales rather small, cycloid on snout and below eyes, ctenoid on other parts of head and body; scales above LL 7–11, below LL 12–17, above + below 20–27. Swimbladder hammer-shaped, with 11–13 pairs of appendages. Vertebrae 10 + 15.

Body dark, but pigment sometimes irregular and concentrated into short dark bars dorsally or on spinous dorsal fin; other fins often black; dark blotch shows through gill cover. Attains 23 cm TL.



*Johnius belangerii*, 17 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Pakistan, India and Sri Lanka; elsewhere to east coast of India, Bangladesh, Indonesia, southern China and Taiwan.

**REMARKS** Inhabits shallow coastal waters to ~40 m deep; enters estuaries and rivers. Feeds on invertebrates, particularly benthic worms. Marketed fresh and dried-salted.

*Johnius carouna* (Cuvier 1830)

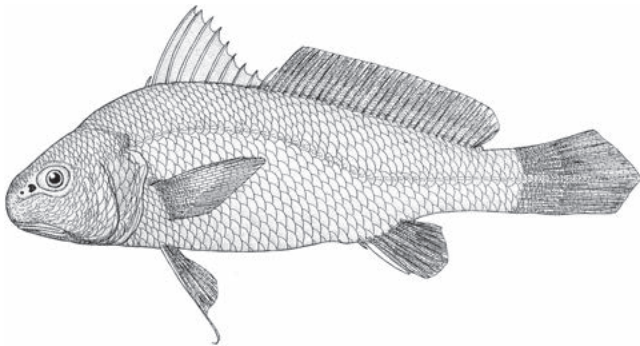
Caroun croaker

PLATE 133

*Corvina carouna* Cuvier in Cuv. & Val. 1830: 125 (Malabar coast, India).*Sciaena glauca* Day 1876: 192, Pl. 46, Fig. 2 (Mumbai, India).*Johnius belangeri*: Trewavas 1977\* [in part].*Johnius carouna*: Lal Mohan 1984; Talwar 1995\*; Sasaki 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 26–30 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal-fin margin rhomboidal. In SL: body depth 3.1–3.9, HL 3–3.7, pectoral fins 3.9–5, and 2nd anal-fin spine 6.4–8.5. In HL: eye diameter 3.5–4.8, interorbital width 3.7–4.6, and lower jaw length 2.3–2.7. Eyes moderately large; lower jaw teeth uniformly sized. No barbel on chin. GR 4–6/11–14, pointed, slender, not club-shaped. Scales cycloid on snout, below eyes, and on cheeks and throat, ctenoid on other parts of head and body; scales above LL 6–9, below LL 10–14, above + below 17–23. Vertebrae 10 + 15.

Body greyish dorsally, yellowish on flanks and belly; opercle with dark bluish blotch; dorsal fin pale grey; anal fin, paired fins and lower part of caudal fin with yellowish tinge. Attains 25 cm TL.

*Johnius carouna*, 13 cm SL (India). Source: Sasaki 2001

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan and India; elsewhere to Myanmar, Indonesia (Sumatra, Borneo) and southern China.

**REMARKS** Inhabits shallow coastal waters, entering estuaries and mangroves.

*Johnius carutta* Bloch 1793

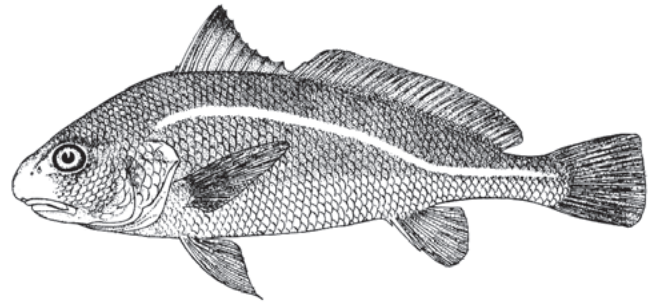
Karut croaker

*Johnius carutta* Bloch 1793: 133, Pl. 356 (Hooghly Estuary, India);

Trewavas 1977\*; Coad 1991; Randall 1995\*; Talwar 1995\*; Sasaki 1996\*, 2001\*; Manilo &amp; Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 26–29 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal-fin margin truncate or weakly S-shaped. In SL: body depth 2.9–3.8, HL 3.1–3.4, pectoral fins 3.8–5, and 2nd anal-fin spine 9–13. In HL: eye diameter 4.2–5.3, interorbital width 3.2–3.8, and lower jaw length 2.8–3.5. Lower jaw teeth uniformly sized. Skin around chin pores sometimes thick but not tag-like. GR 3–5/7–10, short and stumpy. Scales cycloid on head and front of body, finely ctenoid on rear part of body; scales above LL 7–10, below LL 12–17, above + below 21–25. Vertebrae 10 + 15.

Body drab grey dorsally, with darkly stained appearance, belly golden silvery, and cheeks and opercle silvery; scales minutely dotted with black and their edges darker brown than ground colour; lateral line silvery, with pale yellow midlateral streak along body; spinous dorsal fin black distally, other fins pale but minutely dotted with black. Attains 30 cm TL.

*Johnius carutta*, 16 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indian Ocean: Pakistan and India to Thailand.

**REMARKS** Found in inshore waters and enters estuaries. Feeds on small fishes and invertebrates. Sold fresh and dried-salted.

*Johnius coitor* (Hamilton 1822)

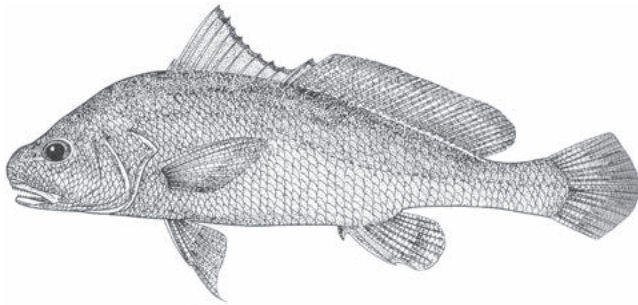
Coitor croaker

*Bola coitor* Hamilton 1822: 75, 368, Pl. 27, Fig. 24 (Ganges River, India).*Johnius coitor*: Trewavas 1977\*; Talwar & Jhingran 1991\*; Talwar 1995\*; Sasaki 1996\*, 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 9–11 + 1 spines, 24–29 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal-fin margin rhomboidal to pointed. In SL: body depth 3.5–4.3, HL 3.2–3.6, pectoral fins 4.1–5, and 2nd anal-fin spine 6–9.1. In HL: eye diameter 4.3–7.9, interorbital width 3.5–4.5, and lower jaw length 2.2–2.9. Lower jaw teeth uniformly sized. GR 5–7/10–15, short, slender.

Scales rather small, cycloid on snout and below eyes, ctenoid on other parts of head and body; scales above LL 7–10, below LL 11–17, above + below 18–25. Vertebrae 10 + 16.

Body pale golden yellow with pale purple-blue sheen; spinous dorsal fin with dusky margin; soft-rayed dorsal, anal and caudal fins with dull green-grey margins. Attains 20 cm SL.



*Johnius coitor*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: India; elsewhere to Bangladesh, Malay Peninsula and Indonesia (Borneo).

**REMARKS** Inhabits shallow coastal waters and enters estuaries and rivers.

### *Johnius elongatus* Lal Mohan 1976

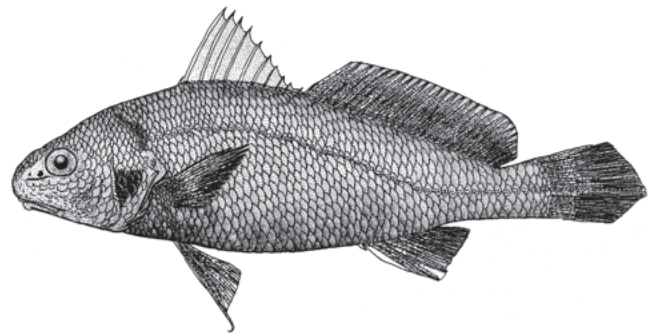
Spindle croaker

PLATE 133

*Johnius elongatus* Lal Mohan 1976: 19, Fig. 1 (Veraval, India, Arabian Sea); Trewavas 1977\*; Talwar 1995\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 or 11 + 1 spines, 24–30 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal-fin margin rhomboidal or S-shaped. In SL: body depth 3.2–4.3, HL 3.1–3.8, pectoral fins 4.1–5.9, and 2nd anal-fin spine 7.6–16. In HL: eye diameter 3.8–5.4, interorbital width 3.5–4.6, and lower jaw length 2.3–3.2. No barbel on chin, but mental pores surrounded by thickened skin produced into 2 short irregular tags between medial and first lateral pores; lower jaw teeth uniformly sized. GR 3–5/7–11, short but not club-shaped. Scales small, cycloid on snout, below eyes and on cheeks, ctenoid on other parts of head and body; scales above LL 6–10, below LL 12–15, above + below 19–24. Vertebrae 10 + 15.

Body colour variable, from silvery to dark brown, with narrow pale streak along lateral line in darker individuals (similar to *J. carutta*); tips of dorsal, anal and caudal fins dotted with black. Attains 30 cm TL.



*Johnius elongatus*, 13 cm SL (India). © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: Persian/Arabian Gulf, Pakistan, India and Sri Lanka.

**REMARKS** Found in shallow coastal waters and estuaries. Feeds on benthic worms and crustaceans. Marketed fresh and dried-salted.

### *Johnius fuscolineatus* (Von Bonde 1923)

African bearded croaker

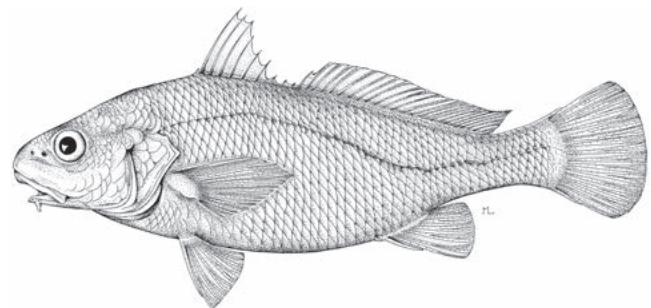
*Umbrina fuscolineata* Von Bonde 1923: 15, Pl. 4 (KwaZulu-Natal, South Africa).

*Johnius amblycephalus*: Trewavas 1977\* [in part]; SSF No. 199.5\* [in part].

*Johnius fuscolineatus*: Talwar 1995\*; Sasaki 1997; Heemstra & Heemstra 2004.

Dorsal fin 10 or 11 + 1 spines, 23–27 rays; anal fin 2 spines, 7 or 8 rays; pectoral fins 18 or 19 rays. Caudal-fin margin slightly rhomboidal to truncate. In SL: body depth 2.9–3.7, HL 2.9–3.3, pectoral fins 3.7–4.5, and 2nd anal-fin spine 7.2–11.8. In HL: eye diameter 4–4.7, interorbital width 3.2–4.2, and lower jaw length 2.8–3.3. Dorsal-fin spines 2–5 not noticeably elongated, 2nd spine >5 in SL. Chin with stout, blunt barbel. GR 3–4/7–10. Scales moderately large, cycloid on head and body; scales above LL 6–8, below LL 11–15, above + below 18–22. Vertebrae 10 + 15.

Body brownish, silvery ventrally. Attains 23 cm TL.



*Johnius fuscolineatus*, 13 cm SL (South Africa). Source: SSF



**DISTRIBUTION** WIO: Mozambique, South Africa (KwaZulu-Natal) and Madagascar.

**REMARKS** Inhabits shallow coastal waters and estuaries. This species is not a synonym of *Johnius amblycephalus* (Bleeker 1855) (see Sasaki 1997).

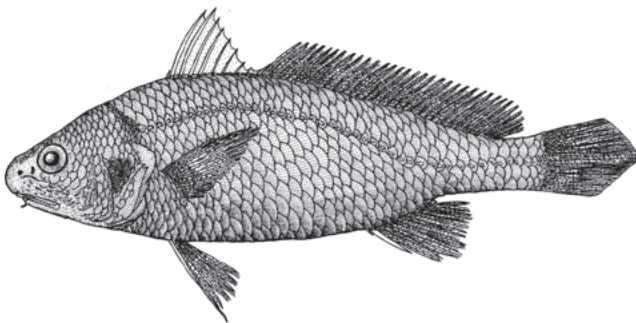
### *Johnius macropterus* (Bleeker 1853)

Largefin croaker

*Umbrina macropterus* Bleeker 1853: 254 (Priaman, Sumatra, Indonesia).  
*Johnius macropterus*: Trewavas 1977\*; Talwar 1995\*; Sasaki 1996\*, 2001\*;  
Manilo & Bogorodsky 2003.

Dorsal fin 10 or 11 + 1 spines, 29–33 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. Caudal fin rhomboidal. In SL: body depth 3.1–4.4, HL 3.3–3.9, pectoral fins 4–4.9, and 2nd anal-fin spine 6.3–11. In HL: eye diameter 3.6–5.6, interorbital width 3–4.2, and lower jaw length 2.8–3.3. Chin with short fleshy barbel; lower jaw teeth uniformly sized. GR 3–6/8–13. Scales large, those on flanks much larger than LL scales; ctenoid scales on interorbital region, nape, opercle and body; scales above LL 4–6, below LL 9–12, above + below 14–17. Vertebrae 10 + 15.

Body dark brown dorsally, flanks and belly whitish with silvery reflections; spinous dorsal fin darkish; pectoral fins hyaline. Attains 25 cm TL.



*Johnius macropterus* (India). Source: Sasaki 2001

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to Thailand, Indonesia, Malaysia and New Guinea.

**REMARKS** Found in shallow coastal waters, to ~30 m deep. Feeds on benthic worms and small crustaceans. Sold fresh and dried-salted in markets.

### *Johnius macrorhynchus* (Lal Mohan 1976)

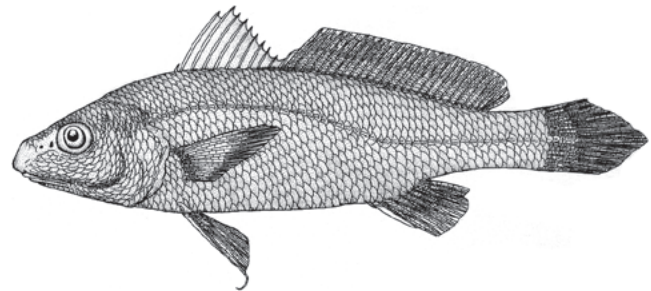
Bigsnout croaker

PLATE 134

*Johnieops macrorhynchus* Lal Mohan 1976: 20, Fig. 2 (Mumbai, India).  
*Johnius macrorhynchus*: Trewavas 1977; Sasaki 1996\*, 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 27–30 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. In SL: body depth 3–4.2, HL 3–3.5, pectoral fins 4.6–6.2, and 2nd anal-fin spine 7.5–14. In HL: eye diameter 3.3–4.5, interorbital width 4.1–5, and lower jaw length 2.7–3.1. Caudal-fin margin rhomboidal, becoming truncate or S-shaped in individuals >15 cm TL. Lower jaw with outer band of villiform teeth and short inner row of molariform teeth posteriorly. GR 2–4/6–10, short and stumpy. Scales moderately large, cycloid on snout and below eyes, ctenoid on other parts of head and body; scales above LL 6–9, below LL 10–14, above + below 16–20. Vertebrae 10 + 15.

Body silvery, lower part with golden tinge; anal fin and paired fins yellow; faint grey-blue blotch on gill cover. Attains 30 cm TL.



*Johnius macrorhynchus*, 13 cm SL (India). © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, India and Sri Lanka; elsewhere to Malay Peninsula, Indonesia (Borneo) and South China Sea.

**REMARKS** Found in shallow coastal waters.

### *Johnius majan* Iwatsuki, Jawad & Al-Mamry 2012

Majan croaker

PLATE 134

*Johnius (Johnius) majan* Iwatsuki, Jawad & Al-Mamry 2012: 152, Figs. 1–2 (Madrakah, southern Oman).

Dorsal fin 9 + 1 spines, 29–31 rays; anal fin 2 spines, 8 rays; pectoral fins 17 or 18 rays. Caudal fin rounded. In SL: body depth 2.7–3, HL 3.2–3.5, pectoral fins 3.4–3.9, and 2nd anal-

fin spine 11–13. In HL: eye diameter 3.5–4.3, interorbital width 2.5–3.1, and lower jaw length 2.6–3.2. Lower jaw teeth uniformly sized. GR 5 or 6/16. Scales moderately large, cycloid on head (except occiput), ctenoid on body, but ctenii weakly developed (smooth to touch); scales above LL 6, below LL 11, above + below 17. Vertebrae 10 + 14.

Head and upper body iridescent mauve or bronzy, creamy white on lower sides and ventrally; black blotch on pectoral-fin axil. Attains 19 cm TL.

**DISTRIBUTION** WIO: Arabian Peninsula to Gulf of Oman.

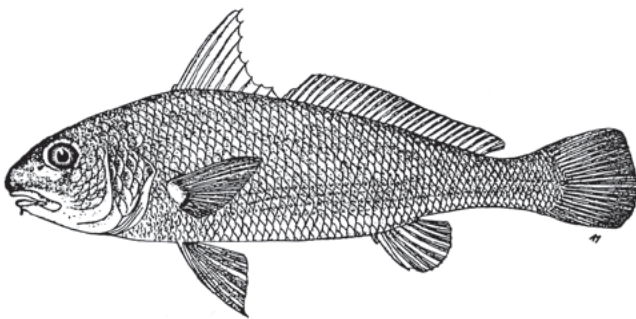
### *Johnius mannarensis* Lal Mohan 1971

Mannar croaker

*Johnius mannarensis* Lal Mohan 1971: 320, Fig. 1 (off Pamban I., Gulf of Mannar); Sasaki 1994, 1996.

Dorsal fin 10 or 11 + 1 spines, 27–30 rays; anal fin 2 spines, 7 rays; pectoral fins 15–18 rays. Caudal fin rhomboidal. In SL: body depth 3.1–3.5, HL 3.1–3.5, pectoral fins 4.8–5.6, and 2nd anal-fin spine 6.7–11. In HL: eye diameter 3.9–5.6, interorbital width 3.7–4.4, and lower jaw length 2.9–3.7. Chin with short fleshy barbel; lower jaw teeth uniformly sized. GR 3–5/9–11. Scales small, cycloid on head, ctenoid on body; scales above LL 6–9, below LL 12–15, above + below 19–23. Vertebrae 10 + 15.

Colour in life unknown. Attains at least 20 cm TL.



*Johnius mannarensis*, 17 cm TL, female type (Gulf of Mannar).

Source: Lal Mohan 1969; reproduced with permission from ICAR-CMFRI: JMBAI

**DISTRIBUTION** Indian Ocean: Sri Lanka and southeastern India.

**REMARKS** Trewavas's (1977) synonymy of this species with *J. macropterus* (Bleeker 1853) is erroneous (Sasaki 1994).

### GENUS *Kathala* Lal Mohan 1969

Body depth subequal to HL; mouth terminal and oblique; caudal fin convex or truncate with rounded corners. Gill rakers slender and numerous, lower GR 21–24. Swimbladder carrot-shaped, with pair of horn-like appendages anteriorly and penetrating transverse septum. One species.

### *Kathala axillaris* (Cuvier 1830)

Kathala croaker

PLATE 134

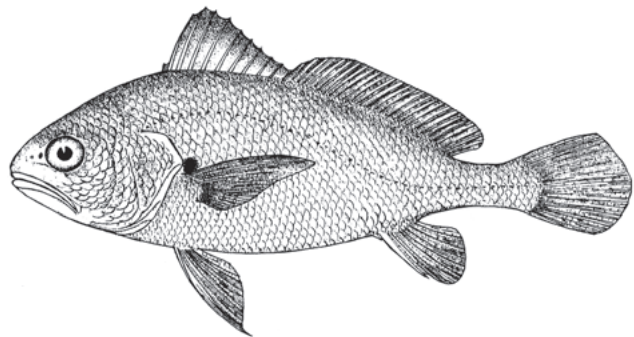
*Corvina axillaris* Cuvier in Cuv. & Val. 1830: 113 (Malabar coast, India).

*Bola axillaris*: Jordan & Starks 1917.

*Kathala axillaris*: Lal Mohan 1969, 1984\*; Trewavas 1977\*; Talwar 1995\*; Mishra & Srinivasan 1999\*; Manilo & Bogorodsky 2003.

Diagnosis as for genus. Dorsal fin 10 + 1 spines, 26–29 rays; anal fin 2 spines, 7 rays; pectoral fins 17 or 18 rays. Caudal fin slightly rounded to rhomboidal. In SL: body depth 2.8–3.3, HL 2.8–3.3, pectoral fins 3.2–3.9, and 2nd anal-fin spine 6.1–9.4. In HL: eye diameter 3.6–5.1, interorbital width 2.7–3.2, and lower jaw length 1.8–2.3. GR 10–12/21–24. Scales small, cycloid on head, ctenoid on body; scales above LL 8–12, below LL 12–15, above + below 20–27.

Body grey-green dorsally, flanks silvery yellow; spinous dorsal fin black; black blotch on pectoral-fin axil. Attains 18 cm TL.



*Kathala axillaris*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: Pakistan, India and Sri Lanka; elsewhere to Bangladesh.

### GENUS *Macrospinosa* Lal Mohan 1969

Nape highly arched; mouth terminal and slightly oblique; 2nd anal-fin spine long; lower GR ~10; swimbladder carrot-shaped, with pair of horn-like appendages anteriorly, penetrating transverse septum. One species.

*Macropsinosa cuja* (Hamilton 1822)

Cuja croaker

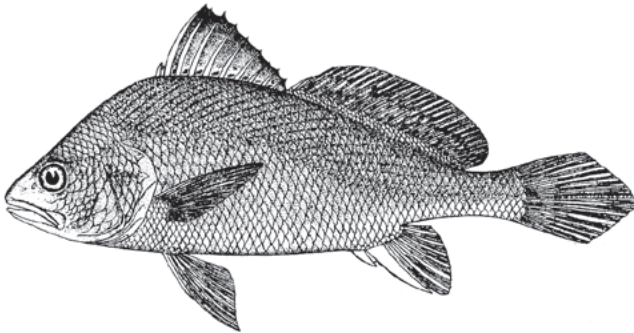
PLATE 134

*Bola cuja* Hamilton 1822: 81, 369, Pl. 12, Fig. 27 (Ganges River estuaries, India).

*Macropsinosa cuja*: Trewavas 1977\*.

Diagnosis as for genus. Dorsal fin 10 + 1 spines, 26–29 rays; anal fin 2 spines, 6 or 7 rays; pectoral fins 17 or 18 rays. In SL: body depth 2.9–3.1, HL 3.1–3.3, pectoral fins 4.4–5.2, and 2nd anal-fin spine 4.3–5.2. In HL: eye diameter 3.9–4.7, interorbital width 4.7–6.1, and lower jaw length 2–2.1. Caudal-fin margin rhomboidal. GR 4 or 5/9. Scales cycloid on snout and immediately behind eyes, ctenoid on other parts of head and body; scales above LL 9–11, below LL 10–14, above + below 19–25.

Body greyish dorsally, silvery ventrally; oblique series of dark spots along scale rows above lateral line and faint horizontal streaks below lateral line. Attains 150 cm TL.



*Macropsinosa cuja* (India).

Source: Lal Mohan 1981; reproduced with permission from ICAR-CMFRI: JMBAI

**DISTRIBUTION** Indian Ocean. WIO: west coast of India; elsewhere to Bangladesh and Thailand.

**REMARKS** Inhabits estuaries.

**GENUS** *Megalonibea* Chu, Lo & Wu 1963

Antermost mental pores close together behind jaw tip, united by groove; swimbladder carrot-shaped, with branched appendages along its entire sides, none penetrating transverse septum. One species. Chu *et al.* (1963) described *Megalonibea fusca* as a new genus and species. Trewavas (1971) established *Protonibea* as a new genus for *Lutjanus diacanthus*. Because *fusca* is a junior synonym of *diacanthus*, *Protonibea* is a junior synonym of *Megalonibea* (see Lo *et al.* 2017).

*Megalonibea diacantha* (Lacepède 1802)

Spotted croaker

PLATE 134

*Lutjanus diacanthus* Lacepède 1802: 195, 204 [no locality given].

*Johnius cataleus* Cuvier 1829: 173 (India).

*Protonibea diacanthus*: Trewavas 1977\*; Lal Mohan 1984\*.

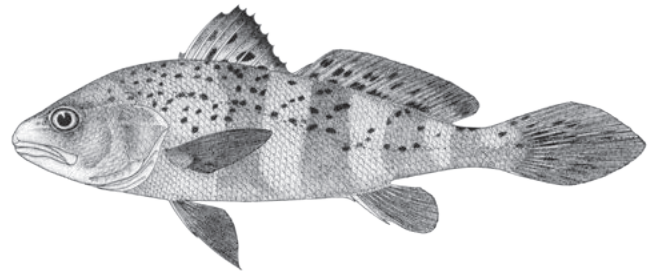
*Protonibea diacantha*: Randall 1995\*; Talwar 1995; Sasaki 1996;

Carpenter *et al.* 1997\*; Manilo & Bogorodsky 2003.

*Megalonibea fusca* Chu, Lo & Wu 1963: 90 (China).

Diagnosis as for genus. Dorsal fin 9 or 10 + 1 spines, 22–25 rays; anal fin 2 spines, 7 rays; pectoral fins 17–21 rays. In SL: body depth 3.3–4.3, HL 2.7–3.4, pectoral fins 4.4–5.9, and 2nd anal-fin spine 7.9–16. In HL: eye diameter 4.7–8.4, interorbital width 4.4–6.3, and lower jaw length 2–2.3. GR 3–6/7–10. Scales above LL 10–14, below LL 15–22, above + below 26–35.

Body with 3–5 wide, darkish, vertical bars, and many small black spots (about size of pupil) on head, upper body, dorsal fin and caudal fin (bars and spots obscure or absent in large adults); paired fins, anal fin and lower half of caudal fin dark. Attains 150 cm SL, ~180 cm TL.



*Megalonibea diacantha*, 57 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Pakistan, India and Sri Lanka; elsewhere to Bangladesh, China, Indonesia (Borneo), Philippines, Japan, New Guinea and Australia.

**REMARKS** Found in coastal areas, over muddy bottom and off the sea-bed, and ascends tidal rivers and estuaries. Feeds mainly on crustaceans and small fishes. An important food fish; caught with bottom trawls, sold fresh and the swimbladder dried-salted in markets.

**GENUS** *Nibea* Jordan & Thompson 1911

First pair of chin pores close together, united by crescent-shaped groove just behind symphysis; lower jaw teeth differently sized; swimbladder carrot-shaped, with branched appendages along its entire sides, anterior pair of appendages penetrating transverse septum. Six species (excluding enigmatic *N. coibor* Hamilton 1822), 2 in WIO (see Lo *et al.* 2017).

**KEY TO SPECIES**

- 1a Dorsal fin 22–26 rays; upper body with 5 dark bars or series of dark spots extending to lower flanks ..... *N. maculata*
- 1b Dorsal fin 27–33 rays; no dark bars or spots on body.....  
..... *N. soldado*

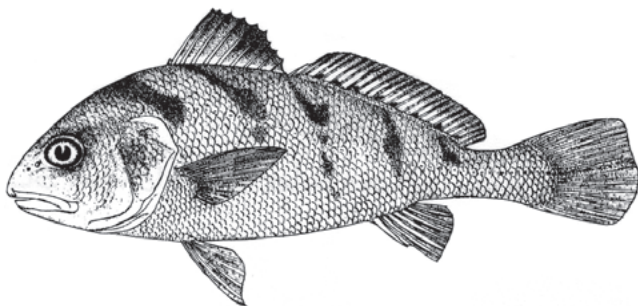
*Nibea maculata* (Bloch & Schneider 1801)

Blotched croaker

*Johnius maculatus* Bloch & Schneider 1801: 75 (Tharangambadi, India).  
*Nibea maculata*: Trewavas 1977\*; Lal Mohan 1984\*.

Dorsal fin 10 + 1 spines, 22–26 rays; anal fin 2 spines, 7 rays; pectoral fins 17 or 18 rays. In SL: body depth 2.9–3.6, HL 2.7–3, pectoral fins 4.1–4.5, and 2nd anal-fin spine 7.4–11 (relatively short). In HL: eye diameter 3.9–5.6, interorbital width 4.6–6, and lower jaw length 2.4–3 (relatively short). GR 5 or 6/8–11. Scales above LL 10–13, below LL 17–21, above + below 29–33.

Head and upper body with 5 irregular dark streaks extending obliquely towards lower flanks (1st streak on nape); dark blotch (or 6th streak) on dorsal surface of peduncle; spinous dorsal fin black, except base pale, soft-rayed portion with black margin and series of dark spots along base. Attains 30 cm TL.



*Nibea maculata*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indian Ocean. WIO: Pakistan to Sri Lanka; elsewhere to east coast of India.

**REMARKS** Found in coastal waters. An important food fish, sold fresh and dried-salted.

*Nibea soldado* (Lacepède 1802)

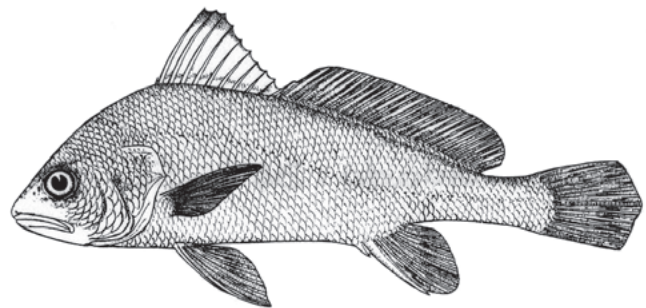
Soldier croaker

PLATE 134

*Holocentrus soldado* Lacepède 1802: 344, 389 [no locality given].  
*Nibea soldado*: Trewavas 1977\*; Lal Mohan 1984\*; Talwar 1995\*;  
Sasaki 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 9 or 10 + 1 spines, 27–33 rays; anal fin 2 spines, 7 rays; pectoral fins 16–18 rays. In SL: body depth 3–4.2, HL 3–3.4, pectoral fins 4.5–4.8, and 2nd anal-fin spine 6.3–7.9 (relatively long). In HL: eye diameter 4.7–5.8, interorbital width 5.2–6, and lower jaw length 1.9–2 (relatively long). GR 4–7/8–13. Scales above LL 8–13, below LL 12–17, above + below 21–29.

Body silvery, with faint series of oblique stripes along scale series; margin of soft-rayed dorsal fin dark; paired fins with yellow tinge. Attains 65 cm TL.



*Nibea soldado*, 34 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to Indonesia, Philippines, South China Sea, New Guinea and Australia.

**REMARKS** Found in shallow coastal waters and estuaries; juveniles occur in brackish estuaries and often ascend the lower reaches of large turbid rivers. Feeds on small fishes and invertebrates. Marketed fresh and dried-salted.

**GENUS** *Otolithes* Oken 1817

Body slender to moderately elongate, depth slightly less than HL. Mouth large and strongly oblique, lower jaw projecting; no upper rostral pores on snout; 1 or 2 pairs of canines on upper

jaw or on both jaws. Scales cycloid on head and front of body. Swimbladder carrot-shaped, with branching appendages along its entire sides, anterior pair confined to abdominal cavity. Genus reviewed by Lin *et al.* (2019). Four species (including *Otolithes* sp. of Lo *et al.* 2017 and Lin *et al.* 2019), all in WIO. See Lin *et al.* (2019) for the problematic species status of *O. ruber* from WIO.

## KEY TO SPECIES

- |    |   |                      |
|----|---|----------------------|
| 1a | Caudal fin truncate; two to three black spots on membranes between rays of soft dorsal fin..... | <i>O. arabicus</i>   |
| 1b | Caudal fin rhomboid or rounded; spots absent on membranes between rays of soft dorsal fin.....  | 2                    |
| 2a | Dorsal fin 8 or 9 + 1 spines.....   | <i>Otolithes</i> sp. |
| 2b | Dorsal fin 10 + 1 spines.....   | 3                    |
| 3a | GR 7–9/13–15; dorsal fin 29–32 rays; canines moderate.....                                      | <i>O. cuvieri</i>    |
| 3b | GR 4–6/8–11; dorsal fin 27–30 rays; canines very strong.....                                    | <i>O. ruber</i>      |

### *Otolithes arabicus* Lin, Qurban, Shen & Chao 2019

Arabian tigertooth croaker

*Otolithes arabicus* Lin, Qurban, Shen & Chao 2019: 14 (Arabian Gulf and Gulf of Oman).

Dorsal fin 10 + 1 spines, 28–31 rays; anal fin 2 spines, 7 rays; pectoral fins 16 rays. In SL: body depth 3.4–4.3, HL 3–3.6, pectoral fins 4.3–5.6, and 2nd anal-fin spine 22.5. In HL: eye diameter 5–6.8, interorbital width 3.4–4.4, and lower jaw length 1.7–2.1. GR 4–6/11–13. Scales above LL 7–9, below LL 11–13.

Body greyish dorsally, silver ventrally, with oblique streaks dorsally; pectoral fins black; pelvic fins yellow. Attains 40 cm TL.

**DISTRIBUTION** WIO: Western Arabian Gulf to Gulf of Oman.

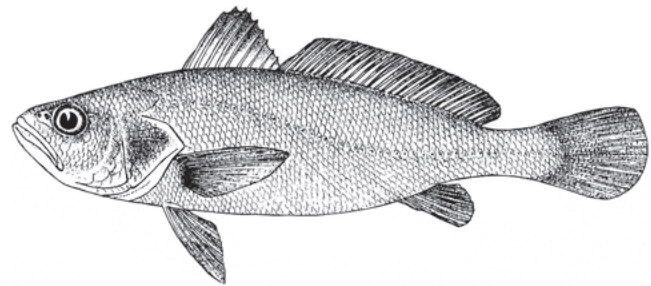
### *Otolithes cuvieri* Trewavas 1974

Lesser tigertooth croaker

*Otolithes cuvieri* Trewavas 1974: no page number (Malabar coast, India); Randall 1995\*; Talwar 1995\*; Sasaki 1996\*; Manilo & Bogorodsky 2003.

Dorsal fin 10 + 1 spines, 29–32 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. In SL: body depth 3.2–4.1, HL 2.6–3.1, pectoral fins 4–5.3, and 2nd anal-fin spine 10–23. In HL: eye diameter 4.1–5, interorbital width 3.7–4.3, and lower jaw length 1.8–2. GR 7–9/13–15. Scales above LL 8–11, below LL 12–17, above + below 21–28.

Body silvery, belly white; scale centres olive-brown on upper two-thirds of body, forming narrow oblique bands; spinous dorsal fin edged in grey-black; anal fin and paired fins yellowish. Attains at least 33 cm SL.



*Otolithes cuvieri*, 33 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indian Ocean. WIO: southern Oman, Pakistan and west coast of India; elsewhere to Myanmar.

**REMARKS** Inhabits inshore and coastal waters. Feeds on *Acetes* spp., penaeid prawns, deep-sea prawns, fishes, stomatopods, molluscs, isopods, copepods and fish larvae.

### *Otolithes ruber* (Bloch & Schneider 1801)

Tigertooth croaker

PLATE 134

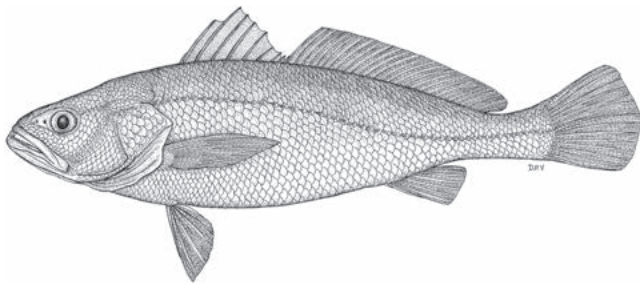
*Johnius ruber* Bloch & Schneider 1801: 75, Pl. 17 (Indian Ocean).

*Otolithes ruber*: Trewavas 1977\*; SSF No. 199.7\*; Winterbottom *et al.*

1989; Coad 1991; Talwar 1995; Mishra & Srinivasan 1999; Bijukumar & Sushama 2000; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 10 + 1 spines, 27–30 rays; anal fin 2 spines, 7 rays; pectoral fins 15–17 rays. In SL: body depth 3.6–5.2, HL 2.8–3.3, pectoral fins 4–4.9, and 2nd anal-fin spine 12–22.2. In HL: eye diameter 4.4–6.7, interorbital width 4.1–5.1, and lower jaw length 1.8–2. GR 4–6/8–11. Scales above LL 9–12, below LL 12–18, above + below 22–29.

Body brownish dorsally, often with oblique dark streaks, silvery with golden sheen on flanks and belly; anal fin and paired fins reddish or pale brown. Attains 75 cm TL.



*Otolithes ruber*, 23 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Indo-Pacific. WIO: Oman, Kenya to South Africa (Sundays River), Madagascar and India; not known from Red Sea; elsewhere to Indonesia, China and Australia.

**REMARKS** Found in coastal waters. Feeds on fishes, prawns and other invertebrates. Generally marketed fresh, sometimes dried-salted.

### *Otolithes* sp.

*Otolithes* sp. Lo, Lin, Nor & Chen 2017: 13 (as *Otolithes* sp, WIO II group; Dubai and Gujarat, western coast of India).

Dorsal fin 8 or 9 + 1 spines, 26–30 rays; anal fin 2 spines, 6–8 (mostly 7) rays; pectoral fins 15–18 rays. In SL: body depth 2–3.8, HL 2.9–3.4, pectoral fins 4.3–5.6, and 2nd anal-fin spine 11.2–21.7. In HL: eye diameter 4.1–7.5, interorbital width 4.0–5.4, and lower jaw length 1.7–1.9. Scales above LL 9–12, below LL 13–18, above + below 22–28.

Body silvery, slightly greyish dorsally, with oblique streaks on dorsal half of body; pectoral fins greyish; pelvic fins pale with yellowish tinge. Attains 43 cm TL.

**DISTRIBUTION** WIO: South Africa to western coast of India.

### GENUS *Otolithoides* Fowler 1933

Body elongate; dorsal fin weakly notched; 2nd anal-fin spine weak; caudal fin cuneate. Mouth large and terminal; teeth in both jaws well-differentiated in size. LL scales covered with small subsidiary scales. Swimbladder carrot-shaped, with pair of long tubular branches originating near its rear end and running forward and parallel to swimbladder as they penetrate the transverse septum and branch into several caeca under the skull. Two species, both in WIO.

#### KEY TO SPECIES

- |    |                             |                     |
|----|-----------------------------|---------------------|
| 1a | Dorsal fin 27–32 rays ..... | <i>O. biauritus</i> |
| 1b | Dorsal fin 40–45 rays ..... | <i>O. pama</i>      |

### *Otolithoides biauritus* (Cantor 1849)

Bronze croaker

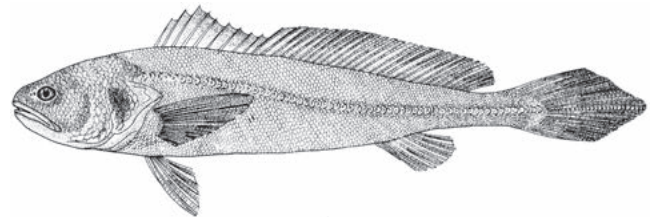
*Otolithus biauritus* Cantor 1849: 1039 [57] (Sea of Penang, Malayan Peninsula [Chusan]).

