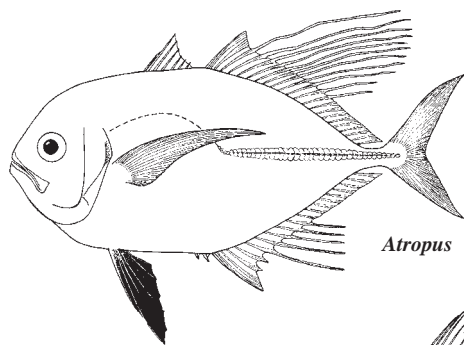


CARANGIDAE

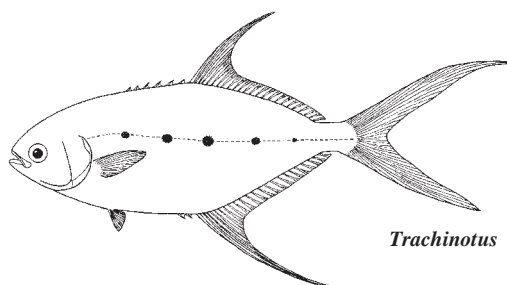
Jacks and scads (also trevallies, queenfishes, runners, amberjacks, pilotfishes, pampanos, etc.)

by W.F. Smith-Vaniz

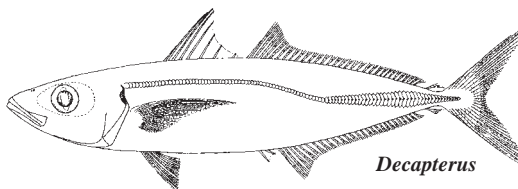
D **Diagnostic characters:** Body highly variable in shape, ranging from elongate and fusiform to deep and strongly compressed; caudal peduncle of medium width to notably slender, in some species with a moderate lateral keel, bilateral paired keels or dorsal and ventral grooves. Head varying from moderately long and rounded to short, deep and very compressed. Eye small to large, with adipose eyelid negligible to strongly developed. Snout pointed to blunt; lower jaw protruding to subtended (included). Teeth in jaws in rows or bands, either small to minute or an enlarged row of recurved canines present; teeth on roof of mouth (vomer, palatines) or tongue present or absent depending on species or developmental stage. Gill openings large, gill membranes not united, free from isthmus; branchiostegal rays 6 to 10 (usually 7); gill rakers moderate in length and number to long and numerous, their number decreasing with growth in some species; opercular bones smooth (but with spines in larvae and small juveniles). **Two dorsal fins** that are separate in small juveniles, **the first of moderate height or very low, with IV to VIII spines (spines obsolete or embedded in adults of some species), the second dorsal fin with I spine and 18 to 44 soft rays** and the anterior lobe scarcely produced to extremely long; **anal fin with II anterior spines (only I spine in *Elagatis* and *Seriolina*) that are separate from rest of fin by a gap (becoming embedded in adults of some species) followed by I spine and 15 to 39 soft rays**, with the anterior lobe low to elongate; pectoral fins with about 14 to 24 soft rays, either long and falcate or short and pointed or rounded; pelvic fins with I spine and 5 soft rays, moderately long in some species to becoming rudimentary in others (absent in *Parastromateus*); caudal fin forked, with the lobes equal in most species. **Scales small, sometimes difficult to see**, and cycloid (smooth to touch), but strongly lanceolate to needle-like in a few species, usually absent from some areas of head and covering body (but absent on certain body areas in some species) and sometimes extending onto fins. **Lateral line arched (curved) or elevated above pectoral fins and straight posteriorly, extending onto caudal fin; scutes (enlarged, thickened, and often pointed scales in lateral line) present and prominent, or reduced in some species and absent in some genera.** Vertebrae 10-11+14-16 (usually 10+14; total 24 to 26). **Colour:** darker above (green or blue to blackish) and paler below (silvery to white or yellow-golden), some species almost entirely silvery when alive, others with dark or coloured bars or stripes on head, body or fins, and some able to change patterns; the young of many species with bars or spots.



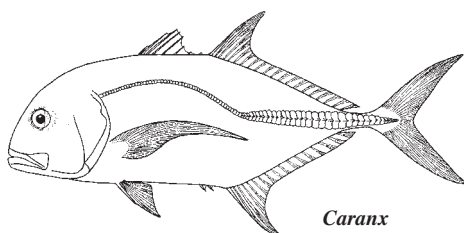
Atropus



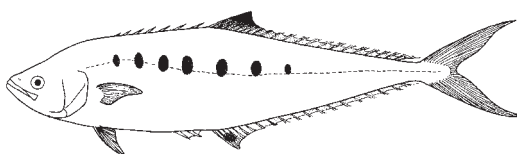
Trachinotus



Decapterus



Caranx



Scomberoides

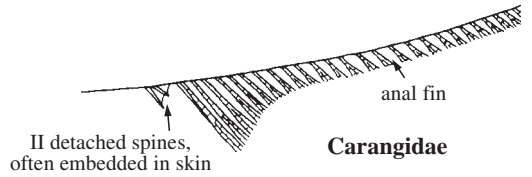
examples of body shapes

Habitat, biology, and fisheries: Mostly schooling species (but *Alectis* generally solitary); some species have largely continental distributions and occur primarily in brackish environments (especially young), others such as *Elagatis* and *Naucrates* are pelagic, usually found at or near the surface, mostly in oceanic waters, often far offshore. This is one of the most important families of commercial fishes, and all species are used for food. For 1995, FAO's Yearbook of Fishery Statistics reports a total catch of around 959 300 t of Carangidae from the Western Central Pacific. Caught commercially with trawls, also with purse seines, traps, and on line gear. The larger species of *Trachinotus*, *Seriola*, and *Caranx* are highly regarded as sportfish.

