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FISHES OF THE FAMILY
PSEUDOCROMIDAE (PERCIFORMES) IN
THE WESTERN INDIAN OCEAN

(with Plates 1-5)

by

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Zoological Laboratory
University of Cambridge
Downing Street, Cambridge

and

A NOTE ON *ANISOCHROMIS KENYAE*

by

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CONTENTS

I Fishes of the family Pseudochromidae (Perciformes) in the Western Indian Ocean by R. Lubbock.

Introduction	1
<i>Pseudochromis</i> Rüppell, 1835	2
General description	2
Distribution	2
Key.....	3
<i>Pseudochromis magnificus</i> n. sp.	3
<i>Pseudochromis dutoiti</i> Smith, 1955	4
<i>Pseudochromis leucorhynchus</i> n. sp.	6
<i>Pseudochromis melanotus</i> Lubbock, 1975	7
<i>Pseudochromis melas</i> n. sp.	8
<i>Pseudochromis tauberæ</i> n. sp.	9
<i>Pseudochromis natalensis</i> Regan, 1916	10
<i>Chlidichthys</i> Smith, 1953	12
General description	12
Distribution	12
Key.....	13
<i>Chlidichthys johnvoelckeri</i> Smith, 1953	13
<i>Chlidichthys bibulus</i> (Smith, 1954)	14
<i>Chlidichthys smithæ</i> n. sp.	16
<i>Chlidichthys pembae</i> Smith, 1954	17
<i>Chlidichthys abruptus</i> n. sp.....	17
<i>Chlidichthys randalli</i> n. sp.	18
Acknowledgements	19
References	19
Tables	20
II A note on <i>Anisochromis kenyæ</i> Smith, 1954 by M. M. Smith	22
Index	23
Plates	24

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ABSTRACT

An account is given of pseudochromid fishes from the western Indian Ocean. Seven species of *Pseudochromis* (four of which are new) and six species of *Chlidichthys* (three of which are new) are recorded and described, with details of ecology. Keys are provided.

INTRODUCTION

This study is a revision of fishes of the family Pseudochromidae (as defined by Smith, 1954) from the western Indian Ocean; the western Indian Ocean is here defined as the East African coast, Madagascar, and adjacent islands, and does not include the Gulf of Aden. This work is essentially complementary to my paper on north-west Indian Ocean and Red Sea Pseudochromidae (Lubbock, 1975).

Only two genera of pseudochromids occur in the western Indian Ocean, *Pseudochromis* and *Chlidichthys*. Four nominal species of *Pseudochromis* were known from the western Indian Ocean, described by Regan (1916), Smith (1955), Bauchot-Boutin (1958) and Kotthaus (1970); Klausewitz (1961) and Lubbock (1975) showed Bauchot-Boutin's species to be synonymous with that of Smith; the name of the species described by Kotthaus was preoccupied, and a new name was proposed in Lubbock (1975). Four new species of *Pseudochromis* are described here. Smith (1953 & 1954) described three species of western Indian Ocean *Chlidichthys* (*Wamizichthys* is a synonym of *Chlidichthys*), and three new *Chlidichthys* are described here. Thus seven species of *Pseudochromis* and six species of *Chlidichthys* are now known from the western Indian Ocean.

Western Indian Ocean fishes used in this study are mainly the results of collections by the late Professor J. L. B. Smith and M. M. Smith along the East African Coast in the 1950s, collections by Dr T. H.

Fraser and Dr V. G. Springer at Cargados Carajos in 1971 and 1976, collections by Dr J. E. Randall and M. M. Smith in Mauritius in 1973 and collections by the author in Kenya in 1973-4. Further specimens, mainly from Madagascar, were loaned to me by Dr M. L. Bauchot of the Muséum National d'Histoire Naturelle, Paris and by Dr V. G. Springer of the United States National Museum; a specimen from Somalia was loaned to me by Dr A. Kotthaus.

For each genus, a general description of western Indian Ocean species is given, followed by details of distribution and a key; descriptions of individual species are then given, showing only details of diagnostic value; mean values are in parentheses; common characters, given in the general description of the genus, are not repeated. Meristic and morphometric characters are summarized in Tables 1 and 2; meristic frequencies are given in Tables 3 and 4. Measurements and counts are those defined in Lubbock (1975). Type specimens are deposited at the British Museum (Natural History) (BMNH), the United States National Museum (USNM), the Bernice P. Bishop Museum, Hawaii (BPBM), the Senckenberg Museum, Frankfurt (SMF), the Muséum National d'Histoire Naturelle, Paris (MNHN), the J. L. B. Smith Institute of Ichthyology, Rhodes University, Grahamstown (RUSI), and the Zoologisches Museum, Hamburg (ZIM).

For generic synonymy, see Fowler (1931)

GENERAL DESCRIPTION

(Based only on western Indian Ocean species)

Dorsal fin rays III 24–33; anal fin rays III 13–19; pectoral fin rays 18–20, usually 19 or 20 (first ray minute, weakly spinous, very closely applied to second ray); pelvic fin rays I 5; principal caudal fin rays 17, with 6–9 small supplementary rays above and below. Scale rows from origin of lateral line to base of caudal fin 41–50; tubular lateral line scales 25–36 in anterior portion, 0–11 in posterior, disconnected, portion beginning on the fourth to sixth row of scales below anterior portion (total 33–45 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 12–14+1+2 or 3; predorsal scales 15–27; 3–7 rows of scales on preoperculum. 11–50 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Vertebrae (counted, when possible, from 2 specimens of each species) 10+16, including terminal half-centrum. Gill-rakers on first arch 4–6+1+9–12=15–19 (all elements counted). Maximum size 72,0 mm S.L.

The following measurements are expressed as percentages of the S.L., and only apply to specimens over 30 mm S.L. Head length 23,8–30,8; snout length 4,6–7,7, orbit diameter 6,4–9,9; depth at first dorsal spine 20,0–31,4; predorsal length 27,4–38,7; least depth of caudal peduncle 12,0–17,0; pectoral fin length 13,0–23,0; length of longest pelvic fin ray 12,0–30,6; dorsal fin base length 54,9–69,4; anal fin base length 23,2–33,4.

Small, elongate, reef fishes, head and body moderately compressed. Jaws nearly equal anteriorly, reaching posteriorly to below pupil; cleft of mouth oblique. Eye with pear-shaped pupil. Scales on head and anterior part of body cycloid, remainder ctenoid. Snout, preorbital and anterior part of interorbital area, chin and maxilla naked; 3–7 transverse scale series on preoperculum; scales irregular and large on operculum. Lateral line scales with sensory tubules; lateral line series interrupted, consisting of an anterior portion rising rapidly from the dorsal angle of the branchial opening, then continuing parallel with dorsal fin base towards posterior part of fin, and a posterior portion on caudal peduncle and scaly base of caudal fin (posterior portion absent in one specimen of *P. natalensis*). Upper part of operculum, edge of preoperculum, orbital and supraorbital region of head, lower jaw and snout bearing sensory canals; opercular edge entire, inconspicuously serrated dorsally; edge of preoperculum smooth.

Upper jaw with two lateral series of fine, sharp, slightly recurved, subconical teeth on posterior part of jaw, the outer series enlarged; at symphysis 6–8 series of teeth, those of the anterior two series caniniform and irregular in size, the remainder small and setiform; anteriorly 2–7 enlarged curved canines, outer canines largest. Lower jaw dentition similar, but with single lateral series on posterior part of jaw; 2–5 enlarged canines anteriorly. Vomer with a single, irregular, chevron-shaped series of fine teeth. Dentate area of palatines elongate to oval. Pharyngeals densely covered with conical teeth of irregular size. Tongue smooth.

Dorsal fin with three spines, the first rather small, followed by mostly if not all branched soft rays; second spine shorter than, but slightly less stout than, or as stout as, third spine. Anal fin similar, but second spine as stout as, less stout, or stouter than third spine. Pectoral fins rounded, principal rays branched. Pelvic fins inserted below pectoral fins, pointed, soft rays branched, second soft ray longest. Caudal fin rounded, truncate or emarginate, with basal scaly sheath.

DISTRIBUTION

A total of about forty valid species of *Pseudochromis* is known, all from the Indo-west Pacific region, but the range of individual species appears to be restricted, as in the closely related *Chlidichthys*. Seven species are known from the western Indian Ocean, and have been recorded from the following localities (for precise locality references see descriptions of species):

1. *P. magnificus*: Cargados Carajos;
2. *P. dutoiti*: Sri Lanka (?), Pakistan, Oman, Arabian Gulf, Kenya, Mozambique, South Africa, Aldabra, Madagascar;
3. *P. leucorhynchus*: Kenya;
4. *P. melanotus*: Somalia;
5. *P. melas*: Kenya;
6. *P. natalensis*: Kenya, Tanzania, Mozambique, South Africa, Madagascar;
7. *P. tauberæ*: Kenya, Tanzania, Mozambique, Madagascar.

The above species have been recorded only from the western Indian Ocean, with the exception of *P. dutoiti* which is also known from the north-west Indian Ocean. As with north-west Indian Ocean and Red Sea *Pseudochromis* (Lubbock, 1975), the distributions of species of western Indian Ocean *Pseudochromis* seem to be rather narrow.

KEY

The following key is provided for the identification of preserved western Indian Ocean *Pseudochromis*;

living *Pseudochromis* (with the exception of *P. melanotus*, whose colours in life are unknown) may be identified by coloration.

1. (a) Soft dorsal fin rays 24; soft anal fin rays 14 or 15 (usually 14); second anal spine as stout as, or slightly less stout than, third anal spine; depth at first dorsal spine 28,0–31,4% of S.L.

Pseudochromis magnificus n.sp.

- (b) Soft dorsal fin rays 25–33; soft anal fin rays 13–19; second anal spine stouter than third anal spine; depth at first dorsal spine 20,0–30,5% of S.L.

2

2. (a) Soft dorsal fin rays 28–33; soft anal fin rays 16–19; depth at first dorsal spine 20,0–26,2% of S.L.; length of longest pelvic fin ray 12,0–15,9% of S.L.; dark ocellus at upper margin of operculum.

3

- (b) Soft dorsal fin rays 25–30; soft anal fin rays 13–17; depth at first dorsal spine 24,7–30,5% of S.L.; length of longest pelvic fin ray 15,7–30,6% of S.L.; dark ocellus at upper margin of operculum present or absent.

4

3. (a) Depth at first dorsal spine 20,0–23,8% of S.L.; caudal fin truncate, oblique black stripe on upper lobe.

Pseudochromis dutoiti Smith, 1955

- (b) Depth at first dorsal spine 22,8–26,2% of S.L.; caudal fin rounded, no oblique stripe on upper lobe.

Pseudochromis leucorhynchus n.sp.

4. (a) Soft dorsal fin rays 26; depth at first dorsal spine 24,7% of S.L.; length of longest pelvic fin ray 30,6% of S.L.; black ocellus at upper margin of operculum.

Pseudochromis melanotus Lubbock, 1975

- (b) Soft dorsal fin rays 25–30; depth at first dorsal spine 25,4–30,5% of S.L.; length of longest pelvic fin ray 15,7–28,1% of S.L.; black ocellus at upper margin of operculum present or absent.

5

5. (a) Gill-rakers on first arch 19; length of longest pelvic fin ray 26,9–28,1% of S.L.; black ocellus at upper margin of operculum.

Pseudochromis melas n.sp.

- (b) Gill-rakers on first arch 15–18; length of longest pelvic fin ray 15,7–24,5% of S.L.; no black ocellus at upper margin of operculum.

6

6. (a) Soft dorsal fin rays 28–30; gill-rakers on first arch 16–18 (16 rare); 23–42 sensory pores in the post- and sub-orbital series; no dark spot at upper margin of preoperculum.

Pseudochromis tauberæ n.sp.

- (b) Soft dorsal fin rays 25–27; gill-rakers on first arch 15–16; 16–30 sensory pores in the post- and sub-orbital series; dark spot at upper margin of preoperculum usually present in fishes over 40–45 mm S.L.

Pseudochromis natalensis Regan, 1916

Pseudochromis magnificus n.sp.

PLATES 1A and B, 5A and B

DESCRIPTION

Based on 11 fishes, 32,4–52,3 mm S.L., from Cargados Carajos shoals.

Dorsal fin rays III 24; anal fin rays III (second anal spine as stout as, or less stout than, third anal spine) 14 or 15 (two fishes with 15). Scale rows from origin of lateral line to base of caudal fin 41–48; tubular lateral line scales 31–36 in anterior portion, 5–10 in posterior, disconnected, portion beginning on the fourth or fifth row of scales below anterior portion (total 39–43 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 13 or 14+1+2 or 3; predorsal scales 15–20; 3 or 4 rows of scales on preoperculum. 18–26 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch 4–6+1+10 or 11=16 or 17 (all elements counted). Upper jaw with 2–4 large canines; lower jaw with 2–5 large canines. Caudal fin rounded to truncate. Maximum size 52,3 mm S.L., 63,0 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 28,3–30,8 (29,5); snout length 5,5–6,2 (5,8); orbit diameter 7,5–9,3 (8,2); depth at first dorsal spine 28,0–31,4 (29,3); predorsal length 33,5–38,0 (35,2); least depth of caudal peduncle 14,5–16,6 (15,6); pectoral fin length 18,2–20,8 (19,7); length of longest pelvic fin ray 16,8–21,6 (19,5); dorsal fin base length 56,5–60,3 (58,4); anal fin base length 25,1–27,9 (26,4).

Coloration

When freshly dead, (from 35 mm transparencies – see Plates 5A & B) male* with orange snout, becoming yellow on head and anterior part of body; yellow grades posteriorly into reddish purple and

*Presumed.

then dark reddish brown to black on caudal peduncle; body with faint rows of dark spots (one per scale). Iris red with oval dark blue ring around pupil. Pectoral and pelvic fins pinkish hyaline; anal fin red with 4 horizontal rows of blue spots and blue distal margin; dorsal fin bright red orange with blue distal margin, posteriorly dark reddish brown to black basally; caudal fin dark reddish brown to black, posteriorly with bright red submarginal stripe and dark distal margin. (In life, according to V. G. Springer *in litt.*, "the yellows are much brighter, the blacks grade into blues, and the mid-body is a rich magenta".) Female* with pinkish head and thorax, remainder of body brown. Iris red with oval dark blue line around pupil. Pectoral and pelvic fins pinkish hyaline; dorsal and anal fins brown with reddish outer margin, possibly fine blue distal margin also present; caudal fin bright yellow with dark posterior margin.