*Otolithus brunneus* Day 1873: 524 (Mumbai, India).

*Otolithoides biauritus*: Trewavas 1977\*; Talwar 1995; Manilo & Bogorodsky 2003.

Dorsal fin 8 or 9 + 1 spines, 27–32 rays; anal fin 2 spines, 6 or 7 rays; pectoral fins 18 or 19. In SL: body depth 3.6–5.2, HL 2.9–3.5, pectoral fins 3.8–4.9, and 2nd anal-fin spine 12–22. In HL: eye diameter 5.7–8.4, interorbital width 3.1–4.2, and lower jaw length 1.8–2.2. GR 5 or 6/11–13. Scales small, cycloid on head, front of upper body and breast, elsewhere finely ctenoid; scales above LL 15–23, below LL 15–24, above + below 32–46.

Head and body greyish, flanks silvery with golden tinge, belly paler; lateral line golden yellow; median fins yellow to pale orange; pectoral fins brownish, with black spot at axil; pelvic fins pale orange. Attains 160 cm TL.



*Otolithoides biauritus*. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Pakistan, India and Sri Lanka; elsewhere to Bangladesh, Thailand, Vietnam, Malaysia and Indonesia (Borneo).

**REMARKS** Found in coastal and inshore waters. Feeds on small fishes and invertebrates. An important food fish, sold in markets fresh and (the swimbladder) dried-salted.

*Otolithoides pama* (Hamilton 1822)

Pama croaker

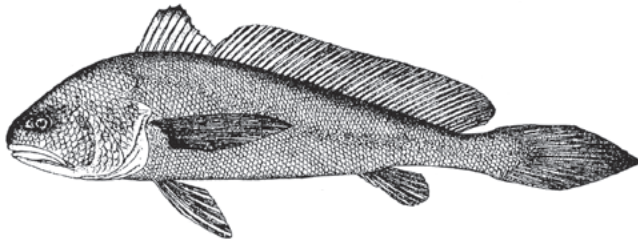
PLATE 134

*Bola pama* Hamilton 1822: 79, Pl. 32, Fig. 26 (Ganges tidal estuaries, Kolkata, India).

*Otolithoides pama*: Trewavas 1977\*; Manilo & Bogorodsky 2003.

Dorsal fin 9 or 10 + 1 spines, 40–45 rays; anal fin 2 spines, 7 rays; pectoral fins 18 rays. In SL: body depth 3.6–4.6, HL 3.2–3.6, pectoral fins 3.5–4.1, and 2nd anal-fin spine 12–24. In HL: eye diameter 7.5–8.7, interorbital width 3–3.3, and lower jaw length 1.7–1.9. GR 7/13–15. Scales on head cycloid, finely ctenoid on most of body; scales above LL 12–15, below LL 14–17, above + below 28–31.

Body pale brownish dorsally, belly silvery white; head with flecks of gold and purple; fins yellowish; distal half of dorsal fin grey. Attains 160 cm TL.



*Otolithoides pama*, 18 cm SL (India). Source: Lal Mohan 1981; reproduced with permission from CMFRI

**DISTRIBUTION** Indian Ocean: Pakistan, India and Sri Lanka to Bangladesh and Myanmar.

**GENUS** *Panna* Lal Mohan 1969

Body elongate; dorsal fin weakly notched; mouth large and terminal. Swimbladder carrot-shaped, with anterior tubule on each side which bifurcates into long simple abdominal appendage and cephalic appendages that are simple in young or branched in adults. Genus reviewed by Sasaki (1995). Three species, 1 in WIO.

*Panna heterolepis* Trewavas 1977

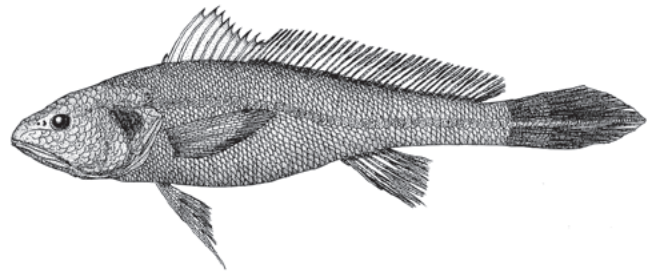
Indian panna croaker

*Panna heterolepis* Trewavas 1977: 308, Fig. 6 (Kolkata, India); Sasaki 1995\*; Manilo & Bogorodsky 2003.

*Panna microdon*: Lal Mohan 1984\*.

Dorsal fin 8–10 + 1 spines, 32–37 rays; anal fin 2 spines, 6 or 7 rays; pectoral fins 18–21 rays. In SL: body depth 4–5.1, HL 3.1–3.5, pectoral fins 4–5.8, and 2nd anal-fin spine 9.7–17. In HL: eye diameter 6–8.5, interorbital width 3.1–4, and lower jaw length 1.8–2. GR 6–8/12–16. Scales cycloid on head, ctenoid on body in adults (transition from cycloid to ctenoid scales on body occurs at 12–20 cm SL); scales above LL 12–17, below LL 14–22.

Body brown, paler on flanks and belly; fins yellow, dorsal and anal fins with darker margins. Attains 30 cm TL.



*Panna heterolepis*, 11 cm SL, juvenile (Bangladesh). Source: Sasaki 1995

**DISTRIBUTION** Indian Ocean: India, Sri Lanka and Bay of Bengal.

**REMARKS** All Indian Ocean records of *Panna microdon* (Bleeker 1849) are based on misidentification of this species (Sasaki 1995).

**GENUS** *Paranibea* Trewavas 1977

Body deep, dorsal profile arched; mouth slightly inferior; lips thick and papillose; lower jaw teeth uniformly sized. Swimbladder carrot-shaped, with branched appendages along its entire sides, anterior pair penetrating transverse septum. One species.

*Paranibea semiluctuosa* (Cuvier 1830)

Half-mourning croaker

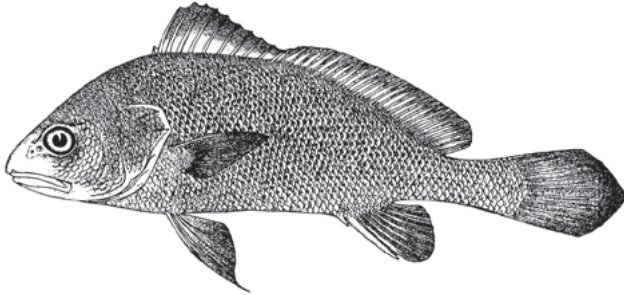
*Corvina semiluctuosa* Cuvier in Cuv. & Val. 1830: 97, Pl. 106 (Malabar coast, India).

*Paranibea semiluctuosa*: Trewavas 1977\*; Lal Mohan 1984\*; Talwar 1995; Manilo & Bogorodsky 2003.

Diagnosis as for genus. Dorsal fin 9 or 10 + 1 spines, 27–31 rays; anal fin 2 spines, 7 or 8 rays; pectoral fins 18–20 rays. In SL: body depth 3.1–3.5, HL 2.9–3.2, pectoral fins 4.2–4.9, and 2nd anal-fin spine 6.6–7.7. In HL: eye diameter 4.1–5.6, interorbital width 4.3–4.9, and lower jaw length 2.4–2.6.

GR 4 or 5/7–9. Scales above LL 10–15, below LL 18–21, above + below 30–36.

Body dark, with numerous oblique, thin, wavy black stripes; pelvic fins and anal fin darkest. Attains 40 cm TL.



*Paranibea semiluctuosa*, 25 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indian Ocean: Pakistan, India to Malay Peninsula.

**REMARKS** Coastal; sold fresh and dried-salted in markets.

**GENUS** *Pennahia* Fowler 1926

Anteriormost mental pores on front of chin, one on each side of jaw tip, not united by groove; swimbladder carrot-shaped, with branched appendages along its entire sides, anterior appendages not penetrating transverse septum, and appendages without well-developed dorsal limbs; end of tadpole-shaped impression of sagitta only slightly curved. Five species, 1 in WIO.

*Pennahia anea* (Bloch 1793)

Bigeye croaker PLATE 135

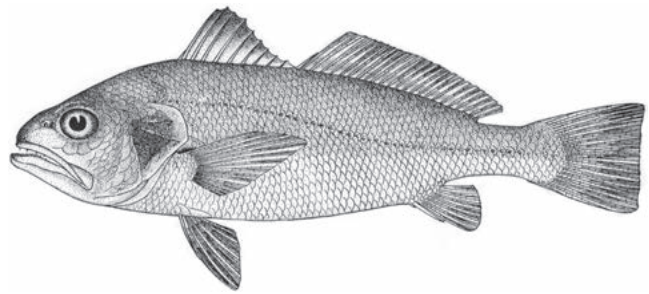
*Johnius aneus* Bloch 1793: 135, Pl. 357 (Malabar coast, India).

*Pennahia macrophthalmus*: Trewavas 1977\*; Lal Mohan 1984\*.

*Pennahia anea*: Sasaki 1994; Randall 1995\*; Carpenter *et al.* 1997\*; Sasaki 2001\*; Manilo & Bogorodsky 2003.

Dorsal fin 9 or 10 + 1 spines, 22–24 rays; anal fin 2 spines, 7 rays; pectoral fins 16–18 rays. Caudal fin truncate. In SL: body depth 3.1–3.8, HL 2.7–3.1, pectoral fins 3.5–4.3, and 2nd anal-fin spine 7.5–14 (spine shorter than peduncle depth). In HL: eye diameter 3.8–4.7, interorbital width 3.3–4, and lower jaw length 1.7–1.9. Chin with 2 pairs of pores; inner row of teeth on lower jaw large and well-spaced. GR 5–7/10–12. Scales above LL 8–12, below LL 13–27, above + below 22–29.

Head and body pale brown to greyish dorsally, silvery laterally, abdomen whitish; gill cover with diffuse dark blotch; distal two-thirds of spinous dorsal fin dusky. Attains 30 cm TL.



*Pennahia anea*, 15 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, India and Sri Lanka; elsewhere to Indonesia, Philippines and Taiwan.

**REMARKS** Occurs in inshore waters. Feeds on small crustaceans, benthic worms and small fishes. Marketed fresh and dried-salted.

**GENUS** *Umbrina* Cuvier 1816

Body oblong, depth subequal to HL; mouth ventral, edge of snout deeply lobed; chin with short fleshy barbel with median pore at tip, and 2 pores on each side of barbel; teeth villiform, in broad band on lower jaw; swimbladder simple, without appendages. Southern African species of *Umbrina* revised by Hutchings & Griffiths (2005). About 15 species, 3 in WIO.

**KEY TO SPECIES**

1a	Rear margin of gill cover dark brown or black; GR 3–5/7–9 .....	<i>U. cirrosa</i>
1b	Rear margin of gill cover not darkly pigmented; GR 4–7/8–12 .....	<b>2</b>
2a	Dorsal fin 24 or 25 rays; body depth 26–36% SL; pectoral fins 15–21% SL .....	<i>U. robinsoni</i>
2b	Dorsal fin 26–30 rays; body depth 33–39% SL; pectoral fins 20–25% SL .....	<i>U. canariensis</i>

*Umbrina canariensis* Valenciennes 1843

Canary drum PLATE 135

*Umbrina canariensis* Valenciennes 1843: 24 (Canary Is.); Trewavas 1977; Chao 1986\*; SSF No. 199.8\*; Randall 1995\*; Sasaki 1996; Fricke 1999; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Hutchings & Griffiths 2005\*.

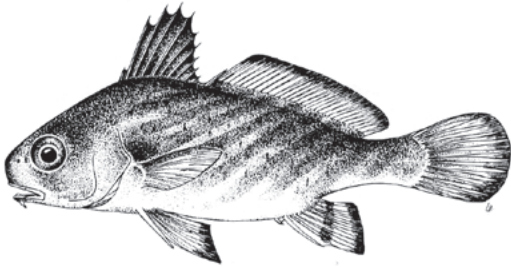
*Umbrina sinuata* Day 1876: 182, Pl. 46, Fig. 1 (Karachi, Pakistan); Trewavas 1977\*.

*Umbrina striata* Boulenger 1888: 660 (Muscat, Oman, Gulf of Oman).

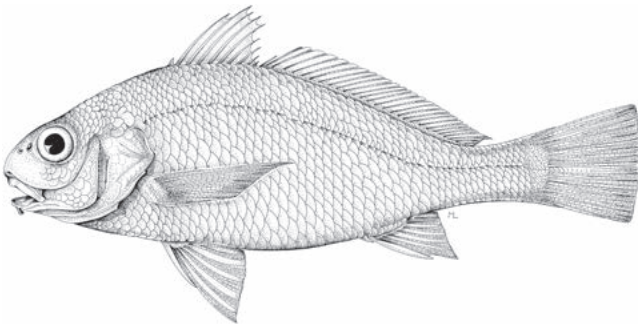


Dorsal fin 9 or 10 + 1 spines, 26–30 rays; anal fin 2 spines, 7 rays; pectoral fins 17–19 rays. In SL: body depth 2.5–3.4, HL 2.8–3.3, pectoral fins 4–6.5, and 2nd anal-fin spine 6–13. In HL: eye diameter 3.1–7.3, interorbital width 3.6–6.5, and lower jaw length 2.7–4.2. GR 4–7/8–12. Scales above LL 8–11, below LL 13–17, above + below 21–28. Drumming muscles present in males only, firmly joined to dorsal surface of swimbladder and loosely attached to ribs.

Body greyish silvery, darker dorsally, paler ventrally; broad dark grey oblique stripes on flanks, which may extend onto dorsal part of head and increase in number with growth; distal parts of soft-rayed dorsal, pelvic, anal and caudal fins dark grey or black; opercle membrane not dark, but inside of operculum blackish. Attains 43 cm TL.



*Umbrina canariensis*, 12 cm TL, juvenile. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission



*Umbrina canariensis*, 26 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Western Mediterranean Sea and eastern Atlantic (Bay of Biscay and Morocco to Angola, Canary Is. and Cape Verde Is., northern Namibia, and South Africa south of St Helena Bay). WIO: South Africa (False Bay and Cape south coast), Mozambique, Madagascar, Réunion, Oman and Pakistan.

**REMARKS** Occurs on continental shelf and upper slope, on mud and sand bottom, from surf zone to at least 414 m deep. Feeds on small shrimps, worms and other bottom-dwelling invertebrates. Sold fresh and dried-salted.

## *Umbrina cirrosa* (Linnaeus 1758)

Shi drum

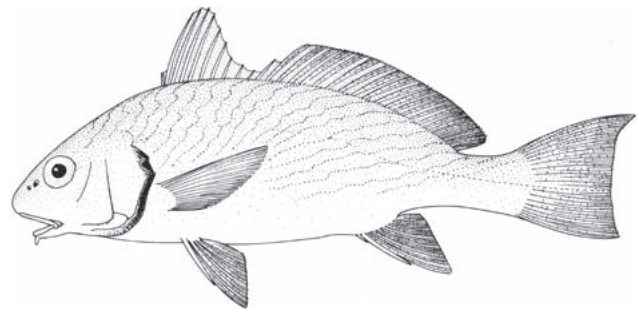
PLATE 135

*Sciaena cirrosa* Linnaeus 1758: 289 (Mediterranean Sea and eastern Atlantic).

*Umbrina cirrosa*: Trewavas 1973; Chao 1986\*; Goren & Dor 1994.

Dorsal fin 8–10 + 1 spines, 21–26 rays; anal fin 2 spines, 7 rays; pectoral fins 17 or 18 rays. In SL: body depth 3.2–3.9, HL 3–3.7, pectoral fins 5–6.1, and 2nd anal-fin spine 7.6–9.3. In HL: eye diameter 3.2–5.7, interorbital width 3.7–4.5, and lower jaw length 2.8–3.8. GR 3–5/7–9. Scales above LL 8–15, below LL 14–18, above + below 22–32.

Body greyish silvery to brownish, with metallic hue and longitudinal dark lines on back and sides; opercle membrane dark brown or black. Attains 80 cm TL.



*Umbrina cirrosa*, 37 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** Eastern Atlantic (Bay of Biscay to Senegal), Sea of Azov, Black Sea, Mediterranean Sea, and anti-Lessepsian migrant to Gulf of Suez (possibly to Red Sea).

**REMARKS** Found in coastal waters over rocky and sandy bottom; juveniles enter estuaries. Feeds on bottom-dwelling invertebrates.

## *Umbrina robinsoni* Gilchrist & Thompson 1908

Longtail drum

PLATES 135 & 136

?*Umbrina capensis* Pappe 1853: 16 (False Bay, South Africa) [*nomen dubium*, description inadequate].

*Umbrina robinsoni* Gilchrist & Thompson 1908: 182 (KwaZulu-Natal, South Africa); Trewavas 1977 [in part]; Heemstra & Heemstra 2004\*.

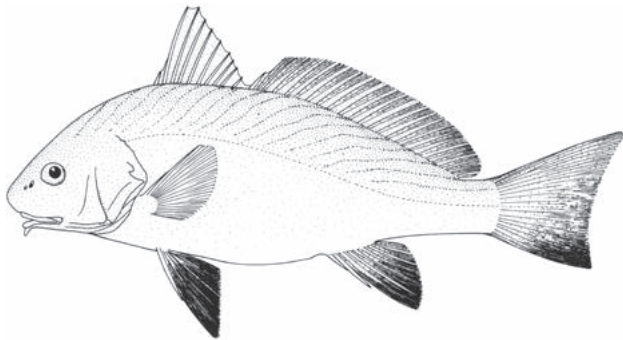
*Umbrina angustilineata* Gilchrist & Thompson 1911: 38 (KwaZulu-Natal, South Africa).

*Umbrina ronchus* (*non* Valenciennes 1843): Trewavas 1977 [in part]; SSF No. 199.9\*; Randall 1995\*.

Dorsal fin 10 or 11 + 1 spines, 24 or 25 rays; anal fin 2 spines, 7 rays; pectoral fins 17 or 18 rays. Caudal fin truncate in juveniles (<15 cm), margin S-shaped or emarginate in adults. In SL: body

depth 2.9–3.9, HL 2.9–4, pectoral fins 4.2–5.3, and 2nd anal-fin spine 6.7–12. In HL: eye diameter 3.8–6, interorbital width 3.7–4.4, and lower jaw length 3–3.7. GR 5–7/8–11. Scales above LL 8–11, below LL 14–17, above + below 23–26. Drumming muscles present in males only.

Body dark brown to grey dorsally, with thin, white, oblique lines along scale series, tending to fade in larger individuals; pelvic fins and distal part of anal fin black, other fins dusky. Attains 99 cm TL, ~13 kg.



*Umbrina robinsoni*, 40 cm SL. © Food and Agriculture Organization of the United Nations, Original Scientific Illustrations Archive; reproduced with permission

**DISTRIBUTION** WIO: Oman, Mozambique to South Africa (False Bay) and Madagascar.

**REMARKS** Coastal, on rocky and sandy bottom; juveniles may occur in littoral areas, but not in estuaries. Feeds on shrimps, worms and other bottom-dwelling invertebrates. Sold fresh.

#### GLOSSARY

**cauda of sagittal sulcus** – the posterior of the sulcus.  
**drumming muscles** – the muscles that are attached to the swimbladder and produce drumming sounds when contracted.  
**sagitta** – the largest of the otoliths or ear-bones.  
**sulcus** – the indentation on the inner surface of the sagitta.

## FAMILY MENIDAE

### Moonfish

Phillip C Heemstra

Body disc-like, very deep and extremely compressed, depth 1.3–1.5 in SL; ventral profile from lower jaw to peduncle strongly convex, chest and belly cultrate. Head short, HL ~3 in FL. Mouth oblique, upper jaw very protrusile; maxilla exposed when mouth closed; jaws with bands of villiform teeth, no teeth on vomer and palatines. Opercle and preopercle smooth.

Dorsal fin long and low, but anterior rays slightly elevated; no spines; rays spine-like in young but lost with age, first 3–10 rays unbranched; anal fin also long and low, with very short embedded rays (only their weakly branched tips visible); pectoral fins shorter than head; pelvic fins 1 spine, 5 rays, first 2 rays thickened, fused and greatly elongated in adults; caudal fin deeply forked. Scales minute, thin, deciduous, barely visible.

Monotypic.

### *Mene maculata* (Bloch & Schneider 1801)

Moonfish

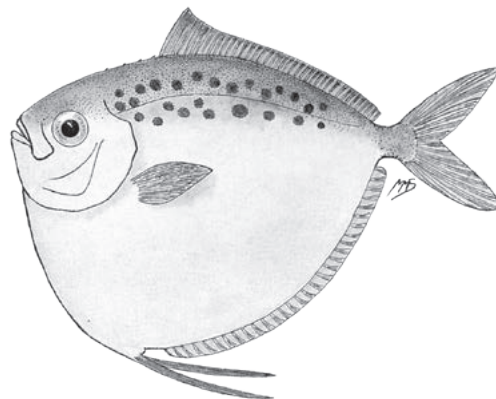
PLATE 136

*Zeus maculatus* Bloch & Schneider 1801: 95, Pl. 22 (Tharangambadi, India).

*Mene maculata*: SFSA No. 623\*; SSF No. 200.1\*; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 43–46 rays; anal fin 30–33 rays; pectoral fins 15 or 16 rays; GR 6 or 7/23 or 24.

Head and body dark bluish green dorsally, with several dark spots of various sizes and shapes, and silvery below. Attains 25 cm SL.



*Mene maculata*, 10 cm TL. Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf and Gulf of Oman to India and Sri Lanka, and Red Sea to South Africa (KwaZulu-Natal) and Madagascar; elsewhere to Thailand, Indonesia, Japan and Australia.

**REMARKS** Mainly continental, frequents coastal waters to ~478 m deep but also found in estuaries; usually seen in shoals. Used for food in India and other Asian countries; readily dries out unsalted.

#### GLOSSARY

**cultrate** – sharp-edged.

## FAMILY LEIOGNATHIDAE

### Ponyfishes or slipmouths

Prosanta Chakrabarty and John S Sparks

Small-sized (<20 cm SL), laterally compressed, deep-bodied to somewhat elongate, with highly protrusile mouth (protracting either dorsorostrally, rostrally or most commonly ventrorostrally). Single long dorsal fin and long anal fin, low throughout rayed portion, both with spinous and rayed portions, all rays branched; caudal fin forked. Eyes moderate to large. Teeth in jaws distinct to minute, conical and villiform to caniniform, depending on genus. Branchiostegal rays 5. Body typically silvery, often with unique pigmentation patterns on upper flank. All species with circumoesophageal light-organ system with symbiotic bioluminescent bacteria which produce light that the fish co-opt for photic defence and communication; in most species the light-organ system is sexually dimorphic (in size and shape of the organ, in number and placement of translucent patches on sides of the body or on the lower jaw, and opercle, and with regard to clearing of

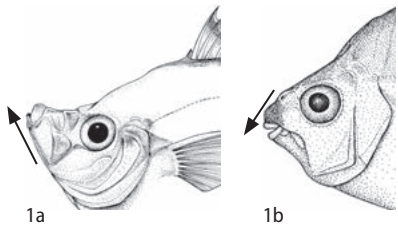
the generally silvery guanine-lined swimbladder). Males of many species also have an external translucent lateral stripe or patch/patches through which bacterial luminescence is transmitted. Scales small (generally difficult to see). Vertebrae 10 + 14.

Restricted to shallow coastal waters (<160 m) and often enter estuaries; juveniles are sometimes found in brackish or freshwater habitats, such as lower reaches of tidally influenced rivers. Readily consumed as food fish and abundant in local markets in some developing nations. In more developed nations, only large species (members of *Leiognathus* and *Aurigequula*) are regularly consumed. Commonly sold as dried-salted.

Occur throughout the Indo-Pacific, from the northern Red Sea to southern Africa, Australia, Japan and the western Pacific islands (such as Micronesia, New Caledonia and Fiji), but most diverse in coastal waters of Southeast Asia; one species (*Equulites klunzingeri*) has recently entered the Mediterranean Sea via the Suez Canal. Ten genera, the majority of which have been recently described or resurrected from synonymy, and ~48 species; all 10 genera and ~23 species in WIO.

#### KEY TO GENERA

- 1a Mouth protracts dorsorostrally ..... *Deveximentum*  
 1b Mouth protracts rostrally or ventrorostrally ..... 2



- 2a Enlarged caniniform teeth in jaws; mouth protracts rostrally ..... *Gazza*  
 2b Small, feeble, conical/villiform teeth in jaws ..... 3  
 3a Adults attain >15 cm SL ..... 4  
 3b Adults attain <15 cm SL ..... 5  
 4a No large round yellowish blotches on sides of body; 2nd spine of dorsal and anal fins <60% body depth ..... *Leiognathus*  
 4b Series of round yellow blotches along sides of body; 2nd spine of dorsal fin >70% body depth ..... *Aurigequula*  
 5a Body of males with conspicuous external translucent patches or stripes, and with enlarged dorsal lobes of light organ ..... 6  
 5b No translucent patches on sides of body; species not externally sexually dimorphic ..... 8

- 6a Males with translucent patch in pectoral-fin axil, and with greatly enlarged dorsal lobes of light organ ..... *Photopectoralis*  
 6b Males with large conspicuous translucent patch or stripe on flank, and with lateral clearing of the internally guanine-lined swimbladder ..... 7  
 7a Males with a translucent triangular, cornucopia-shaped, or trapezoidal patch on flanks, and with extensive lateral clearing of internal surface of guanine-lined swimbladder ('window' spanning nearly full length of swimbladder) ..... *Equulites*  
 7b Males with a conspicuous translucent stripe on flanks (either continuous or broken), and with limited lateral clearing of internal surface of guanine-lined swimbladder ('window' only on posterior region of swimbladder) ..... *Photolateralis*  
 8a Dark saddle-shaped mark on nuchal area ..... *Nuchequula*  
 8b No dark mark on nuchal area ..... 9  
 9a Sides of body with vermiculate pattern, and interspinous dorsal-fin membranes with black markings ..... *Eubleekeria*  
 9b Sides of body deep golden yellow; elongate rhomboid body shape ..... *Karalla*

GENUS *Aurigequula* Cuvier 1815

Second spine of dorsal fin markedly elongate (0.8–2 times body depth). No scales on head, chest, entire triangular region between rear margin of opercle, pectoral-fin bases and pelvic-fin margins; remainder of body with scales, including nuchal region except for dorsal midline; large axillary scale on pelvic fins and anal fin. Lips fleshy but thin; teeth small and conical; rear margin of maxilla exposed and reaching vertical through front margin of pupil. Sides of body with horizontal series of round yellow blotches. Distinguished from all other ponyfishes, other than *Leiognathus*, by non-sexually dimorphic light organ. Relatively large-sized leiognathids (>15 cm SL). Three species, all in WIO.

KEY TO SPECIES

- 1a Second spine of anal fin 60–100% body depth ..... *A. longispina*
- 1b Second spine of anal fin <60% body depth ..... 2
  
- 2a Upper flanks with golden yellow vertical bars, not forming rounded dashes below lateral line ..... *A. striata*
- 2b Upper flanks with 10–15 vertical yellow lines, extending slightly below lateral line and then breaking up into rounded dashes ..... *A. fasciata*

*Aurigequula fasciata* (Lacepède 1803)

Striped ponyfish

PLATE 136

- Clupea fasciata* Lacepède (ex Commerson) 1803: 425, 460 (Mauritius, Mascarenes).
- Equula cara* Cuvier 1829: 212 ('Indian seas' [Visakhapatnam, India]).
- Equula filigera* Valenciennes in Cuv. & Val. 1835: 92, Pl. 284 (Moluccas, Indonesia; Trincomalee, Sri Lanka; Malabar coast, India; Seychelles).
- Equula serrulifera* Richardson 1848: 137, Pl. 59, Figs. 12–14 (Sydney, New South Wales, Australia [likely erroneous]).
- Equula asina* De Vis 1884: 544 (Cape York, Queensland, Australia).
- Leiognathus fasciatus*: Goren & Dor 1994; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003.
- Aurigequula fasciata*: Chakrabarty *et al.* 2010; Abraham *et al.* 2011; Sparks & Chakrabarty 2015.

Entire dorsal and ventral profiles equally convex; dorsal head profile with strong concavity above eyes and then large hump in nuchal region. Body depth 53–57% SL; HL 30–35% SL; mouth length ~15–20% SL; snout length 30–35% HL; eye diameter 33–36% HL; interorbital width 28–37% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal fin elongate (~60–100% body depth; 2–3 times longer than 3rd spine); 2nd spine of anal fin elongate (~30–60% body depth; ~20–50% longer than 3rd spine). Mouth horizontal, protracting strongly ventrorostrally and

extending to ~15–20% SL; lower jaw profile slightly concave. LL scales ~50–60.

Body silvery, head and chest silvery white; 10–15 vertical yellow lines on flanks, extending slightly below lateral line and then breaking up into rounded dashes; melanophores on snout above upper lip; fin spines silvery; pectoral-, dorsal- and anal-fin membranes pale yellow (particularly between anal-fin rays); pectoral-fin base and axil deep yellow; pelvic fins white; caudal fin with little colour; axillary scale on pelvic fins and anal fin silvery white. Attains 17 cm SL.



*Aurigequula fasciata*, 15 cm SL (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa, Madagascar, Mauritius, India and Sri Lanka; elsewhere to Indonesia, Philippines, Japan, northeastern Australia and New Caledonia.

*Aurigequula longispina* (Valenciennes 1835)

Longspine ponyfish

PLATE 136

- Equula longispinis* Valenciennes in Cuv. & Val. 1835: 94 (Waigeo I., Papua Barat, Indonesia).
- Equula smithursti* Ramsay & Ogilby 1886: 11 (Hood Lagoon, Papua New Guinea).
- Leiognathus longispinis*: Manilo & Bogorodsky 2003; Sparks 2006; Fricke *et al.* 2009.
- Aurigequula longispina*: Chakrabarty *et al.* 2009; Sparks & Chakrabarty 2015.

Entire dorsal and ventral profiles equally convex; dorsal head profile with strong concavity above eyes. Body depth 52–55% SL; HL 27–30% SL; snout length 34–41% HL; eye diameter 29–32% HL; interorbital width 38–41% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal fin elongate (~60–100% body depth; 2 or 3 times longer than 3rd spine); 2nd spine of anal fin elongate

(~60–100% body depth), reaching past origin of peduncle. Mouth horizontal, protracting strongly ventrorostrally; lower jaw profile slightly concave. LL scales ~65.

Body silvery, with vertical rows of greyish yellow dashes on sides, extending to lateral midline, markings more prominent dorsally and posteriorly; melanophores on snout above upper lip; pectoral-fin bases and upper margin of opercle yellow; fin spines silvery. Attains 17 cm SL.



*Aurigequula longispina*, 13 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: South Africa, Madagascar, Seychelles, Réunion and southern India; elsewhere to Thailand, Indonesia, Philippines, New Guinea and Western Australia.

**REMARKS** Known from 1–67 m.

### *Aurigequula striata* (James & Badrudeen 1991)

Striated ponyfish

PLATE 137

*Leiognathus striatus* James & Badrudeen 1991: 218, Fig. 1, Pls. 1–2 (Gulf of Mannar at Pamban, Mandapam and Kilakarai, India); Chakrabarty *et al.* 2009.

*Aurigequula striata*: Sparks & Chakrabarty 2015.

Robust and very deep-bodied; entire dorsal profile much more convex than ventral profile; dorsal head profile slopes to upper orbital ridge and then rises steeply, creating prominent nuchal hump anterior to dorsal-fin origin; tip of snout blunt and squared-off. Body depth 57–61% SL; HL 32–35% SL; snout length 33–42% HL; eye diameter 29–34% HL; interorbital width 26–35% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal fin 2–3½ times longer than 3rd spine, and ~50–80% body depth; 2nd spine of anal fin elongate, ½–2 times longer than 3rd spine, and 20–40% body depth. Mouth horizontal, protracting strongly ventrorostrally and extending to ~15% SL; lower jaw profile concave; lips somewhat fleshy but thin. LL scales ~50–60.

Body silvery, head and chest silvery white; 10–15 golden yellow vertical bars extending to lateral midline (never forming

circular dashed pattern as in *A. fasciata*); dense melanophores on snout above upper lip; opercle yellowish; fin spines silvery; pectoral-fin base and axil without pigment; pectoral- and dorsal-fin membranes tinged yellow; anal fin silvery white; pelvic fins white, with silvery white axillary scale; caudal fin with little colour. Attains 17.5 cm SL.

**DISTRIBUTION** Indian Ocean: Gulf of Mannar (India and Sri Lanka); elsewhere, Singapore.

## GENUS *Deveximentum* Fowler 1904

Body extremely laterally compressed and deep; snout very short; mouth protracts dorsorostrally. Eyes large and near dorsal head profile. Pelvic fins very small. Dense melanophores on distal half of spinous portion of dorsal fin; margin of lower jaw lined with melanophores. Seven species, 3 in WIO.

### KEY TO SPECIES

- |    |  |                            |
|----|--|----------------------------|
| 1a | Upper flanks with ~10 well-defined vertical bars   | ..... <i>D. ruconius</i>   |
| 1b | Upper flanks with large spots and dashes   | ..... 2                    |
| 2a | Body oval and evenly rounded ventrally; blotches on upper flanks in poorly defined columns                       | ..... <i>D. insidiator</i> |
| 2b | Body hatchet-shaped ventrally; upper flanks with 8–11 well-defined columns of irregular small spots and blotches | ..... <i>D. mazavaaoka</i> |

### *Deveximentum insidiator* (Bloch 1787)

Slender soapy

PLATE 137

*Zeus insidiator* Bloch 1787: 41, Pl. 192, Figs. 2–3 (Tapti River estuary, Surat District, India).

*Secutor insidiator*: SFSA No. 652\*; SSF No. 201.4\*; Talwar & Jhingran 1991; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004; Chakrabarty *et al.* 2009; Baldwin & Sparks 2011; Chakrabarty *et al.* 2011.

*Deveximentum insidiator*: Sparks & Chakrabarty 2015.

Entire ventral body profile more convex than dorsal body profile. Body depth 40–58% SL; HL 25–30% SL; snout very short, length 24–30% HL; eye diameter 30–36% HL; interorbital width 27–42% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second and 3rd spines of dorsal and anal fins each about equal in length; 2nd spine of dorsal fin ~35% body depth, and 2nd spine of anal fin ~25% body depth. Mouth points upward and may extend to

~15–20% SL when protracted; lower jaw straight and nearly vertical; lips thin and not fleshy. Lateral line incomplete, ending before peduncle; LL scales ~40; head and cheeks naked; nuchal region, chest and remainder of body scaly.

Body silvery, with dark vertical markings on upper flanks forming incomplete circular bands and vertical dashes; strip of dense melanophores flanking dorsal midline and extending from nuchal region to origin of peduncle; rear margin of lower jaw (just below eyes) with oblique black line; interspinous dorsal-fin membrane black from ~¼ length of 2nd spine to distal margin of fin; oblique black line of dense melanophores from pectoral-fin axil to about pelvic-fin margins. Attains 9 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea, Kenya to South Africa (Eastern Cape), Madagascar, northwest India and Sri Lanka; elsewhere to Indonesia, Philippines, Australia, New Caledonia and French Polynesia.

**REMARKS** Elongate and deep-bodied forms appear to be sympatric, but these may prove to be distinct species. Found in loose groups in coastal waters, near bottom. Feeds on various invertebrates and fish larvae. Sold fresh or dried-salted, and also used for fishmeal.

## *Deveximentum mazavasaoka*

(Baldwin & Sparks 2011)

Translucent-chinned ponyfish

PLATE 137

*Secutor insidiator*: James 1984\*; Mochizuki & Hayashi 1989 [in part: description, black and white photograph].

*Secutor* sp. 'Madagascar': Sparks *et al.* 2005.

*Secutor* n. sp. 'Madagascar': Sparks 2006; Chakrabarty *et al.* 2011.

*Secutor mazavasaoka* Baldwin & Sparks 2011: 41,

Figs. 3–5 (Maroansetra market, Antongil Bay, Madagascar).

*Deveximentum mazavasaoka*: Sparks & Chakrabarty 2015.

Body strongly compressed and oval, hatchet-shaped; dorsal profile markedly less convex than ventral profile, particularly anteriorly. Snout compressed and pug-like; mouth strongly upturned; lips not fleshy. Body depth 40.5–57.7% SL, greatest body depth at vertical from dorsal-fin origin to just anterior of anal-fin origin. Dorsal fin 8 spines, 16 branched rays; anal fin 3 spines, 14 branched rays; pelvic fins 1 spine, 5 branched rays, fins short (>1 pelvic-fin length from first anal-fin spine when adducted); pectoral fins 16 or 17 rays. Dorsal-fin insertion well behind vertical through pectoral-fin bases; anal-fin origin near vertical through midpoint of body, just anterior to vertical between last dorsal-fin spine and first dorsal-fin ray; peduncle slender and shallow. Eyes large and circular; sensory pores

around eyes weakly to moderately developed. Teeth exposed; 1 row of closely set elongate, recurved, uniformly sized conical teeth in both jaws. Lateral line complete, with well-developed pores, slightly arched and extending from opercle to end of peduncle. LL scales ~60; flanks covered with small, regularly imbricate scales; scales extending onto and fully covering chest.

Body silvery; upper flanks with 8–11 well-defined columns of irregular small spots and blotches. Attains 11 cm SL.



*Deveximentum mazavasaoka*, 8 cm SL, holotype (NE Madagascar).  
JS Sparks © AMNH

**DISTRIBUTION** WIO: South Africa (east coast), Mozambique, Madagascar and Mascarenes.

## *Deveximentum ruconius* (Hamilton 1822)

Deep-pugnose ponyfish

PLATE 137

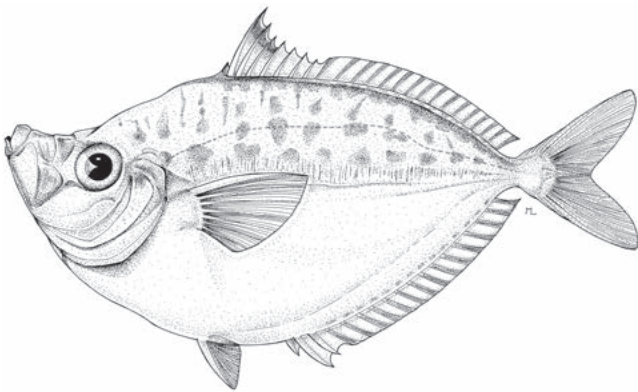
*Chanda ruconius* Hamilton 1822: 106, 371, Pl. 12, Fig. 35 (Ganges River estuaries, India).

*Secutor ruconius*: SFSA No. 624\*; SSF No. 201.5\*; Talwar & Jhingran 1991; Goren & Dor 1994; Chakrabarty *et al.* 2009; Baldwin & Sparks 2011; Chakrabarty *et al.* 2011.

*Deveximentum ruconius*: Sparks & Chakrabarty 2015.

Strongly compressed and very deep-bodied, front half nearly circular or disc-shaped; entire ventral profile much more convex than dorsal profile; dorsal head profile with strong concavity above eyes and then convex to dorsal-fin origin. Body depth 57–62% SL; HL 25–31% SL; snout length 22–31% HL; eye diameter 35–44% HL; interorbital width 43–46% HL. Dorsal fin 7–11 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal and anal fins each ~20–40% longer than 3rd spine; 2nd spine of dorsal fin ~30–40% body depth; 2nd spine of anal fin ~10–20% body depth. Snout very short; mouth points extremely upward and may extend to ~15–20% SL when protracted; lower jaw straight and nearly vertical; lips thin and not fleshy. LL scales ~30–40; head naked; nuchal region, chest and remainder of body with scales.