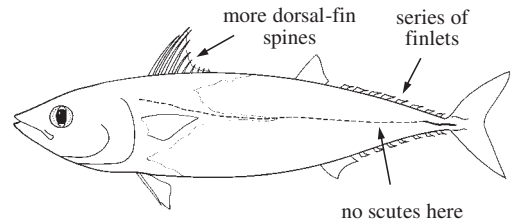
Similar families occurring in the area

The Carangidae is distinguished from all similar families in having the first 2 anal-fin spines detached from rest of fin (caution: these spines sometimes partially or completely embedded in large adults of several genera, especially *Seriola*, *Alectis*, and *Caranx*; however, they can be found, without much difficulty by dissection). The presence of enlarged, thickened scutes in the straight part of lateral line in some genera easily distinguishes them from other families. Additional distinguishing characters of similar families (especially to those carangid genera lacking scutes on the lateral line), are the following:

Scombridae: dorsal-fin spines IX to XXVII (IV to VIII in Carangidae); no scutes developed along posterior part of lateral line; series of finlets present behind dorsal and anal fins (*Scomberoides*, the only carangid that lacks scutes and at the same time has a series of finlets, is further distinguished by having II detached, depressible spines in front of anal fin).

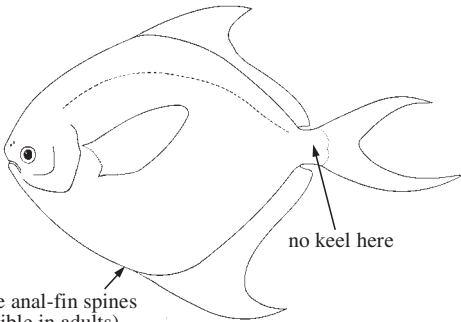


Carangidae

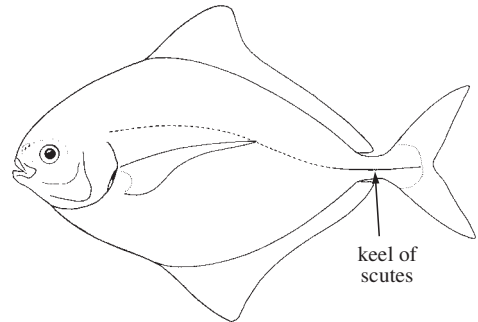


Scombridae

Stromateidae: *Pampus*, the only genus in the area, can be distinguished from carangids as follows: IV blade-like anal-fin spines, not detached from fin (barely visible in adults, may be embedded in skin); pelvic fins minute or absent in adults (readily apparent in carangids, except in adults of *Parastromateus*). *Pampus* is very similar in body shape to *Parastromateus*, but has the lateral line strongly arched anteriorly (weakly arched in *Parastromateus*) and the straight part does not form a slight keel on the caudal peduncle or has 8 to 19 weak scutes as in *Parastromateus*.



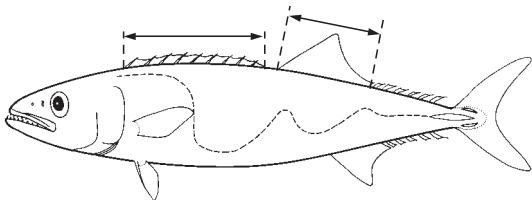
Pampus (Stromateidae)



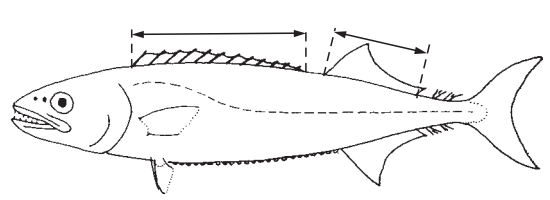
Parastromateus niger (Carangidae)

IV blade-like anal-fin spines (barely visible in adults)

Gempylidae (especially *Lepidocybium* and *Ruvettus* species): base of first dorsal fin longer than that of second excluding finlets (equal or shorter than second in Carangidae); a series of dorsal and anal finlets present in *Lepidocybium* and *Ruvettus*.



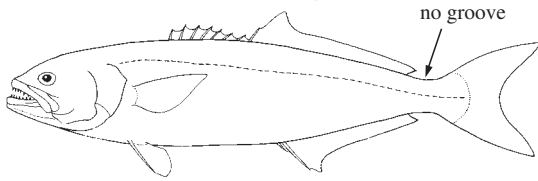
Lepidocybium



Ruvettus

Gempylidae

Pomatomidae: both jaws with a series of strong compressed teeth; no grooves on caudal peduncle (present in *Seriola* which is superficially similar).

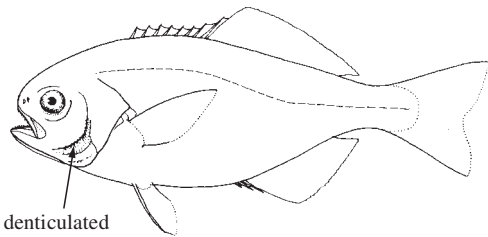


Pomatomidae

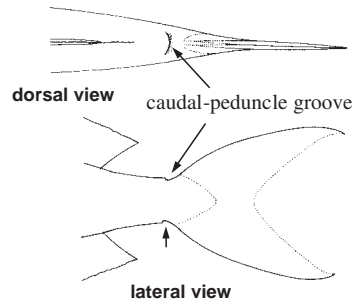
Rachycentridae: head broad and depressed, lower jaw projecting; body more slender; first dorsal fin with VIII or IX short, free spines, each depressible in a groove, II or III anal-fin spines, none detached from fin.