In alcohol, head and body of female brown, slightly darker dorsally; dorsal, anal and caudal fins light to dark brown (darker in small specimens), latter with faint dusky posterior margin; pelvic fins light beige; pectoral fins hyaline. In male, head and body slightly lighter brown; dorsal fin beige, posteriorly becoming dark brown to black basally, with dusky distal margin; anal fin beige with 3 or 4 horizontal rows of dusky spots and dusky distal margin; caudal fin dark brown to black, posteriorly with beige submarginal stripe and dusky distal margin; pelvic fins light beige; pectoral fins hyaline. Faint rows of small spots (one per scale, dark in males, light in females) may be present on body.

HABITAT AND DISTRIBUTION

This species is known only from the Cargados Carajos shoals, where it was collected around ledges, cliffs and channels to a depth of 10 m.

REMARKS

Pseudochromis magnificus is relatively unusual among *Pseudochromis* in that it appears to show pronounced sexual dichromatism (fishes sexed by superficial examination of gonads).

Etymology: The latin name *magnificus* refers to the beautiful coloration of males of the present species. According to V. G. Springer (*in litt.*), "When you see one of these animals underwater it stands out from everything else - truly the most beautiful pseudochromid I have seen".

COMPARISONS

Pseudochromis magnificus is distinct among western Indian Ocean Pseudochromidae. It may be distinguished by the number of soft dorsal fin rays (24), the number of soft anal fin rays (14 or 15), the relatively deep body (depth at first dorsal spine 28,0-31,4% of

*Presumed.

S.L.) and the nature of the second anal spine, which is as stout as, or slightly less stout than, the third anal spine. It appears to be the only species from the western or north-western Indian Ocean that shows pronounced sexual dichromatism.

MATERIAL EXAMINED

Type series

- (a) *Holotype*, 50,5 mm S.L., surge channel in patch reef, SW side of Raphael I., Cargados Carajos shoals, coll. T. H. Fraser on 23.3.1971; RUSI. 1901.
- (b) 1 *Paratype*, 39,8 mm S.L., coll. with (a); BMNH. 1975.2.12.6.
- (c) 1 *Paratype*, 39,2 mm S.L., coll. with (a); USNM. 214109.
- (d) 1 *Paratype*, 52,3 mm S.L., coll. with (a); RUSI. 1902.
- (e) 1 *Paratype*, 35,6 mm S.L., coll. with (a); BPBM. 18036.
- (f) 6 *Paratypes*, 32,4-48,4 mm S.L., dead rocky reef channels and ledges, at 0-6 m, SE side of Grande Passe, Cargados Carajos shoals, coll. V. G. Springer *et al.* on 5.4.1976; USNM. 216137.

Non-type series

- (g) 14 fishes, 36,0-50,9 mm S.L., rock cliff with incuts, at 0-10 m, half mile S of Raphael I., Cargados Carajos shoals, coll. V. G. Springer *et al.* on 12.4.1976; USNM. 216138.

Pseudochromis dutoiti Smith, 1955

PLATE 3E

Pseudochromis dutoiti Smith, 1955, *Ann. Mag. nat. Hist.* (12) **8**: 145 (Bazaruto Island).

Pseudochromis aldabraensis Bauchot-Boutin, 1958, *Ann. Inst. Océanogr., Monaco* **34**: 80 (Aldabra).

DESCRIPTION

Based on 40 fishes, 15,0-71,9 mm S.L. (1 fish, 31,5 mm S.L., from Saudi Arabia; 1 fish, 71,5 mm S.L., from Bahrain; 13 fishes, 15,0-58,5 mm S.L., from Abu Dhabi; 8 fishes, 27,0-57,8 mm S.L., from Oman; 1 fish, 40,2 mm S.L., from Pakistan; 4 fishes, 39,3-48,6 mm S.L., from Sri Lanka; 2 fishes, 28,3-63,7 mm S.L., from Kenya; 1 fish, 39,6 mm S.L., from Aldabra; 4 fishes, 44,5-68,7 mm S.L. from Mozambique; 5 fishes, 44,8-71,9 mm S.L., from South Africa).

Dorsal fin rays III 28-33 (most of specimens with 28 from north-west Indian Ocean); anal fin rays III (second anal spine stouter than third) 16-19. Scale rows from origin of lateral line to base of caudal fin 41-49; tubular lateral line scales 25-34 in anterior

portion, 3-7 in posterior, disconnected, portion beginning on the fourth to sixth (usually fifth) row of scales below anterior portion (total 33-41 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 12-14 (12 rare) +1+2 or 3; predorsal scales 20-27; 5-7 (7 rare) rows of scales on preoperculum. 11-50 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count); in larger fishes the series may consist of two approximately parallel rows of pores. Gill-rakers on first arch 4 or 5+1+10 or 11=15-17 (all elements counted). Upper jaw with 2-7 large canines; lower jaw with 2-5 large canines. Caudal fin truncate. Maximum size 71,9 mm S.L., 87,5 mm T.L.

The following measurements are expressed as percentages of the S.L., and only apply to specimens over 30 mm S.L. Head length 23,8-27,7(25,4); snout length 4,6-6,1(5,5); orbit diameter 6,4-8,3(7,3); depth at first dorsal spine 20,0-23,8(22,2); predorsal length 27,4-32,5(30,0); least depth of caudal peduncle 12,0-14,1(13,1); pectoral fin length 13,0-17,3(15,1); length of longest pelvic fin ray 12,0-15,9(13,7); dorsal fin base length 62,4-69,4(65,9); anal fin base length 27,5-33,4(31,4).

Coloration

In life, fishes from Das Island, Bahrain and Karachi with overall yellow-orange head and body (brownish in specimens from Bahrain), becoming slightly reddish on anal and caudal fins. Narrow bright blue stripe from snout along dorsal body contour to caudal peduncle; another blue stripe from maxilla to upper opercular edge, the latter dark blue with a fine gold distal margin; area above and between blue stripes dusky; ventral part of operculum and preoperculum blue. Iris reddish with two horizontal blue lines, one above and one below pupil. Dorsal fin black with two horizontal blue stripes, both consisting of a series of adjacent blue spots; anal fin red-orange; pectoral and pelvic fins hyaline; caudal fin reddish-orange, upper lobe with oblique blue stripe, bordered exteriorly with black, lower lobe sometimes with faint oblique blue stripe (see colour plate in Lubbock, 1975).

Fishes from Kenya (see Plate 3E) with yellowish-brown body, darker on head. Narrow bright blue stripe from snout along dorsal body contour to caudal peduncle; another blue stripe from maxilla to just below upper opercular edge, the latter with a dark blue ocellus and fine gold distal margin; area above and between blue stripes dusky; ventral part of operculum and preoperculum blue; dark blue patch around pectoral fin base; upper parts of operculum

and preoperculum, edge of preoperculum and posterior margin of orbit with black spots. Iris dark reddish-brown with two horizontal blue lines, one above and one below pupil. Dorsal fin black with basal blue stripe, consisting of a series of adjacent blue spots, merging posteriorly with blue stripe along dorsal body contour; short horizontal blue stripe on posterior median part of dorsal fin; edge of dorsal fin reddish with blue distal margin; anal fin dark reddish-brown with blue distal margin; pectoral fins yellowish hyaline; pelvic fins pinkish hyaline; caudal fin dark reddish-brown, upper and lower lobes each with oblique blue stripe, bordered exteriorly with black and then blue. This colour pattern seems close to that described by Smith (1955) for Mozambique fishes (see colour plate in Smith and Smith, 1960).

In alcohol, dusky, dark and black markings remain; pelvic and pectoral fins hyaline; remainder of fish beige to brown.

HABITAT AND DISTRIBUTION

Pseudochromis dutoiti is known from Madagascar (MNHN. 1965. 225, not examined), Aldabra, South Africa, Mozambique, Kenya, Oman, the Arabian (Persian) Gulf, Pakistan and possibly Sri Lanka (Ceylon); see Lubbock (1976) for reasons why Sri Lanka record is doubtful. It was observed underwater in the Arabian Gulf, where it lived from 2-25 m among coral rock, coralline algae and coral, swimming into holes and crevices when frightened; occasionally pairs were observed. At Cape Monze, near Karachi, *P. dutoiti* was observed at about 2 m in very large rock pools. In Kenya, two fishes were observed living around coralline rocks covered with coral at 10-15 m.

REMARKS

The above description is a modification of that given in Lubbock (1975), and includes data from further specimens of *P. dutoiti* from the East African coast. *Pseudochromis dutoiti* is the only western Indian Ocean pseudochromid to be recorded also in the north-west Indian Ocean.

COMPARISONS

Lubbock (1975) compares *P. dutoiti* with *Pseudochromis* of the north-west Indian Ocean and Red Sea. Of the species considered in the present study, *P. dutoiti* is closest to *P. leucorhynchus* from Kenya and *P. melanotus* from Somalia. *Pseudochromis dutoiti* has a very distinctive living coloration, the combination of a bright blue stripe along the dorsal body contour and an oblique black and blue bar on the upper lobe of the caudal fin being diagnostic. Preserved specimens of *P. dutoiti* may be distinguished from *P. leucorhynchus* by their lesser body depth (depth at first dorsal spine 20,0-23,8% of S.L. for *P. dutoiti*,

22,8–26,2% of S.L. for *P. leucorhynchus*), the truncate caudal fin (rounded in *P. leucorhynchus*) and the presence of an oblique black stripe on the upper lobe of the caudal fin (caudal fin of *P. leucorhynchus* more or less uniform in coloration). *Pseudochromis melanotus* may be easily distinguished from *P. dutoiti* by its very long pelvic fins (longest pelvic fin ray 30,6% of S.L. for *P. melanotus*, 12,0–15,9% of S.L. for *P. dutoiti*), its greater body depth (depth at first dorsal spine 24,7% of S.L. for *P. melanotus* 20,0–23,8% of S.L. for *P. dutoiti*) and its longer pectoral fins (19,2% of S.L. for *P. melanotus*, 13,0–17,3% of S.L. for *P. dutoiti*).

MATERIAL EXAMINED

- (a) 1 fish, 71,5 mm S.L., coralline rock, at 3 m, Bahrain, coll. R. Lubbock and P. Etherington-Smith in 6.1972; BMNH. 1973.12.20.103.
- (b) 1 fish, 31,5 mm S.L., Tarut Bay, Saudi Arabia, coll. Erdman in 6.1948; USNM. 147901.
- (c) 13 fishes, 15,0–58,5 mm S.L., coral and coral rock, at 5–25 m, Das Island, Abu Dhabi, coll. R. Lubbock and P. Etherington-Smith in 7.1972; BMNH. 1973.1.22.6–17.
- (d) 8 fishes, 27,0–57,8 mm S.L., coral and coral rock, at 1–3 m, Khasab, Oman, coll. P. Cornelius in 12.1971; BMNH. 1973.1.22.17–25.
- (e) 1 fish, 45,3 mm S.L., coral rock, at 10 m, Islands of the Devil, Muscat, Oman, coll. K. van Terheyden in 3.1974; BMNH. 1974.9.12.3.
- (f) 37 fishes, 21,8–54,3 mm S.L., rocks, sand and scanty scattered coral, W end of Astola Island, Pakistan, coll. L. Woods, H. Fehlmann *et al.* on 27.11.1963; USNM. 212272.
- (g) 1 fish, 40,2 mm S.L., rock and *Porites* in pool, at 1–2 m, Cape Monze, Karachi, Pakistan, coll. R. Lubbock and Shabbir Khan in 1.1973; BPBM. 16410.
- (h) 4 fishes, 39,2–48,6 mm S.L., Sri Lanka (?), pres. W. Klausewitz; USNM. 197597.
- (i) 1 fish, 40,0 mm S.L., Aldabra, Seychelles (*holotype* of *P. aldabraensis*); MNHN. 54.145.
- (j) 2 fishes, 28,3–63,7 mm S.L., around large coralline rocks and coral, at 10–15 m, Pungutiayu Island, Shimoni, Kenya, coll. R. Lubbock and M. Stewart-Moore on 5.1.1974; BMNH. 1974.2.12.4 and 1974.6.3.1.
- (k) *Holotype*, 52,9 mm S.L., reef on outside of Bazaruto Island, Mozambique, coll. M. M. Smith in 9.1953; RUSI. 164.
- (l) 2 *Paratypes*, 44,5–48,3 mm S.L., coll. with (k); RUSI. 795.
- (m) 1 fish, 68,7 mm S.L., Inhaca Island, Mozambique, coll. T. H. Fraser in 12.1970; RUSI. 1847.23.
- (n) 1 fish, 44,8 mm S.L., Durban, South Africa, coll. A. Wright in 10.1964; RUSI. 3629.
- (o) 3 fishes, 63,7–66,9 mm S.L., Durban, South

Africa, coll. A. Wright from 20.9.1969 to 4.12.1969; RUSI. 3627.

- (p) 1 fish, 71,9 mm S.L., Durban, South Africa, coll. L. Jones and J. Jones; RUSI. 3626.

Pseudochromis leucorhynchus n.sp.

PLATES 2B and 3B.

DESCRIPTION

Based on 7 fishes, 37,5–54,0 mm S.L., from Kenya.

Dorsal fin rays III 29–31; anal fin rays III (second anal spine stouter than third) 17 or 18. Scale rows from origin of lateral line to base of caudal fin 45–50; tubular lateral line scales 30–34 in anterior portion, 5–8 in posterior, disconnected, portion beginning on the fourth or fifth row of scales below anterior portion (total 36–42 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 13 or 14+1+2 or 3; predorsal scales 20–25; 5 rows of scales on preoperculum. 16–22 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch 4 or 5+1+10 or 11=15–17 (all elements counted). Upper jaw with 2–5 large canines; lower jaw with 2–5 large canines. Caudal fin rounded. Maximum size 54,0 mm S.L., 67,1 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 24,6–29,1(26,8); snout length 5,2–6,4(5,7); orbit diameter 7,2–9,9(8,3); depth at first dorsal spine 22,8–26,2(24,6); predorsal length 29,8–34,7(32,1); least depth of caudal peduncle 13,8–15,7(14,7); pectoral fin length 15,7–18,7(17,2); length of longest pelvic fin ray 13,7–15,7(14,6); dorsal fin base length 61,6–65,3(63,0); anal fin base length 27,2–33,1(29,9).