Body silvery, with greenish yellow vertical markings forming incomplete circular bands and vertical dashes below lateral midline, but interconnected and forming distinct vertical lines above lateral midline; oblique black line running forward from behind rear margin of lower jaw; dorsal-fin base with prominent silvery line, and interspinous membranes with dense melanophores from about one-quarter length of 2nd spine to distal margin of fin; oblique black line of dense melanophores from pectoral-fin axil to near pelvic-fin margins. Attains 10.5 cm SL.



*Deveximentum ruconius*, 10 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, northern Mozambique to South Africa (Eastern Cape), Madagascar and Sri Lanka; elsewhere to east coast of India, Indonesia, Philippines, China, Taiwan and Australia.

**REMARKS** Found in coastal waters, estuaries and rivers, usually over sand or mud bottom. Feeds on small crustaceans. Sold fresh or dried-salted.

## GENUS *Equulites* Fowler 1904

Body elongate; dorsal head profile straight; snout pointed. Mouth small and protracts ventrorostrally; rear margin of maxilla exposed and reaching vertical through front margin of eye; lower jaw profile straight; lips thin and not fleshy. Jaws with 2 rows of small, close-set, conical teeth, or small, elongate, recurved teeth. No scales on head; nuchal region, chest and remainder of body with scales. Light-organ system strongly sexually dimorphic externally and internally: males with expansive external translucent lateral stripe or series of discrete horizontally arrayed patches on flanks (no transparent patch in females); light organ with hypertrophied dorsolateral lobes that extend posteriorly and slightly into the swimbladder in both sexes but considerably more so in males; and males with

clear lateral 'window' in the otherwise silvery lining of the swimbladder. Eleven species, 3 in WIO.

### KEY TO SPECIES

- |    |   |                          |
|----|---|--------------------------|
| 1a | Translucent patch on flanks in males trapezoidal or cornucopia-shaped; upper flanks with wavy vermiculate lines forming ovals and semicircles ..... | <i>E. laterofenestra</i> |
| 1b | Translucent patch on flanks in males triangular; upper flanks highly speckled with fine lines and spots .....                                       | 2                        |
| 2a | Translucent patch in males does not extend anteriorly to pectoral-fin axil; 2nd dorsal-fin spine rarely as long as body depth .....                 | <i>E. leuciscus</i>      |
| 2b | Translucent patch in males extends anteriorly to pectoral-fin axil; 2nd dorsal-fin spine longer than body depth .....                               | <i>E. klunzingeri</i>    |

## *Equulites klunzingeri* (Steindachner 1898)

Klunzinger's ponyfish

PLATE 137

*Equula klunzingeri* Steindachner 1898: 199 (Gulf of Suez, Red Sea).

*Leiognathus mediterraneus* Rhasis Erazi 1943: 49, Fig. (İskenderun, SE Turkey, Mediterranean Sea).

*Leiognathus klunzingeri*: Goren & Dor 1994; Golani 1998; Heemstra & Heemstra 2004.

*Photoplagios klunzingeri*: Sparks *et al.* 2005; Sparks 2006; Sparks & Chakrabarty 2007.

*Equulites klunzingeri*: Chakrabarty & Sparks 2008; Kimura *et al.* 2008; Chakrabarty *et al.* 2010; Golani *et al.* 2011.

Entire dorsal and ventral profiles about equally convex; dorsal head profile straight. Body elongate, its depth 40–44% SL; HL 27–30% SL; snout length 26–32% HL; eye diameter 32–37% HL; interorbital width 28–32% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal fin up to twice length of 3rd spine and greater than body depth; 2nd spine of anal fin only slightly longer than 3rd spine. Mouth protracts ventrorostrally, extending to ~7–15% SL; lower jaw profile straight.

Body silvery white, but less silvery below lateral midline than dorsally (appearing clear when viewed from above); dense melanophores on snout above upper lip; dark vermiculate lines on flanks, often forming open circular patterns; pelvic-fin spine silvery. Males with large translucent inverted triangular patch on flanks (its base below but parallel to lateral midline, anteriormost point reaching pectoral-fin axil, and apex reaching between pelvic-fin tip and anal-fin origin); underlying tissue of patch translucent with scattered melanophores. Attains 12 cm SL.



*Equulites klunzingeri*, 7 cm SL (Red Sea). © Gon © NRF-SAIAB



*Equulites klunzingeri*, 6 cm SL, female (Gulf of Suez). © SV Bogorodsky

**DISTRIBUTION** WIO: endemic to northern Red Sea, and Lessepsian migrant to Mediterranean Sea.

### *Equulites laterofenestra* (Sparks & Chakrabarty 2007)

PLATE 137

*Photoplagios laterofenestra* Sparks & Chakrabarty 2007: 624, Figs. 3–4 (Samar Sea, Carigara Bay, Philippines).

*Equulites laterofenestra*: Chakrabarty *et al.* 2008; Chakrabarty *et al.* 2009; Kimura *et al.* 2008.

Entire ventral profile slightly more convex than dorsal profile; dorsal head profile straight. Body elongate, its depth 34–39% SL; HL 27–35% SL; snout length 30–39% HL; eye diameter 27–39% HL; interorbital width 28–39% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal and anal fins each usually only slightly longer than respective 3rd spine (but in some individuals 2nd spine of dorsal fin twice as long as 3rd spine, and slightly longer than body depth). Mouth protracts ventrorostrally, extending to ~7–15% SL; lower jaw profile straight.

Body silvery white, but less silvery ventrally (appears clear when viewed from above), with relatively broad dark lines, sometimes forming open circular patterns; row of 5–7 translucent oval patches along lateral midline (in males and females), and smaller, more numerous, irregularly shaped patches of yellow or blue concentrated along lateral line; dense melanophores on snout above upper lip; some yellow pigment on membranes of spinous portions of dorsal and anal fins, and

on caudal fin; pectoral fins yellowish; pelvic-fin spine silvery. Males with large trapezoidal or cornucopia-shaped translucent patch on flanks (extending from pectoral-fin base to mid-body), translucent scales overlying this patch, and underlying tissue transparent with scattered melanophores. Attains 14 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere, Indonesia and Philippines.

**REMARKS** Found in coastal waters, to ~86 m deep.

### *Equulites leuciscus* (Günther 1860)

Whipfin ponyfish

PLATE 138

*Equula leuciscus* Günther 1860: 503 (Ambon I., Moluccas, Indonesia).

*Equula novaehollandiae* Steindachner 1879: 31 (Cleveland Bay, Townsville, Queensland, Australia).

*Leiognathus vermiculatus* Fowler 1904: 513, Pl. 15 (Padang, Sumatra, Indonesia).

*Photoplagios leuciscus*: Sparks *et al.* 2005; Sparks 2006; Sparks & Chakrabarty 2007.

*Equulites leuciscus*: Chakrabarty & Sparks 2008; Kimura *et al.* 2008; Abraham *et al.* 2011.

Entire dorsal and ventral profiles equally convex; head small, dorsal head profile straight above eyes and then weakly sloping to dorsal-fin origin. Body elongate, its depth 40–46% SL; HL 25–30% SL; snout length 28–46% HL; eye diameter 30–39% HL; interorbital width 33–44% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal and anal fins variable in length: these spines either markedly longer than other spines, or 2nd spine of dorsal fin rarely up to twice length of 3rd spine and equal to or greater than body depth. Snout pointed; lower jaw profile straight.

Body silvery, with thin, dark, transverse lines and small circular blotches on upper flanks (blotches follow contours of myomeres and are concentrated dorsally). Males with translucent triangular patch on flanks (roughly forming an equilateral triangle, with base of triangle slightly below lateral midline and apex slightly above anal-fin origin). Attains 12 cm SL.



*Equulites leuciscus*, 10 cm SL, holotype (Australia). © P Chakrabarty, LSU



**DISTRIBUTION** Indo-Pacific. WIO: Madagascar and Seychelles; elsewhere, Indonesia, Philippines and Australia.

**REMARKS** Found in coastal inshore waters to 67 m, over mud or sand bottom, near substrate but rarely near reefs. Feeds on small shrimps and other crustaceans, and polychaetes.

## GENUS *Eubleekeria* Chakrabarty & Sparks 2008

Robust and deep-bodied; distinguished from all other leiognathids by vermiculate pattern on flanks, black markings on dorsal-fin interspinous membranes, and scaly chest. Orbital ridge strongly protruding dorsally. Snout short, its length 25–30% HL; lips thin and not fleshy; rear margin of maxilla exposed, reaching vertical at front margin of eye. Teeth small and conical. Head naked; remainder of body mostly scaly: chest fully scaly, and nuchal region generally scaly. Four species, distinguished from each other by scale pattern (on cheeks, nape and/or chest) and extent of dark pigmentation on dorsal-fin membrane (Kimura *et al.* 2005), 2 species in WIO.

### KEY TO SPECIES

- |    |   |                     |
|----|---|---------------------|
| 1a | Dorsal-fin interspinous membranes with conspicuous large dark blotch; nape entirely scaly .....         | <i>E. splendens</i> |
| 1b | Dorsal-fin interspinous membranes with scattering of melanophores; portion of nape without scales ..... | <i>E. jonesi</i>    |

## *Eubleekeria jonesi* (James 1971)

Jones's ponyfish

PLATE 138

*Leiognathus jonesi* James 1971: 316, Fig. 1 (Palk Bay, Tamil Nadu, India); Kimura *et al.* 2005.

*Eubleekeria jonesi*: Kimura *et al.* 2008; Chakrabarty *et al.* 2009; Abraham *et al.* 2011; Sparks & Chakrabarty 2015.

Entire dorsal and ventral profiles equally convex; dorsal head profile slightly convex. Body depth 51–58% SL; HL 29–34% SL; snout length 26–38% HL; eye diameter 30–44% HL; interorbital width 22–33% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Eyes large; upper orbital ridge reaches dorsal head profile (more pronounced in juveniles). Mouth protracts slightly ventrorostrally; lower jaw profile straight. Nape scaly except region just anterior to dorsal fin.

Body silvery white, particularly below lateral midline; black marking on snout above upper lip; dark vermiculate

vertical lines forming zigzags or curves on flanks; thin silvery midlateral line, sometimes dashed; LL scales pale yellow; dorsal-fin interspinous membranes with scattering of melanophores, more concentrated towards fin margin; pectoral-fin axil black. Attains 14 cm SL.



*Eubleekeria jonesi*, 11 cm SL (Malaysia). © P Chakrabarty, LSU

**DISTRIBUTION** Indo-Pacific. WIO: Mauritius, India and Sri Lanka; elsewhere to southeast coast of India, Indonesia, Malaysia, Philippines and Australia.

## *Eubleekeria splendens* (Cuvier 1829)

Splendid ponyfish

PLATE 138

*Equula splendens* Cuvier 1829: 212 (Chennai, India) [based on illustration and description of Russell 1803: 48, Pl. 61].

*Equula gomorah* Valenciennes in Cuv. & Val. 1835: 80 (Puducherry, India).

*Equula splendens* var. *novemaculeata* Klunzinger 1880: 379 [55]

(Endeavour River, Queensland, Australia).

*Equula argentea* De Vis 1884: 542 (Cape York, Queensland, Australia).

*Equula ovalis* De Vis 1884: 543 (Cape York, Queensland, Australia).

*Equula simplex* De Vis 1884: 544 (Cape York, Queensland, Australia).

*Leiognathus spilotus* Fowler 1904: 516, Pl. 14 (Padang, Sumatra, Indonesia).

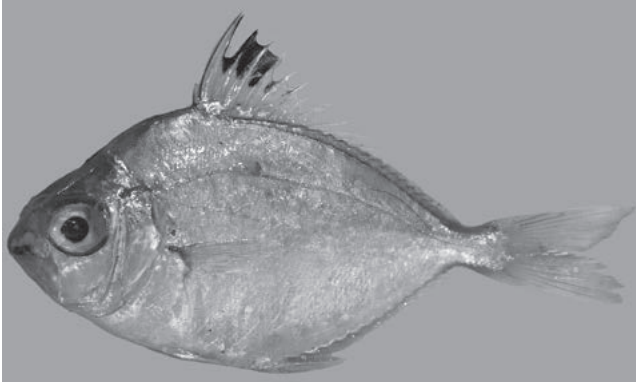
*Leiognathus devisi* Whitley 1929: 113, Fig. 2 (Cape York, Queensland, Australia).

*Leiognathus splendens*: Goren & Dor 1994; Fricke 1999; Manilo & Bogorodsky 2003; Kimura *et al.* 2005.

*Eubleekeria splendens*: Chakrabarty & Sparks 2008; Chakrabarty *et al.* 2009; Abraham *et al.* 2011; Sparks & Chakrabarty 2015.

Entire dorsal and ventral profiles equally convex in adults; dorsal head profile slightly convex, except slight concavity above eyes and then rising to dorsal-fin origin. Body depth 50–57% SL; HL 28–31% SL; snout length 27–32% HL; eye diameter 39–43% HL; interorbital width 31–47% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins short; 2nd spine ~30% body depth, and about equal in length to 3rd spine. Eyes large; upper orbital ridge reaches dorsal head outline in juveniles. Mouth protracts slightly ventrorostrally, extending to ~8–15% SL; lower jaw profile straight. LL scales ~40; nape scaly.

Body silvery white, particularly below lateral midline; black marking on snout above upper lip; dark vermiculate vertical lines forming zigzags or curves above lateral midline; narrow silvery midlateral line, sometimes dashed; LL scales deep yellowish orange, particularly in adults; pectoral-fin axil black; dorsal-fin interspinous membranes with concentrated melanophores from about half length of 2nd spine to distal margin of fin; all fins pale yellow (fading soon after death), except pelvic fins white. Attains 12 cm SL.



*Eubleekeria splendens*, 7 cm SL (Sri Lanka). © P Chakrabarty, LSU

**DISTRIBUTION** Indo-Pacific. WIO: India and Sri Lanka; elsewhere to east coast of India, Indonesia, Philippines, Taiwan, Japan and Australia.

**REMARKS** Found schooling in coastal waters, at 10–100 m. Feeds on fishes, crustaceans, foraminiferans and bivalves.

**GENUS** *Gazza* Rüppell 1835

Rhomboidal to slightly deep-bodied. Eyes large. Teeth caniniform, large or small, and adapted for a piscivorous diet as adults; lips thin and not fleshy; rear margin of maxilla exposed and reaches vertical through anterior margin of pupil. Eleven species, 4 in WIO.

**KEY TO SPECIES**

- 1a Relatively elongate, body depth generally <45% SL; nuchal region scaly, chest naked ..... *G. minuta*
- 1b Deep-bodied or rhomboidal, body depth >45% SL ..... 2

Continued ...

**KEY TO SPECIES**

- 2a Deep-bodied and more or less disc-shaped, body depth >50% SL; predorsal region above lateral line naked ..... *G. achlamys*
- 2b Rhomboidal, body depth ~45–50% SL ..... 3
- 3a Chest scaly between pectoral and pelvic fins ..... *G. squamiventralis*
- 3b Chest naked ..... *G. dentex*

*Gazza achlamys* Jordan & Starks 1917

Smalltoothed ponyfish

PLATE 138

*Gazza achlamys* Jordan & Starks 1917: 446, Pl. 45 (Colombo, Sri Lanka); Manilo & Bogorodsky 2003; Chakrabarty *et al.* 2009; Chakrabarty *et al.* 2010; Abraham *et al.* 2011.

*Gazza shettyi* Jayabalan 1986: 42, Fig. 1 (Porto Novo, Bay of Bengal).

Entire dorsal and ventral profiles about equally convex; dorsal head profile straight. Body depth 50–57% SL; HL 30–37% SL; snout short, its length 25–32% HL; eye diameter 40–45% HL; interorbital width 29–41% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Dorsal- and anal-fin spines feeble; 1st spine of dorsal and anal fins short, 2nd and 3rd spines of each fin subequal; 2nd spine of dorsal fin ~40–50% body depth, and 2nd spine of anal fin ~35–40% body depth. Mouth protracts rostrally, extending to ~15–20% SL; lower jaw profile concave. LL scales ~40–45.

Body silvery, without obvious pigmentation pattern on flanks; rear margin of lower jaw black in some specimens; dorsal-fin interspinous membranes with dense melanophores from about one-quarter length of 2nd spine to distal margin of fin; pectoral-fin axil black; anal-fin spines yellowish, fin membrane hyaline; axillary scales on pelvic fins silvery. Attains at least 13 cm SL.



*Gazza achlamys*, 6 cm SL (Sri Lanka). © P Chakrabarty, LSU

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere, Bay of Bengal, Malaysia, Indonesia and Taiwan.

**REMARKS** Occurs in schools, in coastal inshore waters, over sand or mud bottom. Feeds mainly on small fishes, crustaceans and polychaetes. Larger specimens marketed fresh or dried-salted, but catches are most often made into fishmeal or discarded.

### *Gazza dentex* (Valenciennes 1835)

Ovoid toothpony

PLATE 138

*Equula dentex* Valenciennes in Cuv. & Val. 1835: 91 (Mauritius, Mascarenes).  
*Gazza dentex*: Heemstra *et al.* 2004; Fricke *et al.* 2009.

Entire ventral profile slightly more convex than dorsal profile; head relatively large, dorsal head profile straight; snout short. Body depth 40–51% SL; HL 30–34% SL; snout length 30–36% HL; eye diameter 37–43% HL; interorbital width 30–34% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Dorsal- and anal-fin spines feeble: 1st spine reduced, 2nd and 3rd spines of each fin about equal in length; 2nd spine of dorsal fin ~30–40% body depth, and 2nd spine of anal fin ~35–40% body depth. Mouth protracts rostrally, extending to ~15–20% SL; lower jaw profile straight. LL scales 55–65.

Body silvery, with irregularly shaped, broad, dark vertical bands; dorsal-fin interspinous membranes with dense melanophores from about one-quarter length of 2nd spine to distal margin of fin. Attains 12 cm SL.



*Gazza dentex*, 12 cm SL (Rodrigues). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Madagascar, Seychelles, Mascarenes and Sri Lanka; elsewhere to Malaysia, Indonesia and northern Australia.

**REMARKS** Found in shallow coastal waters, over sand or mud bottom, to ~20 m deep.

### *Gazza minuta* (Bloch 1795)

Toothed ponyfish

PLATE 138

*Scomber minutus* Bloch 1795: 110, Pl. 429, Fig. 2 (Tharangambadi, India).  
*Zeus argentarius* Forster in Bloch & Schneider 1801: 96 (Pacific [Tana I., Vanuatu]).

*Caranxomorus pilitschei* Lacepède 1802: 709, 710 (Tharangambadi, India).  
*Gazza equulaeformis* Rüppell 1835: 4, Pl. 1, Fig. 3 (Massawa, Eritrea, Red Sea).

*Gazza tapeinosoma* Bleeker 1853: 260 (Priaman, Sumatra; Java, Jakarta, Indonesia).

*Gazza dispar* De Vis 1884: 542 (Cape York, Queensland, Australia).

*Gazza minuta*: SFSA No. 627\*; Van der Elst 1981\*; SSF No. 201.1\*; Randall 1995\*; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*; Chakrabarty *et al.* 2010; Abraham *et al.* 2011; Jawad & Al-Mamry 2013.

Entire dorsal and ventral profiles about equally convex; dorsal head profile straight; snout short. Body depth 28–47% SL; HL 30–35% SL; snout length 30–34% HL; eye diameter 32–41% HL; interorbital width 31–41% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Dorsal- and anal-fin spines feeble. Eyes large. Mouth protracts rostrally, extending to ~15–20% SL; lower jaw profile straight. LL scales ~45; head and chest naked, remainder of body scaly.

Body silvery white, without obvious pigmentation pattern on flanks; rear margin of lower jaw black in some specimens; dorsal-fin interspinous membranes with scattered melanophores from about one-quarter length of 2nd spine to distal margin of fin; dorsal- and anal-fin membranes yellowish; pectoral fins yellowish, except axil black; pelvic-fin spine and axillary scale silvery. Attains 13 cm SL.



*Gazza minuta*, 6 cm SL (Sri Lanka). © P Chakrabarty, LSU

**DISTRIBUTION** Indo-Pacific (widespread). WIO: Red Sea, Yemen, Kenya to South Africa (KwaZulu-Natal), Madagascar, Mauritius and Sri Lanka; elsewhere to east coast of India, Indonesia, Australia, Taiwan and Ryukyu Is.

**REMARKS** Found in shallow inshore coastal waters, over silty substrates, and juveniles often in mangroves. Feeds on small fishes, crustaceans and polychaetes by inserting its protruding mouth into silt or by sieving food items through the gill rakers. Larger individuals sold fresh or dried-salted.

## *Gazza squamiventralis* Yamashita & Kimura 2001

### Scaled belly toothpony

*Gazza squamiventralis* Yamashita & Kimura 2001: 161, Figs. 1–4 (Mombasa, Kenya).

Body robust, with large head and short snout; entire ventral profile more convex than dorsal profile; dorsal head profile straight. Body depth 44–46% SL; HL 34–36% SL; snout length 35–41% HL; eye diameter 30–31% HL; interorbital width 22–29% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins greatly reduced; 2nd and 3rd spines of each fin about equal in length; 2nd spine of dorsal fin ~40–50% body depth, and 2nd spine of anal fin ~25–35% body depth. Mouth protracts rostrally, extending to ~15–20% SL; lower jaw profile straight; anteriormost teeth large and caniniform. LL scales ~55–60; head naked; nuchal region, chest and remainder of body scaly.

Body silvery white, without obvious pigmentation pattern on flanks; rear margin of lower jaw black in some specimens; dorsal-fin interspinous membranes with scattered melanophores from about one-quarter length of 2nd spine to distal margin of fin; dorsal- and anal-fin membranes yellowish; pectoral fins yellowish, except axil black; pelvic-fin spine and axillary scale silvery. Attains 10.5 cm SL.



*Gazza squamiventralis*, 10 cm SL (Kenya). © P Chakrabarty, LSU

**DISTRIBUTION** WIO: Kenya to southern Mozambique.

**REMARKS** Biology unknown; has been collected with *G. minuta*, at ~13 m, and trawled from 17 m.

**GENUS** *Karalla* Chakrabarty & Sparks 2008

Body elongate and rhomboidal, with deep golden colouration on flanks; nuchal region scaly. Two species, both in WIO.

### KEY TO SPECIES

- |    |   |                      |
|----|---|----------------------|
| 1a | Lips large and fleshy; dark blotch on spinous portion of dorsal fin ..... | <i>K. daura</i>      |
| 1b | Lips not fleshy; no dark blotch on spinous portion of dorsal fin .....    | <i>K. dussumieri</i> |

## *Karalla daura* (Cuvier 1829)

### Goldstripe ponyfish

PLATE 138

*Equula daura* Cuvier 1829: 212 ('Indian seas' [Visakhapatnam, India]) [name based on illustration of Russell 1803: Pl. 65].

*Equula dacer* Valenciennes in Cuv. & Val. 1835: 83 (Sri Lanka).

*Leiognathus daura*: Manilo & Bogorodsky 2003.

*Karalla daura*: Chakrabarty *et al.* 2009; Chakrabarty *et al.* 2010;

Abraham *et al.* 2011; Sparks & Chakrabarty 2015.

Body robust and rhomboidal; entire dorsal and ventral profiles equally convex; dorsal head profile straight; snout somewhat pointed. Body depth 40–46% SL; HL 28–31% SL; snout length 31–37% HL; eye diameter 27–39% HL; interorbital width 33–37% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins greatly reduced; 2nd and 3rd spines of each fin about equal in length; 2nd spine of dorsal fin ~50% body depth. Pelvic-fin origin slightly anterior to vertical through dorsal-fin origin; anal-fin origin at vertical with last dorsal-fin spine. Eyes relatively small, upper orbital ridge not protruding beyond dorsal profile. Mouth horizontal, protracting strongly ventrorostrally and extending to ~10–15% SL; lower jaw profile straight; lips relatively large and fleshy; teeth not exposed. LL scales ~30–40; head and chest naked; nuchal region and remainder of body scaly.

Body silvery, with broad golden yellow horizontal band through dorsal half of eye, extending across lateral line and ending on peduncle; dorsum with thin vermiculate lines; dense melanophores on snout above upper lip; upper half of dorsal-fin interspinous membranes black, and spines silvery; anal-fin membrane and spines yellow; pectoral-fin axil black; pelvic-fin spine silvery; caudal-fin margin yellow. Attains 14 cm TL.



*Karalla daura*, 11 cm SL (Sri Lanka). © JE Randall, Bishop Museum

**DISTRIBUTION** Indian Ocean. WIO: Tanzania, Gulf of Aden, India and Sri Lanka; elsewhere to east coast of India and Indonesia.

**REMARKS** Usually found in schools, in shallow water, over mud bottom. Feeds on polychaetes, bivalves, sponges and small crustaceans.

### *Karalla dussumieri* (Valenciennes 1835)

Dussumier's ponyfish PLATE 139

*Equula dussumieri* Valenciennes in Cuv. & Val. 1835: 77, Pl. 283  
(Coromandel coast, India); Fricke 1999; Manilo & Bogorodsky 2003.  
*Karalla dussumieri*: Chakrabarty *et al.* 2009; Abraham *et al.* 2011;  
Sparks & Chakrabarty 2015.

Body elongate and robust; entire dorsal and ventral profiles equally convex; dorsal head profile straight; snout pointed. Body depth 40–45% SL; HL 30–35% SL; snout length 33–40% HL; eye diameter 28–36% HL; interorbital width 26–34% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins greatly reduced in length; 2nd and 3rd spines of each fin about equal in length; 2nd spine of dorsal fin ~45% body depth, and 2nd spine of anal fin ~35% body depth. Dorsal- and pelvic-fin origins on same vertical; anal-fin origin at vertical through last dorsal-fin spine. Eyes relatively small. Mouth protracts strongly ventrorostrally, extending to ~10–15% SL; upper jaw protruding; lower jaw profile straight; lips somewhat fleshy. LL scales ~50; head naked; chest, nuchal region and remainder of body fully scaled.

Body silvery, with greenish yellow tint, particularly above lateral midline and on dorsal portion of head; slightly curved or zigzagged dark yellowish green vermiculate lines on upper half of body (no distinct golden stripe), with lines extending slightly below lateral line, and thin silvery midlateral line (usually continuous, sometimes dashed); dense melanophores on snout; LL scales sometimes greenish yellow; pectoral-fin axil black; dense band of yellow chromatophores frequently present below pectoral fins and diagonally angled towards midpoint of pelvic fins; dorsal-fin spines silvery, and interspinous membranes with large dark blotch and scattered melanophores; dorsal- and anal-fin membranes otherwise pale yellow. Attains 10.5 cm SL.

**DISTRIBUTION** Indo-Pacific. WIO: Madagascar, Réunion, India and Sri Lanka; elsewhere to east coast of India, Indonesia and Philippines.

**REMARKS** Found in schools, over coral-sand bottom of coastal waters and in estuaries. Feeds on small crustaceans,

polychaetes, bivalves, foraminiferans, gastropods and nematodes. Sold dried-salted in markets, and also used for fishmeal.

## GENUS *Leiognathus* Lacepède 1802

Relatively large-sized leiognathids (adults attain >15 cm SL), with strongly ventrorostrally projecting mouth, and lower jaw profile strongly concave (cf. straight or nearly straight in *Aurigequula*); 2nd spine of dorsal and anal fins not markedly elongate (<60% body depth). No scales on head, chest, entire triangular area between rear margin of opercle, pectoral-fin bases, and pelvic-fin margins; remainder of body scaly, except for dorsal midline of nuchal region; axillary scale present on pelvic fins and anal fin, within which the retracted spines can be partially enclosed. No large round blotches on sides or faint yellowish or greyish yellow vermiculate lines or vertical bars on upper flanks. Distinguished from all other ponyfishes, except *Aurigequula*, by presence of non-sexually dimorphic light organ. Eight species, 2 in WIO.

### KEY TO SPECIES

- |    |   |                    |
|----|---|--------------------|
| 1a | Predorsal profile strongly sloping .....          | <i>L. equula</i>   |
| 1b | Predorsal profile weakly sloping, not steep ..... | <i>L. robustus</i> |

### *Leiognathus equula* (Forsskål 1775)

Common ponyfish PLATE 139

*Scomber equula* Forsskål in Niebuhr 1775: 58, xii (Al-Luhayya, Yemen, Red Sea).

*Leiognathus argenteus* Lacepède 1802: 448 (Tharangambadi, India).

*Equula ensifera* Cuvier 1829: 212 ('Indian seas' [Tharangambadi, India]).

*Equula caballa* Valenciennes in Cuv. & Val. 1835: 73 (Indian Ocean; Red Sea).

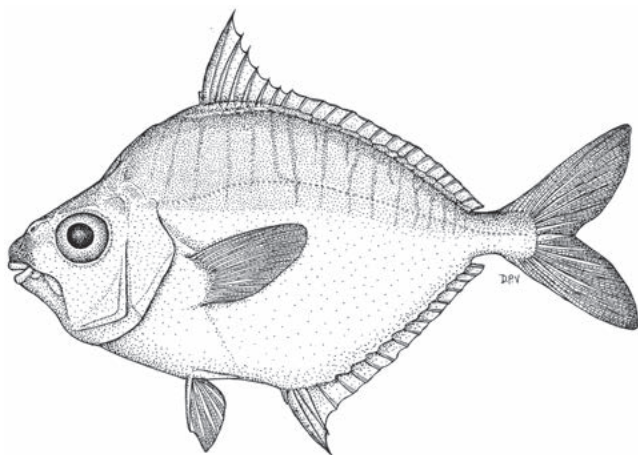
*Leiognathus equula*: SFSA No. 626\*; SSF No. 201.3\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Kottelat 2013; Sparks & Chakrabarty 2015.

*Leiognathus equulus*: Van der Elst 1981\*; Dor 1984; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Sparks & Dunlap 2004; Chakrabarty *et al.* 2009; Abraham *et al.* 2011.

Entire dorsal profile more convex than ventral profile; dorsal head profile straight and then with strong hump in nuchal region; nuchal spine well-developed, exposed in lateral view. Body depth 52–61% SL; HL 29–33% SL; snout length 34–40% HL; eye diameter 33–42% HL; interorbital width 32–37% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins greatly reduced; 2nd spine of

dorsal fin ~50% longer than 3rd spine, and ~40% body depth; 2nd spine of anal fin ~40% body depth. Mouth horizontal and protracting strongly ventrorostrally, extending to ~15% SL; lower jaw profile concave; lips somewhat fleshy, but thin. LL scales ~50–60.

Body silvery with yellowish hue, and head and chest silvery white: strong concentration of silvery guanine on head and along dorsal midline of nuchal region, creating smooth armour-like appearance; faint grey vertical vermiculate lines on upper flanks; dense melanophores on snout above upper lip; dorsal-fin spines silvery; pelvic fins white, caudal fin entirely yellowish, and other fins occasionally with strong yellow hue (particularly anal fin, which may be orangish); axillary scales on pelvic fins and anal fin silvery. Attains 18.5 cm SL.



*Leiognathus equula*, 17 cm SL (South Africa). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Red Sea, Kenya, Mozambique, South Africa (Kei River, Eastern Cape), Madagascar, Comoros, Seychelles and Réunion; elsewhere to east coast of India, Singapore, Ryukyu Is., Caroline Is., Australia and Fiji.

**REMARKS** Found in schools, in muddy inshore waters, river mouths and mangroves, at 1–70 m. Feeds on a variety of invertebrates and small fishes. Important food fish in the tropics; sold fresh or dried-salted.

### *Leiognathus robustus* Sparks & Dunlap 2004

Robust ponyfish

PLATE 139

*Leiognathus robustus* Sparks & Dunlap 2004: 6, Figs. 3–6 (Singapore fish market).

Body robust, rhomboidal; entire dorsal and ventral profiles equally convex; dorsal head profile straight with weakly sloping nuchal hump; distinct preorbital protuberance present due to

hypertrophy and protrusion of frontals and lateral ethmoids; nuchal spine not well-developed and not exposed in lateral view. Body depth 52–58% SL; HL 29–30% SL; snout length 34–37% HL; eye diameter 37–39% HL; interorbital width 35–36% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal and anal fins robust and elongate relative to 3rd spine, but not markedly. Mouth horizontal and protracting strongly ventrorostrally, extending to ~15% SL; lower jaw profile concave; lips somewhat fleshy but thin. LL scales ~60–65.

Body silvery white; dense melanophores on snout above upper lip; dorsal-fin spines silvery; pelvic fins white; caudal fin orangish yellow; axillary scales on pelvic fins and anal fin silvery. Attains 18.5 cm SL.

**DISTRIBUTION** Probably Indo-Pacific. Known so far from market specimens from Malay Peninsula (Singapore, Malaysia and Thailand) and from Madagascar in WIO, but likely more widespread.

### GENUS *Nuchequula* Whitley 1932

Distinguished from all other leiognathids by dark saddle-shaped nuchal marking and pigment-free mitten-shaped area posteroventral to pectoral-fin bases. Six species, 2 in WIO.

#### KEY TO SPECIES

- |    |  |                      |
|----|--|----------------------|
| 1a | Chest scaly .....  | <i>N. blochii</i>    |
| 1b | Chest naked; oblique yellowish stripe between pectoral and pelvic fins ..... | <i>N. gerreoides</i> |

### *Nuchequula blochii* (Valenciennes 1835)

Two-blotch ponyfish

PLATE 139

*Equula blochii* Valenciennes in Cuv. & Val. 1835: 84 (Kerala State, India).

*Leiognathus blochii*: Manilo & Bogorodsky 2003.

*Nuchequula blochii*: Chakrabarty & Sparks 2007; Kimura *et al.* 2008.

Relatively medium-sized, laterally compressed and somewhat elongate; entire dorsal and ventral profiles equally convex; dorsal head profile nearly straight, with slight concavity above eyes; snout pointed. Body depth 37–38% SL; HL 31–32% SL; snout length 29–33% HL; eye diameter 29–31% HL; interorbital width 34–35% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal fin ~50% body depth. Mouth horizontal, protracting ventrorostrally and extending to ~15–20% SL; lower jaw profile straight or slightly concave; lips thin and not fleshy. LL scales

50–56; entire body scaly, including chest and nuchal region.

Body silvery, with large triangular dark grey nuchal marking, and black blotch on distal halves of spinous portions of dorsal and anal fins. Attains at least 7 cm SL.



*Nuquequula blochii*, 7 cm SL, syntype (India). © P Chakrabarty, LSU

**DISTRIBUTION** Indian Ocean. WIO: Pakistan and India; elsewhere, Andaman Sea and Gulf of Thailand.

**REMARKS** Found in shallow coastal waters, near bottom, and also enters brackish waters. Feeds on small crustaceans, nematodes and foraminiferans. Sold fresh or dried-salted, and also used for fishmeal.

### *Nuquequula gerreoides* (Bleeker 1851)

Decorated ponyfish

PLATE 139

*Equulites gerreoides* Bleeker 1851: 371 (Jakarta, Indonesia).

*Leiognathus decorus*: Randall 1995\*; Manilo & Bogorodsky 2003.

*Nuquequula gerreoides*: Kimura *et al.* 2008.

Body elongate and somewhat laterally compressed; entire ventral profile slightly more convex than dorsal profile; dorsal head profile nearly straight, with slight concavity above eyes; snout pointed. Body depth 42–43% SL; HL 30–33% SL; snout length 29–34% HL; eye diameter 31–37% HL; interorbital width 30–37% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. Second spine of dorsal and anal fins 20–30% longer than 3rd spine; 2nd spine of dorsal fin ~50–60% body depth, and 2nd spine of anal fin ~40% body depth. Mouth horizontal, protruding ventrorostrally, extending to ~15–20% SL; lower jaw profile straight or slightly concave; lips thin and not fleshy. LL scales ~50; head, chest and nuchal region naked (but nuchal scales occasionally present), and remainder of body scaly.

Body silvery white below lateral midline, and silvery to bluish grey above midline and on head; dense melanophores on snout above upper lip; large dark grey nuchal mark (generally rounded, occasionally triangular), often with rounded translucent area near its centre; pectoral fins and anal

fin yellowish; membrane of distal halves of spinous portion of dorsal fin and especially anal fin yellowish; oblique yellowish stripe on flanks, heavily spotted with melanophores, extending between pectoral and pelvic fins. Attains 10 cm SL.



*Nuquequula gerreoides*, 9 cm TL (Bahrain). © JE Randall, Bishop Museum

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf and Sri Lanka; elsewhere, Malay Peninsula and Indonesia.

**REMARKS** Found in coastal waters and estuaries. Often referred to as *Leiognathus decorus* (a junior synonym) in local faunal lists (Kimura *et al.* 2008).

## GENUS *Photolateralis*

Sparks & Chakrabarty 2015

Strongly sexually dimorphic: males with characteristic midlateral stripe on flanks, and moderately enlarged, doughnut-shaped, conspicuously spotted light organ which extends only slightly posteriorly into swimbladder lining. Four species, 2 in WIO (*Photolateralis polyfenestrus* Sparks & Chakrabarty 2019 [Plate 140], with no species account in this volume).

### *Photolateralis antongil* (Sparks 2006)

PLATE 140

*Photoplagios antongil* Sparks 2006: 7, Figs. 3–4 (Maroansetra market, Antongil Bay, Madagascar).

*Equulites antongil*: Kimura *et al.* 2008; Chakrabarty *et al.* 2010; Jawad *et al.* 2013.

*Photolateralis antongil*: Sparks & Chakrabarty 2015.

Entire dorsal and ventral profiles equally convex. Body elongate, its length 40–45% body depth, its depth 41–44% SL; HL 26–28% SL; snout length 33–38% HL; eye diameter 31–32% HL; interorbital width 31–36% HL. Dorsal fin 7–9

spines, 15–17 rays; anal fin 3 spines, 13–15 rays. LL scales 60–63.

Body silvery; sides with thin dark transverse lines that follow outline of myomeres; large, dark, sparse spots and blotches along lateral midline and lateral line; males with continuous translucent midlateral stripe (stripe not broken and comprised of multiple translucent patches as in congeners), with translucent scales over the transparent patch; midlateral region of females with normal scales and no transparent patch. Attains 8.5 cm SL.

**DISTRIBUTION** WIO: northeastern Madagascar.

**REMARKS** Probably more widespread based on comments in some regional faunal guides alluding to an undescribed species similar to *Equulites leuciscus*. This species has now been described as *Photolateralis polyfenestrus* by Sparks & Chakrabarty (2019) – see Plate 140.

## GENUS *Photopectoralis*

Sparks, Dunlap & Smith 2005

Strongly sexually dimorphic: males with conspicuous translucent patch in pectoral-fin axil, and greatly enlarged dorsolateral lobes of light organ, with contralateral light-organ ‘windows’ that abut translucent external patch in pectoral-fin axil. Four species, 1 in WIO.

### *Photopectoralis bindus* (Valenciennes 1835)

Orangefin ponyfish

PLATE 140

*Equula bindus* Valenciennes (ex Russell) in Cuv. & Val. 1835: 78 [Visakhapatnam, India].

*Leiognathus virgatus* Fowler 1904: 515, Pl. 15 (Padang, Sumatra, Indonesia).