Centrolophidae, particularly the genus *Hyperoglyphe*: III anal-fin spines, none detached from fin; adults with margin of preopercle usually moderately denticulate (smooth in Carangidae); jaw teeth all conical; simple caudal fin, not deeply forked.

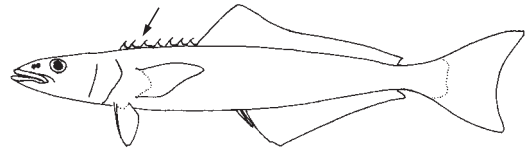
Lactariidae: III anal-fin spines, none detached from fin; anal fin has more soft rays than dorsal fin; caudal peduncle not exceptionally narrowed.



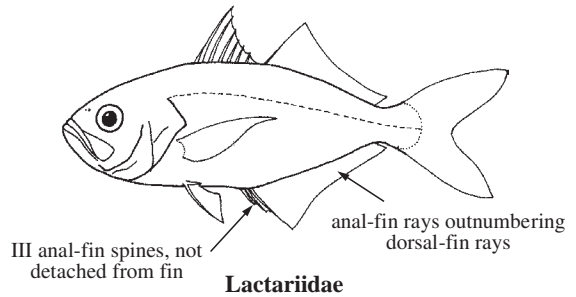
***Hyperoglyphe* (Centrolophidae)**



***Seriola* (Carangidae)**



Rachycentridae



Lactariidae

Identification note

Dentition: Dentition has traditionally been used by past workers to finely subdivide a number of presumably monophyletic species-groups centered around *Caranx* under different generic or subgeneric designations. One such group is the "catch-basket" category "*Carangoides*." The Indo-Pacific species of *Carangoides* (sensu lato) exhibit a wide range of dentition types, including some that appear to be morphologically intermediate. In other cases, genera long recognized as valid appear to be most closely related to a subgroup within *Carangoides*. It is tempting to recognize a more inclusive genus *Caranx*, with *Carangoides* recognized as one of several subgenera. However, *Caranx* would then probably become undefinable as a monophyletic group, thus the status quo is maintained for the present with some reluctance. Two nominal genera, *Pseudocaranx* and *Ulua*, are especially likely candidates for synonymization.

Fin spines: The 2 detached anterior anal-fin spines and some of the anterior spines of the first dorsal fin (especially the first spine) frequently become completely embedded in the skin in large individuals of many carangids (all spines of the first dorsal fin become embedded in *Alectis* and *Parastromateus* at a relatively small size). Even in those genera with a relatively high spinous dorsal fin, the first spine is usually small and closely appressed to the second spine and thus can easily be overlooked.

Breast squamation: Many species of *Carangoides*, *Caranx*, and *Uraspis* have the breast only partially scaly, and the pattern of breast squamation is an important character used to distinguish species. The pattern of breast squamation is sometimes difficult to observe in fresh specimens; observation is facilitated by gently scraping the breast with a knife to remove mucous and allowing the breast to partially dry, hastened by blowing air on the area.

Gill-raker counts: In species with relatively numerous gill rakers (e.g. *Decapterus* and *Trachurus*) great care must be taken not to overlook rakers at either end of the gill arch. It is suggested that a small knife be used to free the upper limb of the gill arch where it joins the skull. With a little practice this can be done

without leaving any stub with rakers attached. Once this has been accomplished, the gill rakers are much easier to see. In some genera (e.g. *Caranx* and *Seriola*) the number of developed rakers decreases with growth with a concomitant increase in the number of rudiments (tubercles or short rakers with the diameter of their bases greater than their height). When rudimentary rakers are included in the gill-raker counts, and large specimens are being examined, it is very important that all of the tubercles are counted. In all cases the raker in the angle of the gill arch is included in the count of lower-limb rakers.

Lateral-line scutes: In many carangids, size and configuration of the scales and scutes on the lateral line is variable and there may be a gradual transition from one type to another. Scutes are here defined as modified scales that either have their posterior margin with a small to moderate projecting spine or the scale has a raised horizontal ridge and ends in an apex not exceeding a 90° angle. All scutes should be counted, including those extending onto the caudal-fin base. In order to observe and accurately count the lateral-line scales and scutes, good lighting and some magnification is recommended. In some species it may also be necessary to remove small body scales that tend to overgrow or otherwise obscure the lateral line.

Measurements: The curved part of the lateral line is measured as a chord of the arch extending from the upper edge of the opercle to its junction with the straight part. The straight part of the lateral line is measured from its junction with the curved part to its termination on the caudal-fin base (end of the last scute). In cases where the junction of the curved and straight parts is very gradual, the curved part is considered to begin with the scale or scute that has 3/4 of its height above the central axis of the straight part.

Key to the genera and subgenera of Carangidae occurring in the area

- 1a. Posterior straight part of lateral line with hardened scutes; in adults, pectoral fins long and falcate, in most genera longer than head (Fig. 1) (about equal to head length in *Selar* and *Trachurus*, and shorter than head length in some *Decapterus* spp.) → 2
- 1b. No scutes in lateral line (only pored scales, not enlarged); pectoral fins relatively short, shorter than head (about 50 to 90% of head length) → 19

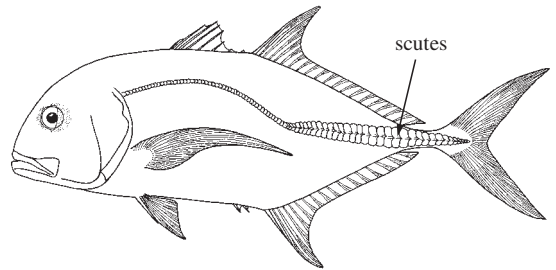


Fig. 1 *Caranx*

- 2a. Pored scales in curved lateral line scute-like, expanded dorsoventrally (Fig. 2) (caution: in large fish may be obscured by overgrowth of smaller scales); dorsal accessory lateral line normally extends posteriorly at least to below origin of second dorsal fin, usually farther posteriorly (Figs 2 and 3) *Trachurus*
- 2b. No enlarged scute-like scales in curved lateral line; dorsal accessory lateral line terminating before origin of spinous dorsal fin → 3