Coloration

In life, head and body brownish-olive to dark olive, slightly darker dorsally, becoming lighter posteriorly; on anterior half of body, scale pockets dark brownish-olive; on posterior half of body, rows of red spots (one per scale) forming horizontal lines; upper edge of operculum with dark blue ocellus with fine gold distal margin; dark stripe from snout to eye, faint stripe from eye to upper edge of operculum, becoming fainter posteriorly; whitish stripe (above dark stripe) from tip of snout to eye (conspicuous under water). Iris reddish to brown with two horizontal green-blue lines, one above and one below pupil. Dorsal and anal fins olive, basally darker with rows of close-set red spots and lines (making bases of

fins seem reddish), distally with fine blue margin; caudal fin olive, sometimes slightly yellowish on upper and lower margins; pectoral fins hyaline; pelvic fins very light olive to hyaline.

In alcohol, body brown, lighter posteriorly and ventrally; dark stripe and ocellus black; red spots become beige. Dorsal, anal and caudal fins dusky brown, pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION

This species is known only from the vicinity of Lamu in Kenya, where it was collected under *Porites* boulders as well as smaller live and dead coral rocks from 2 to 8 m; it was seen to occasionally enter small holes in the rocks, in a similar manner to *P. dutoiti*. *Pseudochromis leucorhynchus* was syntopic with *P. natalensis* at Patta Island.

REMARKS

Etymology: *leucorhynchus* is derived from the Greek λευκος—white and ρινχος—snout.

COMPARISONS

Pseudochromis leucorhynchus is closest to *P. dutoiti* from the north-western and western Indian Ocean and to *P. melanotus* from Somalia. The differences between *P. dutoiti* and *P. leucorhynchus* are discussed under "Comparisons" for *P. dutoiti*. *Pseudochromis melanotus* may be easily distinguished from *P. leucorhynchus* by its lower numbers of soft dorsal fin rays (26 for *P. melanotus*, 29–31 for *P. leucorhynchus*) and soft anal fin rays (15 for *P. melanotus* 17–18 for *P. leucorhynchus*), and its very long pelvic fins (longest pelvic fin ray 30,6% of S.L. for *P. melanotus*, 13,7–15,7% of S.L. for *P. leucorhynchus*).

MATERIAL EXAMINED

- (a) *Holotype*, 54,0 mm S.L., under live and dead coral rocks, at 2–8 m, near beacon, Shela, Lamu I., Kenya, coll. R. Lubbock and M. Stewart-Moore on 31.12.1973; BMNH. 1975.2.12.7.
- (b) 2 *Paratypes*, 47,2–51,5 mm S.L., coll. with (a); BMNH. 1975.2.12.8–9.
- (c) 1 *Paratype*, 49,9 mm S.L., coll. with (a); BPBM. 18038.
- (d) 1 *Paratype*, 39,0 mm S.L., under boulders of *Porites* on rubble at 5–6 m, Congoni channel, Pazarli ridge, Patta I., Kenya, coll. R. Lubbock and M. Stewart-Moore on 30.12.1973; USNM. 214105.
- (e) 1 *Paratype*, 37,8 mm S.L., coll. with (d); SMF. 12989.
- (f) 1 *Paratype*, 37,5 mm S.L., coll. with (d); RUSI. 3703.

Pseudochromis punctatus Kotthaus, 1970 (non Richardson, 1846), "Meteor" *Forsch.-Ergebnisse* D(6):52 (6°N, Somalia). Preoccupied.

Pseudochromis melanotus Lubbock, 1975, *J. Zool., Lond.* 176: 157.

DESCRIPTION

Based on one fish, 54,6 mm S.L., from Somalia.

Dorsal fin rays III 26; anal fin rays III (second anal spine stouter than third) 15. Scale rows from origin of lateral line to base of caudal fin 41; tubular lateral line scales 30 in anterior portion, 6 in posterior, disconnected, portion beginning on the fifth row of scales below anterior portion (total 36 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 12+1+2; predorsal scales 20; 4 or 5 rows of scales on preoperculum. 18 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch 5+1+11 (all elements counted). Upper jaw with 4 large canines; lower jaw similar. Caudal fin emarginate (?). Maximum size 54,6 mm S.L., 72,2 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 28,6; snout length 5,9; orbit diameter 8,6; depth at first dorsal spine 24,7; predorsal length 31,9; least depth of caudal peduncle 15,2; pectoral fin length 19,2; length of longest pelvic fin ray 30,6; dorsal fin base length 60,6; anal fin base length 26,0.

Coloration

Live colours unknown. In alcohol, body brown-black above a line from the snout to the upper caudal rays (eye is included); below this line head and body yellowish white. On the upper hind edge of the operculum is a black spot, half of which is in the upper dark half of the body. The dorsal fin is light brown with scattered dark brown pinhead sized spots which are mainly confined to the upper half of the fin. The distal margins of the caudal and anal fins are light brown, but otherwise the caudal and anal fins are white, as are the pectoral and pelvic fins. On the anal fin are three dark spots, similar to those on the dorsal fin (after Kotthaus, 1970).

The coloration of this fish had faded considerably by the time I received it in early 1974.

HABITAT AND DISTRIBUTION

This species is known from 6°03' to 6°06'N (approximately 100 km NE of Obbia) on the Somali

coast; it was caught at a depth of 55–65 m.

REMARKS

Kotthaus's original name for this species was preoccupied, and a new name was proposed, with Dr Kotthaus's approval, in Lubbock (1975). The holotype is now deposited at the Zoologisches Museum, Hamburg (formerly it was at the Biologische Anstalt, Helgoland).

COMPARISONS

Pseudochromis melanotus is relatively distinct, being characterized by very long pelvic fins (longest pelvic fin ray 30,6% of S.L.), a relatively shallow body (depth at first dorsal spine 24,7% of S.L.), and 26 soft dorsal fin rays and 15 soft anal fin rays. *Pseudochromis melanotus* is closest to *P. dutoiti* from the north-western and western Indian Ocean and to *P. leucorhynchus* from Kenya; the differences between *P. melanotus* and *P. dutoiti* are discussed under "Comparisons" for *P. dutoiti*, and the differences between *P. melanotus* and *P. leucorhynchus* are discussed under "Comparisons" for *P. leucorhynchus*.

MATERIAL EXAMINED

(a) *Holotype*, 54,6 mm S.L., at 55–65 m, 6°06'N 49°05'E—6°03'N 49°02,8'E (approx. 100 km NE of Obbia), Somalia, coll. "Meteor" on 28.12.1964; ZIM. 5025.

Pseudochromis melas n. sp.

PLATES 1D and 3A

DESCRIPTION

Based on 2 fishes, 64,8–71,3 mm S.L., from Kenya.

Dorsal fin rays III 26; anal fin rays III (second anal spine stouter than third) 15. Scale rows from origin of lateral line to base of caudal fin 47–48; tubular lateral line scales 34–35 in anterior portion, 8–10 in posterior, disconnected, portion beginning on the fifth row of scales below anterior portion (total 42–45 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 14+1+2 or 3; predorsal scales 18–22; 5 rows of scales on pre-operculum. 29–34 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch 6+1+12 (all elements counted). Upper jaw with 4 large canines; lower jaw with 2–4 large canines.

Caudal fin rounded to truncate. Maximum size 71,3 mm S.L., 90,1 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 30,1–30,2; snout length 7,3–7,6; orbit diameter 8,1–9,0; depth at first dorsal spine 29,5–29,8; predorsal length 34,6–35,3; least depth of caudal peduncle 16,0–17,0; pectoral fin length 21,9–23,0; length of longest pelvic fin ray 26,9–28,1; dorsal fin base length 60,6–61,6; anal fin base length 25,9–28,5.

Coloration

In life (see Plate 3A), head and body overall dark grey to black, slightly lighter ventrally; upper edge of operculum with dark blue ocellus with fine yellow distal margin; upper part of flanks with very inconspicuous dark blue spots. Iris dark grey with two inconspicuous horizontal green lines, one above and one below pupil. Dorsal, anal and caudal fins black with fine blue distal margin; pelvic fins black; pectoral fin rays reddish, membrane hyaline, dusky basally in one fish.

In alcohol, head, body, and fins (with exception of hyaline pectoral fins) uniform dark grey-brown to black; ocellus black.

HABITAT AND DISTRIBUTION

This species is known only from Wasin Island, Kenya, where two specimens, probably a pair, were collected at 15 m swimming around a large *Acropora* table on rubble at the bottom of the reef slope.

REMARKS

Etymology: *melas* is derived from the Greek μέλας –black, and refers to this fish's distinctive coloration.

COMPARISONS

The living coloration of *P. melas* is diagnostic, being more or less uniform dark grey to black with the exception of the hyaline pectoral fins and the dark blue ocellus (edged posteriorly with yellow) on the upper edge of the operculum. *Pseudochromis melas* is closest to *P. natalensis* and *P. tauberæ* from the East African coast and Madagascar, and may be distinguished by the presence of the black (in alcohol) ocellus on the upper edge of the operculum (absent in *P. natalensis* and *P. tauberæ*), the number of gill-rakers (19 for *P. melas*, 15–16 for *P. natalensis*, 16–18 for *P. tauberæ*), and the length of the longest pelvic fin ray (26,9–28,1% of S.L. for *P. melas*, 15,7–24,5% of S.L. for *P. natalensis*, 16,8–21,0% of S.L. for *P. tauberæ*); also *P. melas* has only 26 soft dorsal fin rays, whereas *P. tauberæ* has 28–30.

MATERIAL EXAMINED

(a) *Holotype*, 71,3 mm S.L., around large *Acropora* table and rubble at bottom of reef slope, at 15

m, E side of Wasin Island, Shimoni, Kenya, coll. R. Lubbock on 5.1.1974; BMNH. 1975.2.12.5.

(b) 1 Paratype, 64,8 mm S.L., coll. with (a); USNM. 214106.

Pseudochromis tauberæ n.sp.

PLATES 2A, 3C and 3D

DESCRIPTION

Based on 15 fishes, 40,7–63,9 mm S.L. (8 fishes, 45,3–63,6 mm S.L., from Kenya; 1 fish, 53,0 mm S.L., from Mozambique; 6 fishes, 40,7–53,9 mm S.L., from Madagascar).

Dorsal fin rays III 28–30 (usually 29); anal fin rays III (second anal spine stouter than third) 15–17 (usually 16). Scale rows from origin of lateral line to base of caudal fin 42–47; tubular lateral line scales 28–35 in anterior portion, 5–11 in posterior, disconnected, portion beginning on the fourth (rare) or fifth row of scales below anterior portion (total 33–45 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 13 or $14+1+2$ or 3; predorsal scales 15–26; 4 or 5 (usually 4) rows of scales on preoperculum. 23–42 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count); smaller fishes generally have fewer pores, and in larger fishes the series may consist of two approximately parallel rows of pores. Gill-rakers on first arch $4-6+1+10-12=16-18$ (16 rare) (all elements counted). Upper jaw with 3–6 large canines; lower jaw with 2–4 canines. Caudal fin truncate. Maximum size 63,9 mm S.L., 78,5 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 26,8–30,0(27,8); snout length 5,3–6,7(6,0); orbit diameter 7,4–8,8(8,0); depth at first dorsal spine 26,3–29,8(28,0); predorsal length 30,8–33,9(32,7); least depth of caudal peduncle 13,2–16,1(14,8); pectoral fin length 17,9–21,1(19,5); length of longest pelvic fin ray 16,8–21,0(19,4); dorsal fin base length 59,4–64,0(61,1); anal fin base length 26,4–30,6(28,3).

Coloration

In life, holotype (see Plate 3C upper, and 3D) and one paratype (56,6 mm S.L. from Shanzu) with reddish to pinkish-grey head, becoming mustard yellow on anterior third of body and then dark bluish-grey posteriorly; dorsal body contour slightly darker; upper half of body anteriorly with rows of dark spots (one per scale), lower half of body

posteriorly with rows of faint reddish spots (one per scale); posterior margin of orbit black and then bright blue. Iris bright red with two horizontal blue lines, one above and one below pupil. Dorsal and anal fins light pinkish grey with approximately five horizontal rows of red spots, dorsal fin with red and then blue distal margin, anal fin with blue distal margin; caudal fin dark bluish-grey basally, becoming light grey distally in holotype and bright yellow with hyaline upper and lower margins in paratype; pectoral and pelvic fins pinkish hyaline. Overall, colours of holotype less intense than those of paratype.

In life, two paratypes [52,2 mm S.L. from Shanzu (see Plate 3C lower), 45,3 mm S.L. from Kikambala] with olive head and body, lighter ventrally; approximately 15 horizontal rows of orange-red spots (one per scale) from behind pectoral fins; posterior margin of orbit black and then bright blue. Iris greenish to reddish brown with two horizontal blue lines, one above and one below pupil. Dorsal and anal fins light olive, with approximately five horizontal rows of red spots and blue distal margin.

In alcohol, head and body brown (dark brown in some Madagascar fishes); posterior margin of orbit dark brown to black; red spots on body become beige, and may disappear completely; dark spots gradually fade. Dorsal, anal and caudal fins light to dark brown, the latter sometimes with hyaline upper and lower margins; horizontal rows of spots on anal fin remain prominent, becoming hyaline.

HABITAT AND DISTRIBUTION

Pseudochromis tauberæ is known from Kenya, Tanzania, Mozambique and Madagascar. It is recorded only to a depth of 6 m, and appears to have been often found in the relatively shallow water inside a fringing reef, living in coral and coral rock. I only found this species inside the fringing reef in Kenya, where *P. natalensis* was apparently absent.

REMARKS

Pseudochromis tauberæ is relatively similar morphologically to *P. natalensis*, which may explain why such an apparently common shallow-water *Pseudochromis* should have escaped description for so long. *Pseudochromis tauberæ* appears to show juvenile/adult dichromatism, smaller fishes being olive with rows of orange-red spots while adults have a reddish to pinkish-grey head, becoming mustard yellow on anterior third of body and then dark bluish-grey posteriorly.

ETYMOLOGY

This species is named after Ruth Tauber, who has been very helpful to me during my visits to Kenya.