*Leiognathus bindus*: Talwar & Jhingran 1991; Goren & Dor 1994; Randall 1995\*; Manilo & Bogorodsky 2003; Chakrabarty & Sparks 2007.

*Photopectoralis bindus*: Sparks *et al.* 2005; Sparks 2006; Chakrabarty *et al.* 2009; Chakrabarty *et al.* 2010; Abraham *et al.* 2011.

Deep-bodied and laterally compressed; entire ventral profile more convex than dorsal profile; dorsal head profile straight; snout short. Body depth 51–58% SL; HL 28–31% SL; snout length 25–30% HL; eye diameter 34–44% HL; interorbital width 36–47% HL. Dorsal fin 7–9 spines, 15–17 rays; anal fin 3 spines, 13–15 rays. First spine of dorsal and anal fins greatly reduced, and 2nd and 3rd spines of each fin about equal in length; 2nd spine of dorsal fin 35–40% body depth, and 2nd spine of anal fin ~20–25% body depth. Mouth protracts

rostrally, extending to ~10–15% SL; lower jaw profile straight; lips thin and not fleshy. Head, chest and nuchal region naked; remainder of body scaly.

Body silvery white, with yellow tinge on head, and silvery guanine most intense along lateral midline, less silvery dorsally than ventrally; some individuals with horizontal black dashes along flanks; upper flanks with dark yellow semicircles, sometimes forming complete circles or ovals; dense melanophores on snout above upper lip; distal half of dorsal-fin interspinous membrane bright orange, with sparse melanophores close to orange pigmentation; pectoral fins, anal fin and caudal fin yellow; fin spines silvery; pectoral-fin axil translucent in males, covered in silvery white guanine in females. Attains 11 cm SL.



*Photopectoralis bindus*, 8 cm SL (Red Sea). © SV Bogorodsky

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Oman, Red Sea and Sri Lanka; elsewhere to Indo-Malay Peninsula, Indonesia, Philippines, Hong Kong, Taiwan, Japan and Australia.

**REMARKS** Found in schools, in inshore coastal waters, over mud bottom, and often enters estuaries.

## FAMILY LOBOTIDAE

### Tripletails

Phillip C Heemstra

Body oval to oblong, robust. Dorsal fin with 11 or 12 strong spines; soft-rayed portion of dorsal and anal fins high, margins rounded posteriorly, reaching well past base of caudal fin; pectoral fins asymmetric, upper rays longest, about half HL, shorter than pelvic fins; pelvic fins 1 spine, 5 rays, with short scaly axillary process; caudal fin rounded, with 15 branched rays. Upper jaw slightly protrusile; no supramaxilla. Jaws



with outer row of closely set short canines and inner band of much smaller teeth; vomer, palatines and tongue toothless. No spines on opercle; preopercle coarsely serrate in young, serrae decreasing in size but increasing in number with age. Nostrils round, close-set. Branchiostegal rays 6; gill membranes narrowly united, free from isthmus; gill rakers much shorter than gill filaments. Scales weakly ctenoid, covering body, median fins and head, except preorbital region and jaws. Vertebrae 12 + 12; supraneural bones 3: 0/0/0+2/1+1/1/1/1/.

One genus, *Lobotes* Cuvier 1829, with 2 species, 1 in WIO.

### *Lobotes surinamensis* (Bloch 1790)

Tripletail

PLATE 140

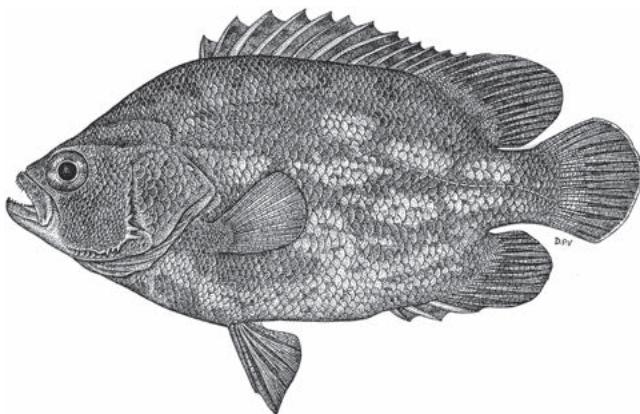
*Holocentrus surinamensis* Bloch 1790: 98, Pl. 243 (Suriname, Caribbean Sea).

*Lobotes erate* Cuvier in Cuv. & Val. 1830: 322 (India).

*Lobotes surinamensis*: SFSA No. 414\*; SSF No. 202.1\*; Schmid & Randall 1997; Manilo & Bogorodsky 2003; Heemstra & Heemstra 2004\*.

Dorsal fin 11 or 12 spines, 15 or 16 rays; anal fin 3 spines, 11 or 12 rays; pectoral fins 17 rays. Body depth 2–2.5 in SL; HL 2.6–3 in SL; eye diameter 1–2.5 in interorbital width. GR 6 or 7/13–15, including rudiments. LL scales 43–45 (+ 5 on caudal fin); 7 horizontal scale rows between sheath at mid-dorsal-fin spines and lateral line.

Body of adults dark brown or greenish yellow dorsally, silvery grey below; pectoral fins pale yellow, other fins darker than body, and caudal fin with yellow margin. Juveniles mottled yellowish brown; caudal fin with white to yellowish margin. Attains 100 cm TL (commonly 80 cm TL), ~20 kg.



*Lobotes surinamensis*, 9 cm SL (South Africa). Source: Whitfield 1998

**DISTRIBUTION** Circumglobal in tropical to warm-temperate seas, including Mediterranean Sea, except eastern Pacific. WIO: Red Sea (rare), Kenya, Mozambique (south of Moma) to South Africa (Saint Sebastian Bay, Western Cape), Madagascar, Pakistan and India.

**REMARKS** Found in bays, estuaries and offshore among floating objects and *Sargassum*; juveniles often lie on their sides, mimicking a fallen leaf. Popular game fish; excellent to eat.

## FAMILY PENTACEROTIDAE

### Armourheads

Phillip C Heemstra

Moderate- to large-sized, body compressed, oblong-oval or rhomboid; head length less than body depth; bones of head mostly exposed, rugose, with small spines and knobs in young. Dorsal fin single, greatly elevated in some species, with 4–14 strong spines, 8–29 rays; anal fin 2–6 strong spines, 6–17 rays; pectoral fins less than or subequal to HL; pelvic fins 1 strong spine, 5 branched rays, no scaly axillary process, fin origins below or distinctly behind pectoral-fin bases; caudal fin truncate or emarginate. Mouth small; maxilla not reaching past vertical at front edge of eye; no supramaxilla; jaws with bands of small teeth, no canines. Branchiostegal rays 7; gill membranes separate, free of isthmus; gill arches 4, a slit behind the last; gill rakers short or rudimentary. Lateral line complete. Scales small, ctenoid; few scale series on cheek, but head otherwise naked. Swimbladder large; pyloric caeca numerous. Vertebrae 24–27; supraneural bones: 0/0+2/1/1/ or 0/0/2/1+1/1/.

Solitary and demersal, usually found inshore on reefs or on rough bottoms of outer continental shelf and upper slope, some species common at seamounts. Occur in all oceans, but mainly in Southern Hemisphere. Family revised by Hardy (1983) and phylogenetic systematics reassessed by Kim (2012). Seven genera and 13 species; 2 genera and 3 species in WIO.

#### KEY TO GENERA

- |    |  |                     |
|----|--|---------------------|
| 1a | Dorsal fin 4 spines, 25–27 rays; base of soft-rayed portion much longer than spinous portion ..... | <i>Histiopterus</i> |
| 1b | Dorsal fin 11–15 spines; spinous portion of fin much longer than soft-rayed portion .....          | <i>Pentaceros</i>   |

GENUS *Histiopterus* Temminck & Schlegel 1844

Body rhomboid, depth about twice HL. Dorsal fin greatly elevated, sail-like, with 4 spines, penultimate spine thick and subequal to or longer than last spine; anal fin with 3 spines. No teeth on vomer. One species.

*Histiopterus typus* Temminck & Schlegel 1844

Sailfin armourhead

PLATE 141

*Histiopterus typus* Temminck & Schlegel 1844: 86, Pl. 45 (Nagasaki, Japan); SFSA No. 620\*; Smith 1964\*; Hardy 1983\*; SSF No. 203.1\*; Baranes & Golani 1993\*; Randall 1995\*; Fricke 1999; Manilo & Bogorodsky 2003; Fricke *et al.* 2009; Kim 2012\*.

*Histiopterus spinifer* Gilchrist 1904: 3, Pl. 21 (Mossel Bay, South Africa).

Dorsal fin 4 spines, 25–27 rays, first 2 spines short, 3rd and 4th spines enlarged, longer than head; anal fin 3 spines, 8–10 rays; pectoral fins 16 or 17 rays; caudal fin 15 branched rays. Body depth 1.3–1.7 in SL; HL 2.4–2.9 in SL. GR 5–7/14–17. LL scales 60–65.

Small juveniles pale, with irregular dark blotches on body, head, and dorsal, anal and pelvic fins; blotches enlarge and coalesce with age; adult body dark, with or without narrow pale vertical bands. Attains 42 cm TL.



*Histiopterus typus*, 8 cm TL, juvenile (South Africa). Source: SSF



*Histiopterus typus*, 25 cm TL (South Africa). Source: SFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Gulf of Oman to India, Mozambique (Bazaruto) to South Africa (Cape Agulhas), Madagascar and Réunion; elsewhere to Indonesia, Philippines, Taiwan, southern Japan, Australia and Hawaii.

**REMARKS** Inhabits deep rocky reefs, in 40–421 m.

GENUS *Pentaceros* Cuvier 1829

Body oblong. Dorsal fin 11–13 spines, 12–14 rays (longest rays  $\sim\frac{1}{3}$  HL), base of soft-rayed dorsal fin about half length of spinous portion; anal fin 4–6 spines, 7–10 rays. LL scales 45–53. In the transformation from larva to juvenile to adult, the spines, rugose knobs, and ridges on the head shrink and disappear, and the bony orbit diameter increases relative to HL. Vertebrae 12 + 12 or 13. Six species, 2 in WIO.

KEY TO SPECIES

- 1a Dorsal fin 11–13 spines, 12–14 rays; 7 scale rows from 6th spine of dorsal fin to lateral line ..... *P. capensis*
- 1b Dorsal fin 13–15 spines, 8–10 rays; 12–15 scale rows from 6th spine of dorsal fin to lateral line ..... *P. richardsoni*

*Pentaceros capensis* Cuvier 1829

Cape armourhead

PLATE 141

*Pentaceros capensis* Cuvier in Cuv. & Val. 1829: 30, Pl. 43 (Cape of Good Hope, South Africa); Smith 1951\*, 1964\*; Hardy 1983\*; SSF No. 203.3\*; Fricke *et al.* 2009; Kim 2012\*.

*Quinquarius capensis*: Barnard 1937\*; Smith 1951\*, 1964\*.

Dorsal fin 11–13 spines, 12 or 13 rays; anal fin 4–6 spines, 7–9 rays; pectoral fins 16–18 rays; pelvic fins wide apart, spine subequal to longest dorsal-fin spine and longer than 2nd spine of anal fin. Anterior dorsal- and anal-fin spines with locking mechanism. Body depth 1.7–2.3 in SL; HL 2.7–3 in SL. Chin with fine villi and 6 large pores; lips also villose. GR 5–7/15–17. LL scales 43–47; 7 or 8 scale rows from dorsal-fin origin to lateral line. Vertebrae 12 + 13.

Body of adults brownish, darker dorsally, and fins darkest; juveniles pale, with irregular black blotches. Attains 35 cm TL.



*Pentaceros capensis*, 32 cm TL (South Africa). Source: SSF

**DISTRIBUTION** South Africa (Port Nolloth) in southeastern Atlantic, to Mozambique (Bazaruto), Madagascar, Réunion and Atlantis Seamount in WIO.

**REMARKS** Found at 73–601 m.

*Pentaceros richardsoni* Smith 1844

Pelagic armourhead

PLATE 141

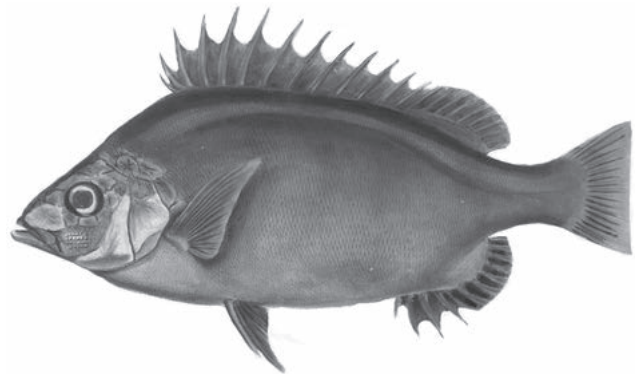
*Pentaceros richardsoni* Smith 1844: 51, Pl. 21 (very deep water near Cape Point, South Africa); Smith 1964\*; Kim 2012\*.

*Pentaceros knerii* Steindachner 1866: 19 (Cape Horn, South America).

*Pseudopentaceros richardsoni*: Hardy 1983\*; SSF No. 203.3\*; Heemstra & Heemstra 2004; Randall 2007.

Dorsal fin 14 or 15 spines, 8–10 rays; anal fin 4 or 5 spines, 7 or 8 rays; pectoral fins 17 or 18 rays; pelvic fins wide apart. Body depth 1.7–2.3 in SL; HL 2.7–3 in SL. Head bones of small juveniles (<2 cm SL) with large spines on preopercle, supraoccipital, supraorbital rim and posttemporal; with growth these spines shrink and disappear. Chin of adults with fine villi and 6 large pores; lips also villose; large adults with convex snout. Belly with midventral fleshy keel. GR 5–7/15–17. LL scales 74–86; 7 or 8 scale rows from dorsal-fin origin to lateral line. Vertebrae 12 + 13.

Body dark bluish dorsally, paler ventrally; pectoral fins and caudal fin dark, pelvic fins paler. Attains 59 cm TL.



*Pentaceros richardsoni*, 53 cm TL (South Africa). Source: SFSA

**DISTRIBUTION** Mainly circumglobal in Southern Hemisphere. WIO: South Africa (Table Bay, Cape Point and outer Thukela Bank), Madagascar and Atlantis Seamount; elsewhere, Argentina, Tristan da Cunha, Australia and New Zealand.

**REMARKS** Adults found near bottom, in 50–783 m; juveniles caught on surface at night with a light.

**FAMILY POMACANTHIDAE**

## Angelfishes

Phillip C Heemstra

Body compressed, ovoid to subrhomboidal, body depth greater than HL; soft-rayed portion of dorsal and anal fins large, reaching past caudal-fin base. Dorsal fin continuous, with 11–15 sharp spines, 15–27 rays; anal fin 3 spines, 16–23 rays; pelvic fins 1 spine, 5 branched rays, no scaly axillary process; caudal fin typically truncate to convex (occasionally lunate). Mouth small, with slender, generally tricuspid teeth; no teeth on vomer and palatines. Preopercle strongly serrate, with

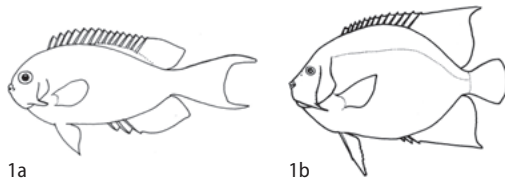
large retrorse spine at angle. Lateral line inconspicuous. Body and most of head and median fins covered with small spinoid scales, exposed part of scales with longitudinal ridges ending in sharp tips.

Diurnal, territorial, coral-reef fishes, mainly solitary or in pairs. Species of the genus *Genicanthus* are sexually dichromatic, and juveniles of other genera usually have distinctive colouration quite different to the adults of their species. Many angelfishes are suitable for aquaria but often outgrow a home aquarium.

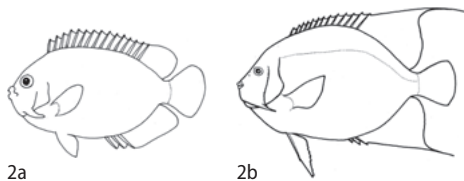
Nine genera and ~88 species; 5 genera and 21 species in WIO.

#### KEY TO GENERA

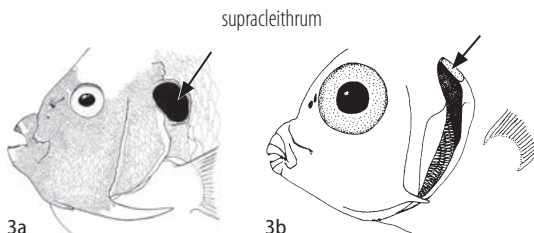
- 1a Caudal fin emarginate to lunate ..... *Genicanthus*  
 1b Caudal fin truncate or rounded ..... 2



- 2a Rear end of dorsal and anal fins rounded or angular, not acute or filamentous; dorsal fin 13–15 spines ..... 3  
 2b Rear end of dorsal and anal fins acute or elongated into filaments in adults and reaching past vertical at caudal-fin base; dorsal fin 11–14 spines ..... *Pomacanthus*



- 3a Supracleithrum conspicuous as black ovate bone above gill opening; subopercle bone smooth ..... *Apolemichthys*  
 3b Supracleithrum elongate, well hidden by scales; subopercle with spines ..... 4



- 4a Body yellow, with black-edged bluish white curved vertical stripes; caudal fin yellow ..... *Pygoplites*  
 4a Colour not as above; body plain, or with some spots, or with irregular narrow vertical bars ..... *Centropyge*

## GENUS *Apolemichthys* Fraser-Brunner 1933

Preorbital convex, without strong spines; interopercle without strong spines; no groove in spine at preopercle; median fins rounded or angular, not produced. Occur in Indo-Pacific; 8 species, 5 in WIO.

#### KEY TO SPECIES

[Yellow and gold markings mentioned in the key are pale on preserved specimens.]

- 1a Dorsal fin 15 spines; body with alternating wavy black and gold bars dorsally; juveniles (<5 cm SL) with black spot at base of rear dorsal-fin spines, enclosed by gold circle or ring of gold spots ..... *A. kingi*  
 1b Dorsal fin 14 spines; colour pattern not as above ..... 2  
 2a Head, dorsal and anal fins, and rear half of body dark brown; caudal fin dark, without filament at upper corner; no spot at upper end of gill opening; GR 3 or 4/11 or 12 ..... *A. guezei*  
 2b Caudal fin pale, with filament at upper corner; spot (dusky or pale) above gill opening; GR 5 or 6/13 or 14 ..... 3  
 3a Head pale, with black spot on nape and dusky spot usually above gill opening; juveniles (<5 cm SL) with black band through eyes to black spot on nape ..... *A. trimaculatus*  
 3b Head dark, with yellow spot or ocellus above gill opening, but no black spot on nape ..... 4  
 4a Head, breast and body to pectoral-fin bases dark ..... *A. xanthotis*  
 4b Head anterior to preopercle margin and front of breast dark ..... *A. xanthurus*

## *Apolemichthys guezei* (Randall & Maugé 1978)

Réunion angelfish

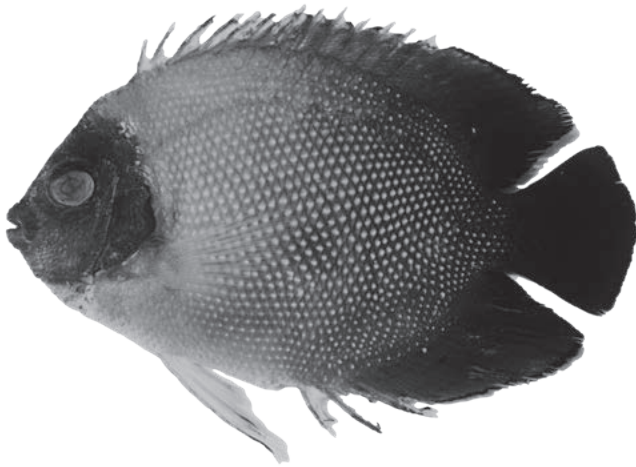
PLATE 142

*Holocanthus guezei* Randall & Maugé 1978: 298, Fig. 1 (Réunion, Mascarenes).

*Apolemichthys guezei*: Heemstra 1984\*; Debelius *et al.* 2003\*.

Dorsal fin 14 spines, 17 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 17 rays. Median fins angular. GR 3 or 4/11 or 12; LSS 48–50.

Head dark purplish brown, except lips and opercle membrane blackish; body dark brown dorsally and posteriorly, paler ventrally, with yellow spot on each scale; dorsal and anal fins yellow-brown, darker distally, with blue margin; pectoral fins hyaline with yellow rays; pelvic fins yellow with blackish tip; caudal fin blackish with blue margin. Attains 11 cm SL.



*Apolemichthys guezei*, 10 cm SL (Réunion). © JE Randall, Bishop Museum

**DISTRIBUTION** WIO: endemic to Réunion.

**REMARKS** Rare; known from moderately deep outer reefs, in 60–80 m.

### *Apolemichthys kingi* Heemstra 1984

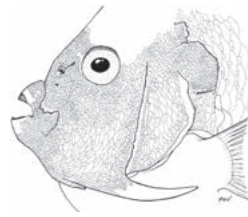
Tiger angelfish

PLATE 142

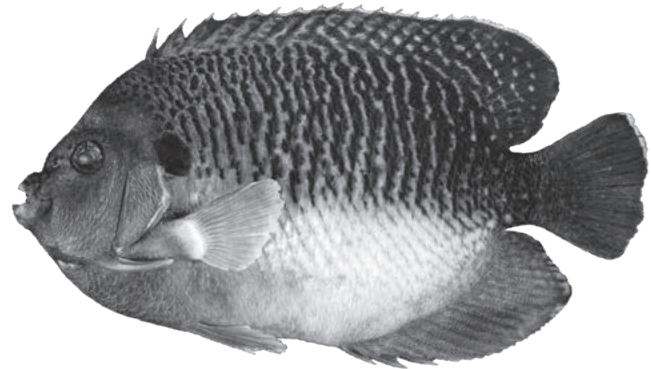
*Apolemichthys kingi* Heemstra 1984: 6, Figs. 1–4 (reef off Durban, KwaZulu-Natal, South Africa); SSF No. 204.1\*; King 1996\*; Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*.

Dorsal fin 15 spines, 16 or 17 rays; anal fin 3 or 4 spines, 17 or 18 rays; pectoral fins 16 or 17 rays. Median fins rounded. GR 4 or 5/14; LSS 44 or 45.

Dorsal fin and upper part of body with wavy, alternating wide black and narrow gold bars; head dusky, with thin gold stripe across snout between eyes; lower lip and preopercle spine bluish; black spot subequal to eye at upper gill opening; ventral body, pelvic fins and anal fin pale grey, anal-fin margin may be darker distally; peduncle and caudal fin black. Juveniles ~2 cm SL with black eyeband from nape to pelvic fins; upper third of body gold, with 5 or 6 black bars; dorsal and caudal fins black with pale margins; gold ring on base of soft-rayed portion of dorsal fin. Attains 25 cm TL.



*Apolemichthys kingi*, 17 cm SL, holotype (South Africa). Source: Heemstra 1984



**DISTRIBUTION** WIO: southern Mozambique (Ponta Morrungulo) to South Africa (Margate, KwaZulu-Natal; juveniles to East London, Eastern Cape), and northwestern Madagascar.

**REMARKS** Found in 14–40 m (usually >20 m); solitary or in small, loose groups; juveniles cryptic on coral reefs. A hybrid *A. kingi* × *A. trimaculatus* has been recorded at Aliwal Shoal, South Africa.

### *Apolemichthys trimaculatus* (Cuvier 1831)

Threespot angelfish

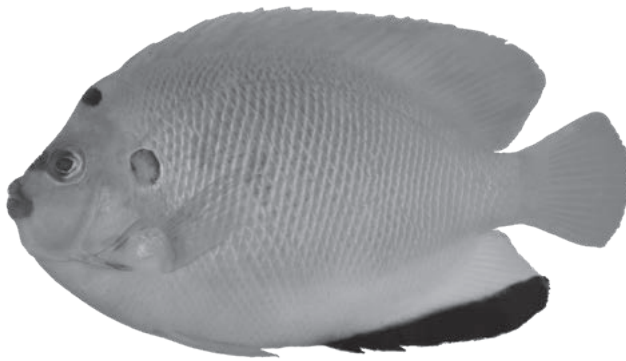
PLATE 142

*Holacanthus trimaculatus* Cuvier (ex Lacepède) in Cuv. & Val. 1831: 196, Pl. 182 (Moluccas, Indonesia).

*Apolemichthys trimaculatus*: Heemstra 1984\*; Winterbottom *et al.* 1989\*; Terashima *et al.* 2001\*; Debelius *et al.* 2003\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*.

Dorsal fin 14 spines, 16–18 rays; anal fin 3 spines, 17–19 rays; pectoral fins 17 or 18 rays; caudal fin of fish >10 cm SL with filament at upper corner. Median fins rounded. GR 5 or 6/13 or 14; LSS 45–50.

Head and body yellow; lips bright blue; black spot on nape, and sometimes with dusky spot at upper gill opening; Pacific specimens with blue stripe below eyes; anal fin white with broad black margin, other fins yellow. Juveniles with black spot at base of soft-rayed portion of dorsal fin, and black eyeband through eyes to nape spot. Attains 25 cm TL.



*Apolemichthys trimaculatus*, 14 cm SL (Seychelles).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Kenya to South Africa (Aliwal Shoal; rarely to Eastern Cape), Seychelles, Aldabra, Réunion, Mauritius, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, southern Japan, Marshall Is., Australia, New Caledonia and Samoa.

**REMARKS** Solitary, in pairs or small groups, in lagoons and on coral reefs, in 8–90 m. Feeds on sponges and tunicates. Hybrids (probably with *A. xanthurus*) have been seen at Seychelles and were described as *A. armitagei* by Smith (1955).

### *Apolemichthys xanthotis* (Fraser-Brunner 1950)

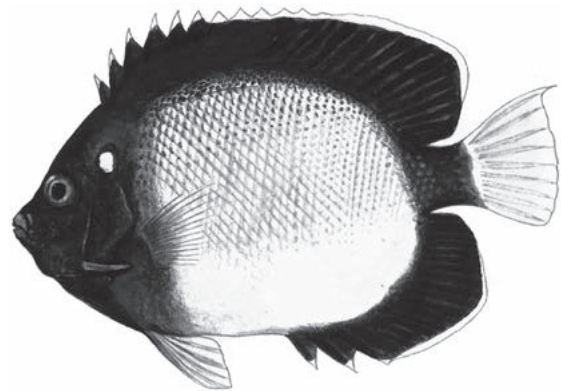
Yellow-ear angelfish PLATE 142

*Holacanthus (Apolemichthys) xanthotis* Fraser-Brunner 1950: 43, Pl. 1, Fig. 1 (Al Mukallā, Yemen, Red Sea).

*Apolemichthys xanthotis*: Klausewitz & Wongratana 1970\*; Randall 1983, 1995; Heemstra 1984; Khalaf & Disi 1997\*; Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*; Field 2005\*.

Dorsal fin 14 spines, 17–19 rays; anal fin 3 spines, 17 or 18 rays; pectoral fins 16 or 17 rays; caudal fin with filament at upper corner. Median fins rounded. GR 5 or 6/13 or 14; LSS 45–50.

Body mostly pale yellow, entire head and breast dark brown; dorsal and anal fins black, with white or pale blue margins; caudal fin pale yellow. Juveniles mostly black, except for pale yellow area from dorsal-fin origin to abdomen and pelvic fins. Attains ~20 cm TL.



*Apolemichthys xanthotis*, 14 cm SL (Red Sea).

**DISTRIBUTION** WIO: Red Sea to Gulf of Oman.

**REMARKS** Occurs singly, in pairs or in small groups, on shallow rocky substrate and coral-rich areas, in 5–35 m. Feeds on algae, sponges and invertebrates. Adapts well to captivity.

### *Apolemichthys xanthurus* (Bennett 1833)

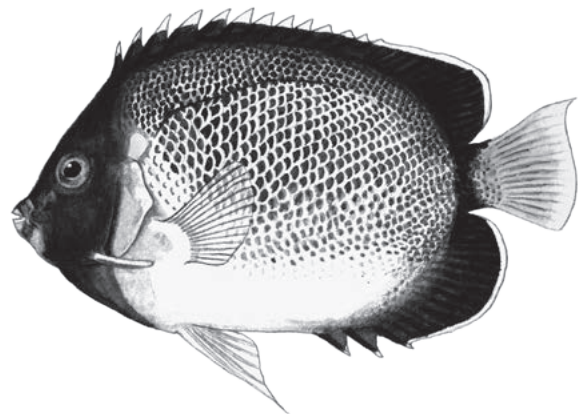
Indian yellowtail angelfish PLATE 143

*Holacanthus xanthurus* Bennett 1833: 183 (Sri Lanka).

*Apolemichthys xanthurus*: Klausewitz & Wongratana 1970\*; Heemstra 1984; Debelius *et al.* 2003.

Dorsal fin 14 spines, 17–19 rays; anal fin 3 spines, 17 or 18 rays; pectoral fins 16 rays; caudal fin with short filament at upper corner. Median fins rounded. GR 5/13; LSS 40–43.

Body pale grey, with scale margins darker dorsally; front of head to preopercle margin and breast dark grey to black; diffuse yellow area above gill opening; dorsal and anal fins dark grey to black with pale margins; pelvic fins of juveniles pale, dusky in adults; caudal fin yellow. Attains 15 cm TL.



*Apolemichthys xanthurus*, ~14 cm SL (Maldives).

**DISTRIBUTION** Indian Ocean. WIO: Mauritius, Maldives, India and Sri Lanka; elsewhere to Andaman Is. and Thailand.

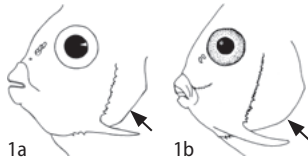
**REMARKS** Solitary or in pairs, on coral reefs, in 5–30 m. Feeds on algae, sponges and benthic invertebrates. Thrives in aquaria.

## GENUS *Centropyge* Kaup 1860

Interopercle spiny; no naked band of skin below and behind eyes; scales relatively large,  $\sim\frac{1}{2}$  pupil diameter; lateral line ends below last dorsal-fin ray; median fins usually rounded. Feeds on algae and detritus and most species are suitable for aquaria. Thirty-three species, 6 in WIO.

### KEY TO SPECIES

- 1a Lower edge of opercle straight; GR 14–19 ..... 2  
 1b Lower edge of opercle convex; GR 20–25 ..... 3



- 2a Blue-edged dark spot (about twice eye size) above gill opening; all fins dark ..... *C. multispinis*  
 2b No dark spot above gill opening; body and fins pale, only caudal fin and rear of soft-rayed portion of dorsal fin black ..... *C. eibli*
- 3a Head, body, pelvic and median fins all dark ..... *C. flavipectoralis*  
 3b Body, pelvic and median fins not all dark ..... 4
- 4a Head, chest, dorsal fin and upper part of body yellow-orange in life (pale in preservative), rest of body and anal fin blue in life (dark in preservative) ..... *C. acanthops*  
 4b Colour not as above ..... 5
- 5a Body usually with irregular dark bars, nape without spots; caudal fin dark ..... *C. bispinosa*  
 5b Body without bars, but nape with scattered black irregular spots; caudal fin pale ..... *C. debelius*

## *Centropyge acanthops* (Norman 1922)

African pygmy angelfish or jumping bean PLATE 143

*Holacanthus acanthops* Norman 1922: 318 (Durban, KwaZulu-Natal, South Africa).

*Centropyge fisheri* (non Snyder 1904): SFSA No. 588\*.

*Xiphipops fisheri* (non Snyder 1904): Smith 1955.

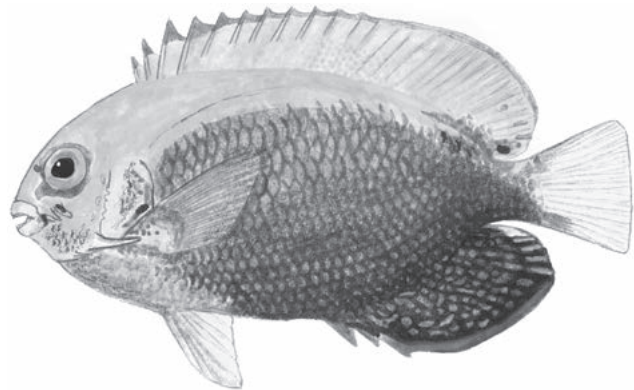
*Xiphipops flavicauda* (non Fraser-Brunner 1933): Smith 1955, 1961.

*Xiphipops acanthops*: Smith 1955.

*Centropyge acanthops*: Smith 1980; Heemstra 1984; SSF No. 204.3\*; Winterbottom *et al.* 1989\*; Randall 1995\*; Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 14 spines, 16 or 17 rays; anal fin 3 spines, 16–18 rays; pectoral fins 16 rays. GR 5 or 6/15 or 16; LSS 33–37.

Head, upper body, and dorsal, pectoral and caudal fins yellow to orange; most of lower body, pelvic fins and anal fin dark blue; blue ring around eyes. Juveniles with similar colour to adults. Attains 10 cm TL.



*Centropyge acanthops*, 3 cm SL (Comoros).

**DISTRIBUTION** WIO: southern Oman, Somalia to South Africa (Aliwal Shoal; juveniles to Algoa Bay), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos and Maldives.

**REMARKS** Found in tidepools, on coral and rocky reefs and over rubble, in 8–40 m.

## *Centropyge bispinosa* (Günther 1860)

Coral beauty

PLATE 143

*Holacanthus bispinosus* Günther 1860: 48, 516 (Ambon I., Moluccas, Indonesia) [replacement name for *Holacanthus diacanthus* Bleeker 1857, preoccupied].

*Centropyge bispinosus*: Smith 1955\*; Allen 1980\*; Kuitert 1998\*; Heemstra 1984\*; SSF No. 204.4\*; Winterbottom *et al.* 1989\*.

*Centropyge bispinosa*: Terashima *et al.* 2001\*; Debelius *et al.* 2003\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004; Fricke *et al.* 2009.

Dorsal fin 14 spines, 16–18 rays; anal fin 3 spines, 17–19 rays; pectoral fins 15–17 rays; dorsal and anal fins slightly angular. GR 6–8/16 or 17; LSS 42–45.

Head and median fins blue (rarely brown), body yellow to orangish with irregular reddish or bluish bars (rare variant without bars), median fins with bright blue margins; pectoral fins yellow; pelvic fins yellow to orange. Attains 10 cm TL.



*Centropyge bispinosa*, snout configuration (South Africa). Source: Heemstra 1984



*Centropyge bispinosa*, ~7 cm TL (Comoros).

**DISTRIBUTION** Indo-Pacific. WIO: possibly Somalia, Kenya to South Africa (Park Rynie, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Indonesia, Japan, Marshall Is., Australia and Tuamotu Is.

**REMARKS** Solitary or in small groups, on coral and rocky reefs and drop-offs, to at least 45 m deep.

*Centropyge debelius* Pyle 1990

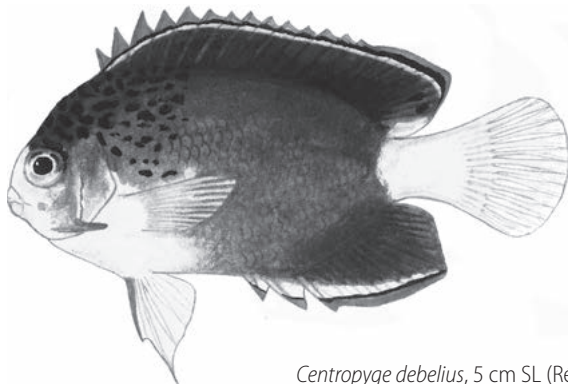
Blue Mauritius angelfish

PLATE 143

*Centropyge debelius* Pyle 1990: 47, Figs. 1–4 (Mauritius, Mascarenes); Debelius *et al.* 2003\*.

Dorsal fin 14 spines, 16 or 17 rays; anal fin 3 spines, 17 rays; pectoral fins 17 rays. GR 6 or 7/15 or 16; LSS 41 or 42.

Snout, eyes and head below eyes, chest, paired fins, peduncle and caudal fin yellow, rest of body and dorsal and anal fins blue; black marks on nape. Attains 9 cm TL.



*Centropyge debelius*, 5 cm SL (Réunion).

**DISTRIBUTION** WIO: Aldabra, Réunion and Mauritius.

**REMARKS** Rare; found on vertical drop-offs, in 20–90 m (usually >48 m).

*Centropyge eibli* Klausewitz 1963

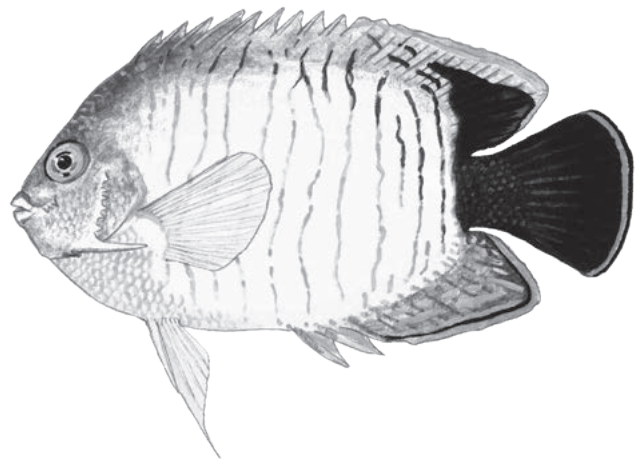
Blacktail angelfish

PLATE 144

*Centropyge eibli* Klausewitz 1963: 177, Figs. 1–2 (Tillanchong, Nicobar Is.); Kuitert 1993\*; Kuitert & Debelius 2001\*; Debelius *et al.* 2003\*.

Dorsal fin 14 spines, 14–17 rays; anal fin 3 spines, 15–17 rays; pectoral fins 15 or 16 rays. GR 4 or 5/12; LSS 32–36.

Head, body and paired fins pale; irregular thin orangish bars on body; rear of soft-rayed portion of dorsal fin, peduncle and caudal fin black. Attains 15 cm TL.



*Centropyge eibli*, ~14 cm SL (Indonesia).

**DISTRIBUTION** Indian Ocean. WIO: Maldives and Sri Lanka; elsewhere to Nicobar Is., Thailand, Christmas I., Indonesia and Western Australia.

**REMARKS** Found in groups of a single male and a harem of females, on coastal coral reefs, in silty or clear water, in 1–25 m. Known to hybridise with other species. A hardy aquarium species.

*Centropyge flavipectoralis*

Randall & Klausewitz 1977

Yellowfin angelfish

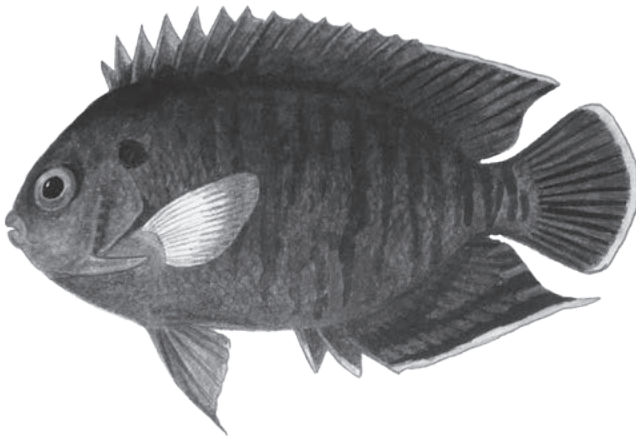
PLATE 144

*Centropyge flavipectoralis* Randall & Klausewitz 1977: 236, Figs. 1–2 (Trincomalee, Sri Lanka); Heemstra 1984\*; Debelius *et al.* 2003\*.