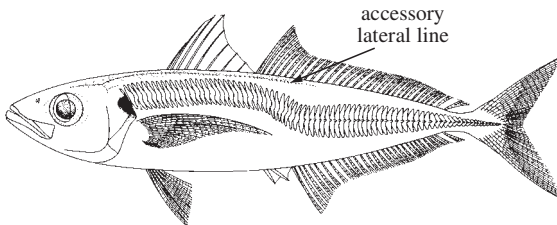


Fig. 2 *Trachurus*

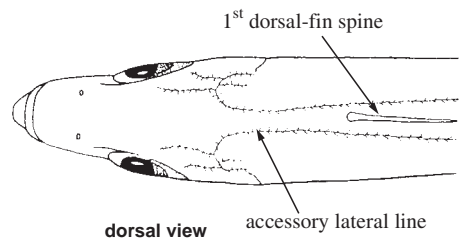


Fig. 3 *Trachurus*

- 3a. Pelvic fins, if present (absent in specimens larger than about 10 cm fork length), positioned distinctly anterior to a vertical line through pectoral-fin base; soft anal-fin rays 35 to 39 *Parastromateus*
- 3b. Pelvic fins (always present) not positioned distinctly anterior to a vertical through pectoral-fin base; soft anal-fin rays 15 to 31 → 4

- 4a. Scales on body minute, inconspicuous and embedded giving the impression of naked skin; in smaller fish, anterior soft rays of dorsal and anal fins filamentous (Fig. 4) *Alectis*
- 4b. Scales on body small but conspicuous, not embedded; in smaller fish, anterior soft rays of dorsal and anal fins not filamentous → 5
- 5a. Second dorsal and anal fins with 1 or more distinctly separate finlets → 6
- 5b. Second dorsal and anal fins without finlets → 7

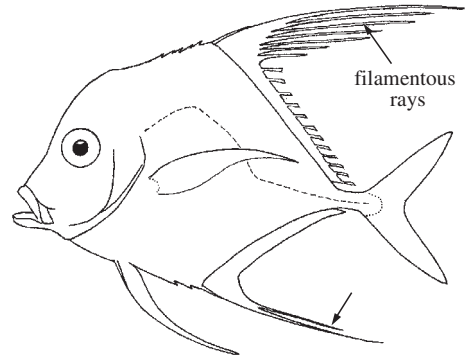


Fig. 4 *Alectis*

- 6a. Single detached terminal 2-rayed finlet in dorsal and anal fins (Fig. 5); shoulder girdle (cleithrum) margin with 2 papillae, the lower papilla larger (Fig. 6); maximum scute height smaller than eye diameter. . . *Decapterus*
- 6b. Posterior soft dorsal- and anal-fin rays consisting of 6 to 10 detached finlets; shoulder girdle margin smooth; maximum scute height larger than eye diameter (Fig. 7) . . . *Megalaspis*

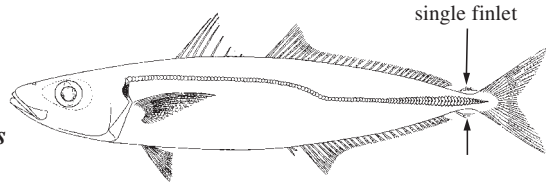
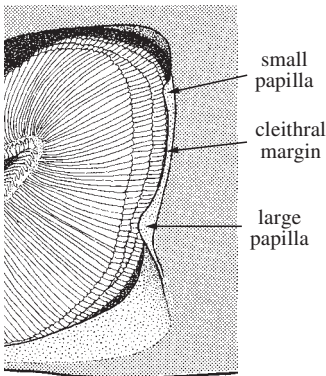


Fig. 5 *Decapterus*



gill chamber after lifting operculum

Fig. 6 *Decapterus*

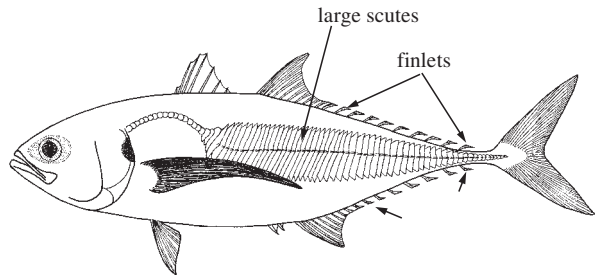
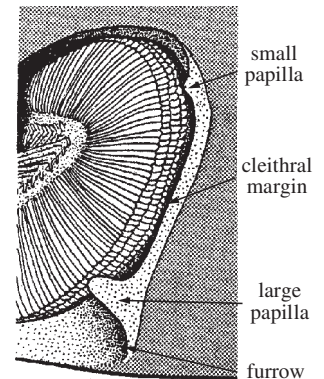