COMPARISONS

Pseudochromis tauberæ is closest to *P. melas* from Kenya and *P. natalensis* from the East African coast and Madagascar. The differences between *P. tauberæ* and *P. melas* are discussed under "Comparisons" for *P. melas*. *Pseudochromis tauberæ* may be distinguished from *P. natalensis* by living coloration (see Plates 3C and F), the number of soft dorsal fin rays (28–30 for *P. tauberæ*, 25–27 for *P. natalensis*), the number of gill-rakers (16–18, 16 rare, for *P. tauberæ*, 15–16 for *P. natalensis*), and the number of sensory pores in the post- and sub-orbital series (23–42 for *P. tauberæ*, 16–30 for *P. natalensis*). In addition, *P. natalensis* over 40–45 mm S.L. usually have a dark spot at the upper margin of the preoperculum; this is absent in *P. tauberæ*.

MATERIAL EXAMINED

Type series

- (a) *Holotype*, 63,6 mm S.L., around very large coral rock (covered with *Porites*, faviids), living in cracks and holes, at 3 m, inside fringing reef, Shanzu, Kenya, coll. R. Lubbock and M. Stewart-Moore on 18.12.1973; BMNH. 1975.2.12.10
- (b) 2 *Paratypes*, 52,2–56,6 mm S.L., coll. with (a); BMNH. 1975.2.12.11–12.
- (c) 1 *Paratype*, 45,3 mm S.L., living under ledges of large slab of rock, at 2 m, inside fringing reef, Kikambala, Kenya, coll. R. Lubbock and M. Stewart-Moore on 17.12.1973; BPBM. 18035.
- (d) 1 *Paratype*, 56,2 mm S.L., Malindi, Kenya, coll. J. L. B. and M. M. Smith on 5.10.1952; SMF. 12660.
- (e) 1 *Paratype*, 51,3 mm S.L., over flat reef with dead coral and sand, at 0–1.5 m, Ras Mwa Kisenge, Andromache Reef, Mombasa, Kenya, coll. H. Fehlmann on 15.11.1964; USNM. 212217.
- (f) 1 *Paratype*, 53,8 mm S.L., Shimoni, Kenya, coll. J. L. B. and M. M. Smith in 11.1952; RUSI. 3605.
- (g) 1 *Paratype*, 55,4 mm S.L., Shimoni, Kenya, coll. J. L. B. and M. M. Smith in 11.1952; RUSI. 3614.
- (h) 1 *Paratype*, 53,0 mm S.L., Baixo Pinda, Mozambique, coll. J. L. B. and M. M. Smith in 7 or 8.1950; SMF. 12987.
- (i) 5 *Paratypes*, 40,7–63,9 mm S.L., Tuléar, Madagascar, coll. A. Maugé; MNHN. 1965–382.
- (j) 1 *Paratype*, 60,3 mm S.L., coral patches on sand, at 1–6 m, Tanikely, Madagascar, coll. Bolin *et al.* on 7.8.1964; USNM. 212277.

Non-type series

- (k) 1 fish, 47,4 mm S.L., coll. with (h); SMF. 12988.

- (l) 1 fish, 54,5 mm S.L., Ibo, Mozambique, coll. J. L. B. and M. M. Smith on 18.8.1951; SMF. 12658.
- (m) 1 fish, 16,3 mm S.L., coll. with (c); BMNH. 1975.2.12.13.
- (n) 1 fish, 50,8 mm S.L., Zanzibar, Tanzania, coll. J. L. B. and M. M. Smith on 9.9.1952; RUSI. 3613.
- (o) 1 fish, 56,3 mm S.L., no data; RUSI. 3609.
- (p) 1 fish, 61,1 mm S.L., Kifuki, Mozambique, coll. J. L. B. and M. M. Smith on 8.8.1951; RUSI. 3702.
- (q) 1 fish, 31,7 mm S.L., Cabo Delgado, Mozambique, coll. J. L. B. and M. M. Smith on 2.2.1951; RUSI. 3611.
- (r) 3 fishes, 34,8–43,8 mm S.L., sandy cove behind barrier reef of Nosi N'Tanga, Nossi-Bé, Madagascar, coll. J. Rudloe on 30.1.1964; USNM. 212278.
- (s) 3 fishes, 28,4–44,9 mm S.L., barrier reef off Nosi N'Tanga, Nossi-Bé, Madagascar, coll. J. Rudloe on 17.2.1964; USNM. 212279.
- (t) 1 fish, 35,0 mm S.L., Ambariobe Bay, Nossi-Bé, Madagascar, coll. J. Rudloe on 28.1.1964; USNM. 212280.

Pseudochromis natalensis Regan, 1916

PLATES 1E and 3F

Pseudochromis natalensis Regan, 1916, *Ann. Durban Mus.* 1 (3): 167 (Durban)

DESCRIPTION

Based on 20 fishes, 26,8–72,0 mm S.L. (11 fishes, 26,8–70,2 mm S.L., from Kenya; 2 fishes, 47,8–55,1 mm S.L., from Mozambique; 2 fishes, 52,4–72,0 mm S.L., from South Africa; 5 fishes, 39,2–51,4 mm S.L., from Madagascar).

Dorsal fin rays III 25–27; anal fin rays III (second anal spine stouter than third) 13–17. Scale rows from origin of lateral line to base of caudal fin 41–49; tubular lateral line scales 30–35 in anterior portion, 0–11 (only one fish with 0, remainder 4–11) in posterior, disconnected, portion beginning on the fourth or fifth row of scales below anterior portion (total 33–44 tubular scales); transverse scale series, counted forwards and upwards from the second anal spine, 12–14 (14 rare) +1+2 or 3; predorsal scales 17–26; 4–6 (6 rare) rows of scales on preoperculum. 16–30 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count); in one fish the series consisted of two approximately parallel rows of pores. Gill-rakers on first arch 4–6+1+9–11=15 or 16 (all elements counted). Upper jaw with 2–5 large

canines; lower jaw similar. Caudal fin truncate, emarginate in larger specimens. Maximum size 72,0 mm S.L., 87,9 mm T.L.

The following measurements are presented as percentages of the S.L., and only apply to fishes over 30 mm S.L. Head length 25,7–30,6(28,5); snout length 5,5–7,7(6,2); orbit diameter 6,9–9,7(8,8); depth at first dorsal spine 25,4–30,5(27,9); predorsal length 29,6–38,7(34,4); least depth of caudal peduncle 14,2–16,5(15,3); pectoral fin length 17,5–21,8(19,5); length of longest pelvic fin ray 15,7–24,5(19,5); dorsal fin base length 54,9–65,9(60,6); anal fin base 23,2–31,3(28,3).

Coloration

In life, larger fishes (over 40–45 mm S.L.) (see Plate 3F), with head and body light olive, slightly lighter ventrally; 14 or 15 horizontal rows of blue spots (one per scale) from behind head to caudal peduncle, spots darker olive-blue on dorsal body contour and fainter posteriorly; narrow dark stripe from snout to eye; posterior margin of orbit dark grey; dark blue and black spot at upper margin of preoperculum; faint blue spots and markings on operculum, preoperculum and immediately below eye. Iris tan to brown with two horizontal green lines, one above and one below pupil. Dorsal fin pinkish hyaline, becoming light bluish-olive basally, with blue distal margin; anal fin light olive with very faint red and bluish horizontal wavy lines and blue distal margin; caudal fin greenish-yellow; pectoral and pelvic fins hyaline, the latter with bluish reflections.

One fish from Patta Island (44,2 mm S.L.) and one aquarium fish from Mombasa (similar size) with reddish snout and mustard yellow head and anterior quarter of body, becoming greyish-pink posteriorly; horizontal rows of bluish spots from behind head on upper part of flanks, becoming fainter posteriorly; posterior margin of orbit dark grey. Iris red with two horizontal blue lines, one above and one below pupil. Dorsal and anal fins reddish-pink with horizontal red lines and rows of red spots and blue distal margin; caudal fin reddish-pink; pectoral fins hyaline; pelvic fins pinkish hyaline.

Fishes less than 40–45 mm S.L. with olive head and body, lighter ventrally, and rows of very inconspicuous dark bluish olive spots on the upper anterior part of the flanks; operculum with slightly golden sheen; posterior margin of orbit dusky. Iris light brown with two horizontal blue lines, one above and one below pupil. Dorsal fin bluish hyaline with faint reddish lines and spots on lower half, greenish-yellow on upper half; anal fin light olive hyaline, basally bluish hyaline with faint reddish spots; caudal fin with light olive central region, remainder greenish yellow; pectoral and pelvic fins hyaline.

In alcohol, head and body light brown to brown, darker dorsally; posterior margin of orbit dusky; horizontal rows of dark brown spots (one per scale, smaller ventrally) from behind head to base of caudal fin; dark spot at upper margin of preoperculum and dark stripe from snout to eye may be present in larger fishes. Dorsal and anal fins light brownish hyaline in small fishes to brown in larger fishes, hyaline spots and lines rarely present; caudal fin light brown to brown; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION

Pseudochromis natalensis is known from Durban in South Africa to Patta Island (near Lamu) in Kenya on the East African coast and also from Madagascar. At Patta Island it was found under large coral boulders on rubble at 5–6 m, and was syntopic with *P. leucorhynchus*. It was relatively common in Mombasa harbour where it lived around silt-covered rocks from 5–25 m.

REMARKS

This species appears to have a juvenile colour phase, adult coloration being assumed at 40–45 mm S.L.; juveniles are more or less uniform olive, while adults are characterized by horizontal rows of blue spots on the body and a dark spot at the upper margin of the operculum; two fishes from Patta Island and Mombasa harbour had a rather unusual coloration (see *Coloration*), but aquarium observations as well as morphological data show them to be clearly the present species.

COMPARISONS

Pseudochromis natalensis is closest to *P. tauberæ* from the East African coast and Madagascar and *P. melas* from Kenya. The differences between *P. natalensis* and *P. tauberæ* are discussed under "Comparisons" for *P. tauberæ*, and the differences between *P. natalensis* and *P. melas* are discussed under "Comparisons" for *P. melas*.

MATERIAL EXAMINED

- (a) 2 fishes, 39,0–44,2 mm S.L., in large coral boulders on rubble, at 5–6 m, Congoni channel, Pazarli ridge, Patta Island, Kenya, coll. R. Lubbock and M. Stewart-Moore on 30.12.1973; BMNH. 1975.2.12.14–15.
- (b) 4 fishes, 41,8–70,2 mm S.L., silt covered rocks with holes and ledges, at 15–25 m, Fort Jesus, Mombasa, Kenya, coll. R. Lubbock and M. Stewart-Moore on 19.12.1973; BMNH. 1975.2.12.16–19.
- (c) 1 fish, 60,4 mm S.L., coll. with (b); BPBM. 18040.

- (d) 5 fishes, 26,8–47,4 mm S.L., silt covered rocks with holes and ledges, at 5–25 m, Ras Kisauni (Bahari Club), Mombasa, Kenya, coll. R. Lubbock and M. Stewart-Moore on 20.12.1973; BMNH. 1975.2.12.20–24.
- (e) 1 fish, 46,7 mm S.L., Zanzibar, Tanzania, coll. J. L. B. and M. M. Smith in 9.1952; RUSI. 3610.
- (f) 2 fishes, 40,2–55,1 mm S.L., Baixo Pinda, Mozambique, coll. J. L. B. and M. M. Smith in 7. or 8.1950; SMF. 12659.
- (g) 3 fishes, 65,5–74,5 mm S.L., Kifuki, Mozambique, coll. J. L. B. and M. M. Smith on 1.1.1951; RUSI. 3606.
- (h) 1 fish, 47,8 mm S.L., Inhaca Island, Mozambique, coll. J. L. B. and M. M. Smith on 25.8.1949; RUSI. 3607.
- (i) 1 fish, 52,4 mm S.L., Durban, South Africa, coll. A. Wright in 11.1966; RUSI. 3630.
- (j) *Holotype*, 72,0 mm S.L., Durban, South Africa, coll. R. Romer Robinson; BMNH. 1915.7.6.5.
- (k) 5 fishes, 39,2–51,4 mm S.L., Diego Suarez, Madagascar, coll. M. Pras; MNHN. 1966–66.
- (l) 6 fishes, 40,7–48,2 mm S.L., 5 m, Chesterfield Island, Madagascar, coll. L. Knapp on 16.10.1964; USNM. 212281.

Chlidichthys Smith, 1953

Chlidichthys Smith, 1953, *The Sea Fishes of Southern Africa*: 518. Type species *Chlidichthys johnwoelckeri* Smith, 1953 by original designation.

Wamizichthys Smith, 1954, *Ann. Mag. nat. Hist.* (12) 7: 205. Type species *Wamizichthys bibulus* Smith, 1954 by original designation.

GENERAL DESCRIPTION

(Based only on western Indian Ocean species)

Dorsal fin rays II 22 or 23; anal fin rays II or III (if III, first spiniform ray minute, only clearly visible on radiograph), 13 or 14; pectoral fin rays 17–19 (first ray minute, weakly spinous, very closely applied to second ray); pelvic fin rays I 4; principal caudal fin rays 17, with 5 or 6 small supplementary rays above and below. Scale rows from origin of lateral line to base of caudal fin 36–52; 1 tubular lateral line scale at shoulder; 3–23 pitted scales in upper series, 0–16 in lower series; transverse scale series, counted forwards and upwards from the longest anal spine, 15–19; predorsal scales 12–23; 3–5 rows of relatively large scales on preoperculum. 5–8 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Vertebrae (counted from 2 specimens of each species) 11+16,

terminal half-centrum included. Gill-rakers on first arch $3-6+1+7-13=14-19$ (all elements counted). Maximum size 50,7 mm S.L., 60,9 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 25,0–28,5; snout length 4,6–6,0; orbit diameter 7,1–10,5; depth at first dorsal spine 20,8–23,6; predorsal length 29,5–34,0; least depth of caudal peduncle 12,3–15,6; pectoral fin length 15,2–18,8; length of longest pelvic fin ray 15,4–26,2; dorsal fin base length 57,3–64,0; anal fin base length 26,2–31,6.