Dorsal fin 14–16 spines, 14 or 15 rays; anal fin 3 spines, 16–18 rays; pectoral fins 16 or 17 rays. Dorsal and anal fins angular. GR 5 or 6/13; LSS 44–46.

Body and median fins blue-black, with darker head and body bars; basal three-quarters of pectoral fin bright yellow, rest of fin hyaline; median fins with blue margins. Attains 10 cm TL.



*Centropyge flavipectoralis*, 7 cm SL (Sri Lanka).

**DISTRIBUTION** Indian Ocean. WIO: Maldives and Sri Lanka; elsewhere to Thailand and Indonesia.

**REMARKS** Found on rubble and reefs, in 20–40 m.

### *Centropyge multispinis* (Playfair 1867)

Dusky cherub

PLATE 144

*Holacanthus multispinis* Playfair in Playfair & Günther 1867: 37, Pl. 6, Fig. 4 (Zanzibar, Tanzania).

*Holacanthus somervillii* Regan 1908: 228, Pl. 24, Fig. 6 (Coëtivy I., Seychelles).

*Centropyge bispinosus* (*non* Günther 1860): SFSA No. 587\*.

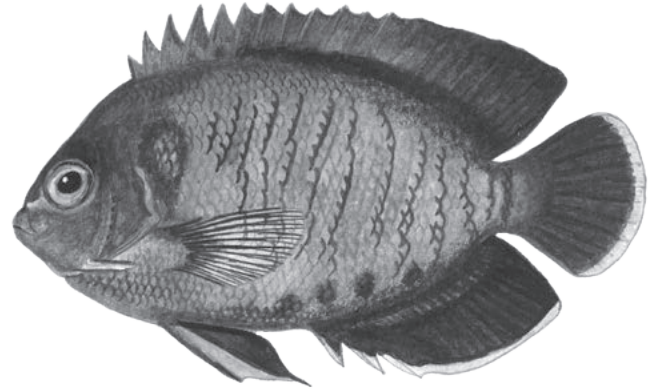
*Centropyge multispinis*: Smith 1955\*, 1961; Klausewitz 1972\*; Steene 1978\*; Allen 1980; Randall 1983\*, 1995\*; Heemstra 1984\*; SSF No. 204.5\*; Winterbottom *et al.* 1989\*; Khalaf & Disi 1997\*; Terashima *et al.* 2001\*; Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 14 spines, 15–17 rays; anal fin 3 spines, 16 or 17 rays; pectoral fins 17 rays. GR 4 or 5/12 or 13; LSS 45–48.

Head, body and fins dark brownish; body with several narrow, slightly oblique, brownish black bars; large blue-black ear spot; leading edges of pelvic fins and anal-fin margin bright blue. Juveniles pale, with ~4 broader darker bars, some bifurcated ventrally. Xanthic (yellow) specimens reported from Maldives. Attains 15 cm TL.



*Centropyge multispinis*, snout configuration (South Africa). Source: Heemstra 1984



*Centropyge multispinis*, 6 cm SL (Red Sea).

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, southern Oman, Tanzania to South Africa (Protea Banks, KwaZulu-Natal; some juveniles to Port Alfred, Eastern Cape), Madagascar, Comoros, Aldabra, Seychelles, Mauritius, Chagos and Sri Lanka; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Solitary or in small groups, in lagoons and tidepools, on coral rubble and reef flats and reef tops, and at drop-offs, to ~32 m deep. Often hides under ledges.

### GENUS *Genicanthus* Swainson 1839

Caudal fin emarginate to lunate; teeth relatively short (lengths ~5 times in eye diameter); all species sexually dichromatic, males usually with dark bars or stripes. Generally found deeper than 30 m, over reefs or rocky bottom. Occur in Indo-Pacific; 10 species, 1 in WIO.

### *Genicanthus caudovittatus* (Günther 1860)

Swallowtail angelfish

PLATE 144

*Holacanthus caudovittatus* Günther 1860: 44 (Mauritius, Mascarenes).

*Holacanthus zebra* Sauvage 1891: 263, Pl. 32, Fig. 2 (Mauritius, Mascarenes).

*Holacanthus caudibicolor* Sauvage (ex Liénard) 1891: 267, Pl. 29, Fig. 6, Pl. 33, Fig. 2 ([not used in same locality, same year, *H. zebra* above] Mauritius, Mascarenes).

*Genicanthus melanospilos* (*non* Bleeker 1857): Smith 1955\*.

*Genicanthus caudovittatus*: Smith 1955\*; Randall 1975\*, 1983\*;

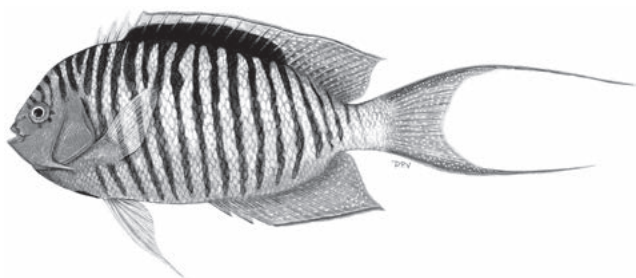
Heemstra 1984; SSF No. 204.6\*; Kuitert 1998\*; Debelius *et al.* 2003\*.

Dorsal fin 14 or 15 spines, 15–17 rays; anal fin 3 spines, 16–19 rays; pectoral fins 16 or 17 rays; caudal fin lunate. GR 3–5/11–13; LSS 45–47.

Males bluish, with ~18 dark bars on body; spinous portion of dorsal fin yellow, black basal area on mid-fin; caudal fin grey, with small yellow spots. Females and juveniles greyish, body scales with dark margins; dark bar above eyes; caudal fin with black bands along lobes, upper band extending below soft-rayed portion of dorsal fin. Attains 20 cm TL.



*Genicanthus caudovittatus*, 9 cm SL, female (N Mozambique). Source: SSF



*Genicanthus caudovittatus*, 10 cm SL, male (Red Sea). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Red Sea, Kenya to South Africa (Park Rynie), Madagascar, Comoros, Mauritius and Maldives; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Protogynous hermaphrodite. Solitary or in small, loose harems, on outer reefs or in caves, in 15–70 m. Feeds on zooplankton and some polychaetes, bryozoans and algae. Can be kept in aquaria.

## GENUS *Pomacanthus* Lacepède 1803

Preorbital mostly without spines, its lower rear edge not free; interopercle and subopercle smooth; anterior nostril largest; supracleithrum elongated, inconspicuous; 2 predorsal bones. Juveniles black or blue, with pale narrow and wide bands (pattern and colour quite different to adults). Feed mainly on sponges. About 13 species, 8 in WIO.

## KEY TO SPECIES

1a	Dorsal fin 11 or 12 spines .....	2
1b	Dorsal fin 13 or 14 spines .....	4
2a	Dorsal fin 12 spines, 19–21 rays .....	3
2b	Dorsal fin 11 or 12 spines, 22–25 rays .....	<i>P. rhomboides</i>
3a	LSS ~70–78; pectoral fins do not reach yellow blotch on body .....	<i>P. maculosus</i>
3b	LSS 52 or 53; pectoral fins reach or overlap yellow blotch on body .....	<i>P. asfur</i>
4a	Adults with oblique bands on body .....	5
4b	Adults without oblique bands on body .....	6
5a	Adults with 20–22 yellow horizontal to upwardly oblique bands on body; roughly triangular, dark, blue-edged area from isthmus to lateral-line origin, and similarly coloured eyeband; caudal fin yellow. Juveniles with mostly concentric bands centred near peduncle .....	<i>P. imperator</i>
5b	Adults with 7–9 blue curved bands on body, and blue ring at lateral-line origin; caudal fin white. Juveniles with vertical pale blue and whitish bars .....	<i>P. annularis</i>
6a	Adults with vertical white bars on dark body, curving backwards near dorsal- and anal-fin bases; head dark blue-brown with blue stripes; usually with dark earspot surrounded by yellow at lateral-line origin; no dark spot at rear of soft-rayed portion of dorsal fin; caudal fin yellow. Juveniles with similar pattern of slightly curved white to bluish white bars, and yellow caudal fin .....	<i>P. chrysuron</i>
6b	Adults without bars on body, and body scales blue with yellow margins; head blue, with yellow mask across eyes; no earspot at lateral-line origin; dark spot at rear of soft-rayed portion of dorsal fin; dorsal fin and caudal fin yellow. Juveniles with dark body and 5 or 6 slightly curved white bars, from behind pectoral fins to peduncle .....	<i>P. xanthometopon</i>
6c	Adults without bars on body, and anterior body scales blue with pale margins; rear of body and median fins dusky brownish covered with blue spots, pattern extending onto caudal fin; mouth yellow, but no yellow mask between eyes; no dark spot on soft-rayed portion of dorsal fin; median fin margins largely bright blue. Juveniles with white semicircular bands becoming more arched posteriorly; caudal fin mostly dark with pale bars .....	<i>P. semicirculatus</i>

## *Pomacanthus annularis* (Bloch 1787)

Blue-ring angelfish

PLATE 145

*Chaetodon annularis* Bloch 1787: 114, Pl. 215, Fig. 2 (Indian Ocean).

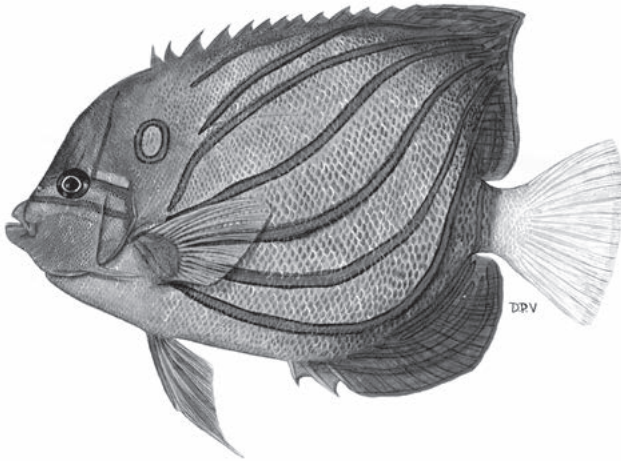
*Pomacanthus annularis*: Fraser-Brunner 1933\*; Steene 1978\*;

Heemstra 1984; SSF No. 204.7\*; Debelius *et al.* 2003\*.

*Pomacanthodes annularis*: Smith 1955.

Dorsal fin 13 spines, 20 or 21 rays; anal fin 3 spines, 20 rays; pectoral fins 18 or 19 rays. Preopercle spine at angle grooved. GR 4/12; LSS ~70.

Body and head yellowish brown, with several bright blue curved bands, extending onto dorsal, anal and pelvic fins; blue-edged circle near upper edge of opercle; caudal fin white. Attains 45 cm TL.



*Pomacanthus annularis*, 11 cm TL (Singapore). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Maldives and Sri Lanka; elsewhere to Thailand, Singapore, Japan, New Caledonia and Solomon Is.

**REMARKS** Records from East Africa are unsubstantiated. Solitary or in pairs, on reefs and wrecks (often in silty water), to ~60 m deep. Feeds on tunicates, sponges and zooplankton.

### *Pomacanthus asfur* (Fabricius 1775)

Arabian angelfish

PLATE 145

*Chaetodon asfur* Fabricius in Niebuhr (ex Forsskål) 1775: 61, xii (Al-Luhayya, Yemen, Red Sea).

*Pomacanthus asfur*: Randall 1983\*, 1995\*; Heemstra 1984\*; 1995\*; Debelius *et al.* 2003\*.

Dorsal fin 12 spines, 19–21 rays; anal fin 3 spines, 18–20 rays; pectoral fins 17 or 18 rays. Middle dorsal- and anal-fin rays develop pointed filament with growth; caudal fin rounded. GR 5 or 6/12 or 13; LSS 52 or 53.

Head, rear part of body, dorsal fin and anal fin blue-black; nape to chest blue; broad yellow bar from above anus to dorsal fin spines 6–12 (bar developing on fish >5.5 cm SL); caudal fin yellow. Juveniles dark with blue bars, some bars paler and wider than others. Attains 35 cm TL.

**DISTRIBUTION** WIO: Red Sea to Gulf of Aden (Yemen), and occasional strays to Oman.

**REMARKS** Found on inshore coral reefs, in crevices and near caves, and often in turbid water, in 3–15 m.

### *Pomacanthus chrysurus* (Cuvier 1831)

Dark earspot angelfish

PLATES 145 & 146

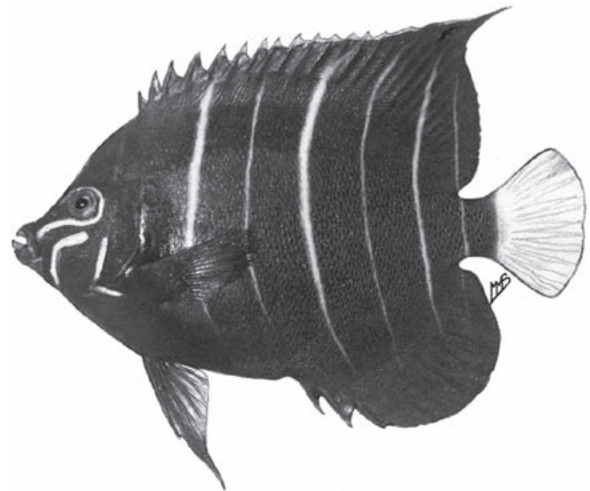
*Holacanthus chrysurus* Cuvier in Cuv. & Val. 1831: 188 (Dorey Harbour, New Guinea [?Madagascar]).

*Holacanthus rodriguezi* Von Bonde 1934: 448, Pl. 23, Fig. 1 (Zanzibar fish market, Tanzania).

*Pomacanthus chrysurus*: Heemstra 1984\*; SSF No. 204.8\*; Debelius *et al.* 2003\*.

Dorsal fin 13 spines, 17–19 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 18 or 19 rays. Preopercle spine not grooved. GR 5 or 6/11–14. Lateral line complete; LL scales ~80; scales on head minute.

Head and body dark, with 5 or 6 slightly curved white bars on body, extending onto dorsal fin; head with blue lines; nape and chest yellowish; earspot dark, edged with yellow; pelvic fins yellowish; anal fin dark with blue lines; caudal fin yellow. Juveniles dark, with alternate narrow blue and broader white bars on body; caudal fin bright yellow, with 0–2 blue lines. Attains 33 cm TL.



*Pomacanthus chrysurus*, 26 cm TL (Kenya). Source: SSF

**DISTRIBUTION** WIO: Gulf of Aden, Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros and Aldabra.

**REMARKS** Uncommon and solitary, on coastal reefs, in 1–25 m. Suitable for aquaria.

## *Pomacanthus imperator* (Bloch 1787)

Emperor angelfish

PLATE 146

*Chaetodon imperator* Bloch 1787: 51, Pl. 194 (Japan Sea).

*Pomacanthodes imperator*: Klausewitz 1972\*.

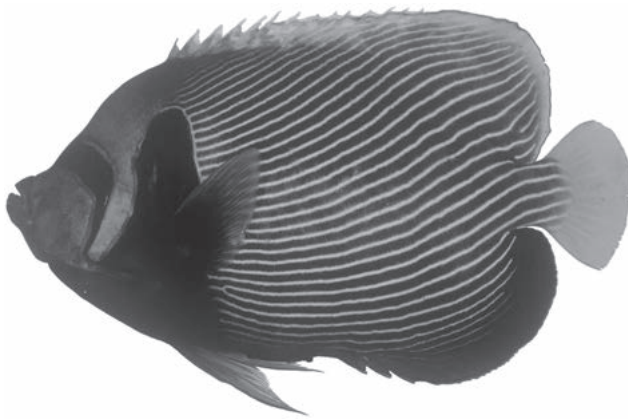
*Pomacanthus imperator*: Randall 1983\*, 1995\*; Heemstra 1984\*;

Winterbottom *et al.* 1989\*; Debelius *et al.* 2003\*; Heemstra *et al.* 2004;

Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 14 spines, 19–21 rays; anal fin 3 spines, 18–20 rays; pectoral fins 19 or 20 rays. GR 6 or 7/13 or 14; LSS ~90.

Body with upwardly oblique, alternating yellow and blue stripes extending onto dorsal and anal fins; dark mask edged with blue over eyes; nape yellowish or greenish grey; snout and cheeks bluish white; dark blue area from opercle extending to breast; dorsal fin (distally) and caudal fin yellow. Juveniles with blue-black body with concentric alternating bluish and whitish circles; caudal fin hyaline. Attains ~40 cm TL.



*Pomacanthus imperator* (South Africa). © RE Stobbs

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Aliwal Shoal; juveniles to East London, Eastern Cape), Madagascar, Aldabra, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to southern Japan, Australia, New Caledonia, Lord Howe I., throughout Polynesia to Hawaii.

**REMARKS** Found in lagoons and on outer-reef slopes, in 1–60 m; adults solitary or in pairs; juveniles usually solitary, often hiding in crevices and caves. Adapts easily to captivity.

## *Pomacanthus maculosus* (Forsskål 1775)

Yellowbar angelfish

PLATE 146

*Chaetodon maculosus* Forsskål in Niebuhr 1775: 62, xiii (Al-Luhayya, Yemen, Red Sea).

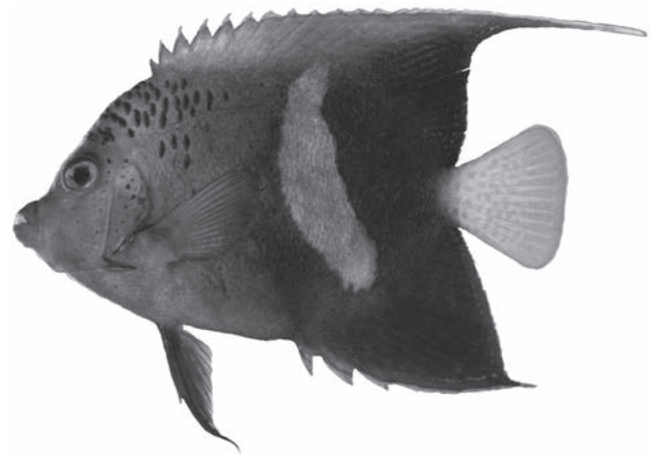
*Holacanthus striatus* Rüppell 1836: 32, Pl. 10, Fig. 2 (Massawa, Eritrea, Red Sea).

*Pomacanthops filamentosus* Smith 1955: 383, Pl. 4, Fig. A (Tecomaji I., Mozambique).

*Pomacanthus maculosus*: Allen 1980\*; Randall 1983\*, 1995\*; Heemstra 1984; SSF No. 204.10\*; Debelius *et al.* 2003\*; Bogorodsky *et al.* 2014.

Dorsal fin 12 or 13 spines, 21–23 rays; anal fin 3 spines, 19–21 rays; pectoral fins 18–20 rays. Middle soft dorsal- and anal-fin rays develop pointed filament with growth; caudal fin rounded. GR 5 or 6/13 or 14; LSS ~70–78.

Head, body and most fins blue, with vertically elongate yellowish blotch across rear of body; caudal fin paler; some scales on nape and front of upper body with obvious dark centres. Juveniles dark blue, with curved alternating whitish and bluish bars; yellow blotch on body starts forming dorsally at ~6–7 cm SL; caudal fin hyaline or whitish to pale yellow. Attains 50 cm TL.



*Pomacanthus maculosus*, 12 cm SL (Persian/Arabian Gulf).

© JE Randall, Bishop Museum

**DISTRIBUTION** WIO: Red Sea to Oman, Persian/Arabian Gulf to Pakistan, Kenya to northern Mozambique (Quirimbas Is.); Lessepsian migrant to Mediterranean Sea.

**REMARKS** Usually solitary but sometimes in pairs, in silty harbours and seagrass beds and on coral reefs, to ~60 m deep. Known to hybridise with *P. chrysurus*. Considered good eating in Persian/Arabian Gulf. Suitable for aquaria.

*Pomacanthus rhomboides*

(Gilchrist &amp; Thompson 1908)

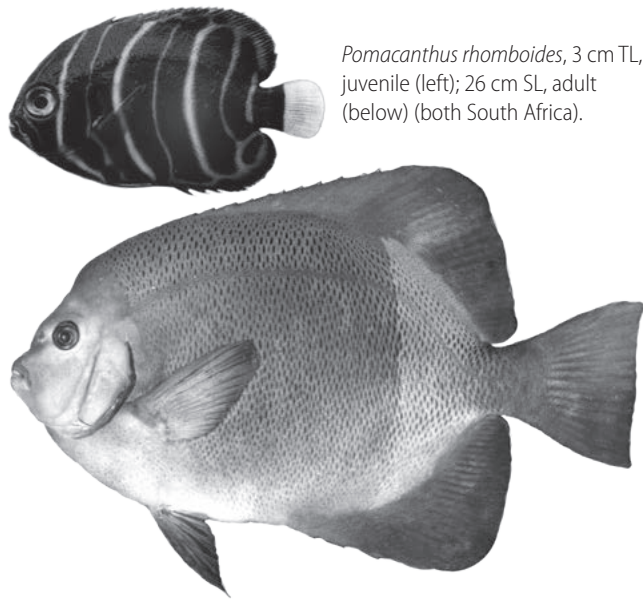
Old woman angelfish

PLATES 146 &amp; 147

*Holacanthus rhomboides* Gilchrist & Thompson 1908: 161 (KwaZulu-Natal, South Africa).*Pomacanthus striatus* (non Rüppell 1836): SFSa No. 583\*; Allen 1980\*, 1986\*; Van der Elst 1981\*; Heemstra 1984; SSF No. 204.12\*.*Pomacanthus rhomboides*: Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*; Kuitert & Debelius 2007\*.

Dorsal fin 11 or 12 spines, 22–25 rays; anal fin 3 spines, 21–23 rays; pectoral fins 19–21 rays. Large adults develop pronounced bump on nape; dorsal and anal fins of adults angular; caudal fin of juveniles rounded, becoming truncate or with slightly produced lobes in adults. GR 5 or 6/12 or 13; LSS ~80.

Head and rear third of body pale bluish grey; rest of body and fins grey-brown; body scales with darker centres. Juveniles dark blue with paler blue bars; caudal fin hyaline. Attains 46 cm TL.



*Pomacanthus rhomboides*, 3 cm TL, juvenile (left); 26 cm SL, adult (below) (both South Africa).

**DISTRIBUTION** WIO: Tanzania (Mafia I.) to South Africa (adults common to southern KwaZulu-Natal; juveniles to Knysna, Western Cape, in summer).

**REMARKS** Found on coral and rocky reefs, in 5–40 m; small juveniles also in tidepools. Suitable for aquaria.

*Pomacanthus semicirculatus* (Cuvier 1831)

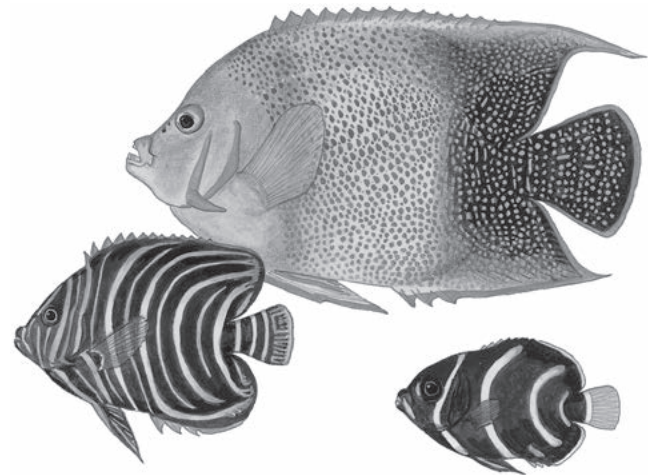
Semicircle angelfish

PLATE 147

*Holacanthus semicirculatus* Cuvier in Cuv. & Val. 1831: 191, Pl. 183 (Timor, Buru and Waigeo, Indonesia; Port Praslin, New Ireland, Bismarck Archipelago); Fowler 1934.*Pomacanthus semicirculatus*: SFSa No. 584 [not fig. of juvenile]; Steene 1978\*; Van der Elst 1981\*; Heemstra 1984\*; SSF No. 204.11\*; Randall 1995\*; Debelius *et al.* 2003\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 13 spines, 21–23 rays; anal fin 3 spines, 20–22 rays; pectoral fins 19–21 rays. Dorsal and anal fins of adults angular; caudal fin rounded. GR 4 or 5/13; LSS ~75.

Head yellowish, without spots; body yellowish grey, becoming dusky brownish distally and covered with small dark blue oval spots; pattern extending onto median fins, but with rounder spots, and fin margins bright blue. Juveniles with wide white and narrow bluish semicircular bands, becoming more arched posteriorly; transition to adult pattern at ~8–16 cm SL. Attains 40 cm TL.



*Pomacanthus semicirculatus*, 39 cm TL, adult; 9 cm TL and 2 cm TL, juveniles (all South Africa). Source: CFSA

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (Margate, KwaZulu-Natal; some juveniles to Algoa Bay), Madagascar, Seychelles and Mascarenes; elsewhere to Indonesia, southern Japan, Australia, Solomon Is., New Caledonia and Fiji.

**REMARKS** Solitary, on inshore reefs and coral-rich areas, to ~25 m deep. Suitable for aquaria.

***Pomacanthus xanthometopon*** (Bleeker 1835)

Blueface angelfish

PLATE 147

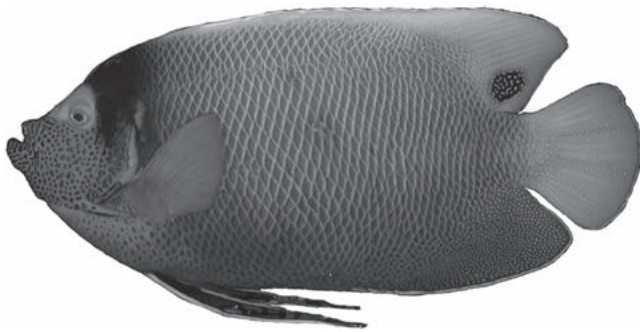
*Holacanthus xanthometopon* Bleeker 1835: 258 (Sumatra, Indonesia).

*Euxiphops xanthometopon*: Klausewitz 1972\*.

*Pomacanthus xanthometopon*: Debelius *et al.* 2003\*.

Dorsal fin 13 or 14 spines, 16 or 17 rays; anal fin 3 spines, 16–18 rays; pectoral fins 18 or 19 rays; caudal fin rounded. GR 4 or 5/13; LSS ~75.

Head bright blue, with yellow-orange mask over eyes and interorbital region; body scales blue with yellow margins; chest, and pectoral, dorsal and caudal fins yellow; large dark blue spot near rear of dorsal-fin base. Juveniles dark blue, with ~18–20 narrow paler blue and wider white bars across body; transition to adult pattern at ~7–12 cm SL. Attains 40 cm TL.



*Pomacanthus xanthometopon*, 24 cm SL (Indonesia). © DA Polack

**DISTRIBUTION** Indo-Pacific. WIO: Maldives; elsewhere to Indonesia, southern Japan, Australia and Vanuatu.

**REMARKS** Adults found in coral-rich areas, lagoons and outer reefs, often near caves, at 5–35 m. Juveniles settle in very shallow inshore caves with algae growth. Usually solitary. Feeds on sponges and other encrusting organisms and tunicates. Difficult to keep in aquaria.

**GENUS** *Pygoplites* Fraser-Brunner 1933

Lateral line ends below last dorsal-fin ray; interopercle small; opercle with ~8 scale rows; supracleithrum elongate in adults and hidden by scales. Feeds mainly on sponges. One species.

***Pygoplites diacanthus*** (Boddaert 1772)

Regal angelfish

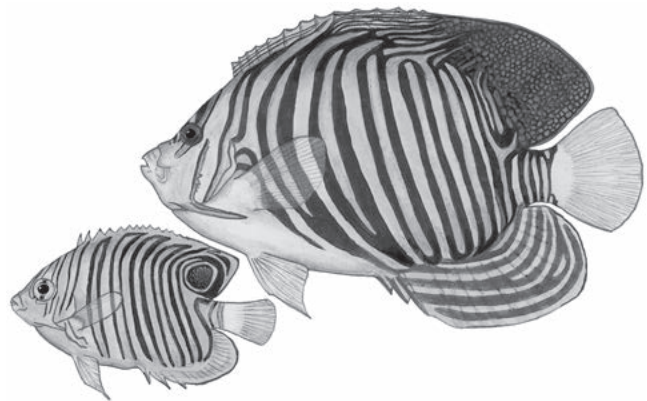
PLATE 148

*Chaetodon diacanthus* Boddaert 1772: 1, Pl. (Ambon I., Moluccas, Indonesia).

*Pygoplites diacanthus*: Klausewitz 1972\*; Steene 1978\*; Randall 1983\*; Heemstra 1984; SSF No. 204.13\*; Winterbottom *et al.* 1989\*; Debelius *et al.* 2003\*; Heemstra & Heemstra 2004\*.

Dorsal fin 14 spines, 17–19 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 16 or 17 rays. Median fins rounded. GR 5 or 6/12 or 13. LSS 52; LL scales ~50.

Diagnosis as for genus. Head, body and fins yellow, with ~8 dark-edged, bluish white subvertical bands, from opercle to peduncle, abruptly curving posteriorly onto dorsal fin; similar blue-edged black band above eyes; soft-rayed portion of dorsal fin dark; anal fin with blue stripes. Pacific specimens with grey chest. Juveniles with similar pattern to adults, but with large dark ocellus on soft-rayed portion of dorsal fin, and slightly fewer bands on body. Attains 25 cm TL.



*Pygoplites diacanthus*, 14 cm TL, juvenile; 25 cm TL, adult (both Comoros). Source: CFSa

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Mauritius, Chagos and Maldives; elsewhere to Indonesia, Japan, Australia, New Caledonia, Tuamotu Is. and Gambier Is.

**REMARKS** Found in pairs or solitary, sometimes in small groups, in lagoons and coral-rich areas, in coral crevices and on drop-offs, in 1–70 m. Difficult to keep in aquaria.

FAMILY **CHAETODONTIDAE**

## Butterflyfishes

Phillip C Heemstra and Elaine Heemstra

Colourful, with ovate, deep, strongly compressed body. Mouth small; teeth long, slender, bristle-like, none on vomer and palatines; nostrils tiny. Dorsal fin continuous, with 10–17 spines, 14–28 rays; anal fin 3 or 4 spines, 15–23 rays; last dorsal- and anal-fin ray usually split to base and counted as one ray; pelvic fins well-developed, with 1 spine, 5 rays; pectoral fins subequal to or shorter than head; caudal fin truncate or rounded, usually with 15 branched rays. Preopercle without spine at angle; no head spines. Branchiostegal membranes separate, with 6 or 7 rays; gill rakers short, sparse. Scales ctenoid, covering head and body; median fins mostly with scaly sheath. Lateral line either incomplete (reaching base of last dorsal-fin rays) or complete (reaching caudal-fin base). Unique tholichthys pre-settlement larvae with thin bony plates with projecting spines covering the head. Vertebrae 11 + 13.

Common, occurring in tropical and warm-temperate

seas worldwide, but most species occur in the Indo-Pacific. Coastal, to at least 320 m, except for a pelagic larval stage, and also found in lagoons and tidepools (particularly juveniles). Most are coral-reef species, with coral polyps a common item in their diet (the presence of species feeding solely on coral polyps can be used as an indicator of the health of a coral reef); they also feed on various small benthic and planktonic invertebrates and algae. Juveniles and occasionally adults of some species are facultative cleaners, picking small parasites from other fishes. Solitary, in pairs, or forming large groups. Their conspicuous colouration and diurnal habits enable most butterflyfishes to be easily identified. At night many change colour and sleep in the shelter of crevices or caves.

The taxonomic account here follows the cladistic phylogeny of Smith *et al.* (2003), which is based largely on the doctoral dissertation of Blum (1988). Twelve genera and ~132 species; 6 genera and ~55 species in WIO (one of these undescribed and known only from a specimen collected off Mozambique, at 135–153 m; a specimen that resembles the same species has been photographed by J Schauer at the Comoros, at ~200 m, from a research submersible: Heemstra *et al.* 2006).

## KEY TO GENERA

- |    |   |    |  |
|----|---|----|--|
| 1a | Snout greatly elongated, tubular, its length 1.1–2.1 in body depth; pectoral fins reaching past anal-fin origin ..... <i>Forcipiger</i> | 4a | Spinous portion of dorsal fin angular, spines 3–5 longest, longest spine more than twice length of shortest spine; rear edge of soft-rayed portions of dorsal and anal fins vertical or nearly vertical; anal fin 15 or 16 rays ..... 5        |
| 1b | Snout not greatly elongated or tubular, its length 3–5 in body depth; pectoral fins not reaching past anal-fin origin ..... 2           | 4b | Spinous portion of dorsal fin rounded, longest spine less than twice length of shortest spine; rear edge of soft-rayed dorsal and anal fins pointed, rounded or with blunt angle, not sub-vertical; anal fin 16–22 rays ..... <i>Chaetodon</i> |
| 2a | Fourth spine of dorsal fin elongated, usually filamentous ..... <i>Heniochus</i>  | 5a | Dorsal fin 11 spines; LL scales 37–45; snout length 2.7–3.6 in HL ..... <i>Roa</i>   |
| 2b | Fourth spine of dorsal fin not elongated or filamentous ..... 3   | 5b | Dorsal fin 13 spines; LL scales 26–28; snout length 2.1–3 (rarely to 3.3) in HL ..... <i>Prognathodes</i>  |
| 3a | Lateral line complete, reaching caudal-fin base; LL scales 68–73 ..... <i>Hemitaenichthys</i>   |    |  |
| 3b | Lateral line incomplete, ending below posterior dorsal-fin rays ..... 4   |    |  |

GENUS **Chaetodon** Linnaeus 1758

Dorsal fin 10–17 spines; anal fin 3 or 4 spines; caudal fin usually slightly rounded to truncate, rarely double emarginate. Snout short or moderately elongated. Lateral line incomplete, ending at base of last dorsal-fin ray. LL scales 22–52. Circumtropical, widely distributed, straying into cool-temperate regions (especially in summer) but rarely breeding there. The largest genus, with ~90 species, 42 in WIO.

## KEY TO SPECIES

[Whereas most adult butterflyfishes are easily identified by looking at colour plates, this key is intended to assist with identifying small juveniles and museum specimens.]

- |    |  |
|----|--|
| 1a | Dorsal fin 16 or 17 spines; body mostly dusky with slightly oblique dark stripes; head and large triangular yellow area behind black eyeband, area pale after preservation ..... <i>C. blackburnii</i> |
| 1b | Dorsal fin 10–15 spines; colour not as above ..... 2   |

Continued ...

## KEY TO SPECIES

- 2a Anal fin 4 (rarely 5) spines ..... 3  
 2b Anal fin 3 spines ..... 4
- 3a Black ocellus on peduncle; dorsal fin 18 rays; body pale, with faint dark stripes following scale rows; caudal, dorsal and anal fins pale, without black areas or bands ..... *C. andamanensis*  
 3b No ocellus on peduncle; dorsal fin 14–16 rays; body with dark chevron markings; small juveniles with black vertical swathe on rear of body including soft-rayed portions of dorsal and anal fins; large juveniles with black semicircle on rear margin of soft-rayed portion of dorsal fin connecting to black on caudal fin, but separating with growth; caudal fin black, with pale margin (>7 cm SL) and dark submarginal line in adults, or fin pale with dark submarginal line in juveniles ..... *C. trifascialis*
- 4a Head and body pale, with 8 vertical black bars: 1st bar through eye, 8th bar on dorsal- and anal-fin margins ..... *C. octofasciatus*  
 4b Colour pattern not as above ..... 5
- 5a Caudal fin completely or mostly dark or dusky or red in life ... 6  
 5b Caudal fin pale or mostly pale (>50% of area), white, yellow, orangish or hyaline in life ..... 13
- 6a Caudal, dorsal and anal fins mostly black, or median fins and body dusky ..... 7  
 6b Caudal fin and either anal fin or soft-rayed portion of dorsal fin mostly black (>50% of area) ..... 12
- 7a Body pale with faint longitudinal lines; dorsal, anal and caudal fins mostly black in adults, or anal fin, caudal fin and peduncle mostly black, and soft-rayed portion of dorsal fin dusky basally with dark margin in juveniles ..... *C. melapterus*  
 7b Colour not as above ..... 8
- 8a Body mostly dusky, with darker chevrons or vertical stripes; caudal fin with large dark triangular or lens-shaped mark ..... 9  
 8b Colour not as above ..... 10
- 9a Body with ~15 or 16 vertical stripes; head pale, with dark eyeband usually present, but no other dark bars on head; no pale streak across peduncle ..... *C. mesoleucus*  
 9b Body with ≥8 chevrons, pattern fading posteriorly; dark eyeband present; dark bar from dorsal fin, over opercle to rear of pelvic-fin base; faint bar may be present on snout; adults with pale streak across peduncle onto anal fin ..... *C. triangulum*
- 10a Body and basal areas of soft-rayed portions of dorsal and anal fins with dark spot in centre of each scale ..... *C. nigropunctatus*  
 10b Body scales with darker margins ..... 11
- 11a Dark eyeband merging with dusky colouration of nape; pale triangular area between eyeband and dusky body (from 4th dorsal-fin spine to pelvic-fin origin) ..... *C. dialeucus* [IN PART]  
 11b Dark eyeband with white band behind (from nape broadening slightly to chest and encircling head) and narrower white band encircling snout ..... *C. collare* [IN PART]
- 12a Body with dark chevron pattern; caudal fin and soft-rayed portion of dorsal fin black with pale margin; head, nape and chest orange (dark in preservative); no eyeband ..... *C. larvatus*  
 12b Body with narrow dark longitudinal lines, 4th or 5th line with lens-shaped thickening (not on small juveniles); anal fin and caudal fin black with pale margin; head yellow (pale in preservative), with black snout, black eyeband and second dark parallel band behind eye ..... *C. austriacus* [IN PART]
- 13a Body with chevron pattern ..... 14  
 13b Body without chevron markings ..... 16
- 14a Body with faint chevron (not ragged) pattern of ~5 narrowly angled bars; eyeband subequal to or less than pupil diameter, usually narrowing and fading from eye towards interopercle and nape (joined at nape in small specimens), but band may be greatly reduced and present only on eye; soft-rayed portions of dorsal and anal fins dark in preservative; juveniles with soft-rayed portion of dorsal fin mostly dusky, and black band around peduncle, fading with growth ... *C. xanthocephalus*  
 14b Body with ragged chevron pattern; horseshoe-shaped mark on nape above short eyeband subequal to pupil diameter, mark slightly wider dorsally ..... 15
- 15a Eyeband dusky with darker borders and pale margins; curved mark on nape surrounded by white border; scale rows 4 or 5 (usually 4) above lateral line; rear part of body with reddish band (grey to dark brown in preservative) from rear dorsal-fin spines to tip of 8th anal-fin ray; dark oval spot on soft-rayed portion of dorsal fin sometimes present ..... *C. paucifasciatus*  
 15b Eyeband dark with pale margins; curved mark on nape with white border on upper side, faint or absent ventrally; scale rows 5–7 above lateral line; rear part of body with yellow band (pale brown in preservative) from rear dorsal-fin spines to tip of anal-fin rays 4–5; dusky oval spot on soft-rayed portion of dorsal fin present or absent ..... *C. madagaskariensis*
- 16a Body with oblique stripes or bars ..... 17  
 16b No oblique stripes on body, but with vertical, or more or less horizontal, stripes or bars ..... 29  
 16c Body without stripes but may have lines of spots or scale rows obviously oblique ..... 32

Continued...