Fig. 7 *Megalaspis*

- 7a. Shoulder girdle (cleithrum) margin with a furrow ventrally, a large papilla immediately above it and a smaller papilla near upper edge (Fig. 8) *Selar*
- 7b. Shoulder girdle margin smooth → 8
- 8a. Upper jaw without teeth → 9
- 8b. Upper jaw with 1 or 2 rows or a band of minute teeth (caution: teeth difficult to detect in some *Carangoides*) → 10



gill chamber after lifting operculum

Fig. 8 *Selar*

- 9a. Lower jaw with a series of minute teeth; a prominent black opercular spot encroaching on shoulder; adipose eyelid well developed posteriorly *Selaroides*
- 9b. Lower jaw with a few feeble teeth in young (smaller than 10 cm fork length), absent in adults; no black opercular spot; adipose eyelid poorly developed *Gnathanodon*
- 10a. Tongue, roof and floor of mouth white, the rest dark (Fig. 9); anal-fin spines reabsorbed or reduced and immovable; no teeth on vomer or palatines *Uraspis*
- 10b. Lining of mouth not distinctly black and white; anal-fin spines normal and movable; teeth present on vomer and palatines → 11

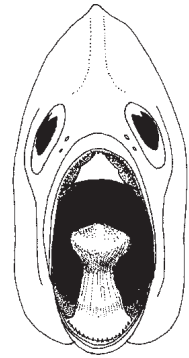


Fig. 9 *Uraspis*

- 11a. Fleshy adipose eyelid completely covering eye except for a vertical slit centred on pupil (Fig. 10a); terminal ray of dorsal and anal fins finlet-like, a little more separated from other rays but not detached, and about twice length of penultimate ray *Atule*

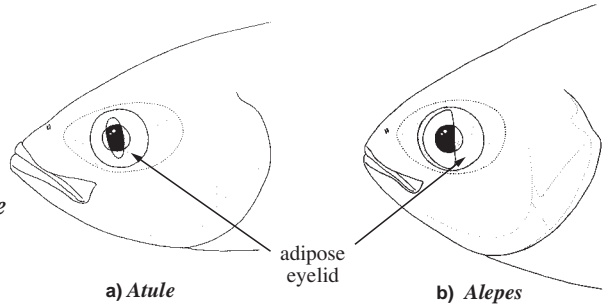


Fig. 10

- 11b. Fleshy adipose eyelid, if present, not well developed anteriorly, most of anterior half of pupil exposed; terminal ray of dorsal and anal fins not finlet-like (except terminal ray length 1.5 times the length of penultimate ray in large *Alepes djedeba*) → 12

- 12a. Both jaws with a single row of numerous, comb-like teeth; adipose eyelid well developed on posterior half of eye only (Fig. 10b) *Alepes*

- 12b. Dentition not as above; adipose eyelid, if present, variously developed → 13

- 13a. Upper jaw anteriorly with 2 irregular rows of short conical teeth, posteriorly inner surface of jaw paved with blunt teeth (Fig. 11a); snout shorter than eye diameter “*Alepes*”

- 13b. Dentition not as above; snout usually equal or larger than eye diameter → 14

- 14a. Upper jaw with an outer series of moderate to strong canines and an inner band of fine teeth (Fig. 11b); lower jaw with a single row of teeth → 15

- 14b. Dentition not as above → 16

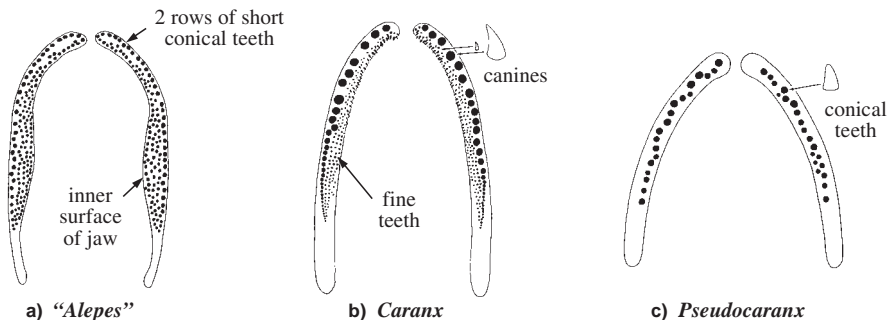


Fig. 11 ventral view of teeth in upper jaw (teeth on roof of mouth not shown)

- 15a. Body generally deep, with dorsal profile more convex than ventral; total gill rakers 20 to 31 on first gill arch; segmented dorsal- and anal-fin rays never produced as filaments; 2 to 4 canines anteriorly in each jaw *Caranx*
- 15b. Body shallow with dorsal and ventral profiles equally convex; total gill rakers 34 to 39 on first gill arch; segmented dorsal- and anal-fin rays produced as filaments in adult males; no canines anteriorly in either jaw *Pantolabus*
- 16a. Both jaws with single series of short, conical teeth (upper jaw sometimes with an inner row of conical teeth anteriorly) (Fig. 11c); breast completely scaly *Pseudocaranx*
- 16b. Both jaws with a band of teeth, at least anteriorly; breast naked ventrally (most species) to completely scaly → 17
- 17a. Belly with a deep median groove, accommodating pelvic fins, anus, and anal-fin spines (Fig. 12a); pelvic fins conspicuously long and black, tip of appressed fins extending almost to origin of anal fin; curved lateral line short, chord of curved part of lateral line contained 1.5 to 2 times in straight part (Fig. 12b) *Atropus*
- 17b. Belly without median groove; pelvic fins not conspicuously long and black; curved lateral line moderate in most species, with chord of curved part of lateral line contained less than 1.5 times in straight part → 18