Small, elongate, reef fishes, head and body moderately compressed. Jaws nearly equal anteriorly, reaching posteriorly to below pupil; cleft of mouth oblique. Eye with pear-shaped pupil. Scales on head and anterior part of body cycloid, remainder ctenoid. Snout, preorbital and most of interorbital area, chin and maxilla naked; 3–5 transverse scale series on preoperculum; scales irregular and very large on operculum. Tube-bearing lateral line scales reduced to a single scale at dorsal angle of branchial opening, but pitted scales, often non-consecutive, occur posteriorly; pitted scales are in two approximate series, one running 1 or 2 scales below dorsal fin base, the other from approximately 8 scale rows above the anal fin origin to the centre of the caudal peduncle. Upper part of operculum, preopercular edge, orbital and supraorbital region of head, lower jaw and snout bearing sensory canals; opercular edge entire, inconspicuously serrated dorsally; edge of preoperculum smooth.

Upper jaw posteriorly with one or two series of teeth, irregular in size; at symphysis about 6 series of teeth, four posterior series being small and setiform, 2 anterior series being caniniform and irregular in size with 3–8 large canines anteriorly in outer series. Lower jaw dentition similar, but posteriorly only one series of teeth, and anteriorly 2–8 large canines in outer series. Vomer with single or double, chevron-shaped series of teeth, irregular in size (double series only in large specimens of *C. bibulus*; smaller *C. bibulus* and all other species in western Indian Ocean with single series). Dentate area of palatines elongate. Pharyngeals covered with conical teeth of irregular size. Tongue smooth.

Dorsal fin with two, anal fin with two or three, small, flexible, spiniform rays; most soft rays simple, only a few posterior rays divided. Pectoral fins rounded, most rays branched. Pelvic fins inserted below pectoral fins, pointed, rays simple, second soft ray longest. Caudal fin rounded to truncate with basal scaly sheath.

DISTRIBUTION

A total of about eleven valid species of *Chlidichthys* is known, all from the Indo-west Pacific region, but the range of individual species appears to be

restricted, as in the closely related *Pseudochromis*. Six species are known from the western Indian Ocean, and have been recorded from the following localities (for precise locality references see descriptions of species):

1. *C. bibulus*: Kenya, Tanzania, Mozambique;
2. *C. johnvoelckeri*: Tanzania, Mozambique;
3. *C. pembae*: Tanzania, Mozambique;
4. *C. randalli*: Mauritius;
5. *C. smithae*: Mauritius;
6. *C. abruptus*: Cargados Carajos.

The above species are known only from the western Indian Ocean. None of the species of *Chlidichthys* recorded in the Red Sea (Lubbock, 1975) or central Indian Ocean (Lubbock, 1976) has been found in the western Indian Ocean.

KEY

The following key is provided for the identification of preserved western Indian Ocean *Chlidichthys*; living *Chlidichthys* may be identified by coloration.

1. (a) Scale rows from origin of lateral line to base of caudal fin 50–52; predorsal scales 19–23; predorsal length 31,1–33,5% of S.L.; length of longest pelvic fin ray 20,4–20,8% of S.L.

Chlidichthys johnvoelckeri Smith, 1953

- (b) Scale rows from origin of lateral line to base of caudal fin 36–48; predorsal scales 12–22; predorsal length 29,5–34,0% of S.L.; length of longest pelvic fin ray 15,4–26,2% of S.L.

2

2. (a) Soft dorsal fin rays 23; soft anal fin rays 14; scale rows from origin of lateral line to base of caudal fin 46–48; predorsal scales 16–20; prominent horizontal dark stripes on head and body.

Chlidichthys bibulus (Smith, 1954)

- (b) Soft dorsal fin rays 22; soft anal fin rays 13; scale rows from origin of lateral line to base of caudal fin 36–46; predorsal scales 12–22; no horizontal dark stripes.

3

3. (a) Gill-rakers on first arch 16–19; transverse scale series 16–18; scale rows from origin of lateral line to base of caudal fin 44–46; length of longest pelvic fin rays 15,6–19,2% of S.L.; pectoral fin length 16,5–18,8% of S.L.

5

- (b) Gill-rakers on first arch 12–15; transverse scale series 15 or 16; scale rows from origin of

lateral line to base of caudal fin 36–43; length of longest pelvic fin ray 23,2–26,2% of S.L.; pectoral fin length 17,2–18,6% of S.L.

4

4. (a) Gill-rakers on first arch 15; scale rows from origin of lateral line to base of caudal fin 40–43; orbit diameter 7,1–7,8% of S.L.; predorsal length 30,3–30,4% of S.L.; pectoral fin length 17,2–17,5% of S.L.

Chlidichthys smithae n.sp.

- (b) Gill-rakers on first arch 12–14; scale rows from origin of lateral line to base of caudal fin 36–40; orbit diameter 8,2–9,0% of S.L.; predorsal length 31,1–33,0% of S.L.; pectoral fin length 17,9–18,6% of S.L.

Chlidichthys pembae Smith, 1954

5. (a) Predorsal scales 16–22; anal fin base length 26,9–28,8% of S.L.; 4 rows of scales on preoperculum; snout abruptly orange in life.

Chlidichthys abruptus n.sp.

- (b) Predorsal scales 12–14; anal fin base length 26,2–26,3% of S.L.; 3 rows of scales on preoperculum; snout pinkish bluish grey in life.

Chlidichthys randalli n.sp.

Chlidichthys johnvoelckeri Smith, 1953

PLATE 4A

Chlidichthys johnvoelckeri Smith, 1953, *The Sea Fishes of Southern Africa*: 518 (Pinda).

DESCRIPTION

Based on two fishes, 32,2–37,1 mm S.L., from Tanzania; one fish, 32,8 mm S.L., from Mozambique.

Dorsal fin rays II 22 or 23; anal fin rays III (first ray minute, only clearly visible on radiograph) 13 or 14. Scale rows from origin of lateral line to base of caudal fin 50–52; 1 tubular lateral line scale at dorsal angle of branchial opening; 18–23 pitted scales in upper series, 5 or 6 pitted scales in lower series (after Smith, 1954); transverse scale series, counted forwards and upwards from the longest anal spine, 17–19; predorsal scales 19–23; 3 or 4 rows of scales on preoperculum. 5–8 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre, and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch 5 or 6+1+9–11=16 or 17 (all elements counted). Upper jaw with 5 large

canines; lower jaw with 2-7 large canines. Caudal fin truncate (?) or rounded (rounded according to Smith, 1954). Maximum size 37,1 mm S.L., 44,4 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 26,4-28,3(27,1); snout length 4,9-5,7(5,2); orbit diameter 9,4-9,8(9,6); depth at first dorsal spine 20,8-23,3(22,1); predorsal length 31,1-33,5(32,1); least depth of caudal peduncle 13,4-13,7(13,5); pectoral fin length 17,4-17,5(17,4); length of longest pelvic fin ray 20,4-20,8(20,7); dorsal fin base length 58,8-60,2(59,7); anal fin base length 28,0-29,9(28,7).

Coloration

In life, "Body mainly uniform cerise-pink, also pectorals and pelvics. Iris brilliant green. A large violet blotch covering most of caudal fin centrally, the margin of the fin body-colour. Most of the dorsal basally dusky iridescent green, the extent diminishing posteriorly. Above this the margin of the fin is carnation-red, the hinder-branched rays this colour more than half their length. The anal is almost exactly similar. On preservation one specimen shows numerous narrow faint angular darker cross-bars" (after Smith, 1954). There is a painting of *C. johnvoelckeri*, showing live coloration, in Smith (1953), reproduced in Plate 4A.

In alcohol, head and body light brown with very faint chevron-shaped lines on flanks. Dorsal, anal and pelvic fins light brown; pectoral fins hyaline; caudal fin brown, slightly darker than body.

HABITAT AND DISTRIBUTION

This species is known from Pemba Island, Pinda and Bazaruto Island (Smith, 1954); it was found in "deepish water on coral, about 30-40 fathoms". Smith states that "The first specimen was found in the mouth of a large specimen of *Cephalopholis rogae* (Forsk.) 1775, brought to the surface from a deep cleft in a submarine coral cliff by a depth charge. By a most curious coincidence the second was obtained two years later in the mouth of the same species in the same fashion at Pemba. The possibility of symbiosis is, however, scarcely tenable."

REMARKS

According to Mrs M. M. Smith (*in litt.*), the paratype from Bazaruto Island has been lost.

Chlidichthys johnvoelckeri was originally described as a new genus and species in Smith (1953); the description was very brief, and an expanded description was published in Smith (1954); the 1954 description erroneously referred to *Chlidichthys* as a new genus and to *C. johnvoelckeri* as a new species, thus ignoring the 1953 publication.

COMPARISONS

Chlidichthys johnvoelckeri is relatively distinct, being characterized by a cerise-pink body, a high number of scale rows from the origin of the lateral line to the base of the caudal fin (50-52), a high number of predorsal scales (19-23), and medium length pelvic fins (longest pelvic fin ray 20,4-20,8% of S.L.). *Chlidichthys johnvoelckeri* is closest in morphology to *C. bibulus* from East Africa, *C. randalli* from Mauritius and *C. abruptus* from Cargados Carajos; *C. bibulus* may be easily distinguished by the horizontal dark stripes on its body, which remain evident after preservation, and the lesser number of scale rows from the origin of the lateral line to the base of the caudal fin (46-48); *C. randalli* may be distinguished by the lesser number of scale rows from the origin of the lateral line to the base of the caudal fin (44-45), the lesser number of predorsal scales (12-14), the shorter pelvic fins (length of longest pelvic fin ray 19,0-19,2% of S.L.), and the live coloration (head orange and grey, body olive). See "Comparisons" under *C. abruptus* for comparison between *C. johnvoelckeri* and *C. abruptus*.

MATERIAL EXAMINED

- (a) *Holotype*, 32,8 mm S.L., from mouth of bombed *Cephalopholis rogae*, coral, at approximately 50-75 m, Bocage, Pinda, Mozambique, coll. J. L. B. and M. M. Smith in 1950; RUSI. 163.
- (b) 1 *Paratype*, 37,1 mm S.L., from mouth of bombed *Cephalopholis rogae*, coral, at approximately 50-75 m, Pemba Island, Tanzania, coll. J. L. B. and M. M. Smith on 28.11.1952; RUSI. 797.
- (c) 1 fish, 32,2 mm S.L., coral, at approximately 50-75 m, Pemba Island, Tanzania, coll. J. L. B. and M. M. Smith on 28.11.1952; RUSI. 797.

Chlidichthys bibulus (Smith, 1954)

PLATE 4B

Wamizichthys bibulus Smith, 1954, *Ann. Mag. nat. Hist.* (12)7: 205 (Wamizi I.).

DESCRIPTION

Based on 7 fishes, 34,8-50,7 mm S.L. (1 fish, 50,7 mm S.L., from Kenya; 1 fish, 34,8 mm S.L., from Tanzania; 5 fishes, 37,0-46,8 mm S.L., from Mozambique).

Dorsal fin rays II 23; anal fin rays III (first ray minute, only clearly visible on radiograph) 14. Scale rows from origin of lateral line to base of caudal fin 46-48; 1 tubular lateral line scale at dorsal angle of branchial opening; 19-21 pitted scales in upper series, 15-16 pitted scales in lower series (after

Smith, 1954); transverse scale series, counted forwards and upwards from the longest anal spine, 17–19; predorsal scales 16–20; 4 or rarely 5 rows of scales on preoperculum. 6 or 7 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla; the first pore adjacent to the maxilla is included in the count. Gill-rakers on first arch 4 or 5+1+9–11=14–17 (all elements counted). Upper jaw with 5–8 large canines; lower jaw with 4–8 large canines. Caudal fin truncate (“feebly convex” in Smith, 1954). Maximum size 50,7 mm S.L., 60,8 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 25,0–27,0(25,8); snout length 4,6–5,5(5,0); orbit diameter 8,5–10,5(9,2); depth at first dorsal spine 20,9–21,6(21,4); predorsal length 29,5–31,3(30,3); least depth of caudal peduncle 13,4–14,4(13,9); pectoral fin length 16,2–18,4(17,2); length of longest pelvic fin ray 15,4–23,9(19,0); dorsal fin base length 59,8–64,0(62,3); anal fin base length 28,4–31,6(30,4).

Coloration

In life (see Plate 4B), “Adult: chin, snout, interorbital, eye and occiput brilliant azo-orange, sharply contrasted with rest of fish. Side of head greenish with pink reflections, a dusky green blotch on cheek and another on opercle. Body basally olive-green with three prominent, dark, almost black, stripes, not as wide as eye, the first from behind eye, narrow at first, broadening behind, running towards hind end of dorsal base, and the lower part continued on the upper part of the caudal peduncle and down over caudal base. The second runs from hind margin of opercle along midline of body, ending abruptly at caudal base. The third starts at lower margin of pectoral base and runs toward the hind margin of the anal base, where it continues along the lower part of the caudal peduncle, and, much narrowed, runs up and round caudal base to unite with hind part of upper stripe. The dorsal has a basal dark stripe, broadening behind, where it unites with the dorsal body stripe, extending up over the last two soft rays. Above this stripe, half the width of the fin, is the green of the body, and the margin above this, about one-fifth of the fin, is pink. The division between the two colours is marked by a narrow diffuse dark stripe along the top of the green. The rays are themselves mostly pink. The anal is precisely similar to the dorsal. The pectorals and pelvics are pink. The caudal is basally dark, the body of the fin green, suffused with pink, grading out to a broad pink margin. The chest alone is light, almost white. Small juveniles are blue rather than green, and the front of the head is not as sharply contrasted, the whole head and chest being pink, also most of the

fins, only the base of the dorsal, anal and caudal being dark green. Iris pink, with mauve ring near rim. Upper part of opercle orange-brown.” (after Smith, 1954)

In alcohol, head and body light brown to brown; dark stripes on body and fins become dark brown; remainder of dorsal, anal and caudal fins brownish hyaline; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION

Chlidichthys bibulus is known from Shimoni to Mozambique Island on the East African coast and also from Zanzibar. Smith states that it is found “in fairly shallow water in coral”. I did not see any in Kenya.

REMARKS

I have been unable to find any characters that would distinguish this species at the generic level from other *Chlidichthys*; I have, therefore, referred *Wamizichthys* to the synonymy of *Chlidichthys*. The holotype of this species was mistakenly referred to on p. 208 of Smith (1954) as being 38 mm in (total) length; this was a misprint for 58 mm, which was in fact written below the figure of the holotype on p. 207.