## KEY TO SPECIES

- 17a Oblique upward stripes on body from nape and upper opercle to dorsal fin, with opposing series of downward stripes running from lowest upward stripe ..... 18
- 17b Oblique or slightly oblique stripes on body running one way only, and slightly curved or not curved ..... 21
- 18a No black band on dorsal- and anal-fin bases; soft-rayed portion of dorsal fin with black spot subequal to eye diameter (usually no spot in Red Sea specimens), and anterior rays elongated in specimens <5 cm SL ..... *C. auriga*
- 18b Black band along dorsal-fin base, across peduncle and along rear of anal fin, or rear part of body and dorsal fin black, and anal fin black with yellow submarginal band; no elongate dorsal-fin rays ..... 19
- 19a Rear part of body, peduncle, and dorsal and anal fins mostly black; caudal fin hyaline (juveniles) or with black lens-shaped bar and black submarginal line (adults) ..... *C. decussatus*
- 19b Colour pattern not as above ..... 20
- 20a Black band from anal-fin base to dorsal-fin base joining black dorsal-fin margin; caudal fin with 2 reddish or brown bars, one submarginal, of subequal width (dusky in preservative); eyeband broader below eyes ..... *C. pictus*
- 20b Black band from anal-fin base to dorsal-fin base running below, but not joining, black dorsal-fin margin; caudal fin with 2 black bars, one submarginal, the other a wider central bar; eyeband below eyes subequal to eye diameter ..... *C. vagabundus* [IN PART]
- 21a Body with 2 oblique stripes (blue in life, dark in preservative), one in front of and one behind pectoral-fin base, from near lateral-line origin to anal-fin base; dark ocellus on lateral line ..... *C. bennetti*
- 21b No oblique stripe on either side of pectoral-fin base; no ocellus on lateral line ..... 22
- 22a Two broad oblique dark bars (interspace narrower than bars) tapering ventrally on body, rear bar reaching peduncle; blackish oval mark or remains of a mark may be present on soft-rayed portion of dorsal fin ..... *C. mitratus*
- 22b Colour pattern not as above ..... 23
- 23a Body with 5–7 black or orange (dark in preservative) oblique curved stripes, with at least one stripe curving around onto dorsal-fin base or membrane ..... 24
- 23b Dark or dusky oblique or slightly oblique stripes not curving around onto dorsal fin; stripes may be mauve in life but dark in preservative ..... 25
- 24a Dorsal fin 26–28 rays; anal fin 21–23 rays; body with 6 orange (dark in preservative) oblique stripes; narrow vertical bar ( $\leq$  pupil diameter) from interopercle upwards behind eyeband, curving back onto dorsal fin in adults and narrowing to form submarginal band along fin to rear of fin base and joining 4th body stripe ..... *C. ornaticissimus*
- 24b Dorsal fin 23 or 24 rays; anal fin 19 or 20 rays; body with some black oblique stripes curving onto dorsal-fin base; stripe behind eyes  $\geq$  pupil diameter and in adults, curving onto dorsal fin, forming submarginal band and going ventrally along anal-fin base ..... *C. meyeri*
- 25a Dark eyeband across interorbital, followed by white band subequal to eye diameter; body with dark triangle or crescent mark behind head (may merge with dusky area on dorsal body) ..... 26
- 25b Colour pattern not as above ..... 27
- 26a White band behind dark eyeband extends to near pectoral-fin origins; body with dusky to black triangle or crescent mark (narrowing dorsally) from rear of head to near base of 6th dorsal-fin spine; dark band along soft-rayed portion of dorsal-fin base extending to black spot (subequal to or larger than eye diameter) on peduncle; juveniles with dark spot or ocellus on soft-rayed portion of dorsal fin, and 2nd dark spot (subequal to eye diameter) on peduncle ..... *C. lunula*
- 26b White band behind dark eyeband extends only to upper gill opening; body with dusky to black triangle continuous around front of 1st dorsal-fin spine; dusky band along soft-rayed dorsal-fin base just reaching to peduncle ..... *C. fasciatus*
- 27a Soft-rayed portions of dorsal and anal fins with black or dusky basal band widening towards peduncle, dorsal-fin band may be pale with black ventral spot on juveniles; dusky longitudinal body stripe below lateral line with darker oval mark ..... *C. trifasciatus* [IN PART]
- 27b Soft-rayed portion of dorsal fin with dusky to black basal band or swathe (which may extend onto peduncle and rear of anal-fin base) in adults, or band may be faint with dark spot posteriorly near or on peduncle in juveniles; no black basal band on anal fin ..... 28
- 28a Black blotch at front of anal-fin base; oblique stripes over most of body, becoming rows of spots ventrally; chest with round to keyhole-shaped black mark (may be connected to eyeband on smaller fish); dorsal fin 18–20 rays ..... *C. melannotus*
- 28b Black spot at front of soft-rayed portion of dorsal fin; dark stripes on body present anterodorsally only; no round or keyhole-shaped black mark on chest; dorsal fin 23–25 rays ..... *C. vagabundus* [juveniles]

Continued...

**KEY TO SPECIES**

- 29a Eyeband joined on upper interorbital area, with reduced black horseshoe-shaped mark above, or joined from upper interorbital area to nape and enclosing white spot ..... **30**
- 29b Eyeband and related pattern not as above ..... **31**
- 30a Black horseshoe-shaped mark on nape above eyeband; dorsal fin 22–24 rays, and fin rays with black line above black basal swathe (swathe extends over peduncle); anal fin 18–20 rays ..... *C. oxycephalus*
- 30b Eyeband enclosing white spot on nape; dorsal fin 24–28 rays, no black line on fin above black basal swathe which extends along base of rear anal-fin rays; anal fin 20–22 rays ..... *C. lineolatus*
- 31a Anal fin with wide black swathe; eyeband from nape, through eye to throat; black band or large spot on peduncle with white margins; body with ~10 mostly horizontal stripes ..... *C. austriacus* [juveniles]
- 31b Anal fin pale; eyeband patch-like, from eye to edge of opercle, and juveniles with narrow bar above eyes; peduncle pale; ~15 vertical darkish lines on body ..... *C. semilarvatus*
- 31c Colour pattern not as above ..... **32**
- 32a Most body scales with darker margins ..... **33**
- 32b Most body scales without darker margins ..... **35**
- 33a Caudal fin pale, with large black lens-shape at centre; pelvic fins pale; eyeband broader below eyes; juveniles (<5 cm SL) with hyaline caudal fin, pale pelvic fins, and black spot on rear edge of dorsal fin ..... *C. rafflesii*
- 33b Caudal fin hyaline; pelvic fins dark; eyeband broader above eyes ..... **34**
- 34a Dark eyeband much broader above eyes than below; whitish triangular area behind eyeband extends from anterior dorsal-fin spines to pelvic fins; snout and ventral part of head white; rear of body dusky with darker scale margins; scales large, LL scales 24 ..... *C. dialeucos* [juveniles]
- 34b Dark eyeband, with narrow white border in front and broader white band behind; snout slightly dusky; body dusky from 1st dorsal-fin spine to pelvic fins; soft-rayed portion of dorsal fin often with dark spot near rear angle; scales relatively small, LL scales 37–44 ..... *C. collare* [juveniles]
- 35a Black spot or ocellus on lateral line ..... **36**
- 35b No black spot or ocellus on lateral line ..... **37**
- 36a Dorsal fin 21–23 rays; black submarginal stripe on soft-rayed portion of dorsal fin extending across peduncle and along anal-fin margin ..... *C. interruptus*
- 36b Dorsal fin 15–18 rays; no black stripe on rear parts of dorsal and anal fins ..... *C. zanzibarensis*
- 37a Body with 2 black triangular saddles extending onto dorsal fin, and dark vertical lines between saddles; dorsal fin 24–26 rays, yellow in life; anal fin 20–22 rays ..... *C. falcula*
- 37b Colour pattern not as above ..... **38**
- 38a Body with more or less horizontal stripes or lines of spots ... **39**
- 38b No horizontal stripes or lines on body or with rows of spots, oblique dorsally becoming horizontal ventrally ..... **41**
- 39a Body pale with ~16 mauve horizontal stripes over most of body (stripes dark in preservative); eyeband above eyes subequal to pupil diameter ..... *C. trifasciatus* [IN PART]
- 39b Body with more or less horizontal stripes or spotted lines on ventral part of body only; eyeband above eyes subequal to eye diameter ..... **40**
- 40a No vertical lines on body (horizontal spotted lines on ventral part of body present in preservative); dorsal fin 20–22 rays, fin black with yellow margin ..... *C. gardineri*
- 40b Dorsum of body with dusky to dark irregular vertical lines, often with dark-margined scales, and 5 or 6 horizontal lines ventrally; dorsal fin 21–23 rays, fin yellow but last few rays and membranes becoming dusky ..... *C. leucopleura*
- 41a Peduncle dark or with dark band, blotch, ocellus or close-set spots ..... **42**
- 41b Peduncle without dark markings but may have a few faint spots ..... **45**
- 42a Body with 2 vertical dark bars and spot or ocellus at upper end of or just behind 2nd bar on larger specimens, 2nd ocellus sometimes present on specimens ~10 cm TL; juveniles (~2 cm TL) with broad vertical dark bar on anterior body, soft-rayed portion of dorsal fin with dark ocellus, and peduncle with dark brown band becoming paler with growth ..... *C. marleyi*
- 42b No dark vertical bars on body ..... **43**
- 43a Body pale, with dark spots smaller and denser over basal portions of dorsal and anal fins or with small dark spots over body denser dorsally ..... **44**
- 43b Body pale with darker spot on each scale; rear part of body, dorsal and anal fins dusky to black; dark blotch present at rear angle of dorsal fin in juveniles, disappearing with growth ..... *C. dolosus*
- 44a Peduncle of juveniles (~3 cm TL) with black band, wider at centre, connected above and below, ventral connection slight on fish ~5 cm TL, reducing to 2 black spots and fading with growth; dots on body forming slightly oblique rows, slightly denser dorsally but similarly sized ..... *C. semeion* [juveniles]
- 44b Peduncle without large black spot or band; body with dark spots running obliquely dorsally, and longitudinally ventrally, spots smaller and denser over peduncle and on soft-rayed portions of dorsal and anal fins ..... *C. guttatissimus*

Continued...

## KEY TO SPECIES

- 45a Anal fin 16 or 17 rays, with broad black submarginal band anteriorly, subequal to pupil diameter at widest point and markedly narrowing posteriorly ..... *C. citrinellus*
- 45b Anal fin 17–22 (usually 18–21) rays, with narrow black submarginal line ..... 46
- 46a First few dorsal-fin rays form a filament; body with tiny dark spot on each scale, forming rows; bases of soft-rayed portions of dorsal and anal fins with black basal band; eyeband joined at nape, noticeably wider below eyes (but only present on head) and merging into deep blue area on nape and interorbital region ..... *C. semeion* [adults]
- 46b No dorsal-fin filament; each body scale with white spot in life (dark in preservative, but may be absent in old museum specimens); no black basal band on soft rays of dorsal and anal fins; eyeband subequal to eye diameter and joined at nape and chest (at pelvic-fin origin) ..... *C. kleinii*

*Chaetodon andamanensis* Kuitert & Debelius 1999

Andaman butterflyfish

PLATE 148

*Chaetodon andamanensis* Kuitert & Debelius 1999: 232, Figs. 1–2 (Great Nicobar I., Nicobar Is., Andaman Sea); Kuitert 2002\*; Smith *et al.* 2003.  
*Chaetodon cf. plebeius*: Kuitert 1998\*.  
*Chaetodon plebeius* (non Cuvier 1831): Randall & Anderson 1993\*.

Dorsal fin 14 spines, 18 rays; anal fin 4 spines, 16 rays; pectoral fins 16 or 17 rays. LL scales 36–38.

Body and head yellow, with dark longitudinal lines on body; black eyeband narrower than eye, fading below preopercle; eye-sized black spot on peduncle. Attains 15 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Maldives, southern India and Sri Lanka; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Found on coral reefs and exposed reef flats, to ~40 m, usually in pairs, sometimes in small groups; small juveniles found among *Acropora* corals. Feeds mainly on coral polyps. Unsuitable for aquaria. Previously confused with *C. plebeius* from the western Pacific, but has more longitudinal scale rows and lacks blue streak on sides (though some blue traces have been noticed on large specimens of *C. andamanensis* from Maldives).

*Chaetodon auriga* Forsskål 1775

Threadfin butterflyfish

PLATE 153

*Chaetodon auriga* Forsskål in Niebuhr 1775: 60, xiii (Jeddah, Saudi Arabia, Red Sea, or Al-Luhayya, Yemen, Red Sea); SFSA No. 592\*; Blaber 1978; Burgess 1978\*; Jones & Kumaran 1980; SSF No. 205.1\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; King 1996\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

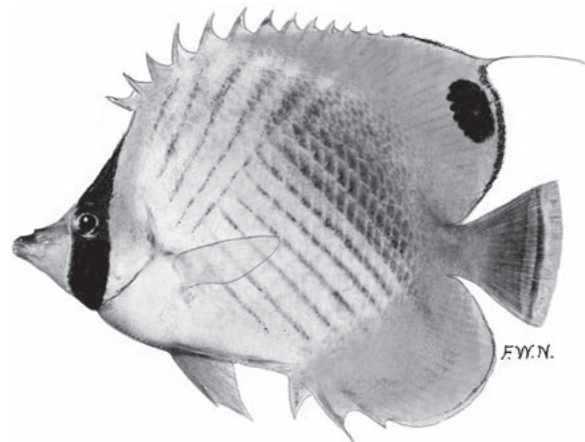
*Chaetodon setifer* Bloch 1795: 101, Pl. 426 [not Pl. 425], Fig. 1 (Tharangambadi, India).

*Chaetodon sebanus* Cuvier in Cuv. & Val. 1831: 74 (Mauritius, Mascarenes; Timor; Tongatabu; Guam; Jakarta, Java, Indonesia).

*Chaetodon auriga* var. *setifer*: Day 1875\*.

Dorsal fin 12 or 13 spines, 22–25 rays, adults with anterior rays elongated into filament; anal fin 3 spines, 19–21 rays; pectoral fins 15 or 16 rays. LL scales 27–32.

Body and head white, with dusky chevron pattern; fins and rear of body yellow; black eyeband fades above eyes in adults; black spot usually present at base of dorsal-fin filament (not on adults from Red Sea). Attains 23 cm TL.



*Chaetodon auriga*, 16 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Oman to South Africa (adults to East London, Eastern Cape; juveniles to Stilbaai, Western Cape), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep; elsewhere to Indonesia, Japan, Wake Atoll, Australia, Pitcairn Is. and Hawaii.

**REMARKS** Occurs inshore, in intertidal and reef-flat habitats, on coral reefs and on sand and coral rubble, to ~40 m deep. Adults usually in pairs but may be solitary, or school at some oceanic localities. Feeds on polychaetes, coral polyps, crustaceans, gastropods and algae. Does well in aquaria.

## *Chaetodon austriacus* Rüppell 1836

Blacktail butterflyfish

PLATES 148 & 155

*Chaetodon austriacus* Rüppell 1836: 30, Pl. 9, Fig. 2 (Jeddah market, Saudi Arabia, Red Sea); Burgess 1978\*; Randall 1995\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon vittatus* (non Bloch & Schneider 1801): Klunzinger 1870.

*Chaetodon klunzingeri* Kossmann & Räuber 1877: 391 (Red Sea).

*Chaetodon trifasciatus* var. *austriacus*: Klunzinger 1884.

*Chaetodon trifasciatus austriacus*: Ahl 1923.

Dorsal fin 13 spines, 20 or 21 rays; anal fin 3 spines, 19 rays; pectoral fins 13 or 14 rays. LL scales 39–42.

Body and head golden, with narrow grey stripes on upper body and black mark on one of upper stripes; 1–2 dark bars on head; dorsal fin white, soft-rayed portion with black margin; anal fin and caudal fin black; juveniles paler than adults, with black spot at base of rear dorsal-fin rays. Attains 13 cm TL.



*Chaetodon austriacus* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden, rarely to southern Oman.

**REMARKS** Found on sheltered coral reefs and reef flats, to ~25 m. Adults usually in pairs defending small territories, rarely solitary, sometimes in small shoals. Juveniles solitary among *Acropora* corals. Feeds on live coral polyps, also some gastropod eggs and anemones. Unsuitable for aquaria.

## *Chaetodon bennetti* Cuvier 1831

Archer butterflyfish

PLATES 148 & 153

*Chaetodon bennetti* Cuvier in Cuv. & Val. 1831: 84 (Sumatra, Indonesia);

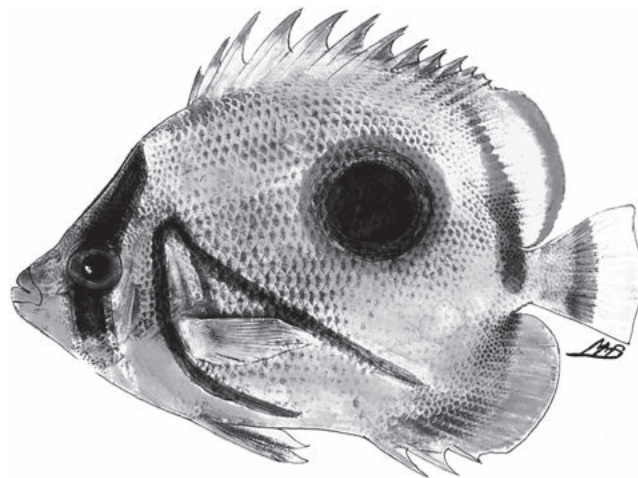
Fourmanoir 1961\*; Burgess 1978\*; Jones & Kumaran 1980; SSF No.

205.2\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*;

Kuitert 1998, 2002\*; Smith *et al.* 2003.

Dorsal fin 14 spines, 16–18 rays; anal fin 3 spines, 15–18 rays; pectoral fins 14–16 rays. LL scales 30–38.

Body, head and fins yellow; oblique blue line above and below pectoral-fin bases, from lateral-line origin to near anal-fin base; blue-edged dark eyeband; blue-ringed black ocellus on lateral line below rear dorsal-fin spines. Attains 20 cm TL.



*Chaetodon bennetti*, 13 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique to South Africa (rare: Sodwana Bay), Madagascar, Seychelles, Mauritius, Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia, Japan, Micronesia and Australia.

**REMARKS** Uncommon; shy, solitary or in pairs, on coral reefs and in lagoons with corals and seagrass beds, at 5–30 m. Feeds on coral polyps and hydroids.

## *Chaetodon blackburnii* Desjardins 1836

Blackburnie

PLATE 153

*Chaetodon blackburnii* Desjardins 1836: 58 (Mauritius, Mascarenes);

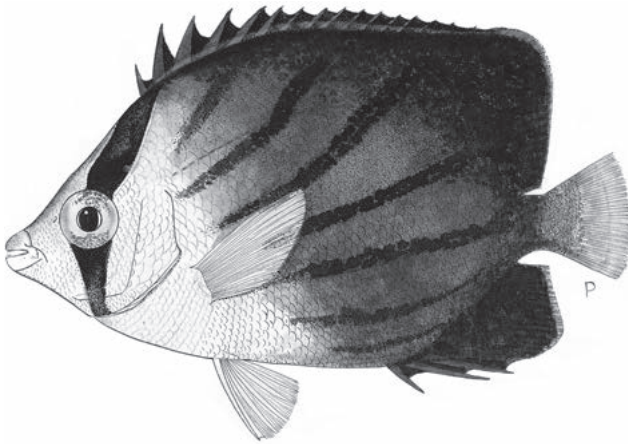
SFSA No. 606\*; Burgess 1978\*; SSF No. 205.3\*; Van der Elst 1988\*;

King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003;

Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 16 or 17 spines, 21–23 rays; anal fin 3 spines, 16–18 rays; pectoral fins 14 or 15 rays. LL scales 34–36.

Front of head, body and pelvic fins yellow, rest of body dark brown with ~7 slightly oblique black stripes; black eyeband from nape to edge of opercle. Attains 13 cm TL.



*Chaetodon blackburnii*, 8 cm TL (South Africa). Source: SFSA

**DISTRIBUTION** WIO: Kenya to South Africa (adults to Park Rynie, KwaZulu-Natal; juveniles to Algoa Bay, Eastern Cape), Madagascar and Mascarenes.

**REMARKS** Solitary or in pairs, on rocky shores and outer coral reefs, to ~70 m deep, and juveniles also in rock pools. Feeds on small invertebrates and zooplankton.

### *Chaetodon citrinellus* Cuvier 1831

Speckled butterflyfish

PLATES 149 & 153

*Chaetodon citrinellus* Cuvier (ex Broussonet) in Cuv. & Val. 1831: 27 (Guam, Mariana Is.); Burgess 1978\*; Jones & Kumaran 1980\*; Randall & Anderson 1993; Winterbottom & Anderson 1997\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 13 or 14 spines, 20–22 rays; anal fin 3 spines, 16 or 17 rays; pectoral fins 13–15 rays. LL scales 36–42.

Body, head and fins pale yellowish, with many dusky bluish spots on body, ventral spots in horizontal rows, rows becoming oblique dorsally; black eyeband from dorsal-fin origin to opercle edge, its width subequal to pupil; anal fin with black margin, white submarginal band; caudal fin hyaline. Attains 13 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Japan, Palau, Australia, Marquesas Is., Mariana Is. and Hawaii.

**REMARKS** Occurs on shallow exposed rocky coastal reefs and in lagoons, occasionally to outer reefs, to ~36 m deep. Adults in pairs or small groups; juveniles in small shoals, often with similar-sized juveniles of other species. Aggressive and adopts a defensive position when threatened. Feeds on polychaetes, coral polyps and algae.

### *Chaetodon collare* Bloch 1787

Redtail butterflyfish

PLATE 153

*Chaetodon collare* Bloch 1787: 116, Pl. 216, Fig. 1 (Japan [in error]); Burgess 1978\*; Jones & Kumaran 1980\*; Randall & Anderson 1993; Randall 1995\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.

*Chaetodon collare* var. *duplicicollis* Ahl 1923: 137 (Indian coast).

*Chaetodon parallelus* Gronow in Gray 1854: 70 (Indian Ocean).

Dorsal fin 12 spines, 25–28 rays; anal fin 3 spines, 20–22 rays; pectoral fins 14 or 15 rays; caudal fin truncate to slightly rounded. LL scales 37–44.

Body scales brownish with pale centres; head grey to black, with white bar (width of pupil) behind eyes and white markings on snout and chin; caudal fin mostly red; juveniles with white head and black eyeband, and with black ocellus on dorsal-fin rays; small juveniles with hyaline caudal fin. Attains 18 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Yemen, Gulf of Oman, Pakistan, India, Lakshadweep, Maldives and Sri Lanka; elsewhere to Cocos (Keeling) Is., Indonesia and Philippines.

**REMARKS** Occurs on outer coral and rocky coastal reefs, to ~20 m, with juveniles in estuaries and sheltered areas; found in pairs and large schools. Feeds on coral polyps, polychaetes and some algae.

### *Chaetodon decussatus* Cuvier 1829

Indian vagabond butterflyfish

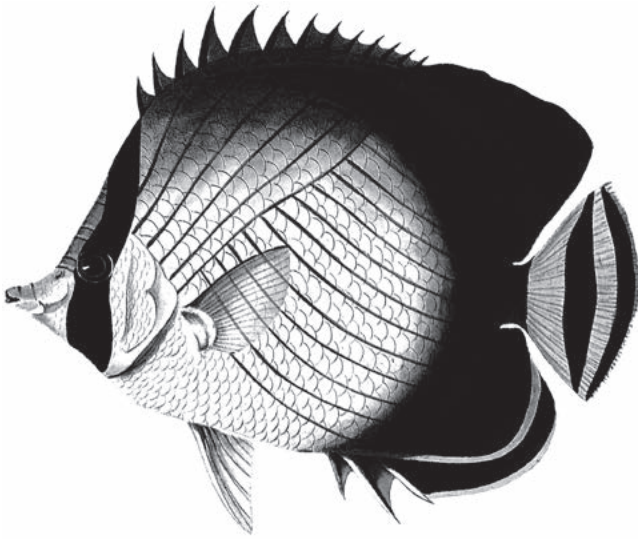
PLATES 149 & 153

*Chaetodon decussatus* Cuvier 1829: 190 (India); Burgess 1978\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.

*Chaetodon vagabundus* (*non* Linnaeus 1758): Bennett 1851.

Dorsal fin 13 spines, 24 or 25 rays; anal fin 3 spines, 20 or 21 rays; pectoral fins 14 or 15 rays. LL scales 36–41.

Body white, oblique dark lines on body running upwards from pointed edge of opercle to dorsal fin, and an opposing set of lines running downwards from the lowest upward line; rear of body and most of dorsal and anal fins black; black eyeband from nape to edge of opercle; caudal fin mostly yellow, with central black bar, black submarginal band, and hyaline margin; juveniles with caudal fin mostly hyaline, yellow basally. Attains 20 cm TL.



*Chaetodon decussatus*, ~12 cm SL (Sri Lanka). Source: Bennett 1830

**DISTRIBUTION** Indian Ocean. WIO: Maldives, India and Sri Lanka; elsewhere to Andaman Sea, Christmas I. and Indonesia.

**REMARKS** Territorial, on rubble or coral reefs, to ~30 m deep; adults solitary or in pairs, juveniles solitary. Feeds on algae and coral polyps. Edible but too small to be of commercial importance. Does well in aquaria.

*Chaetodon dialeucos* Salm & Mee 1989

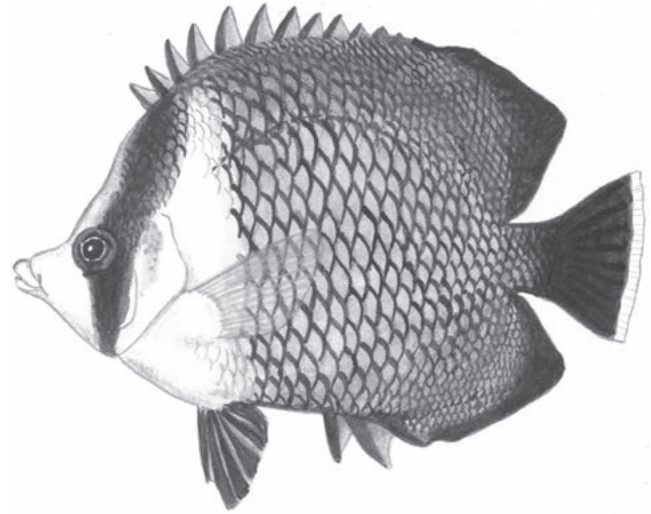
Oman butterflyfish

PLATE 154

*Chaetodon dialeucos* Salm & Mee 1989: 8, Figs. 1–3 (Oman); Randall 1995\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 13 spines, 21 or 22 rays; anal fin 3 spines, 19 rays; pectoral fins 15 or 16 rays. LL scales 24.

Body behind pectoral fins grey-brown, with dark scale edges forming network; head to 3rd dorsal-fin spine white; dark eyeband with diffuse edges, from nape, narrowing below eyes, to opercle or near isthmus; pectoral fins hyaline, other fins dark brown or black; juveniles with hyaline caudal fin. Attains 18 cm TL.



*Chaetodon dialeucos*, 15 cm TL (Oman).

**DISTRIBUTION** WIO: endemic to Oman.

**REMARKS** Occurs on rocky or coral reefs, rubble slopes, and coral outcrops surrounded by sand, in 1–25 m. Usually in pairs, occasionally solitary or in small shoals. Feeds on algae and benthic invertebrates.

*Chaetodon dolosus* Ahl 1923

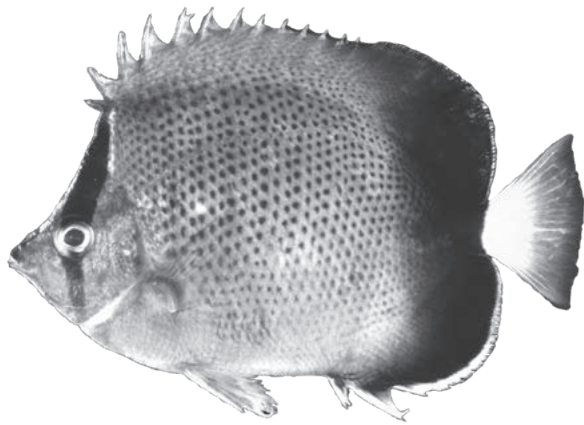
African blackedged butterflyfish

PLATE 153

*Chaetodon dolosus* Ahl 1923: 99 (Mauritius, Mascarenes); Burgess 1978\*; Smith 1980; SSF No. 205.4\*; King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.  
*Chaetodon guentheri* (*non* Ahl 1923): Fourmanoir 1957.  
*Chaetodon miliaris* (*non* Quoy & Gaimard 1825): Sauvage 1891; SFSA No. 595\*.  
*Chaetodon mendoncae* Smith 1953: 9 (Mozambique Channel); SFSA No. 604\*; Smith 1966\*.

Dorsal fin 12 or 13 spines, 21 or 22 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 14 or 15 rays. LL scales 36–42.

Head and body pale, rear part of body and dorsal and anal fins blackish; caudal fin yellow; dark eyeband connected at nape, tapering below eyes to edge of opercle; juveniles pale, with vertical rows of small brownish spots, black blotch on middle of soft-rayed portion of dorsal-fin rays, and rear of body slightly dusky. Attains 15 cm TL.



*Chaetodon dolosus*, 10 cm SL (South Africa). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** WIO: Somalia to South Africa (adults to KwaZulu-Natal, common at Aliwal Shoal; juveniles to Algoa Bay, Eastern Cape), Madagascar, Seychelles, Walters Shoals, Réunion and Mauritius.

**REMARKS** Found on rocky and coral reefs, in 8–200 m (adults usually at >15 m); solitary or in pairs. Has been seen to turn grey when feeding.

### *Chaetodon falcula* Bloch 1795

Saddled butterflyfish

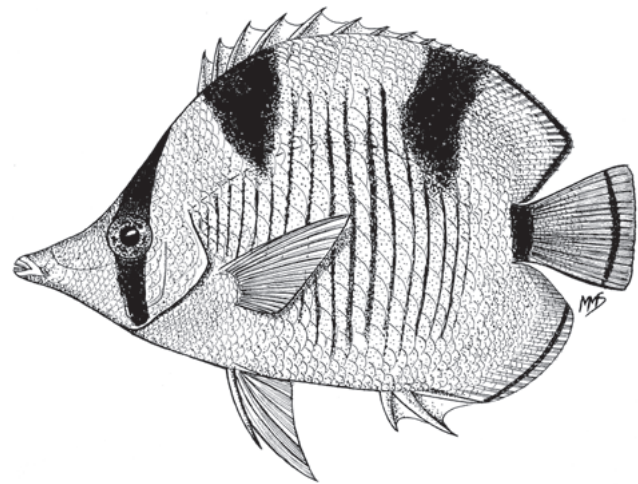
PLATE 153

*Chaetodon falcula* Bloch 1795: 102, Pl. 425, Fig. 2 [Tharangambadi, India]; SFSA No. 597\*; Burgess 1978\*; Jones & Kumaran 1980\*; SSF No. 205.5\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.

*Chaetodon dizoster* Valenciennes *in* Cuv. & Val. 1831: 527 (Mauritius, Mascarenes).

Dorsal fin 12 spines, 24–26 rays; anal fin 3 spines, 20–22 rays; pectoral fins 15 or 16 rays. LL scales 24–30.

Body pale, with 2 triangular black saddles dorsally and several vertical black lines; black band around peduncle; eyeband from nape through eyes to isthmus, forming horseshoe shape. Attains 20 cm TL.



*Chaetodon falcula*, 15 cm TL (WIO). Source: SFSA

**DISTRIBUTION** Indian Ocean. WIO: Kenya to southern Mozambique (juveniles to KwaZulu-Natal, South Africa), Madagascar, Comoros, Seychelles, Mauritius, Rodrigues, Chagos, Maldives and Lakshadweep; elsewhere to eastern India, Andaman Sea and Indonesia.

**REMARKS** Found in lagoons and on reefs with rich coral growth, in 1–15 m. Adults usually in pairs; juveniles cryptic. Feeds on coral polyps and other invertebrates. Replaced in the Pacific by the similarly coloured *C. ulietensis*.

### *Chaetodon fasciatus* Forsskål 1775

Diagonal butterflyfish

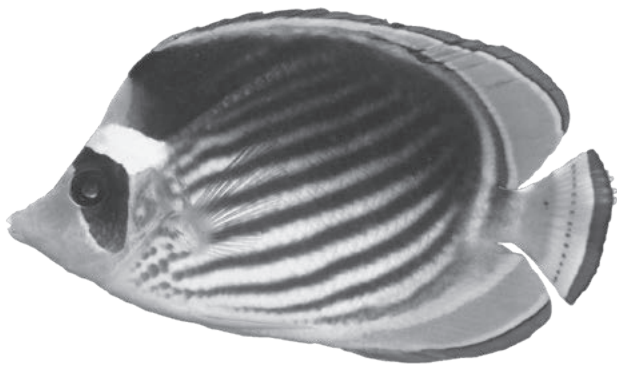
PLATE 155

*Chaetodon fasciatus* Forsskål *in* Niebuhr 1775: 59, xii (Jeddah, Saudi Arabia, Red Sea); Burgess 1978\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon flavus* Bloch & Schneider (ex Forsskål) 1801: 225 (Jeddah, Saudi Arabia, Red Sea).

Dorsal fin 12 spines, 20–24 rays; anal fin 3 spines, 17 or 18 rays; pectoral fins 13–16 rays. LL scales 34–41.

Head, body and fins deep yellow, with dark oblique stripes on body; broad black eyeband with narrow connection above eyes (sometimes absent) and white band immediately behind; nape with dark triangular patch, some specimens with darkened dorsum; no black spot or band on peduncle. Attains 25 cm TL.



*Chaetodon fasciatus* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: endemic to Red Sea and Gulf of Aden.

**REMARKS** Common in lagoons, on fringing reefs and coral reef flats, to ~25 m. Rarely solitary, usually in pairs, and sometimes in loose aggregations of up to ~15 individuals; easy to approach. Feeds on coral polyps, algae and benthic invertebrates. Resembles *C. lunula* but lacks a black spot on caudal peduncle.

*Chaetodon gardineri* Norman 1939

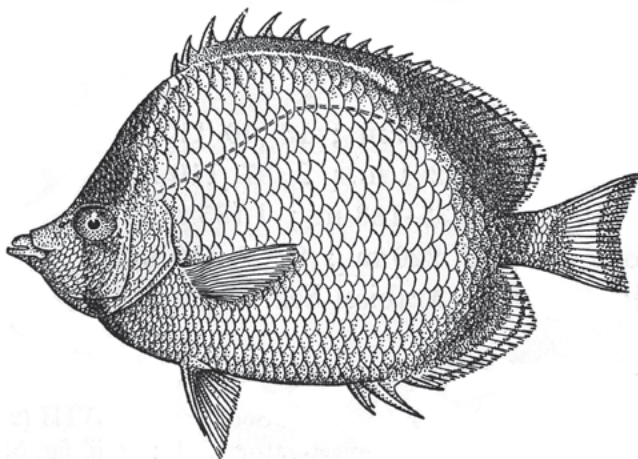
Gardiner's butterflyfish

PLATES 149 & 155

*Chaetodon gardineri* Norman 1939: 65, Fig. 22 (Muscat, Oman, Gulf of Oman); Burgess 1978\* [as *gardineri*]; Randall 1995\*; Allen *et al.* 1998\*; Debelius 1998; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 12 spines, 20–22 rays, anal fin 3 spines, 18 or 19 rays; pectoral fins 14 rays. LL scales 33–36.

Body and head white, becoming black posteriorly and onto dorsal fin; yellow spots on body; black eyeband with yellow rear edge; operculum membrane yellow; dorsal fin margin, caudal-fin base and most of anal fin yellow. Attains 17 cm TL.



*Chaetodon gardineri*, 15 cm TL, holotype (Oman). Source: Norman 1939

**DISTRIBUTION** Indo-Pacific. WIO: Gulf of Aden, Yemen, Oman, Pakistan to India and Sri Lanka; one record from Persian/Arabian Gulf; elsewhere to Myanmar, Thailand and Indonesia.

**REMARKS** In pairs or small aggregations, on coastal reefs, in 2–40 m (usually >25 m). Omnivorous diet includes algae and benthic invertebrates.

*Chaetodon guttatissimus* Bennett 1833

Peppered butterflyfish

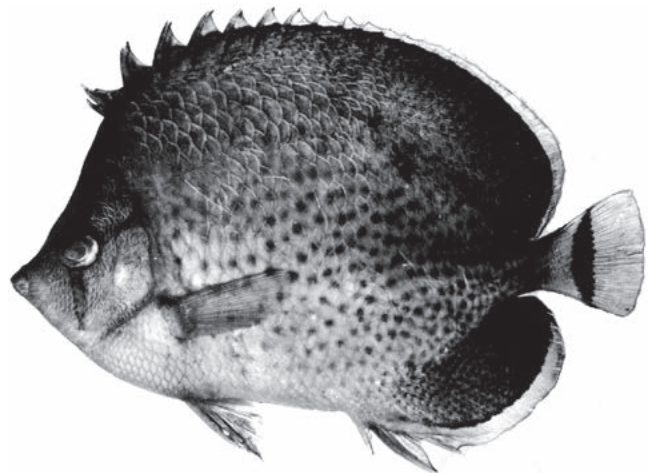
PLATE 153

*Chaetodon guttatissimus* Bennett 1833: 183 (Sri Lanka); SFSA No. 602\*; Smith 1965; Burgess 1978\*; Allen 1980\*; SSF No. 205.6\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

*Chaetodon* (*Tetragonopterus*) *maculatus* Sauvage (ex Liénard) 1891: 259 (Réunion [Mauritius], Mascarenes); Fricke 1999.

Dorsal fin 13 spines, 21–23 rays; anal fin 3 spines, 16–18 rays; pectoral fins 14 or 15 rays. LL scales 27–39.

Body pale yellow to whitish, covered with dark spots extending onto dorsal and anal fins; dorsal-fin margin yellow, fin bright orange above peduncle; black eyeband narrower below eyes; black vertical bar through middle of caudal fin. Attains 13 cm TL.



*Chaetodon guttatissimus*, 13 cm TL (S Mozambique).

**DISTRIBUTION** Indian Ocean. WIO: Yemen to South Africa (Aliwal Shoal; juveniles to Stilbaai, Western Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Thailand, Cocos (Keeling) Is., Christmas I. and Andaman Sea.



**REMARKS** Adults usually in pairs on coral reef areas near drop-offs, to ~33 m; juveniles in lagoons and tidepools. Feeds on coral polyps, polychaetes and algae.