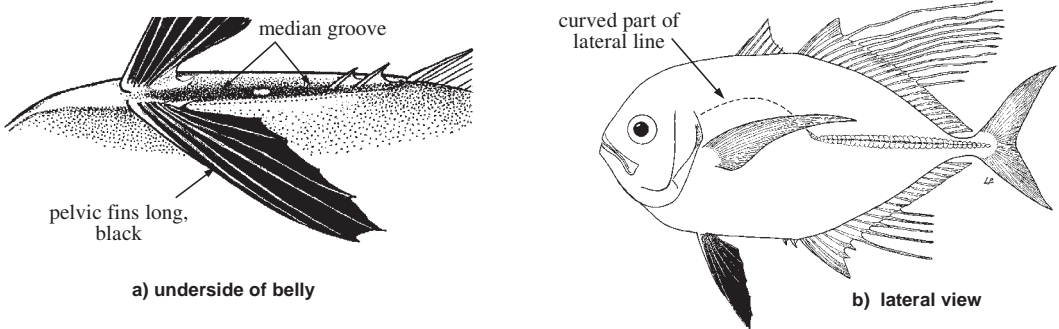


Fig. 12 *Atropus*

- 18a. Gill rakers long, feather-like, and project into mouth along side of tongue (Fig. 13); total gill rakers 54 to 86 on first gill arch; lower jaw becoming prominent in large adults, with the angle of "chin" projecting beyond upper jaw (Fig. 14) *Ulua*
- 18b. Gill rakers of normal length and shape; total gill rakers 21 to 37 on first gill arch; shape of lower jaw not as above *Carangoides*

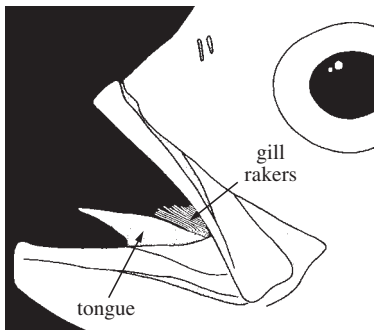


Fig. 13 *Ulua*

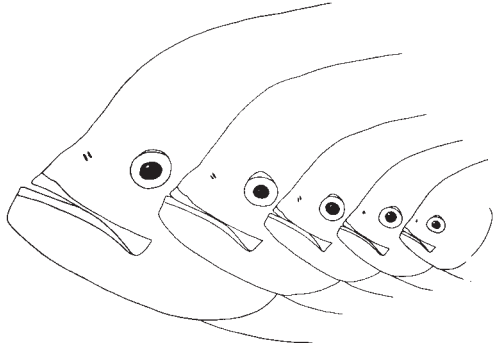


Fig. 14 *Ulua*

- 19a. Bases of soft dorsal and anal fins unequal in length, anal-fin base shorter and only about 45 to 70% of dorsal-fin base length (Fig. 15); caudal-peduncle grooves present, dorsally and ventrally (Fig. 16). → 20
- 19b. Base of soft anal fin as long as, or only slightly shorter than, base of dorsal fin; no caudal-peduncle grooves. → 23

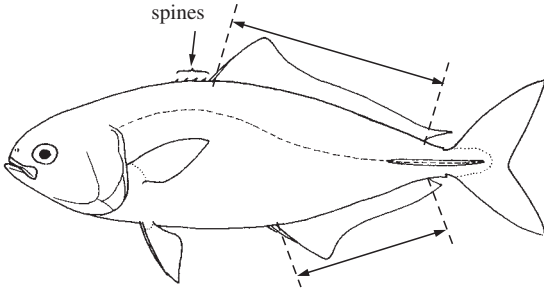


Fig. 15 *Naucrates*

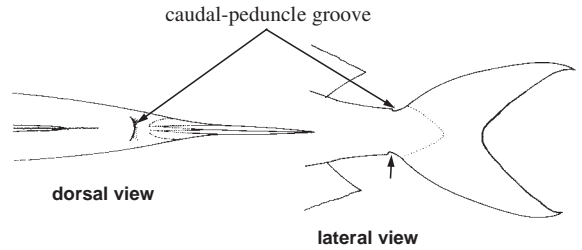


Fig. 16 *Naucrates*

- 20a. Terminal 2-rayed finlet present in dorsal and anal fins (Fig. 17); upper jaw ending distinctly before eye (to below anterior margin of eye in young) *Elagatis*
- 20b. No finlets in dorsal and anal fins; upper jaw ending below anterior margin of eye to posterior margin of eye → 21

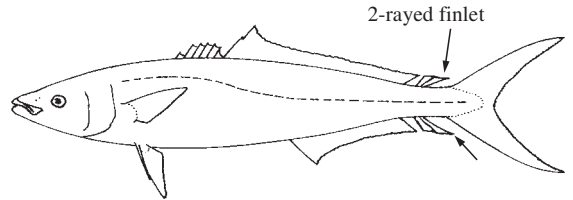
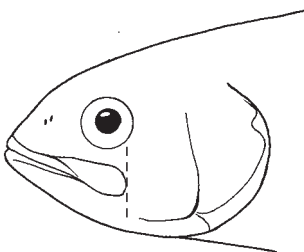
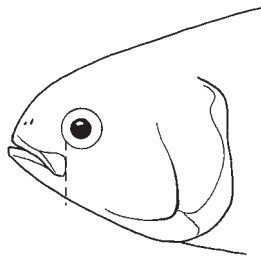


Fig. 17 *Elagatis*

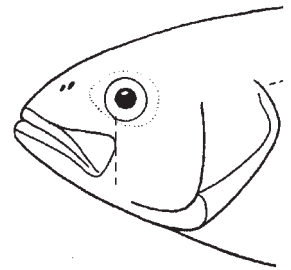
- 21a. Upper jaw broadly rounded posteriorly and usually terminating below posterior margin of eye (Fig. 18a); gill rakers on first gill arch mostly consisting of rudiments, 4 to 10 total elements *Seriolina*
- 21b. Upper jaw truncate or slightly rounded posteriorly and terminating below about anterior margin of eye to middle of eye (Fig. 18b, c); gill rakers on first gill arch mostly well developed, 11 to 29 total elements → 22



a) *Seriolina*



b) *Naucrates*



c) *Seriola*

Fig. 18

22a. First dorsal fin with IV or V spines; soft anal-fin rays 15 to 17; fleshy keel laterally on caudal peduncle well developed (Fig. 19) *Naucrates*