COMPARISON

Chlidichthys bibulus is the largest of western Indian Ocean *Chlidichthys* (max. size 50,7 mm S.L.), and is relatively distinct both in coloration (in life or in alcohol) and in morphology. It is closest to *C. johnwoelckeri* from the East African coast (see “Comparisons” for *C. johnwoelckeri*), to *C. randalli* from Mauritius (see “Comparisons” for *C. randalli*), and to *C. abruptus* from Cargados Carajos (see “Comparisons” for *C. abruptus*).

MATERIAL EXAMINED

- (a) *Holotype*, 46,8 mm S.L., “in fairly shallow water in coral”, Wamizi Island, Mozambique, coll. J. L. B. and M. M. Smith in 1951; RUSI. 144.
- (b) 1 *Paratype*, 44,4 mm S.L., “in fairly shallow water in coral”, Matemo Island, Ibo, Mozambique, coll. J. L. B. and M. M. Smith on 16.8.1954; RUSI. 3618.
- (c) 3 *Paratypes*, 37,0–46,1 mm S.L., no data (at least one of these fishes must be from Mozambique Island, Mozambique); coll. J. L. B. and M. M. Smith; RUSI. 3619.
- (d) 1 *Paratype*, 34,8 mm S.L., “in fairly shallow water in coral”, Zanzibar, Tanzania, coll. J. L. B. and M. M. Smith on 7.9.1952; RUSI. 3616.
- (e) 1 *Paratype*, 50,7 mm S.L., “in fairly shallow water in coral”, Shimoni, Kenya, coll. J. L. B. and M. M. Smith on 19.8.1954; RUSI. 3617.

Chlidichthys smithae n.sp.

PLATES 2D, 3G and 3H

DESCRIPTION

Based on two fishes, 33,2–40,6 mm S.L., from Mauritius.

Dorsal fin rays II 22; anal fin rays II or III (if III, first ray minute, only clearly visible on radiograph) 13. Scale rows from origin of lateral line to base of caudal fin 40–43; 1 tubular lateral line scale at dorsal angle of branchial opening; 10–12 pitted scales in upper series, 5–7 pitted scales in lower series; transverse scale series, counted forwards and upwards from the longest anal spine, 16; predorsal scales 12–16; 3 rows of scales on preoperculum. 7 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla (the first pore adjacent to the maxilla is included in the count). Gill-rakers on first arch $4+1+10=15$ (all elements counted). Upper jaw with 4 large canines; lower jaw with 4 or 5 large canines. Caudal fin rounded. Maximum size 40,6 mm S.L., 48,7 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 25,6–26,8; snout length 4,7–5,1; orbit diameter 7,1–7,8; depth at first dorsal spine 21,7–22,6; predorsal length 30,3–30,4; least depth of caudal peduncle 13,5–14,2; pectoral fin length 17,2–17,5; length of longest pelvic fin ray 23,2; dorsal fin base length 59,3–59,9; anal fin base length 27,1–28,9.

Coloration

In life [from transparencies at BPBM.—See Plate 3G and H (lower)], paratype with yellowish green body; dorsal and posterior part of body with rows of faint slightly darker spots (one per scale), fainter anteriorly; anteroventral part of body with rows of faint red spots (one per scale); head yellow with three diagonal rows of red spots on preoperculum and scattered red spots on operculum. Iris bright orange. Dorsal fin yellowish hyaline with faint horizontal rows of yellow spots and blue distal margin; anal fin yellowish hyaline, basally with a horizontal row of yellow spots and then a horizontal yellow stripe, distally with a blue margin; caudal fin green; pectoral and pelvic fins hyaline. Holotype with reddish-brown body; head greyish on snout, becoming orange-reddish-brown posteriorly; coloration of holotype otherwise similar to that of paratype.

In alcohol, body brown; dorsal and posterior part of body with rows of faint slightly darker spots; oblique or vertical dark lines on flanks, fainter posteriorly; head light brown. Fins hyaline; dorsal fin of holotype with faint traces of pattern.

HABITAT AND DISTRIBUTION

This species is known only from Mauritius, where it was collected from coral in relatively shallow water (6–7 m).

REMARKS

Etymology: This species is named after Margaret M. Smith, for whose help I am most grateful.

COMPARISONS

Chlidichthys smithae is closest to *C. pembae* from the East African coast, *C. inornatus* from the central Indian Ocean and *C. rubiceps* from the Red Sea. *Chlidichthys smithae* differs from *C. pembae* in the number of gill-rakers on the first arch (15 for *C. smithae*, 12–14 for *C. pembae*), the number of scale rows from the origin of the lateral line to the base of the caudal fin (40–43 for *C. smithae*, 36–40 for *C. pembae*), the orbit diameter (7,1–8,7% of S.L. for *C. smithae*, 8,2–9,0% of S.L. for *C. pembae*), the predorsal length (30,3–30,4% of S.L. for *C. smithae*, 31,1–33,0% of S.L. for *C. pembae*), the pectoral fin length (17,2–17,5% of S.L. for *C. smithae*, 17,9–18,6% of S.L. for *C. pembae*), and in live coloration. *Chlidichthys inornatus* has 8–11 predorsal scales, which extend anteriorly to a point above, or slightly anterior to, the edge of the preoperculum, and thus may be easily distinguished from both *C. smithae* and *C. pembae*, which have 12–16 and 12–14 predorsal scales respectively, extending anteriorly to the posterior part of the interorbital area. *Chlidichthys rubiceps* may be distinguished by its usually higher number of gill-rakers on the first arch (15–18 for *C. rubiceps*, 15 for *C. smithae*, 12–14 for *C. pembae*), its greater relative body depth (23,8–28,6% of S.L. for *C. rubiceps*, 21,7–22,6% of S.L. for *C. smithae*, 22,5–23,6% of S.L. for *C. pembae*), its greater head length (28,6–32,3% of S.L. for *C. rubiceps*, 25,6–26,8% of S.L. for *C. smithae*, 26,4–28,5% of S.L. for *C. pembae*) and its greater orbit diameter (9,1–10,6% of S.L. for *C. rubiceps*, 7,1–7,8% of S.L. for *C. smithae*, 8,2–9,0% of S.L. for *C. pembae*).

MATERIAL EXAMINED

- (a) *Holotype*, 40,6 mm S.L., coral slope to silt bottom, at 6–7 m, Trou d'Eau Douce, Mauritius, coll. J. E. Randall and M. M. Smith on 31.10.1973; BPBM. 16295.
(b) 1 *Paratype*, 33,2 mm S.L., coral head, at 7 m, lagoon side of Flamand Islet, Mauritius, coll. J. E. Randall and M. M. Smith on 3.11.1973; BMNH. 1975.2.12.26.

Chlidichthys pembae Smith, 1954

PLATE 2E

Chlidichthys pembae Smith, 1954, *Ann. Mag. nat. Hist.*
(12) 7: 200 (Pemba).

DESCRIPTION

Based on two fishes, 30,2–31,8 mm S.L., from Tanzania and one fish, 29,0 mm S.L. from Mozambique.

Dorsal fin rays II 22; anal fin rays II 13. Scale rows from origin of lateral line to base of caudal fin 36–40; 1 tubular lateral line scale at dorsal angle of branchial opening; 3 or 4 faintly pitted scales in upper series (after Smith, 1954); transverse scale series, counted forwards and upwards from the longest anal spine, 15 or 16; predorsal scales 12–14; 3 or 4 (?) rows of scales on preoperculum. 7 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla; the first pore adjacent to the maxilla is included in the count. Gill-rakers on first arch 3 or 4+1+7–9=12–14 (all elements counted). Upper jaw with 4–6 large canines; lower jaw with 3–6 large canines. Caudal fin rounded. Maximum size 31,8 mm S.L., approximately 38–40 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 26,4–28,5(27,7); snout length 5,1–5,6(5,3); orbit diameter 8,2–9,0(8,5); depth at first dorsal spine 22,5–23,6(23,1); predorsal length 31,1–33,0(32,1); least depth of caudal peduncle 14,1–15,6(14,7); pectoral fin length 17,9–18,6(18,3); length of longest pelvic fin ray 23,4–26,2(24,8); dorsal fin base length 57,3–61,6(59,5); anal fin base length 27,2–29,7(28,1).

Coloration

In life, "Body and fins almost uniform dull olive" (after Smith, 1954). In alcohol, body brown; dorsal, anal and caudal fins brownish hyaline; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION

This species is known only from Pemba Island and Matemo Island near Ibo. At Pemba it was collected from coral at about 27 m depth.

REMARKS

Smith (1954) remarked that "it will not be surprising if a careful examination of *Pseudoplesiops typus* Bleeker, and of *Nematochromis annae* Weber, prove them to be one and the same and identical with the above (*C. pembae*)". *C. pembae* is clearly not identical with either of these species.

COMPARISONS

Chlidichthys pembae is closest to *C. smithae* from Mauritius, *C. inornatus* from the central Indian Ocean and *C. rubiceps* from the Red Sea. The differences between these species are discussed under "Comparisons" for *C. smithae*.

MATERIAL EXAMINED

- (a) *Holotype*, 30,2 mm S.L., coral, at approx. 27 m, W side of Pemba Island, Tanzania, coll. J. L. B. and M. M. Smith; RUSI. 142.
- (b) 1 *Paratype*, 31,8 mm S.L., coll. with (a); RUSI. 3622.
- (c) 1 *Paratype*, 27,0 mm S.L., coll. with (a); RUSI. 3623.
- (d) 1 *Paratype*, 29,0 mm S.L., Matemo Island, Ibo, Mozambique, coll. J. L. B. and M. M. Smith on 16.8.1951; RUSI. 3621.

Chlidichthys abruptus n.sp.

PLATES 5C and D

DESCRIPTION

Based on seven fishes, 39,0–46,6 mm S.L., from Cargados Carajos shoals.

Dorsal fin rays II 22; anal fin rays II or III 13. Scale rows from origin of lateral line to base of caudal fin 44–46; 1 tubular lateral line scale at dorsal angle of branchial opening; approximately 12–16 pitted scales in upper series, 0–3 pitted scales in lower series; transverse scale series, counted forwards and upwards from the longest anal spine, 16–18 (usually 17); predorsal scales 16–22; 4 rows of scales on preoperculum. 7 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla; the first pore adjacent to the maxilla is included in the count. Gill-rakers on first arch 5+1+10–13=16–19 (all elements counted). Upper jaw with 3–5 large canines; lower jaw with 4–7 large canines. Caudal fin rounded to truncate. Maximum size 46,6 mm S.L., 54,9 mm T.L.

The following measurements are presented as percentages of the S.L. Head length 26,8–27,9(27,2); snout length 5,8–6,0(5,9); orbit diameter 8,7–9,5(9,1); depth at first dorsal spine 21,7–23,4(22,4); predorsal length 32,5–34,0(33,6); least depth of caudal peduncle 12,3–13,9(12,9); pectoral fin length 16,5–18,8(17,3); length of longest pelvic fin ray 15,6–20,8(17,4); dorsal fin base length 57,4–59,2(58,5); anal fin base length 26,9–28,8(27,7).

Coloration

In life (from 35 mm transparency—see Plate 5C), body and posterior part of head light olive green; snout and most of ventral part of head anterior to posterior margin of orbit abruptly bright orange; faint oblique to vertical dark stripes on body, fainter posteriorly. Iris light orange, becoming bluish towards outer margin. Pectoral and pelvic fins hyaline; dorsal fin olive basally, becoming pinkish olive hyaline distally; anal and caudal fins olive.

In alcohol, head and body mostly brown; snout beige; oblique to vertical dark stripes on body remain. Pectoral and pelvic fins hyaline, other fins brown.

HABITAT AND DISTRIBUTION

Chlidichthys abruptus is known only from the Cargados Carajos shoals, when it was collected in surge channels and around rock cliffs at up to 10 m depth.

REMARKS

Etymology: The Latin name *abruptus* refers to the abruptly demarcated orange snout of the present species.

COMPARISONS

Chlidichthys abruptus is closest to *C. randalli* from Mauritius, and to *C. bibulus* and *C. johnvoelckeri* from the East African coast. It may be separated from *C. randalli* by live coloration (see Plates 3 and 5), by the number of predorsal scales (16–22 for *C. abruptus*, 12–14 for *C. randalli*), by the number of scale rows on the preoperculum (4 for *C. abruptus*, 3 for *C. randalli*), and by the anal fin base length (26,9–28,8% of S.L. for *C. abruptus*, 26,2–26,3% of S.L. for *C. randalli*). *Chlidichthys bibulus* may be easily distinguished by the horizontal dark stripes on its body and by the number of soft dorsal (23 for *C. bibulus*, 22 for *C. abruptus*) and soft anal (14 for *C. bibulus*, 13 for *C. abruptus*) fin rays. *Chlidichthys johnvoelckeri* may be distinguished by the number of scale rows from the origin of the lateral line to the base of the caudal fin (50–52 for *C. johnvoelckeri*, 44–46 for *C. abruptus*) and by live coloration (see Plates 4 and 5).

MATERIAL EXAMINED

Type series

- (a) *Holotype*, 42,8 mm S.L., surge channel in patch reef, SW side of Raphael I., Cargados Carajos shoals, coll. T. H. Fraser on 23.3.1971; RUSI. 1903.
- (b) 3 *Paratypes*, 39,0–46,6 mm S.L., rock cliff with incuts, at 0–10 m, half mile S of Raphael I., Cargados Carajos shoals, coll. V. G. Springer *et al.* on 12.4.1976; USNM. 216139.

- (c) 2 *Paratypes*, 41,6–42,4 mm S.L., coll. with (b); BMNH. 1976.7.14.1–2.

Non-type series

- (d) 9 fishes, 35,6–44,6 mm S.L., coll. with (b); USNM.

Chlidichthys randalli n.sp.

PLATES 2C and 3H (upper)

DESCRIPTION

Based on two fishes, 34,2–41,2 mm S.L., from Mauritius.

Dorsal fin rays II 22; anal fin rays II (first ray minute, only clearly visible on radiograph) 13. Scale rows from origin of lateral line to base of caudal fin 44 or 45; 1 tubular lateral line scale at dorsal angle of branchial opening; 10–12 pitted scales in upper series, 8–10 pitted scales in lower series; transverse scale series, counted forwards and upwards from the longest anal spine, 17 or 18; predorsal scales 12–14; 3 rows of scales on preoperculum. 7 sensory pores in the post- and sub-orbital series, starting on the vertical above eye centre and extending down the hind margin of the eye to the upper edge of the maxilla; the first pore adjacent to the maxilla is included in the count. Gill-rakers on first arch 4 or 5+1+12=17 or 18 (all elements counted). Upper jaw with 5 or 6 large canines; lower jaw similar. Caudal fin truncate(?). Maximum size 41,2 mm. S.L., 48,8 mm T.L.