### *Chaetodon interruptus* Ahl 1923

Teardrop butterflyfish

PLATES 149 & 156

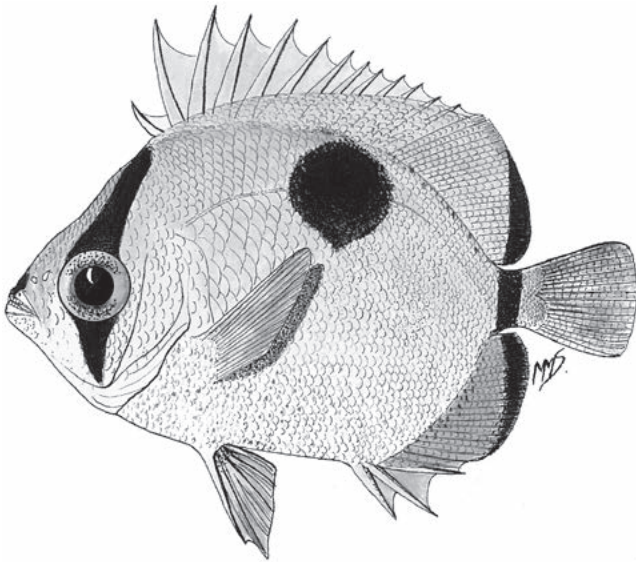
*Chaetodon unimaculatus interruptus* Ahl 1923: 142, Pl. 2, Fig. 9 (Mauritius, Mascarenes); Winterbottom *et al.* 1989\*.

*Chaetodon unimaculatus* (non Bloch 1787): SFSA No. 594\*; Blaber 1978; Burgess 1978\*; SSF No. 205.16\*; Van der Elst 1988\*; Randall & Anderson 1993; King 1996\*.

*Chaetodon interruptus*: Allen *et al.* 1998; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 13 spines, 21–23 rays; anal fin 3 spines, 17–20 rays; pectoral fins 15 or 16 rays. LL scales 35–41.

Head and body yellow; black teardrop-shaped spot below rear dorsal-fin spines in adults, juveniles with white-edged black ocellus; eyeband extends from nape to lower edge of interopercle, narrower than eyes; black submarginal bands along dorsal and anal fins joining over peduncle. Attains 20 cm TL.



*Chaetodon interruptus*, 8 cm TL (South Africa). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Somalia to South Africa (Port Alfred, Eastern Cape), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia.

**REMARKS** Found in lagoons and on coral and rocky reefs, in 1–90 m; juveniles in tidepools. Usually in pairs, sometimes solitary or in small groups. Feeds on hard and soft coral polyps, sponges, polychaetes and algae. The Pacific sibling species *C. unimaculatus* is geographically isolated from *C. interruptus*, has a mostly white body, and eyeband subequal to eye diameter and extending onto chest.

### *Chaetodon kleinii* Bloch 1790

Whitespotted butterflyfish

PLATE 153

*Chaetodon kleinii* Bloch 1790: 7, Pl. 218, Fig. 2 ('Ostindien' [Indonesia]);

SFSA No. 600\*; Burgess 1978\*; SSF No. 205.7\*; Van der Elst 1988\*;

Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*;

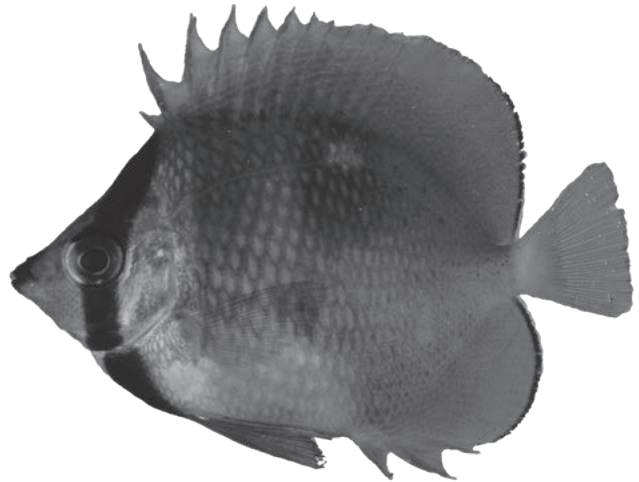
Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra & Heemstra

2004\*; Fricke *et al.* 2009.

*Chaetodon cingulatus* Fowler 1934: 480, Fig. 45 (Durban, KwaZulu-Natal, South Africa).

Dorsal fin 13 spines, 20–23 rays; anal fin 3 spines, 17–19 rays; pectoral fins 13–15 rays. LL scales 33–41.

Head and chest white, body yellowish with large pale spot in each scale (spots usually dark in preservative); black eyeband subequal to eye diameter, from nape to chest, becoming blue above eyes in adults; jaws dark; soft-rayed portions of dorsal and anal fins yellow, with narrow white margin and black submarginal line; WIO specimens with pelvic fins yellow; caudal fin yellowish, margin hyaline. Attains 15 cm TL.



*Chaetodon kleinii*, 10 cm SL (South Africa). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to South Africa (adults to Aliwal Shoal; juveniles to Stilbaai, Western Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia, Japan, Australia, Samoa and Hawaii.

**REMARKS** Found in lagoons and on rocky and coral reefs, in 1–70 m (usually >10 m); usually solitary, occasionally in pairs or aggregations. Feeds on plankton, anthozoans and algae, often near to reef shelter. Fairly hardy, adapts to aquaria, prefers live or frozen food.

### *Chaetodon larvatus* Cuvier 1831

Orangeface butterflyfish PLATES 149 & 155

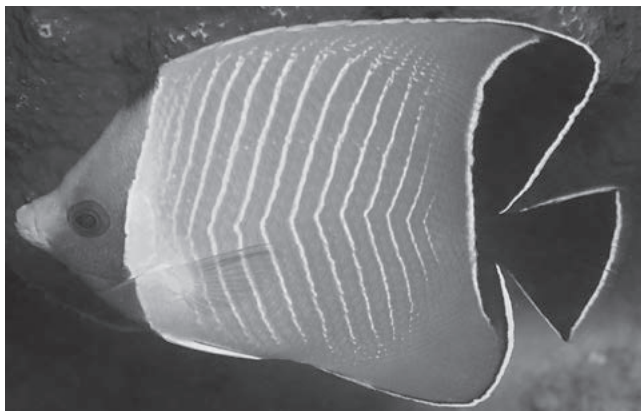
*Chaetodon larvatus* Cuvier (ex Ehrenberg) in Cuv. & Val. 1831: 45 (Massawa, Eritrea, Red Sea); Burgess 1978\*; Randall 1995\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon karraf* Cuvier (ex Ehrenberg) in Cuv. & Val. 1831: 46 (Massawa, Eritrea, Red Sea).

*Chaetodon larvatus* var. *karraf*: Klunzinger 1884.

Dorsal fin 11 or 12 spines, 24–27 rays; anal fin 3 spines, 21 or 22 rays; pectoral fins 15 or 16 rays; caudal fin truncate to slightly rounded. Dorsal- and anal-fin spines become progressively longer, creating distinctly triangular body shape. LL scales 31–37.

Front of head orange (to nape, dorsal-fin origin and breast); rear part of opercle and body grey, with yellow chevron pattern; most of caudal fin and rear of dorsal fin black; juveniles (<2.5 cm TL) with pale snout and nape, forming anteriorly diffuse eyeband. Attains 12 cm TL.



*Chaetodon larvatus* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Red Sea to Gulf of Aden, rarely to Oman.

**REMARKS** Found on fringing reefs with *Acropora* corals, in 3–12 m. Diurnal; solitary or in pairs defending small territories. Feeds mainly on *Acropora* coral polyps.

### *Chaetodon leucopleura* Playfair 1867

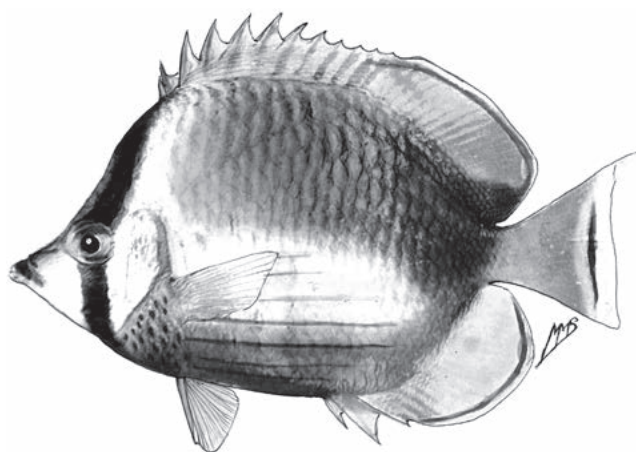
Somali butterflyfish PLATES 149 & 153

*Chaetodon leucopleura* Playfair in Playfair & Günther 1867: 35, Pl. 6, Fig. 3 (Zanzibar, Tanzania); Burgess 1978\*; Randall 1995\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon leucopygus* Ahl 1923: 72, Pl. 2, Fig. 12 (Dar es Salaam, Tanzania).

Dorsal fin 12 spines, 21–23 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 14 or 15 rays; caudal fin rounded to double emarginate. LL scales 31–37.

Head and body mainly white, darker dorsally, ventrally and posteriorly; scales dark-edged on upper body, forming narrow vertical bars in some specimens and 5 or 6 dark longitudinal stripes ventrally; edge of opercle and all fins (except pectoral fins) yellow; eyeband dark, sometimes faded or blotchy below eyes, subequal to eye diameter, and broadly joined at nape and chest. Attains 18 cm TL.



*Chaetodon leucopleura*, 18 cm TL (WIO). Source: Smith & Smith 1963

**DISTRIBUTION** WIO: southern Red Sea to southern Oman, Socotra to Tanzania (Dar es Salaam) and Aldabra.

**REMARKS** Found on coral and rocky reefs and rubble bottom, at 7–80 m (usually >20 m); solitary or in pairs.

### *Chaetodon lineolatus* Cuvier 1831

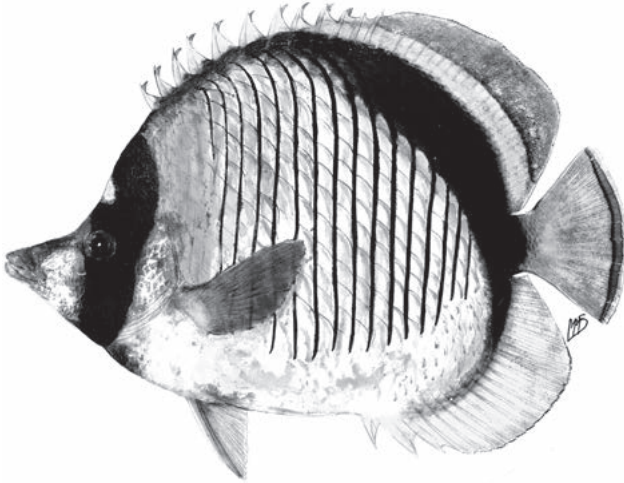
Lined butterflyfish PLATE 150

*Chaetodon lineolatus* Cuvier (ex Quoy & Gaimard) in Cuv. & Val. 1831: 40 (Mauritius, Mascarenes); SFSA No. 601\*; Burgess 1978\*; SSF No. 205.8\*; Winterbottom *et al.* 1989\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009.

*Chaetodon lunatus* Cuvier (ex Ehrenberg) in Cuv. & Val. 1831: 57 (Red Sea).

Dorsal fin 12 spines, 24–28 rays; anal fin 3 spines, 20–22 rays; pectoral fins 15–18 rays. LL scales 27–33.

Body white, with ~16 vertical black lines; broad black band along soft-rayed portion of dorsal-fin base to base of last anal-fin rays; rear of body, and dorsal, caudal and anal fins yellow; black eyeband wider than eye diameter, enclosing white spot at nape. Attains 30 cm TL (largest species of the genus).



*Chaetodon lineolatus*, 13 cm TL (S Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (KwaZulu-Natal), Madagascar, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives and Sri Lanka; elsewhere to Japan, Australia, Pitcairn Is. and Hawaii.

**REMARKS** Adults usually in pairs, occasionally solitary or in groups; juveniles solitary; cryptic in lagoons and on reefs, from 2–171 m. Feeds mainly on coral polyps and anemones, but also benthic invertebrates and algae.

### *Chaetodon lunula* (Lacepède 1802)

Halfmoon butterflyfish

PLATE 150

*Pomacentrus lunula* Lacepède (ex Commerson) 1802: 507, 511  
(no locality [Indian Ocean]).

*Chaetodon lunula*: SFSA No. 598\*; Blaber 1978; Burgess 1978\*; Jones & Kumaran 1980\*; SSF No. 205.9\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; King 1996\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009.

Dorsal fin 11–13 spines, 22–25 rays; anal fin 3 spines, 17–19 rays; pectoral fins 15–17 rays. LL scales 35–43.

Head, body and fins yellow, dusky dorsally with dark oblique lines on body; mask-like eyeband broadly continuous

over interorbital area, bordered dorsally by white band; yellow-edged black bar from edge of opercle to black spot on peduncle, with dorsal streak at bases of dorsal-fin rays; juveniles with black ocellus on soft-rayed portion of dorsal fin and another ocellus on peduncle. Attains 26 cm TL.



*Chaetodon lunula*, 12 cm SL (Seychelles). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: southern Oman (rarely) to South Africa (adults to Park Rynie, KwaZulu-Natal; juveniles to Stilbaai, Western Cape), Madagascar, Aldabra, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Japan, Palau, Wake Atoll, Australia, Pitcairn Is. and Hawaii.

**REMARKS** Adults usually in pairs, sometimes in loose groups, in lagoons and on rocky and coral reefs, to ~38 m; juveniles usually in 1–2 m, often in tidepools. Feeds mainly nocturnally on nudibranchs, coral polyps, opisthobranch gastropods, tubeworms, algae and zooplankton. Does well in aquaria.

### *Chaetodon madagaskariensis* Ahl 1923

Pearly butterflyfish

PLATE 154

*Chaetodon chrysurus madagaskariensis* Ahl 1923: 163 (Mauritius, Mascarenes [not Madagascar]); SSF No. 205.10\*; Van der Elst 1988\*; Allen *et al.* 1998\*.

*Chaetodon chrysurus* Desjardins 1832: 107 (Mauritius, Mascarenes); SFSA No. 603\*.

*Chaetodon madagascariensis*: Burgess 1978\*; Allen 1980\*; Smith 1980; Winterbottom *et al.* 1989\*; Smith *et al.* 2003.

*Chaetodon madagaskariensis*: Randall & Anderson 1993; Kuitert 2002\*; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Fricke *et al.* 2009\*.

Dorsal fin 13 or 14 spines, 20 or 21 rays; anal fin 3 spines, 16 or 17 rays; pectoral fins 14 or 15 rays. Dorsal and anal fins distinctly angular in large adults. LL scales 33–38.

Body pearly white, with 5–7 ragged black chevron marks on body; broad orange bar from soft-rayed portion of dorsal fin through last anal-fin rays; black eyeband on each side separate, not joined above or below; small horseshoe-shaped black mark on nape. Attains 13 cm TL.



*Chaetodon madagaskariensis*, 3 cm SL, juvenile (Rodrigues).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indian Ocean. WIO: Somalia to South Africa (Algoa Bay, Eastern Cape; juveniles to Stilbaai, Western Cape), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives and Sri Lanka; elsewhere to Cocos (Keeling) Is., Christmas I., Andaman Sea and Indonesia.

**REMARKS** Replaced by the similarly coloured *C. paucifasciatus* Ahl 1923 in the Red Sea, and by *C. mertensii* Cuvier 1831 in the Pacific. Found on coral and rocky reefs, in 9–120 m; juveniles occur in groups, adults solitary or in pairs. Feeds on benthic invertebrates and algae. Does well in aquaria.

### *Chaetodon marleyi* Regan 1921

Doublesash butterflyfish

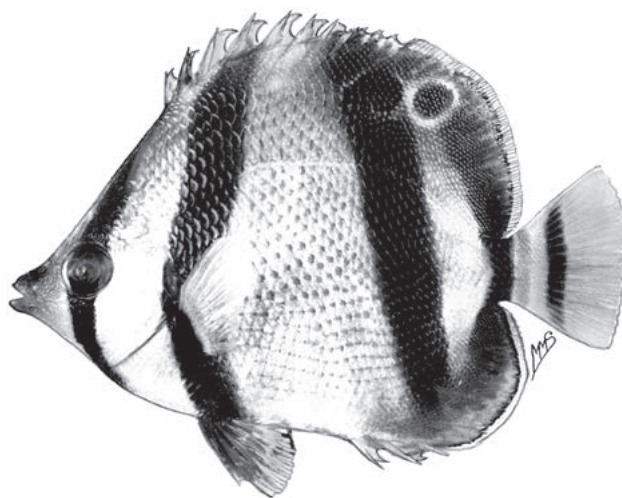
PLATES 150 & 154

*Chaetodon marleyi* Regan 1921: 1 (East London, Eastern Cape, South Africa); SFSA No. 591\*; Smith & Smith 1966\*; Burgess 1978\*; Allen 1980\*; SSF No. 205.11\*; Van der Elst 1988\*; King 1996\*; Allen *et al.* 1998\*; Vine 1998; Kuitert 2002\*; Smith *et al.* 2003; Heemstra & Heemstra 2004\*.

*Chaetodon notophthalmus* Ahl 1923: 81, Pl. 2, Fig. 10 [no locality given].

Dorsal fin 11 spines, 22–25 rays; anal fin 3 spines, 18 or 19 rays; pectoral fins 15 or 16 rays. LL scales 35–42.

Head and body pearly white, with 2 brown or yellowish bars on body and another bar on peduncle; body scales with brown or yellow spot at centre in adults and subadults; brown eyeband from nape to chest; soft-rayed portions of dorsal and anal fins and pectoral fins yellowish; 1 or 2 ocelli on mid-dorsal fin; subadults with black spot at tip of 2nd dorsal-fin spine; caudal-fin margin broadly brown or orangish. Attains 20 cm TL (4 years).



*Chaetodon marleyi*, 8 cm TL (South Africa). Source: SSF

**DISTRIBUTION** WIO: southern Mozambique (Maputo) to South Africa (Lambert's Bay, Western Cape) and southeastern Madagascar.

**REMARKS** Juveniles found inshore in tidepools, estuaries and harbours; adults found in pairs on subtropical coral and rocky reefs, in 1–120 m. Feeds mainly on tubeworm tentacles. Males mature at ~11 cm TL (2 years). Spawns in winter and spring (probably in KwaZulu-Natal) with females releasing multiple batches of eggs. Does well in cool (<24 °C) aquaria. The closely related *C. hoefleri* Steindachner 1882 occurs in the southeastern Atlantic, from southern Angola northwards.

### *Chaetodon melannotus* Bloch & Schneider 1801

Blackback butterflyfish

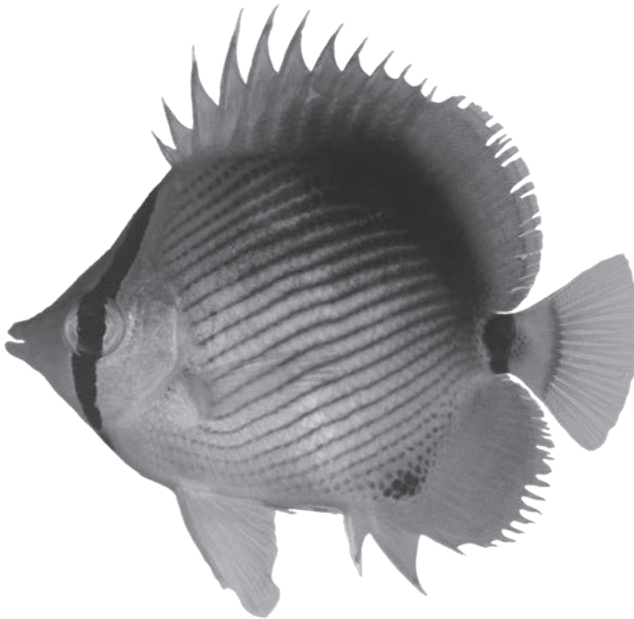
PLATES 150 & 154

*Chaetodon melannotus* Bloch & Schneider 1801: 224 (Tharangambadi, India); Burgess 1978\*; SSF No. 205.12\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Allen 2005; Fricke *et al.* 2009.

*Chaetodon melanotus*: SFSA No. 596\*; Jones & Kumaran 1980\*.

Dorsal fin 12 spines, 18–20 rays; anal fin 3 spines, 16–18 rays; pectoral fins 14 or 15 rays. LL scales 29–37.

Body pearly white, with oblique black streaks running into black area along dorsal-fin base; pelvic fins, median fins, abdomen and front of head yellow; black blotch on peduncle and (usually) another at bases of anal-fin spines. Attains 18 cm TL.



*Chaetodon melannotus*, 5 cm SL (Rodrigues). PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, Kenya to South Africa (occasionally to KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives, Lakshadweep, southern India and Sri Lanka; elsewhere to east coast of India, Japan, Marshall Is., Australia and Tonga.

**REMARKS** Juveniles found inshore; adults home-ranging, usually in pairs or solitary, on coral and rocky reefs, reef flats and lagoons, to ~25 m deep. Feeds mainly on soft coral polyps. Easy to keep in aquaria.

### *Chaetodon melapterus* Guichenot 1863

Arabian butterflyfish PLATE 154

*Chaetodon melapterus* Guichenot 1863: C-6 (Réunion [probably in error]); Burgess 1978\*; Randall 1995\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon melanopterus* Playfair in Playfair & Günther 1867: 34 [unjustified emendation of *Chaetodon melapterus* Guichenot 1863].

*Chaetodon trifasciatus* var. *arabica* Steindachner 1899: 162 (Makalla, southeastern Arabia) [objectively invalid].

Dorsal fin 13 spines, 19 or 20 rays; anal fin 3 spines, 18–20 rays; pectoral fins 14 or 15 rays; caudal fin rounded. LL scales 33–42.

Head and body orange-yellow, with slightly oblique reddish lines on body, and entire body abruptly black posteriorly; dorsal, anal and caudal fins nearly entirely black, with thin pale margins; snout and chin black; 2 black bars on head, first darker and through eyes. Attains 13 cm TL.

**DISTRIBUTION** WIO: southern Red Sea, Gulf of Aden to Gulf of Oman and Persian/Arabian Gulf.

**REMARKS** Adults usually in pairs on coral reefs, to ~16 m; juveniles solitary and cryptic among corals. Feeds mainly on coral polyps and some benthic invertebrates.

### *Chaetodon mesoleucos* Forsskål 1775

Whiteface butterflyfish PLATES 150 & 155

*Chaetodon mesoleucos* Forsskål in Niebuhr 1775: 61, xiii (Al-Mukha, Yemen, Red Sea); Burgess 1978\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon hadjan* Bloch & Schneider 1801: 227 (Arabia, Red Sea).

Dorsal fin 13 spines, 21–23 rays; anal fin 3 spines, 18–20 rays; pectoral fins 14 or 15 rays. LL scales 22–25.

Anterior third of head and body white to pale grey, rear two-thirds dark grey-brown, with  $\geq 13$  narrow black bars; eyeband black (but occasionally faint); caudal fin with pale semicircular band at base and dark lens-shaped central bar. Attains 16 cm TL.

**DISTRIBUTION** WIO: endemic to Red Sea and Gulf of Aden.

**REMARKS** Usually occurs as pairs defending small territories, on coral reefs and wrecks, to at least 20 m deep; also territorial in aquaria. Feeds on polychaetes, nematodes and scleractinian corals.

### *Chaetodon meyeri* Bloch & Schneider 1801

Maypole butterflyfish PLATE 154

*Chaetodon meyeri* Bloch & Schneider 1801: 223 (Ambon I., Moluccas, Indonesia); Smith 1953, 1966\*; Burgess 1978\*; Jones & Kumaran 1980\*; SSF No. 205.13\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

Dorsal fin 12 spines, 23 or 24 rays; anal fin 3 spines, 18–20 rays; pectoral fins 15–17 rays. LL scales 41–47.

Body, head and median fins bluish-white, bluish-grey or bluish-yellow, with several curving black lines; pelvic fins and dorsal- and anal-fin margins yellow. Attains 20 cm TL.



*Chaetodon meyeri*, 12 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Somalia to South Africa (Sodwana Bay; juveniles to Aliwal Shoal, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Indonesia, Japan, Australia, Tonga and Line Is.

**REMARKS** Adults solitary or in pairs, in lagoons and on reefs with well-developed coral, to ~33 m deep; juveniles usually in branching corals. Feeds only on coral polyps, thus not easy to keep in aquaria.

### *Chaetodon mitratus* Günther 1860

Obliquebanded butterflyfish PLATES 150, 151 & 154

*Chaetodon mitratus* Günther 1860: 16 (Mauritius, Mascarenes); Burgess 1978\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2006; Fricke *et al.* 2009.

Dorsal fin 13 spines, 18–20 rays; anal fin 3 spines, 14 or 15 rays; pectoral fins 13 or 14 rays. LL scales 30–38.

Body with 2 broad oblique dark brown to blackish bands, tapering or fading ventrally, with whitish interspaces; head, pelvic fins and anal fin yellow; caudal fin also yellow, with broad hyaline margin; soft-rayed portion of dorsal fin dusky yellow, reddish brown or blackish; pectoral fins hyaline, rays slightly dusky; wide black eyeband joins at interorbital region, but narrows or fades below eyes; juveniles with dusky oval patch on soft-rayed portion of dorsal fin. Specimens from eastern Indian Ocean have pale whitish yellow body, and eyeband below eyes dark yellow. Attains 14 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: southern Mozambique to South Africa (just south of Sodwana Bay), Madagascar, Seychelles, Réunion, Mauritius, Chagos and Maldives; elsewhere to Cocos (Keeling) Is., Christmas I. and Andaman Sea.

**REMARKS** Solitary, in pairs or in small groups, on outer-reef drop-offs and in caves, at 20–100 m. Feed on benthic invertebrates, zooplankton and algae.

### *Chaetodon nigropunctatus* Sauvage 1880

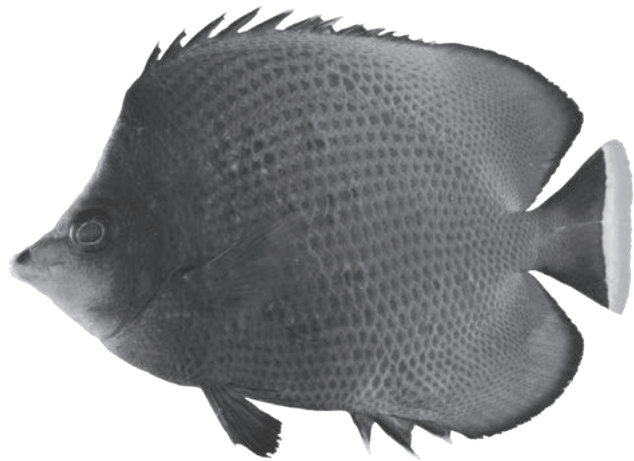
Blackspotted butterflyfish PLATES 151 & 154

*Chaetodon* (*Tetragonopterus*) *nigropunctatus* Sauvage 1880: 222 [12] (Oman); Burgess 1978\*; Randall 1995\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon obscurus* Boulenger 1888: 657 (Muscat, Oman, Gulf of Oman).

Dorsal fin 13 spines, 21–23 rays; anal fin 3 spines, 18–20 rays, pectoral fins 14 or 15 rays. Dorsal and anal fins rounded in juveniles, becoming more angular with growth. LL scales 36–39.

Body and fins brown to yellow-brown, scale centres black; snout and lower head white; median fins with black margin; opercle membrane brown-black; pelvic fins deep brown; dark smudge on nape in front of dorsal fin; juveniles with hyaline caudal fin, and submarginal oval black spot on soft-rayed portions of dorsal and anal fins, fading with growth. Attains 13 cm TL.



*Chaetodon nigropunctatus*, 11 cm SL (Qatar). © SV Bogorodsky

**DISTRIBUTION** WIO: central Oman to Persian/Arabian Gulf.

**REMARKS** Home-ranging, solitary or in pairs, on sheltered coral and rocky reefs, to ~18 m deep; juveniles solitary among *Acropora* corals. Adults feed on mixed invertebrates and algae; juveniles feed mainly on coral polyps.

*Chaetodon octofasciatus* Bloch 1787

Eightbar butterflyfish

PLATE 154

*Chaetodon octofasciatus* Bloch 1787: 113, Pl. 215, Fig. 1 (Indian Ocean); Burgess 1978\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.  
*Chaetodon octolineatus* Gronow in Gray 1854: 69 (Indian Ocean).

Dorsal fin 10–12 spines, 17–19 rays; anal fin 3 spines, 14–17 rays; pectoral fins 12–14 rays. LL scales 36–42.

Body and fins whitish, with 8 paired bars: 1st bar through eyes, 8th bar on margins of dorsal and anal fins; bar through eyes from nape through rear of upper lip; 2 pairs of body bars sometimes with dark blotch in between; juveniles similar to adults, but small juveniles with bar on peduncle wider in centre (like a spot). Attains 12 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives, India and Sri Lanka; elsewhere to Thailand, Taiwan, Japan, Palau, New Guinea, Australia and Solomon Is.

**REMARKS** Found on shallow, often turbid, coastal reefs, to ~20 m deep; usually in pairs or small groups.

*Chaetodon ornatissimus* Cuvier 1831

Ornate butterflyfish

PLATE 155

*Chaetodon ornatissimus* Cuvier (ex Solander) in Cuv. & Val. 1831: 22 Pau (Tahiti, Society Is.); Burgess 1978\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Debelius 1999\*; Smith *et al.* 2003.

Dorsal fin 12 or 13 spines, 24–28 rays; anal fin 3 spines, 20–23 rays; pectoral fins 15 or 16 rays. LL scales 47–52.

Body pale, with 6 oblique orange stripes; head with golden bars, alternating with 2 black bars behind eyes, black eyeband from nape to isthmus, and black band encircling snout; triangular dark interorbital area; caudal fin with 2 black bars. Attains 20 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO (rare): Seychelles, Maldives and Sri Lanka; elsewhere to Indonesia, Japan, Wake Atoll, Cocos (Keeling) Is., Australia, French Polynesia, Pitcairn Is. and Hawaii.

**REMARKS** Found among branching corals, in lagoons, and on reefs with rich coral growth, to ~36 m. Adults in pairs; juveniles solitary. Feeds mainly on coral polyps.

*Chaetodon oxycephalus* Bleeker 1853

Napespot butterflyfish

PLATE 154

*Chaetodon oxycephalus* Bleeker 1853: 603 (Ternate, Moluccas, Indonesia); Burgess 1978\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.

Dorsal fin 11 or 12 spines, 22–24 rays; anal fin 3 spines, 18–20 rays; pectoral fins 14–16 rays. LL scales 26–34.

Head and body white, with 16–18 black vertical lines on body; broad black eyeband wider than eye diameter and widening below eyes; separate horseshoe-shaped black mark above eyeband on nape; somewhat lunate black band at rear of body from base of last dorsal-fin spines to lower edge of peduncle, with 1 or 2 thinner black lines distally on dorsal fin; dorsal, caudal and anal fins yellow. Attains 25 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Maldives and Sri Lanka; elsewhere to Indonesia, Philippines, Australia and Solomon Is.

**REMARKS** Found on coral reefs and rich coral slopes, to ~40 m. Adults usually in pairs; juveniles cryptic.

*Chaetodon paucifasciatus* Ahl 1923

Eritrean butterflyfish

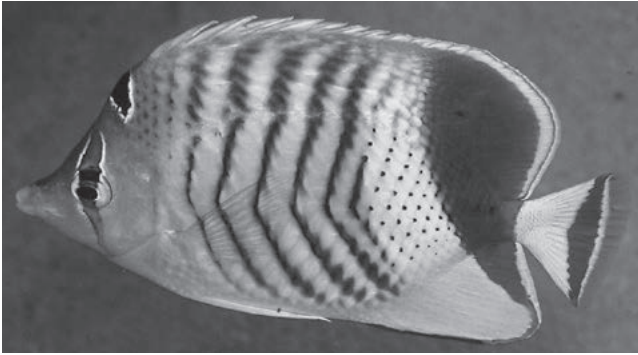
PLATE 155

*Chaetodon chrysurus paucifasciatus* Ahl 1923: 162 (Al-Qusayr, Egypt, Red Sea).

*Chaetodon paucifasciatus*: Burgess 1978\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 12–14 spines, 20–23 rays; anal fin 3 spines, 15–18 rays; pectoral fins 13 or 14 rays. LL scales 36–40.

Head and body pale, with dark chevron pattern on body; golden orange eyebands not connected above eyes; black half-moon mark on nape above and separate from eyeband (may connect with eyeband in small juveniles); conspicuous red-orange patch on upper rear part of body and adjacent fins, and caudal fin yellow with similar red-orange submarginal bar; irregular black spot on soft-rayed portion of dorsal fin in juveniles. Attains 14 cm TL (usually smaller).



*Chaetodon paucifasciatus* (Red Sea). © SV Bogorodsky

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden.

**REMARKS** Found on seagrass beds, rubble patches and coral reefs, quite common in deeper water, to ~65 m; in pairs or loose aggregations. Feeds on coral polyps, polychaetes, small crustaceans and algae. Does well in aquaria.

### *Chaetodon pictus* Forsskål 1775

Horseshoe butterflyfish

PLATE 151

*Chaetodon pictus* Forsskål in Niebuhr 1775: 65, xiii (Al-Mukha, Yemen, Red Sea); Kuitert 2002; Smith *et al.* 2003.

*Anisochaetodon (Linophora) vagabundus pictus*: Fraser-Brunner 1949\*.

*Chaetodon vagabundus pictus*: Burgess 1978\*.

Dorsal fin 13 spines, 23–25 rays; anal fin 3 spines, 19–22 rays; pectoral fins 15 or 16 rays. Dorsal and anal fins angular. LL scales 34–40.

Head, body and pelvic fins white, with oblique dark lines running upwards from pointed edge of opercle to dorsal fin and downwards from lowest upward line; black eyband noticeably broader below eyes, and joined at nape to wide black dorsal-fin margin, which in turn joins black band at dorsal-fin base, extending across peduncle to midway along anal-fin base; rear dorsal-fin rays yellow (yellow portion at least 1.5 times width of dark basal band); rear anal-fin rays yellow; caudal fin yellow, with pale reddish central bar and reddish brown submarginal band. Juveniles with black spot on soft-rayed portion of dorsal fin, and caudal fin hyaline. Attains ~20 cm TL.

**DISTRIBUTION** WIO: southern Red Sea, Gulf of Aden, Yemen to Gulf of Oman.

**REMARKS** Found on rocky reefs, to ~20 m; solitary or in pairs or groups. The predominant butterflyfish of southern Oman.

### *Chaetodon rafflesii* Anonymus [Bennett] 1830

Lattice butterflyfish

PLATE 151

*Chaetodon rafflesii* Anonymus [Bennett] 1830: 689 (Sumatra, Indonesia); Kuitert 2002\*.

*Chaetodon rafflesii*: Burgess 1978\*; Allen *et al.* 1998\*; Smith *et al.* 2003.

Dorsal fin 12 or 13 spines, 21–23 rays; anal fin 3 spines, 18–20 rays; pectoral fins 14 or 15 rays. LL scales 30–37.

Head, body and fins yellow, with darkish scale margins on body forming lattice pattern (sometimes faded), and occasionally with large dusky blotch under spinous portion of dorsal fin; black eyband subequal to pupil extending from nape to eyes, subequal to eye diameter from eye to opercle edge; interorbital region blue; black lens-shaped bar on caudal fin. Juveniles (<5 cm SL) with black spot on soft-rayed portion of dorsal fin. Attains 18 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Indonesia, Japan, Australia and Tuamotu Is.

**REMARKS** Found in lagoons and on sheltered coastal coral reefs, to ~15 m; solitary or in pairs. Feeds on polyps, anemones and polychaetes.

### *Chaetodon semeion* Bleeker 1855

Dotted butterflyfish

PLATE 151

*Chaetodon semeion* Bleeker 1855: 450 (Cocos-Keeling Is., Indian Ocean); Burgess 1978\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 13 or 14 spines, 23–26 rays, anterior rays elongated into filament in adults; anal fin 3 spines, 19–26 rays; pectoral fins 14 or 15 rays. LL scales 33–39.

Head, body and fins yellow, except caudal fin hyaline with rays outlined pale violet; rows of blue-black dots on body; nape and interorbital area blue; black eyband wider below eyes, merging above into blue on nape; black submarginal band on soft-rayed portions of dorsal and anal fins tapering towards spinous portions of fins. Attains 24 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Sri Lanka; elsewhere to Cocos (Keeling) Is., Christmas I., Japan, Palau, Australia, Line Is. and Tuamotu Is.

**REMARKS** Uncommon; usually in pairs, but occasionally in small groups, on coral in lagoons and on reef slopes, from 2–50 m.



*Chaetodon semilarvatus* Cuvier 1831

Bluecheek butterflyfish

PLATE 151

*Chaetodon semilarvatus* Cuvier (ex Ehrenberg) in Cuv. & Val. 1831: 39 (Massawa, Eritrea, Red Sea; Al-Luhayya, Yemen, Red Sea); Burgess 1978\*; Randall 1995\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Chaetodon (Anisochaetodon) semilarvatus*: Klunzinger 1884\*.

*Chaetodon melanopoma* Playfair in Playfair & Günther 1867: 35, Pl. 6, Fig. 2 (Aden).

Dorsal fin 12 spines, 25–27 rays; anal fin 3 spines, 20–22 rays; pectoral fins 15 rays. LL scales 28–32.

Head, body and fins yellow, with thin vertical reddish orange bars; quadrangular blue-grey patch on and behind eyes. Attains 23 cm TL.

**DISTRIBUTION** WIO: Red Sea and Gulf of Aden; one report from southern Oman.

**REMARKS** Solitary, in pairs, or in groups of up to ~20. Typically found resting under ledges or active on coral reefs, in 3–20 m by day, feeding mainly at night. Feeds on coral polyps, some polychaetes and nematodes.

*Chaetodon triangulum* Cuvier 1831

Triangle butterflyfish

PLATES 152 &amp; 154

*Chaetodon triangulum* Cuvier (ex Kuhl & Van Hasselt) in Cuv. & Val. 1831: 44 (Jakarta, Java, Indonesia); Burgess 1978\*; Randall & Anderson 1993; Winterbottom & Anderson 1997; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003.

Dorsal fin 11 or 12 spines, 23–26 rays; anal fin 3 spines, 20 or 21 rays; pectoral fins 14 rays. Body roughly triangular. LL scales 25–33.

Body grey, with many pale chevron markings, more conspicuous anteriorly, body dark dusky grey posteriorly; snout dark; 2 dark reddish brown bars (one through eye, one behind eye), more dusky in juveniles; bright yellowish streak over peduncle onto anal fin; caudal fin with wide lens-shaped black patch. Attains 15 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Chagos, Maldives and Sri Lanka; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Territorial; adults usually in pairs, juveniles solitary. Found among coral branches on coral reefs and in lagoons with *Acropora* corals, to ~25 m deep. Feeds exclusively on *Acropora* coral polyps.

*Chaetodon trifascialis* Quoy & Gaimard 1825

Chevron butterflyfish

PLATE 152

*Chaetodon trifascialis* Quoy & Gaimard 1825: 379, Pl. 62, Fig. 5 (Guam, Mariana Is.); Burgess 1978\*; SSF No. 205.14\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; King 1996\*; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

*Chaetodon triangularis* Rüppell 1829: 42, Pl. 9, Fig. 3 (El Tur, Sinai coast, Egypt, Red Sea).