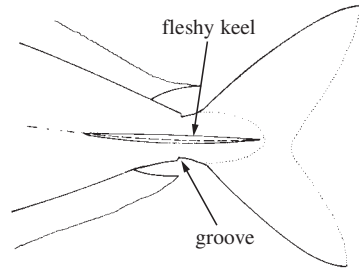


Fig. 19 *Naucrates*

22b. First dorsal fin with VII or VIII spines (caution: anterior spines may become completely embedded in large individuals); soft anal-fin rays 18 to 22 (except 15 to 17 in *S. hippos*); fleshy keel on caudal peduncle absent to moderately developed (*S. lalandi*) *Seriola*

23a. Posterior soft dorsal- and anal-fin rays consisting of semi-detached finlets (Fig. 20); distal quarter to half of rays not connected by interradial membrane (unattached portion of rays increasing with growth); lower jaw of adults with 2 rows of conical teeth separated by a shallow groove; upper lip joined to snout at midline by a bridge of skin (frenum), except crossed by a shallow groove in very young *Scomberoides*

23b. Posterior soft dorsal- and anal-fin rays not consisting of semi-detached finlets (Fig. 21); lower jaw without teeth or with band of small villiform teeth; upper lip separated from snout at midline by a continuous deep groove *Trachinotus*

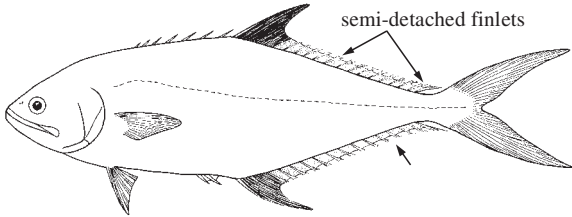


Fig. 20 *Scomberoides*

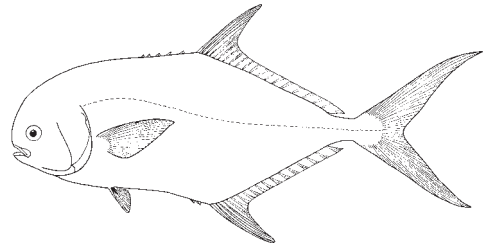


Fig. 21 *Trachinotus*

Key to the species of *Alectis* occurring in the area

1a. Profile of nape and head broadly rounded; suborbital depth relatively narrow, contained 1.7 to 3 times in upper jaw length (Fig. 22); gill rakers (excluding rudiments) on lower limb of first arch 12 to 17 *Alectis ciliaris*

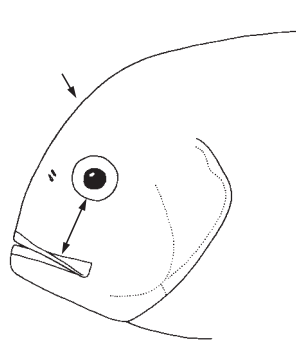


Fig. 22 *Alectis ciliaris*

1b. Profile of nape and head somewhat angular; suborbital depth relatively broad, contained 0.8 to 1 times in upper jaw length (Fig. 23); gill rakers (excluding rudiments) on lower limb of first arch 21 to 26 *Alectis indica*

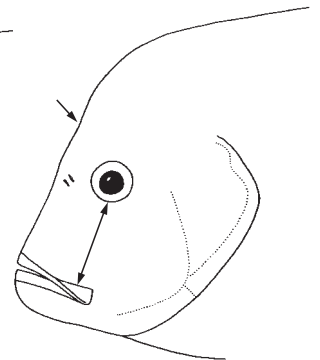


Fig. 23 *Alectis indica*

Key to the species of *Alepes* occurring in the area

- 1a. Interradial membranes of spinous dorsal fin black; total gill rakers 24 to 30 on first arch
 *Alepes melanoptera*
- 1b. Interradial membranes of spinous dorsal fin transparent to dusky; total gill rakers 32 to 47 on first arch (except 27 to 30 in *A. apercna*) → 2
- 2a. Total gill rakers 27 to 30 on first gill arch; upper jaw with supramaxilla relatively small and without an anterior spine-like projection (Fig. 24a) *Alepes apercna*
- 2b. Total gill rakers 32 to 47 on first gill arch; upper jaw with supramaxilla relatively large and with an anterior spine-like projection (Fig. 24b, c) → 3

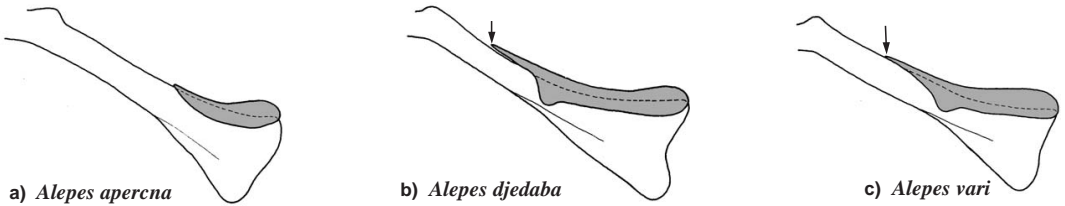


Fig. 24 upper jaw (supramaxilla shaded)