The following measurements are expressed as percentages of the S.L. Head length 26,9–27,7; snout length 5,8; orbit diameter 9,0–10,2; depth at first dorsal spine 21,9–22,6; predorsal length 31,9–32,3; least depth of caudal peduncle 13,1–13,2; pectoral fin length 15,2–17,0; length of longest pelvic fin ray 19,0–19,2; dorsal fin base length 57,6–58,7; anal fin base length 26,2–26,3.

Coloration

In life (from transparency at BPBM.—See Plate 3H), holotype with dull greenish-olive body; anterior part of body with faint oblique or vertical pale lines; head light bluish-pinkish-grey, with approximately horizontal bright orange stripe from upper margin of orbit to just over half way between orbit and dorsal fin origin, diagonal greenish-orange stripe from lower margin of orbit to upper angle of operculum and short stripe, parallel to and same colour as diagonal stripe, on central operculum. Iris orange. Dorsal and anal fins bluish-olive basally, pinkish hyaline distally; caudal fin olive basally, pinkish hyaline distally; pectoral and pelvic fins pinkish hyaline.

In alcohol, head and body light brown; body with pale oblique or vertical lines, fainter posteriorly. Fins hyaline, dorsal and anal fins light brown to brown basally.

HABITAT AND DISTRIBUTION

Chlidichthys randalli is known from Mauritius, where it was found in coral from 6–18 m.

REMARKS

Etymology: This species is named after Dr John E. Randall, who has kindly provided me with specimens for this and other studies.

COMPARISONS

Chlidichthys randalli is closest in morphology to *C. bibulus* and *C. johnvoelckeri* from the East African coast and to *C. abruptus* from the Cargados Carajos shoals. *Chlidichthys bibulus* may be easily distinguished by the

horizontal dark stripes on its body, which remain evident after preservation, the higher numbers of soft dorsal and anal fin rays (soft dorsal fin rays 23 for *C. bibulus*, 22 for *C. randalli*; soft anal fin rays 14 for *C. bibulus*, 13 for *C. randalli*); and the higher number of scale rows from the origin of the lateral line to the base of the caudal fin (46–48 for *C. bibulus*, 44–45 for *C. randalli*). The differences between *C. johnvoelckeri* and *C. randalli* are discussed under "Comparisons" for *C. johnvoelckeri*, while the differences between *C. abruptus* and *C. randalli* are discussed under "Comparisons" for *C. abruptus*.

MATERIAL EXAMINED

- (a) *Holotype*, 34.2 mm S.L., coral heads, at 7–18 m, lagoon side of Flamand Islet, Mauritius, coll. J. E. Randall and M. M. Smith on 3.11.1973; BPBM. 16299.
(b) *Paratype*, 41.2 mm S.L., coll. with (a); BMNH. 1975.2.12.25.

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Margaret M. Smith of the J. L. B. Smith Institute of Ichthyology, Rhodes University, Grahamstown, Dr T. H. Fraser, formerly also of the J. L. B. Smith Institute, and Dr V. G. Springer of the United States National Museum; Alwyne Wheeler and Dr P. J. P. Whitehead of the British Museum (Natural History) kindly helped in obtaining these loans. I am grateful to Dr P. J. P. Whitehead for reviewing the text and suggesting improvements.

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TABLE 1
Summary of meristic characters

	Soft dorsal fin rays	Soft anal fin rays	Tubular lateral line scales	Scale rows from origin of lateral line to caudal fin base	Transverse scale series	Predorsal scales	Post-and sub-orbital pores	Gill-rakers on first arch	Scale rows on preoperculum	Enlarged canines in upper jaw	Enlarged canines in lower jaw
<i>Pseudochromis magnificus</i>	24	14-15	31-36+5-10=39-43	41-48	13-14+1+2-3	15-20	18-26	4-6+1+10-11=16-17	3-4	2-4	2-5
<i>P. dutoiti</i>	28-33	16-19	25-34+3-7=33-41	41-49	12-14+1+2-3	20-27	11-50	4-5+1+10-11=15-17	5-7	2-7	2-5
<i>P. leucorhynchus</i>	29-31	17-18	30-34+5-8=36-42	45-50	13-14+1+2-3	20-25	16-22	4-5+1+10-11=15-17	5	2-5	2-5
<i>P. melanotus</i>	26	15	30+6=36	41	12+1+2	20	18	5+1+11=17	4-5	4	4
<i>P. melas</i>	26	15	34-35+8-10=42-45	47-48	14+1+2-3	18-22	29-34	6+1+12=19	5	4	2-4
<i>P. natalensis</i>	25-27	13-17	30-35+0-11=33-44	41-49	12-14+1+2-3	17-26	16-30	4-6+1+9-11=15-16	4-6	2-5	2-5
<i>P. tauberæ</i>	28-30	15-17	28-35+5-11=33-45	42-47	13-14+1+2-3	15-26	23-42	4-6+1+10-12=16-18	4-5	3-6	2-4
<i>Chlidichthys bibulus</i>	23	14	1	46-48	17-19	16-20	6-7	4-5+1+9-11=14-17	4-5	5-8	4-8
<i>C. johnvoelckeri</i>	22-23	13-14	1	50-52	17-19	19-23	5-8	5-6+1+9-11=16-17	3-4	5	2-7
<i>C. pembae</i>	22	13	1	36-40	15-16	12-14	7	3-4+1+7-9=12-14	3-4	4-6	3-6
<i>C. randalli</i>	22	13	1	44-45	17-18	12-14	7	4-5+1+12=17-18	3	5-6	5-6
<i>C. smithæ</i>	22	13	1	40-43	16	12-16	7	4+1+10=15	3	4	4-5
<i>C. abruptus</i>	22	13	1	44-46	16-18	16-22	7	5+1+10-13=16-19	4	3-5	4-7

TABLE 2
Summary of morphometric characters

	Head length	Snout length	Orbit diameter	Depth at first dorsal spine	Predorsal length	Least depth of caudal peduncle	Pectoral fin length	Length of longest pelvic fin ray	Dorsal fin base length	Anal fin base length
<i>Pseudochromis magnificus</i>	28,3-30,8(29,5)	5,5-6,2(5,8)	7,5-9,3(8,2)	28,0-31,4(29,3)	33,5-38,0(35,2)	14,5-16,6(15,6)	18,2-20,8(19,7)	16,8-21,6(19,5)	56,5-60,3(58,4)	25,1-27,9(26,4)
<i>P. dutoiti</i>	23,8-27,7(25,4)	4,6-6,1(5,5)	6,4-8,3(7,3)	20,0-23,8(22,2)	27,4-32,5(30,0)	12,0-14,1(13,1)	13,0-17,3(15,1)	12,0-15,9(13,7)	62,4-69,4(65,9)	27,5-33,4(31,4)
<i>P. leucorhynchus</i>	24,6-29,1(26,8)	5,2-6,4(5,7)	7,2-9,9(8,3)	22,8-26,2(24,6)	29,8-34,7(32,1)	13,8-15,7(14,7)	15,7-18,7(17,2)	13,7-15,7(14,6)	61,6-65,3(63,0)	27,2-33,1(29,9)
<i>P. melanotus</i>	28,6	5,9	8,6	24,7	31,9	15,2	19,2	30,6	60,6	26,0
<i>P. melas</i>	30,1-30,2	7,3-7,6	8,1-9,0	29,5-29,8	34,6-35,3	16,0-17,0	21,9-23,0	26,9-28,1	60,6-61,6	25,9-28,5
<i>P. natalensis</i>	25,7-30,6(28,5)	5,5-7,7(6,2)	6,9-9,7(8,8)	25,4-30,5(27,9)	29,6-38,7(34,4)	14,2-16,5(15,3)	17,5-21,8(19,5)	15,7-24,5(19,5)	54,9-65,9(60,6)	23,2-31,3(28,3)
<i>P. tauberæ</i>	26,8-30,0(27,8)	5,3-6,7(6,0)	7,4-8,8(8,0)	26,3-29,8(28,0)	30,8-33,9(32,7)	13,2-16,1(14,8)	17,9-21,1(19,5)	16,8-21,0(19,4)	59,4-64,0(61,1)	26,4-30,6(28,3)
<i>Chlidichthys bibulus</i>	25,0-27,0(25,8)	4,6-5,5(5,0)	8,5-10,5(9,2)	20,9-21,6(21,4)	29,5-31,3(30,3)	13,4-14,4(13,9)	16,2-18,4(17,2)	15,4-23,9(19,0)	59,8-64,0(62,3)	28,4-31,6(30,4)
<i>C. johnvoelckeri</i>	26,4-28,3(27,1)	4,9-5,7(5,2)	9,4-9,8(9,6)	20,8-23,3(22,1)	31,1-33,5(32,1)	13,4-13,7(13,5)	17,4-17,5(17,4)	20,4-20,8(20,7)	58,8-60,2(59,7)	28,0-29,9(28,7)
<i>C. pembae</i>	26,4-28,5(27,7)	5,1-5,6(5,3)	8,2-9,0(8,5)	22,5-23,6(23,1)	31,1-33,0(32,1)	14,1-15,6(14,7)	17,9-18,6(18,3)	23,4-26,2(24,8)	57,3-61,6(59,5)	27,2-29,7(28,1)
<i>C. randalli</i>	26,9-27,7	5,8	9,0-10,2	21,9-22,6	31,9-32,3	13,1-13,2	15,2-17,0	19,0-19,2	57,6-58,7	26,2-26,3
<i>C. smithæ</i>	25,6-26,8	4,7-5,1	7,1-7,8	21,7-22,6	30,3-30,4	13,5-14,2	17,2-17,5	23,2	59,3-59,9	27,1-28,9
<i>C. abruptus</i>	26,8-27,9(27,2)	5,8-6,0(5,9)	8,7-9,5(9,1)	21,7-23,4(22,4)	32,5-34,0(33,6)	12,3-13,9(12,9)	16,5-18,8(17,3)	15,6-20,8(17,4)	57,4-59,2(58,5)	26,9-28,8(27,7)

If three specimens or more of a given species were examined a mean figure (in parentheses) is given.
Morphometric characters calculated using sub-adult and adult specimens, i.e.: *Pseudochromis* over 30 mm S.L. *Chlidichthys* over 20 mm S.L.

TABLE 3

	Soft dorsal fin rays												Soft anal fin rays						
	22	23	24	25	26	27	28	29	30	31	32	33	13	14	15	16	17	18	19
<i>Pseudochromis magnificus</i>			11											9	2				
<i>P. dutoiti</i>							14	6	8	5	2	1				2	10	16	8
<i>P. leucorhynchus</i>								2	3	2							4	3	
<i>P. melanotus</i>					1										1				
<i>P. melas</i>					2										2				
<i>P. natalensis</i>				4	12	2							1	3	5	7	2		
<i>P. tauberæ</i>							2	10	3						2	12	1		
<i>Chlidichthys bibulus</i>		6												7					
<i>C. johnwoelckeri</i>	1	2											1	2					
<i>C. pembae</i>	3												3						
<i>C. randalli</i>	2												2						
<i>C. smithae</i>	2												2						
<i>C. abruptus</i>	6												6						

TABLE 4

Scale rows from origin of lateral line to base of caudal fin

	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
<i>Pseudochromis magnificus</i>						2	1	4	1	1	1		1				
<i>P. dutoiti</i>						4	1	5	2	8	3	3	4	2			
<i>P. leucorhynchus</i>										1	2		1	2	1		
<i>P. melanotus</i>						1											
<i>P. melas</i>												1	1				
<i>P. natalensis</i>						1	2		3	5	5		1	1			
<i>P. tauberæ</i>							3		1	4	5	1					
<i>Chlidichthys bibulus</i>											1	3	1				
<i>C. johnwoelckeri</i>															2		1
<i>C. pembae</i>		1			1	1											
<i>C. randalli</i>									1	1							
<i>C. smithae</i>						1		1									
<i>C. abruptus</i>									1	4	1						

TABLE 5

Tubular scales in anterior portion of lateral line

	1	25	26	27	28	29	30	31	32	33	34	35	36
<i>Pseudochromis magnificus</i>								2		5	3		1
<i>P. dutoiti</i>			1	2	5	3	6	5	3	3	4	1	
<i>P. leucorhynchus</i>								1	2	1	2	1	
<i>P. melanotus</i>								1					
<i>P. melas</i>											1	1	
<i>P. natalensis</i>							2	2	3	7	2	2	
<i>P. tauberæ</i>					2	1		1	4	2	3	1	
<i>Chlidichthys bibulus</i>		6											
<i>C. johnwoelckeri</i>		3											
<i>C. pembae</i>		3											
<i>C. randalli</i>		2											
<i>C. smithae</i>		2											
<i>C. abruptus</i>		6											

A NOTE ON ANISOCHROMIS KENYAE
SMITH, 1954

PLATE 4C and D

by

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ABSTRACT

This note lists specimens caught to date and increase in distribution of *Anisochromis kenyae*. Two colour illustrations demonstrate the sexual dichromatism.

This note is being included in here for three reasons. Although Greenwood, Rosen, Weitzman and Myers in their "Phyletic studies of teleostian fishes with a provisional classification of living forms" (*Bul. Am. Mus. nat. Hist.* 131 (4) : 341-455, 32 charts) followed Smith in keeping *Anisochromis* in its own family Anisochromidae, V. G. Springer who has borrowed 20 of the 68 paratypes (RUSI 854) collected at Shimoni in November 1952, has informed me that he considers *Anisochromis* belongs to the Pseudochromidae. If this is substantiated then some reference to *A. kenyae* here is essential. Secondly, as the paper used for the paintings of the two sexes was starting to discolour, it was decided to reproduce them here (Plate 4C and D). Thirdly a southwards extension of distribution is reported.

For those who do not have ready access to the original description, the following is Smith's key differentiating the two families.