Body elongate. Dorsal fin 13 or 14 spines, 14–16 rays; anal fin 4 spines, 13–15 rays; pectoral fins 15 rays. LL scales 21–27.

Head and body white, with dark chevron markings on body; black eyeband; caudal fin black in adults, hyaline in small juveniles; juveniles with black band on rear of body. Attains 17 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea, southern Oman to South Africa (Aliwal Shoal), Madagascar, Comoros, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives and Lakshadweep; elsewhere to Japan, Mariana Is., Australia, Tuamotu Is., and Hawaii.

**REMARKS** Territorial; adults solitary or occasionally in pairs, and juveniles cryptic among coral branches. Found in lagoons and on shallow coral or limestone reefs with well-developed soft corals, to ~33 m deep (usually <15 m). Feeds mainly on *Acropora* plate-coral polyps and mucus and some algae. Not recommended as an aquarium fish. IUCN Red List conservation status Near Threatened.

*Chaetodon trifasciatus* Park 1797

Purple butterflyfish

PLATE 156

*Chaetodon trifasciatus* Park 1797: 34 (Bengkulu Province, Sumatra, Indonesia); SFSA No. 593\*; Burgess 1978\*; Jones & Kumaran 1980\*; SSF No. 205.15\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009.

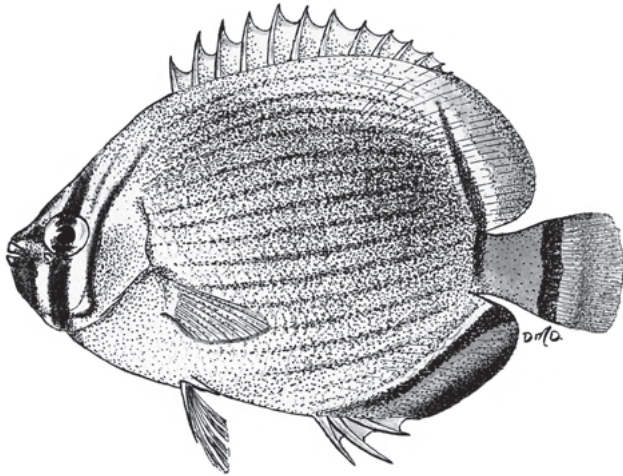
*Chaetodon layardi* Blyth 1852: 50 (Sri Lanka).

*Chaetodon trifasciatus caudifasciatus* Ahl 1923: 57 (Tanzania; Mozambique; Madagascar; Padang, Sumatra, Indonesia).

Dorsal fin 13 or 14 spines, 20–22 rays; anal fin 3 spines, 18–20 rays; pectoral fins 14–16 rays. LL scales 36–38.

Head and anteroventral part of body yellowish orange, rest of body bluish purple, more or less horizontal grey-mauve stripes on body, with blackish lens-shaped mark on

one dorsoposterior stripe; 2 black bars on head (one through eyes); chin dark; anal fin and peduncle yellow to orange; caudal fin pale yellow, with broad black submarginal band. Attains 15 cm TL.



*Chaetodon trifasciatus*, 10 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Kenya to South Africa (Kosi Bay), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Cocos (Keeling) Is., Christmas I. and Indonesia.

**REMARKS** Found in lagoons and on coral and rocky reefs and drop-offs, to ~70 m deep. Solitary or in pairs aggressively defending territory. Feeds on scleractinian corals. Juveniles adaptable to aquarium life. Once thought synonymous with the Pacific species *C. lunulatus* Quoy & Gaimard 1825.

### *Chaetodon vagabundus* Linnaeus 1758

Vagabond butterflyfish PLATES 152 & 156

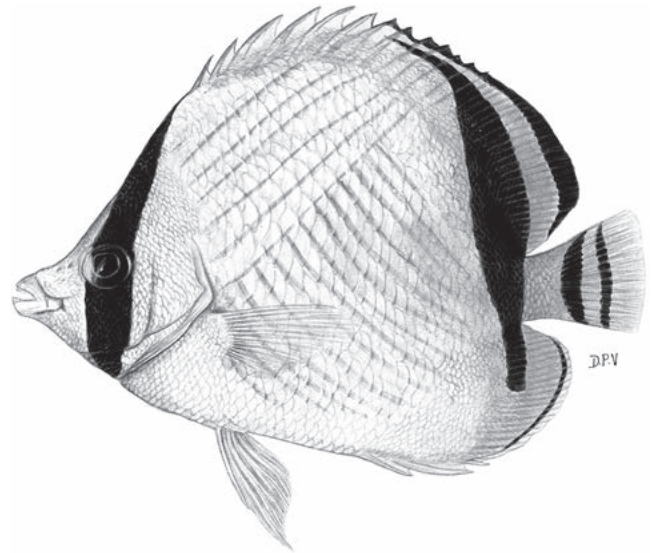
*Chaetodon vagabundus* Linnaeus 1758: 276 ('Indies' [probably Indonesia]); SFSA No. 599\*; Blaber 1978; Burgess 1978\*; Jones & Kumaran 1980\*; SSF No. 205.17\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; King 1996\*; Allen *et al.* 1998\*; Kuitert 1998\*, 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

*Chaetodon nesogallicus* Cuvier 1829: 190 (Mauritius, Mascarenes).

Dorsal fin 13 spines, 23–26 rays; anal fin 3 spines, 19–21 rays; pectoral fins 15–17 rays. LL scales 31–38.

Head, body and pelvic fins white; oblique dark lines on body running upwards from pointed edge of opercle to dorsal fin, and an opposing set of lines running downwards from the lowest upward line; black eyband joined at nape, subequal to

eye diameter ventrally; black band at dorsal-fin base, extending over peduncle and onto anal fin, and joined to dark dorsal fin margin; caudal fin and soft-rayed portions of dorsal and anal fins yellow (yellow area on dorsal fin subequal to ~1.5 times width of dark basal band); caudal fin with black central and submarginal bars. Juveniles with black spot at angle of soft-rayed portion of dorsal fin, and caudal fin hyaline. Attains 23 cm TL.



*Chaetodon vagabundus*, 9 cm SL (Madagascar). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Oman to South Africa (Aliwal Shoal, KwaZulu-Natal; juveniles to Algoa Bay, Eastern Cape), Madagascar, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep; elsewhere to Indonesia, Japan, Marshall Is., Australia and Tuamotu Is.

**REMARKS** Adults usually in pairs, sometimes solitary or in small groups, on coral and rocky reefs, at 1–30 m; juveniles in tidepools and lagoons. Feeds on coral polyps and other benthic organisms. Does well in aquaria.

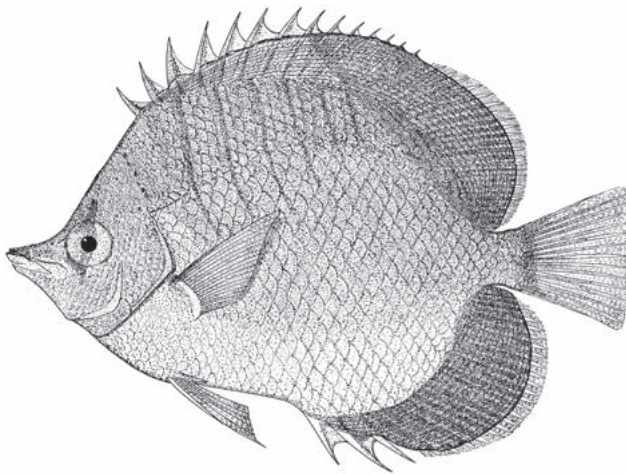
### *Chaetodon xanthocephalus* Bennett 1833

Yellowhead butterflyfish PLATE 156

*Chaetodon xanthocephalus* Bennett 1833: 182 (Sri Lanka); SFSA No. 605\*; Burgess 1978\*; Allen 1980; Jones & Kumaran 1980\*; SSF No. 205.18\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Fricke *et al.* 2009.

Dorsal fin 13 or 14 spines, 23–25 rays; anal fin 3 spines, 21–23 rays; pectoral fins 15–17 rays. LL scales 31–37.

Body and most of head whitish grey, with several thin mauve chevrons on body, and body below soft-rayed portion of dorsal fin with whitened oval area; yellow streak from upper edge of opercle to pectoral-fin base; snout and nape yellow, yellow area extending below eyes to pelvic fins; soft-rayed portions of dorsal and anal fins yellowish to pale brown (dark in preservative); caudal fin greyish, rays whitish with dark outline. Juveniles with black eyeband fading on nape; black spot on peduncle; most of soft-rayed portion of dorsal fin dusky. Attains 20 cm TL.



*Chaetodon xanthocephalus*, 11 cm SL (WIO). Source: Smith 1937

**DISTRIBUTION** Indian Ocean. WIO: Kenya to South Africa (adults to Sodwana Bay; juveniles to Durban, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos, Maldives, Lakshadweep and Sri Lanka; elsewhere to Andaman Is., Thailand and Indonesia.

**REMARKS** Found in lagoons, on sheltered reefs rich with coral and algae, and on drop-offs, to ~25 m; solitary, occasionally in pairs. Roams over reefs in search of live food. Does well in aquaria once acclimated.

### *Chaetodon zanzibarensis* Playfair 1867

Zanzibar butterflyfish

PLATES 152 & 156

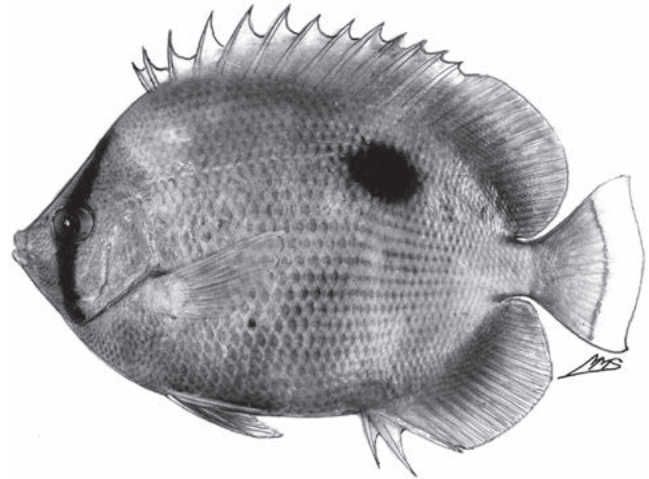
*Chaetodon zanzibarensis* Playfair in Playfair & Günther 1867: 33,

Pl. 6, Fig. 1 (Zanzibar, Tanzania); Burgess 1978\* [as *zanzibariensis*]; Allen 1980\*; SSF No. 205.19\*; Winterbottom *et al.* 1989\*; King 1996\*; Allen *et al.* 1998\*; Kuitert 2002\* [as *zanzibariensis*]; Smith *et al.* 2003; Fricke *et al.* 2009.

*Chaetodon spilopleura* (non Cuvier 1831): Kaup 1860.

Dorsal fin 13 or 14 spines, 15–17 rays; anal fin 3 spines, 15–17 rays; pectoral fins 15 or 16 rays. LL scales 32–39.

Body, head and fins brilliant yellow; black eyeband from nape to opercle, subequal to pupil diameter; body scales with central darkish bar forming longitudinal lines; conspicuous black spot larger than eye on lateral line. Attains 15 cm TL.



*Chaetodon zanzibarensis*, 15 cm TL (Seychelles).

**DISTRIBUTION** WIO: Somalia, Kenya to South Africa (KwaZulu-Natal), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes and Chagos.

**REMARKS** Found in lagoons with staghorn corals and on reef-tops, in 2–40 m; in pairs or small groups.

### GENUS *Forcipiger* Jordan & McGregor 1898

Snout elongate, tube-like; pelvic fins and pectoral fins elongate. Dorsal fin 11 or 12 spines, 22–27 rays; anal fin 3 spines, 17–20 rays; pectoral fins 14–16 rays. Lateral line complete. Four species, 2 in WIO.

#### KEY TO SPECIES

- |    |  |                        |
|----|--|------------------------|
| 1a | Dorsal fin 11 spines; snout length 1.1–1.5 in body depth; distance from eyes to pelvic fins longer than snout length ..... | <i>F. longirostris</i> |
| 1a | Dorsal fin 12 spines; snout length 1.6–2.1 in body depth; distance from eyes to pelvic fins less than snout length .....   | <i>F. flavissimus</i>  |

***Forcipiger flavissimus*** Jordan & McGregor 1898

Forceps butterflyfish

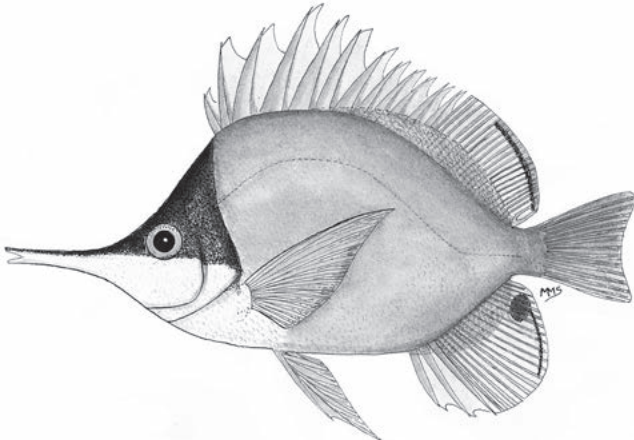
PLATE 157

*Forcipiger flavissimus* Jordan & McGregor in Jordan & Evermann 1898: 1671 (Clarión I., Revillagigedo Is., off Mexico); Burgess 1978\*; SSF No. 205.20\*; Van der Elst 1988\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

*Forcipiger longirostris* (non Broussonet 1782): Smith & Smith 1963\*; SFSA No. 589\*.

Dorsal fin 12 spines, 22–24 rays; anal fin 17 or 18 rays; pectoral fins 14–16 rays. HL 2.2–2.4 in SL; snout length 1.6–2.1 in body depth; mouth gape small, 10–14 in body depth. GR 12–16. LL scales 69–80.

Head white ventrally, with black triangular area dorsally (joining at nape with triangular area on other side); body and entire dorsal and anal fins yellow, except conspicuous black spot on rear of anal fin; pectoral fins and caudal fin whitish hyaline. Attains 22 cm TL.



*Forcipiger flavissimus*, ~20 cm TL (S Mozambique).

**DISTRIBUTION** Indo-Pacific to eastern Pacific (widespread). WIO: Red Sea to South Africa (KwaZulu-Natal), Madagascar, Comoros, Seychelles, Mascarenes, Chagos and Maldives; elsewhere to Japan, Australia, Hawaii, Baja California, Revillagigedo Is., Easter I. and Galápagos Is.

**REMARKS** The most widely distributed species among butterflyfishes. Adults usually in pairs, in lagoons and on reefs and drop-offs, in 1–145 m. Feeds on tubeworm tentacles, hydroids, sea-urchin pedicellaria, small crustaceans and fish eggs. Does well in captivity.

***Forcipiger longirostris*** (Broussonet 1782)

Longnose butterflyfish

PLATE 157

*Chaetodon longirostris* Broussonet 1782: [31], Pl. 7 (Hawaii).

*Forcipiger longirostris*: Burgess 1978\*; Randall & Anderson 1993;

Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Fricke *et al.* 2009.

Dorsal fin 11 spines, 24–27 rays; anal fin 17–20 rays; pectoral fins 14 or 15 rays. HL 2.2–2.6 in SL; snout length 1.1–1.5 in body depth; mouth gape minute, 20–50 in body depth. GR 15–18. LL scales 66–75.

Colour resembles *F. flavissimus* but often with longitudinal rows of darkish spots on chest (may be faint); uniformly dark morphs known, sometimes with black triangular area on head and anal-fin spot barely visible. Attains 22 cm TL.

**DISTRIBUTION** Indo-Pacific to eastern Pacific. WIO: Comoros, Mauritius and Maldives; elsewhere to Japan, Marshall Is., Australia, Pitcairn Is., Hawaii, Gulf of California and Galápagos Is.

**REMARKS** Reports from Seychelles by Smith & Smith (1963) are based on misidentified *F. flavissimus*. Found on coral reefs, in 3–70 m. Feeds on small crustaceans.

**GENUS** *Hemitaurichthys* Bleeker 1876

Lateral line complete; snout short; pectoral fins and pelvic fins elongate; no elongate dorsal-fin spines. Four species, 1 in WIO.

***Hemitaurichthys zoster*** (Bennett 1831)

Belted butterflyfish

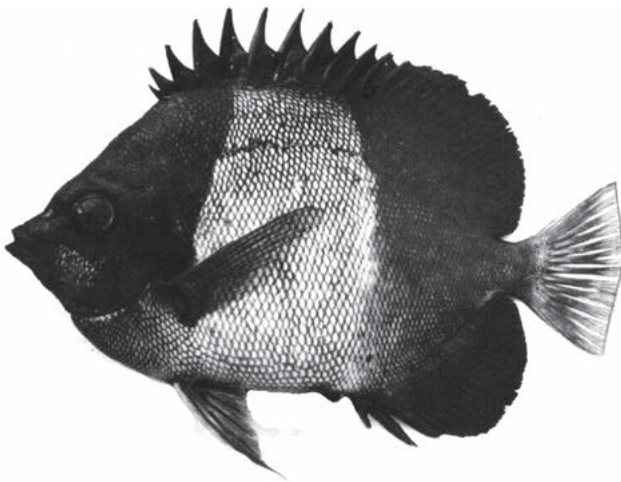
PLATE 157

*Chaetodon zoster* Bennett 1831: 61 (Mauritius, Mascarenes).

*Hemitaurichthys zoster*: Burgess 1978\*; Allen 1980\*; Jones & Kumaran 1980\*; Smith 1980; SSF No. 205.21\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Randall 1995\*; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

Dorsal fin 11 or 12 spines, 24 or 25 rays; anal fin 3 spines, 20 or 21 rays; pectoral fins 17–19 rays. LL scales 66–73.

Body dark brown, with broad white vertical band in middle; dorsal-fin spines yellow (over white area on body); pelvic, pectoral and caudal fins white. Attains 18 cm TL.



*Hemitaurichthys zoster*, 17 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indian Ocean. WIO: Oman to South Africa (Aliwal Shoal, KwaZulu-Natal), Madagascar, Comoros, Seychelles, Réunion, Mauritius, Chagos, Maldives and Lakshadweep; elsewhere to Andaman Sea and Indonesia.

**REMARKS** Usually in large schools on coral and rocky reefs, in 1–120 m. Feeds on zooplankton well above the reef, to which it retreats at the approach of danger. At Aliwal Shoal, South Africa, the species is solitary or in pairs, usually in caves and under ledges.

## GENUS *Heniochus* Cuvier 1816

Lateral line complete; dorsal fin 11 or 12 spines, 4th spine elongated. Eight species currently recognised; 6 species in WIO.

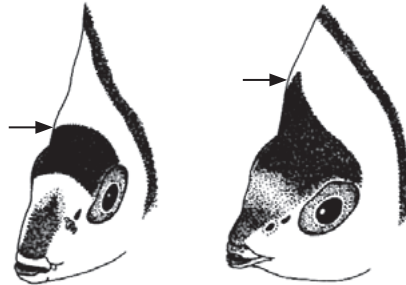
### KEY TO SPECIES

- |    |  |                       |
|----|--|-----------------------|
| 1a | Dark bar on body from (and including) pelvic fins and touching rear of eyes .....                                | <i>H. intermedius</i> |
| 1b | Dark bar on body from (and including) pelvic fins well behind eyes .....   | 2                     |
| 2a | Front of head mostly pale, but with snout dusky dorsally; black interorbital band not extending below eyes ..... | 3                     |
| 2b | Front of head mostly dark; black interorbital band extending just below or well below eyes .....                 | 4                     |

Continued ...

### KEY TO SPECIES

- |    |   |                      |
|----|---|----------------------|
| 3a | Dorsal-fin spines usually 11; snout length 2.7–3.3 in HL; black eyeband restricted to interorbital area .....       | <i>H. acuminatus</i> |
| 3b | Dorsal-fin spines usually 12; snout length 3.3–3.7 in HL; black eyeband runs dorsally above interorbital area ..... | <i>H. diphreutes</i> |



3a

3b

- |    |  |                        |
|----|--|------------------------|
| 4a | Dark bar from pelvic fins to dorsal-fin spines 1–3 .....   | <i>H. singularius</i>  |
| 4b | Dark bar from pelvic fins to below dorsal-fin spines 4–7 .....   | 5                      |
| 5a | Dorsal fin with 4th spine elongated to form a filament; pectoral fins 16–18 rays; black eyeband extends well below eyes to symphysis ..... | <i>H. monoceros</i>    |
| 5b | No filament on dorsal fin; pectoral fins 14 or 15 rays; dark eyeband extends just below eyes .....   | <i>H. pleurotaenia</i> |

## *Heniochus acuminatus* (Linnaeus 1758)

Coachman

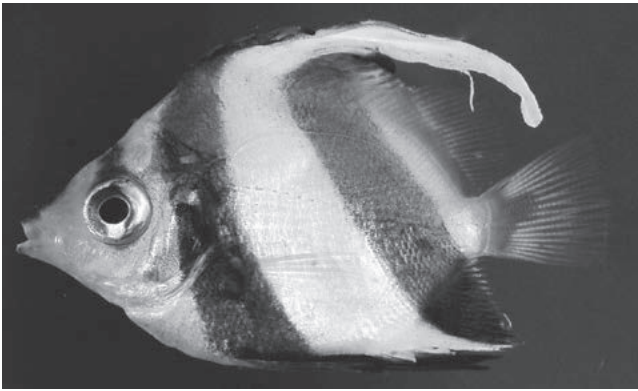
PLATE 156

*Chaetodon acuminatus* Linnaeus 1758: 272 ('Indies').

*Heniochus acuminatus*: SFSA No. 590\* [in part]; Allen & Kuitert 1978\*; Burgess 1978\* [in part]; Jones & Kumaran 1980\*; SSF No. 205.22\*; Van der Elst 1988\*; Randall & Anderson 1993; Randall 1995\*; Winterbottom & Anderson 1997; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Heemstra *et al.* 2004; Heemstra & Heemstra 2004\*; Allen 2005; Fricke *et al.* 2009.

Dorsal fin 11 or 12 spines, 23–26 rays, elongated 4th spine often extending past caudal fin; anal fin 3 spines, 17–19 rays; pectoral fins 16–18 rays. Large adults with short stout spine in front of each eye. LL scales 47–57.

Head and body white with 2 broad black bands; black eyeband restricted to interorbital area; pectoral fins, caudal fin and rear of dorsal fin pale yellow; pelvic fins black. Attains 25 cm TL.



*Heniochus acuminatus*, 3 cm SL, juvenile (Mozambique).  
PC Heemstra © NRF-SAIAB

**DISTRIBUTION** Indo-Pacific. WIO: Persian/Arabian Gulf, Gulf of Oman, Tanzania to South Africa (Aliwal Shoal, KwaZulu-Natal; juveniles to Tsitsikamma, Western Cape), Madagascar, Seychelles, Mascarenes, St Brandon Shoals, Chagos, Maldives and Lakshadweep; elsewhere to Japan, Micronesia, Australia and French Polynesia.

**REMARKS** Solitary or in pairs, in deep lagoons and channels close to live coral reefs, at 2–178 m (usually >10 m).

### *Heniochus diphreutes* Jordan 1903

Schooling coachman

PLATE 156

*Heniochus diphreutes* Jordan 1903: 694, Fig. 3 (Nagasaki, Japan); Allen & Kuitert 1978\*; Smith 1980; SSF No. 205.23\*; Randall & Anderson 1993; Khalaf & Disi 1997\*; Allen *et al.* 1998\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Fricke *et al.* 2009.

*Heniochus acuminatus*: Burgess 1978\* [in part].

Dorsal fin 12 spines, 23–25 rays, elongated 4th spine often extending past caudal fin; anal fin 3 spines, 17–19 rays; pectoral fins 16–18 rays. No spines in front of eyes. LL scales 49–57.

Head and body white with 2 broad black bands; black eyeband runs dorsally above and across interorbital area; pectoral fins, caudal fin, and soft-rayed portion of dorsal fin yellowish; pelvic fins black. Attains 21 cm TL.



*Heniochus diphreutes*, 18 cm TL (Seychelles). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Red Sea to South Africa (KwaZulu-Natal, Aliwal Shoal; juveniles to Port Edward), Réunion, Mauritius, Seychelles and Maldives; elsewhere to Indonesia, Japan, Australia and Hawaii; absent in much of Oceania.

**REMARKS** Usually in schools, on coral and rocky reefs, in 15–210 m. Feeds on zooplankton well off the bottom.

### *Heniochus intermedius* Steindachner 1893

Red Sea bannerfish

PLATE 157

*Heniochus intermedius* Steindachner 1893: 150 (Gulf of Suez, Red Sea); Burgess 1978\*; Debelius 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 11 spines, 25 or 26 rays, elongated 4th spine often extending past caudal fin; anal fin 3 spines, 17–19 rays; pectoral fins 17 or 18 rays. Slight hump on nape, with bilobed horn above each eye. LL scales 48–56.

Head and body white with 2 broad black bars, 1st bar from dorsal-fin origin to pelvic fins and touching rear of eye; snout, interorbital area and nape dark, merging with 1st bar; 2nd bar from 4th dorsal-fin spine to rear of anal fin; caudal fin and soft-rayed portions of dorsal and anal fins yellow. Attains 18 cm TL.

**DISTRIBUTION** WIO: Gulf of Suez, Red Sea and Gulf of Aden; Lessepsian migrant to Mediterranean Sea.

**REMARKS** Found on coral reefs, to ~50 m deep. Adults in pairs, hiding below large corals by day, rarely in large groups; juveniles solitary. Active after dark, feeding on polychaetes, scleractinian coral polyps, crabs, larvae and amphipods; planktivorous in some areas.

### *Heniochus monoceros* Cuvier 1831

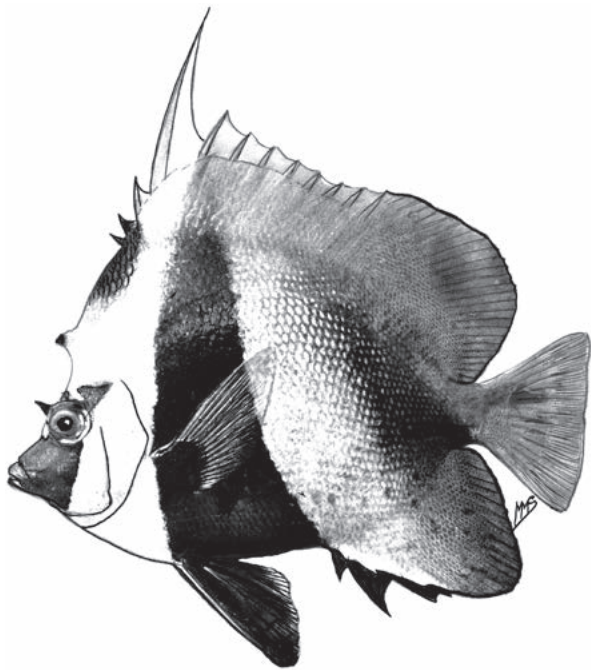
Masked coachman

PLATES 156 & 157

*Heniochus monoceros* Cuvier in Cuv. & Val. 1831: 100, Pl. 176 (Mauritius, Mascarenes); Burgess 1978\*; Jones & Kumaran 1980\*; Smith 1980; SSF No. 205.24\*; Winterbottom *et al.* 1989\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003; Allen 2005; Fricke *et al.* 2009.

Dorsal fin 11 or 12 spines, 24–26 rays; anal fin 3 spines, 17–19 rays; pectoral fins 16–18 rays. Prominent hump on nape; large adults with short horn above each eye. LL scales 51–64.

Body white with dark bar from dorsal-fin spines 5–7 to pelvic fins, and fainter diffuse dark bar from rear of anal fin nearly to dorsal-fin base; anterior part of head and body similarly dark, but interrupted by small white crescent shape above eyes, and dusky yellowish area to nape; pelvic fins black; pectoral fins hyaline yellow, bases black; caudal fin and soft-rayed portions of dorsal and anal fins yellow. Attains 24 cm SL.



*Heniochus monoceros*, ~14 cm TL (N Mozambique). Source: SSF

**DISTRIBUTION** Indo-Pacific. WIO: Mozambique, South Africa (Aliwal Shoal, KwaZulu-Natal; juveniles to Eastern Cape), Madagascar, Comoros, Aldabra, Seychelles, Mascarenes, Chagos, Maldives and Lakshadweep; elsewhere to Japan, Micronesia, Australia and Pitcairn Is.

**REMARKS** Adults in lagoons and on coral and rocky reefs with rich coral growth, to ~30 m deep (usually >15 m); juveniles in tidepools. Feeds on colonial ascidians and polychaetes.

### *Heniochus pleurotaenia* Ahl 1923

Phantom bannerfish

PLATES 156 & 158

*Heniochus pleurotaenia* Ahl 1923: 26, Pl. 1, Fig. 5 (Padang, Sumatra, Indonesia); Burgess 1978\*; Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

*Heniochus varius* (non Cuvier 1829): Eibl-Eibesfeldt 1964\*.

Dorsal fin 11 spines, 23–25 rays, fin triangular (no elongate filament); anal fin 3 spines, 17 or 18 rays; pectoral fins 14 or 15 rays. Adults with prominent pointed hump on nape and strong horn above each eye. LL scales 55–59.

Body ochre; snout, interorbital area and nape to dorsal-fin origin dark; 2 wide dark regions from beneath dorsal-fin spines 4–7: one to pelvic fins, the other to anal fin; white streak from tips of dorsal-fin spines to peduncle; pale triangular area between body bars below lateral line. Attains 17 cm TL.

**DISTRIBUTION** Indian Ocean. WIO: Maldives and Sri Lanka; elsewhere to Andaman Sea, Myanmar and Indonesia.

**REMARKS** Solitary, in pairs or in shoals of up to ~30 fish, over coral reefs, to ~25 m deep.

### *Heniochus singularius* Smith & Radcliffe 1911

Singular bannerfish

PLATES 156 & 158

*Heniochus singularius* Smith & Radcliffe 1911: 321, Fig. 2 (Alibabjan I., Ragay Gulf, Luzon, Philippines); Burgess 1978\*; Randall & Anderson 1993\*; Winterbottom & Anderson 1997; Allen *et al.* 1998\*; Kuitert 2002\*; Smith *et al.* 2003.

Dorsal fin 11 or 12 spines, 25–27 rays, 4th spine moderately elongated (longest in juveniles); anal fin 3 spines, 17 or 18 rays; pectoral fins 16 or 17 rays. Adults with prominent pointed hump on nape and short spine above each eye. LL scales 53–64.

Body grey-blue, dark body scales often with pale centres, and pale body scales sometimes with dark centres; soft-rayed

portion of dorsal fin and caudal fin yellow; broad white bar at rear of head, from dorsal-fin origin to chest, joining white dorsal-fin filament; eyeband joined dorsally and ventrally, preceded by narrower continuous white band around snout, and then narrow dark bar on snout, except lips pale; dark area over rear of opercle to pelvic fins, more or less to dorsal-fin spines 1–3, and second dark area from anal fin to below dorsal-fin spines 7–8. Attains 30 cm TL.

**DISTRIBUTION** Indo-Pacific. WIO: Chagos, Maldives and Sri Lanka; elsewhere to Philippines, Nicobar Is., Indonesia, Japan, Micronesia, Australia and Samoa.

**REMARKS** Found on reef slopes, in 2–40 m. Adults usually in pairs, juveniles solitary. Feeds on scleractinian corals, benthic invertebrates and algae.

**GENUS** *Prognathodes* Gill 1862

Previously considered a subgenus of *Chaetodon*. Snout fairly long, 2.1–3.3 in HL. Dorsal fin 13 spines (spines 3–4 usually longest), 18–21 rays (first rays longer than last spines); anal fin 3 spines (2nd spine strong, longer than 3rd), 14–16 rays. Spinous portion of dorsal fin triangular, much higher than soft-rayed portion, and with low scaly sheath at base, with most spines free; interspinous membranes deeply incised, slight notch between spinous and soft-rayed portions of fin; rear of dorsal and anal fins subvertical. Lateral line incomplete, ending below rear of dorsal fin. Eyeband below eyes absent or reduced, narrower than eye diameter and sometimes angled forward; median stripe on snout usually present. Usually found below 100 m. Eleven species, 2 in WIO.

**KEY TO SPECIES**

- 1a Eyeband not angled forward below eyes; dark bands on body oblique; body depth 1.7–2 in SL; snout length plus upper jaw subequal to eye diameter ..... *P. guyotensis*
- 1b Eyeband angled forward below eyes; dark bands on body more or less vertical; body depth ~1.7 in SL; snout length plus upper jaw distinctly longer than eye diameter ..... *P. guezei*

*Prognathodes guezei* (Maugé & Bauchot 1976)

Guezé's butterflyfish PLATES 153 & 158

*Chaetodon guezei* Maugé & Bauchot 1976: 89, Figs. 1–3 (off Réunion, Mascarenes); Allen *et al.* 1998\*; Kuitert 2002\*.

*Prognathodes guezei*: Smith *et al.* 2003; Fricke *et al.* 2009.

Dorsal fin 20 rays; anal fin 16 rays; pectoral fins 14 rays. Dorsal head profile distinctly concave; HL ~2.5 in SL. LL scales 26–28.

Head and body yellowish white; 2 broad black bars on body narrowing slightly ventrally: 1st bar behind pectoral fin, 2nd bar from 8th dorsal-fin spine to anal fin; narrow dark band around peduncle; black eyeband from dorsal-fin origin to eyes, fading and narrowing along snout to mouth; median black stripe in front of eyeband to front of upper lip; short narrow dusky yellow bar between eyeband and 1st bar and between body bars; dorsal-fin margin pale, with dusky submarginal band; anal fin yellowish white, with pale margin and dusky yellow submarginal band; pectoral fins and caudal fin hyaline; pelvic fins dusky yellow, with white spine. Attains 11 cm TL.



*Prognathodes guezei*, ~8 cm SL (Réunion).

**DISTRIBUTION** WIO: South Africa (Sodwana Bay), Comoros, Réunion and Mauritius.

**REMARKS** Found on deep reefs; known from 80 m at Réunion and 100–120 m at Sodwana Bay. In South Africa they live in canyon-margin habitat, and solitary specimens have been observed feeding on seawhip polyps (K Sink, pers. comm.). Photographs of what appear to be this species have also been taken from a submersible off Cape Vidal, KwaZulu-Natal, South Africa, in 90–104 m.

*Prognathodes guyotensis*

(Yamamoto & Tameka 1982)

Guyot butterflyfish PLATE 158

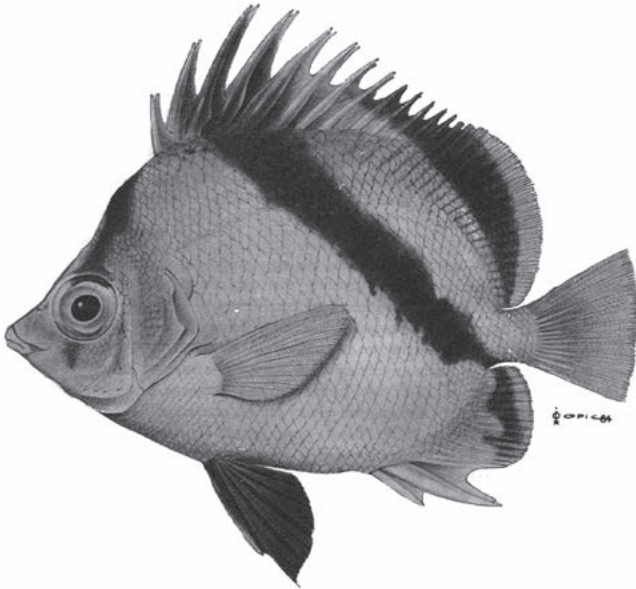
*Chaetodon guyotensis* Yamamoto & Tameka in Okamura *et al.* 1982: 249, Pl. 171 (Kyushu-Palau Ridge); Randall & Anderson 1993; Allen *et al.* 1998\*; Kuitert 2002\*.

*Prognathodes guyotensis*: Randall & De Bruin 1988\*; Smith *et al.* 2003.



Dorsal fin 18 rays; anal fin 14 rays; pectoral fins 14 rays.  
HL ~2.6 in SL. LL scales 26.

Head, body, pectoral fins and caudal fin pale yellowish white; dark eyeband from nape to preopercle, narrower than eye; oblique dark band from bases of dorsal-fin spines 3–7 to peduncle and narrowing onto anal-fin rays, and 2nd oblique dark band on last dorsal-fin spines and rays; pelvic fins dark. Attains 15 cm TL.



*Prognathodes guyotensis*, 9 cm SL (Maldives). Source: Randall & De Bruin 1988

**DISTRIBUTION** Indo-Pacific: records from Maldives in WIO, and Kyushu-Palau Ridge in western Pacific.

**REMARKS** Known from guyots (flat-topped seamounts), in 200–332 m.

## GENUS *Roa* Jordan 1923

Previously considered a subgenus of *Chaetodon*. Species of *Roa* lack the otophysic connection between the swimbladder and lateral line as found in other butterflyfishes. Deep-bodied with a steep nape; snout pointed, 2.7–3.7 in HL. Dorsal fin 11–14 spines (spines 3–5 longest), 19–23 rays, spinous portion of fin more or less triangular, anterior membranes deeply incised, and scaly sheath moderately low; anal fin 3 spines (2nd spine strong, longer than 3rd), 16–18 rays; rear of dorsal and anal fins vertical. Eyeband usually vertical below eyes. Deep-water group rarely seen shallower than 50 m, with most fish living below 100 m. Three species, 1 in WIO.

## *Roa jayakari* (Norman 1939)

Indian goldbarred butterflyfish

PLATE 158

*Chaetodon jayakari* Norman 1939: 63, Fig. 21 (Muscat, Oman, Gulf of Oman); Burgess 1978\*; Klauswitz & Fricke 1985\*; Randall 1995\*; Allen *et al.* 1998\*.

*Coradion jayakari*: Kotthaus 1976\*.

*Chaetodon modestus* (*non* Temminck & Schlegel 1844): Allen 1980.

*Roa jayakari*: Kuitert 2002\*, 2004\*; Smith *et al.* 2003.

Dorsal fin 11 spines, 21–23 rays; anal fin 3 spines, 16–18 rays; pectoral fins 13–15 rays; caudal fin rounded. Body depth 1.3–1.6 in SL; snout length 2.8–3.3 in HL. LL scales 37–45.

Head and body white, with 2 broad golden brown bars on sides of body and median band from nape to upper lip; eyeband dark golden brown, from dorsal-fin origin to preopercle edge; dorsal-fin spines 1–2 with black mark; soft-rayed portion of dorsal fin with white-edged black ocellus (subequal to eye diameter) in brown bar; pelvic fins brown-black, with white spine; caudal fin hyaline. Attains 15 cm TL.



*Roa jayakari* (SW India). KV Akhilesh © CMFRI

**DISTRIBUTION** WIO: Red Sea (including Gulf of Aqaba), Gulf of Aden (Somalia) to Gulf of Oman, Pakistan and western India; not known from Persian/Arabian Gulf.

**REMARKS** Found on deep rocky reefs, in 33–274 m. Solitary, in pairs, or in small groups of up to 10 fish. Has been seen to feed on gorgonians in the wild, but is an opportunistic feeder in aquaria.

### GLOSSARY

**otophysic connection** – an extension from the swimbladder to the inner ear.