A. Vertebrae 10-11+16. Scales on head. Usually two incomplete lateral lines. Gill-membranes barely united far forward. Gill-rakers well developed, moderate to numerous, cover lower arch. Palatines toothed. Distinct spines in dorsal and anal, one or two undivided anterior rays in dorsal and anal. 17 or more pectoral rays. Pelvic inserted below or little forward of pectoralsPseudochromidae

B. Vertebrae 11+22. Head entirely naked. A single dorsal lateral line. Gill-membranes fully united, forming a broad fold across isthmus. Gill-rakers few, confined to small area near angle of arch, most of arch smooth. Palatines edentate. A single feeble rudimentary spin-

iform ray before dorsal and anal, all soft rays in these fins divided. Pectoral of 14 rays, only one simple. Pelvics inserted markedly anterior to pectoralsAnisochromidae

The minute compact little body and absence of head scales quickly differentiates *Anisochromis* from the pseudochromids.

Anisochromis kenyae was described by J. L. B. Smith in *Ann. Mag. nat. Hist.* (12) 7 : 298-302 1 fig., pl. 6 from 76 specimens. The first specimens found in a rock pool at Vuma on 7th October, 1952 were thought to represent different species! It was soon realised that they belonged to a single species exhibiting striking sexual dichromatism. The specimens were carefully set in the fold of a paper using a microscope to ensure the fins were properly extended. Back in South Africa they were photographed, drawn and the illustrations published in the original description.

Due to the minute size of these fishes I decided to paint the drawings from the live fishes, and, taking the illustrations, a binocular microscope and paints to Kisiti reef, off Shimoni in Kenya, coloured the drawings from freshly poisoned specimens while the tide rose around me! Plate 4C shows the female paratype (at one time designated the allotype!) of 19 mm S.L. RUSI 148 and D the holotype male, RUSI 21 mm S.L. both from Malindi, Kenya, in poor weedy ground near Sail Rock channel.

After the publication of the original description, in 1956 specimens were caught further south at Pinda, thus extending the range known from Malindi and Shimoni to Pinda reef (14°14'S 40°47'E) in Mozambique. One of the smallest and most exquisite of vertebrates, they were secured by using rotenone in one or other form.

The material in the J. L. B. Smith Institute of Ichthyology is as follows:

TYPES SERIES all collected in Kenya in 1952

Date	Locality	Sex and Nos	TL*	SL*	Remarks	Cat. No.
1952						RUSI
11 Oct	Malindi	M 1	25	21	Holotype	149
11 Oct	Malindi	F 1	23	19	"Allotype"	148
7 Oct	Vuma	M 2	31; 27	26; 22	Paratype	855
		F 1	22	18	Paratype	
7 Oct	Vuma	M 1	31	26	Paratype	857
		F 1	21	17	Paratype	
1 Nov	Kisiti Is. (off Shimoni)	1	27	22.5	Cleared and stained	856
1 Nov	Kisiti Is. (off Shimoni)	68 specimens	17-29	14-26	Paratypes	854

Males and females, both juvenile and gravid, 20 not examined as away on loan to V. G. Springer, 6 of which are being lodged with the Smithsonian collection.

Subsequent collection in Kenya (1954) and Mozambique (1956) secured the following:

NON TYPE SERIES

Date	Locality	Sex and Nos	TL*	SL*	Remarks	Cat. No.
						RUSI
27 Aug 1954	Shimoni	M 1	27.5	23	used for colour	4904
		F 1	28	23.5		
27 Aug 1954	Shimoni	M 1	26.5	22.5		4905
		F 2	28; 27	24; 23		
3 Sept 1956	Pinda reef (14° 14'S)	M 4	27.5-30	23-25		4906
		F 3	26-29	21.5-24		

*An interesting result of remeasuring the type material which was first preserved in buffered formalin and then in n-propyl alcohol, indicates that the fishes have shrunk about 2 mm or about 8% of their total lengths.

INDEX

Those pseudochromids considered valid in western Indian Ocean are in heavy type.

abruptus, Chlidichthys 17
aldabraensis, Pseudochromis 4

Anisochromis kenyae 22
annae, Nematochromis 17

bibulus, Chlidichthys 14
bibulus, Wamizichthys 14

Chlidichthys 12
abruptus 17
bibulus 14
inornatus 16, 17
johnvoelckeri 13
pembae 17
randalli 18
rubiceps 16, 17
smithae 16

dutoiti, Pseudochromis 4

inornatus, Chlidichthys 16, 17

johnvoelckeri, Chlidichthys 13

kenyae, Anisochromis 22

leucorhynchus, Pseudochromis 6

magnificus, Pseudochromis 3

melanotus, Pseudochromis 7

melas, Pseudochromis 8

natalensis, Pseudochromis 10

Nematochromis annae 17

pembae, Chlidichthys 17

Pseudochromis 2
aldabraensis 4
dutoiti 4
leucorhynchus 6
magnificus 3
melanotus 7
melas 8
natalensis 10
punctatus 7
tauberae 9

Pseudoplesiops typus 17

punctatus, Pseudochromis 7

randalli, Chlidichthys 18

rubiceps, Chlidichthys 16, 17

smithae, Chlidichthys 16

tauberae, Pseudochromis 9

typus, Pseudoplesiops 17

Wamizichthys 14

bibulus 14

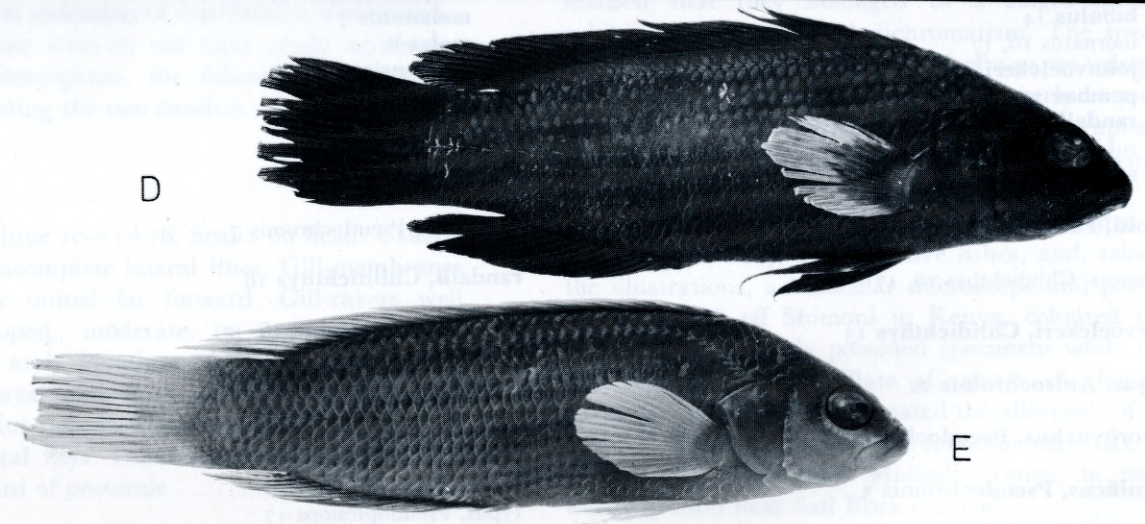
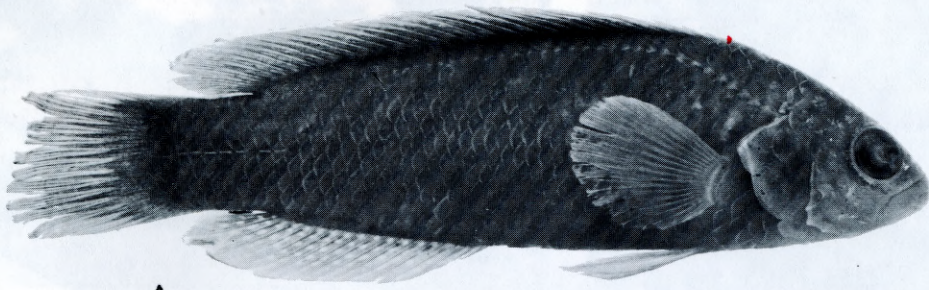


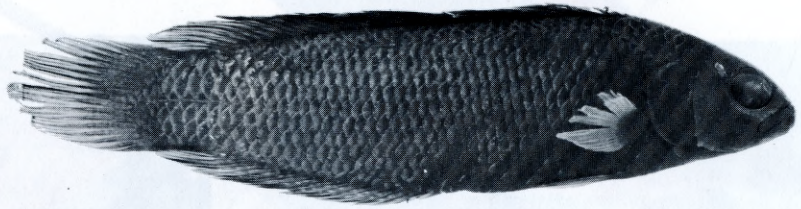
PLATE 1

- A. *Holotype* of *Pseudochromis magnificus*, 50,5 mm S.L., RUSI. 1901.
 B. *Paratype* of *Pseudochromis magnificus*, 52,3 mm S.L., RUSI. 1902.

- C. *Holotype* of *Pseudochromis melanotus*, 54,6 mm S.L., ZIM. 5025.
 D. *Holotype* of *Pseudochromis melas*, 71,3 mm S.L., BMNH. 1975.2.12.5.
 E. *Pseudochromis natalensis*, 70,2 mm S.L., BMNH. 1975.2.12.19.



A



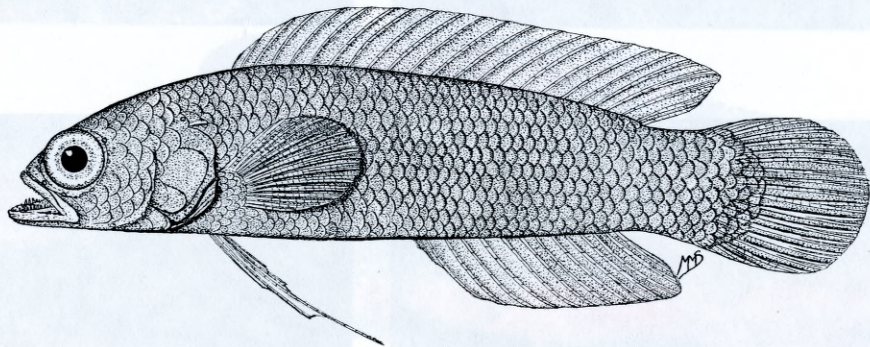
B



C



D



E

PLATE 2

- A. *Holotype* of *Pseudochromis tauberae*, 63,6 mm S.L., BMNH. 1975.2.12.10.
 B. *Holotype* of *Pseudochromis leucorhynchus*, 54,0 mm S.L., BMNH. 1975.2.12.7.

- C. *Holotype* of *Chlidichthys randalli*, 34,2 mm S.L., BPBM. 16299.
 D. *Holotype* of *Chlidichthys smithae*, 40,6 mm S.L., BPBM. 16295.
 E. *Holotype* of *Chlidichthys pembae*, 30,2 mm S.L., RUSI. 142. (After Smith)

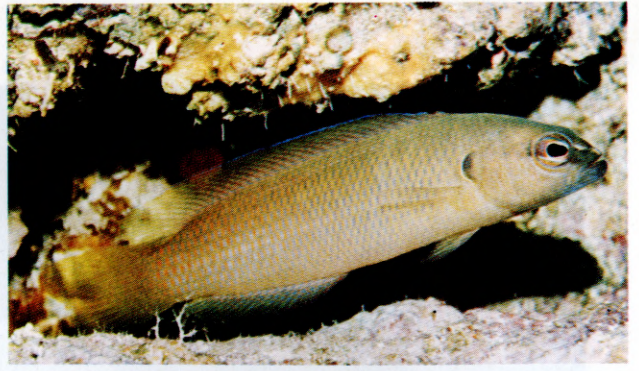


PLATE 3

- A. Paratype of *Pseudochromis melas*, 64,8 mm S.L., USNM. 214106
 B. Paratype of *Pseudochromis leucorhynchus*, 51,5 mm S.L., BMNH. 1975.2.12.8.
 C. (Above) Holotype of *Pseudochromis tauberæ*, 63,6 mm S.L., BMNH. 1975.2.12.10. (Below) Paratype of *Pseudochromis tauberæ*, 52,2 mm S.L., BMNH. 1975.2.12.11.

- D. Holotype of *Pseudochromis tauberæ* (see C. Above) alive.
 E. *Pseudochromis dutoiti*, 63,7 mm S.L., BMNH. 1974.6.3.1.
 F. *Pseudochromis natalensis*, 60,4 mm S.L., BPBM. 18040.
 G. Holotype of *Chlidichthys smithæ*, 40,6 mm S.L., BPBM. 16295. (Photo—J. E. Randall).
 H. (Above) Holotype of *Chlidichthys randalli*, 34,2 mm S.L., BPBM. 16299. (Photo—J. E. Randall) (Below) Paratype of *Chlidichthys smithæ*, 33,2 mm S.L., BMNH. 1975.2.12.26. (Photo—J. E. Randall)



A



B



C



D

PLATE 4

- A. *Holotype* of *Chlidichthys johnvoelckeri*, 32,8 mm S.L., RUSI. 163.
 B. *Holotype* of *Chlidichthys bibulus*, 46,8 mm S.L., RUSI. 144.
 C. *Paratype* (female) of *Anisochromis kenyae*, 19 mm S.L., RUSI. 148.
 D. *Holotype* (male) of *Anisochromis kenyae*, 21 mm S.L., RUSI. 149. (All paintings by Margaret M. Smith.)

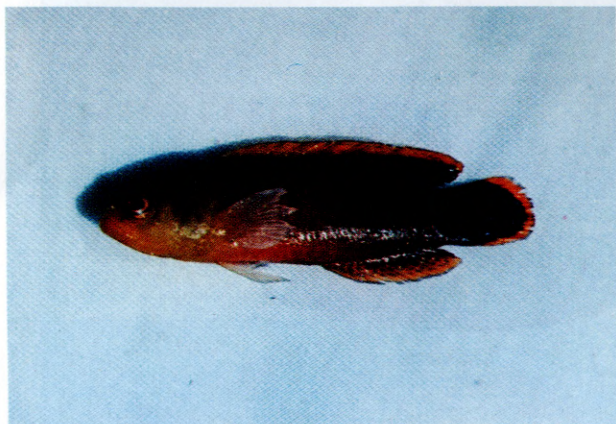


PLATE 5

- A. *Pseudochromis magnificentus*, male, approx. 50 mm S.L.
B. *Pseudochromis magnificentus*, female, approx. 50 mm S.L.
C. *Chlidichthys abruptus*, approx. 40 mm S.L.
D. Holotype of *Chlidichthys abruptus*, 42,8 mm S.L., RUSI.
1903

A-C. Photos by O. Nordlinger.
D. Photo by R. E. Stobbs.