- 3a. Total gill rakers on first gill arch 38 to 47, of which 10 to 14 on upper limb, and 27 to 33 on lower limb; lateral line with 31 to 36 scales and 39 to 51 scutes (total 77 to 85); scutes larger (Fig. 25a); ultimate ray of dorsal and anal fins about 1.3 to 1.5 times the length of penultimate ray *Alepes djedaba*
- 3b. Total gill rakers on first gill arch 32 to 38, of which 9 to 12 on upper limb, and 23 to 26 on lower limb; lateral line with 42 to 50 scales, 48 to 69 scutes (total 86 to 119); scutes smaller (Fig. 25b); ultimate and penultimate rays of dorsal and anal fins of equal length . . . *Alepes vari*

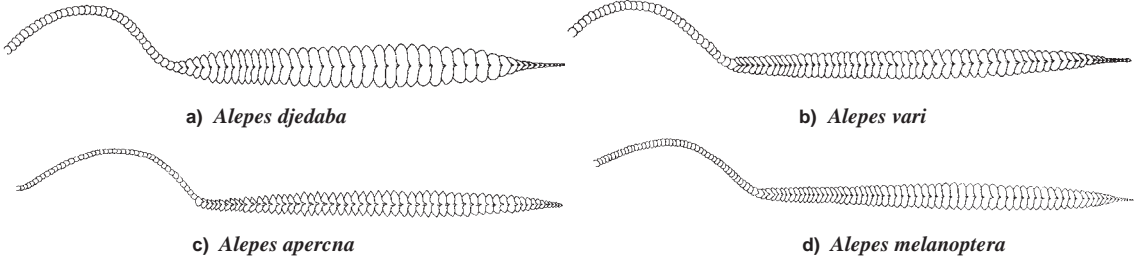


Fig. 25 lateral line

Key to the species of *Carangoides* occurring in the area

Note: species of *Carangoides* that have variable patterns of breast squamation may key out under both sections of couplets when this character is utilized.

- 1a. Breast completely scaly or with a small, median naked area ventrally, scarcely if at all visible in lateral view (Fig. 26) → 2
- 1b. Breast partially to completely naked → 5

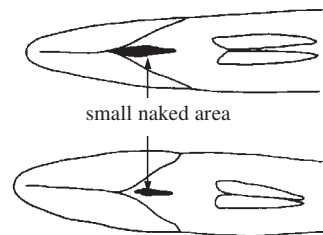
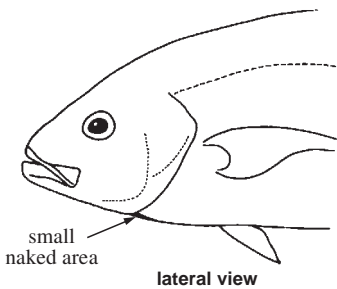


Fig. 26

ventral view (showing examples of variation)

- 2a. Second dorsal fin with a conspicuous black blotch or submarginal band; vomerine tooth patch anchor-shaped, with a long posteromedian extension (Fig. 27a, b) → 3
- 2b. Second dorsal fin without a conspicuous black blotch or submarginal band; vomerine tooth patch without a distinct posteromedian extension (Fig. 27c) → 4

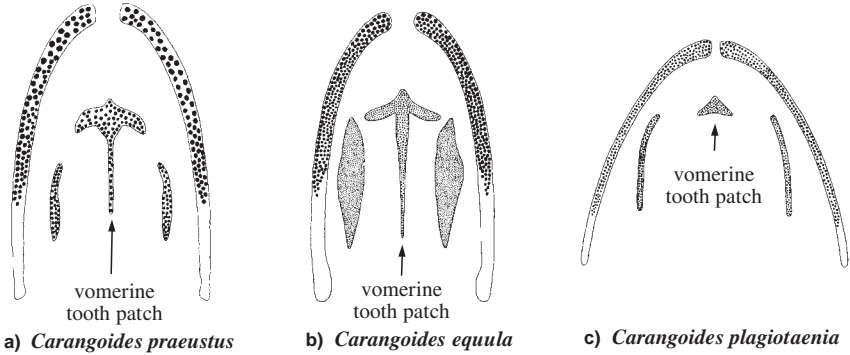


Fig. 27 tooth patches on roof of mouth and upper jaw

- 3a. Second dorsal fin with a conspicuous black blotch anteriorly (Fig. 28); soft anal-fin rays 18 to 20; total gill rakers on first gill arch 32 to 37 *Carangoides praeustus*
- 3b. Second dorsal fin with a submarginal black band (Fig. 29); soft anal-fin rays 21 to 24; total gill rakers on first gill arch 27 to 32 *Carangoides equula*

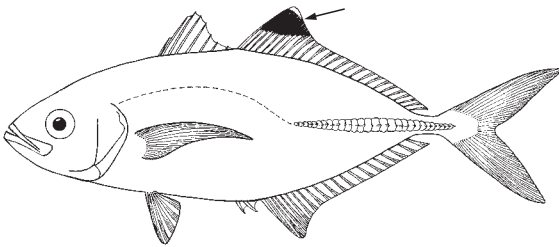


Fig. 28 *Carangoides praeustus*

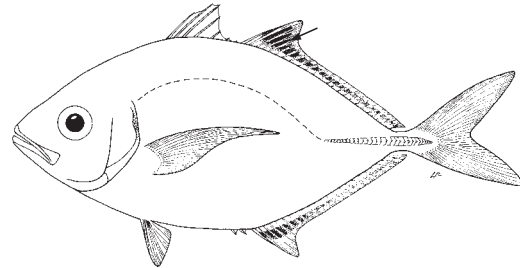


Fig. 29 *Carangoides equula*

- 4a. Soft anal-fin rays 18 to 20; posterior margin of preopercle outlined in black, at least in adults (Fig. 30); scutes 11 to 18 *Carangoides plagiotaenia*
- 4b. Soft anal-fin rays 21 to 24; posterior margin of preopercle not black; scutes 20 to 30 *Carangoides bajad*

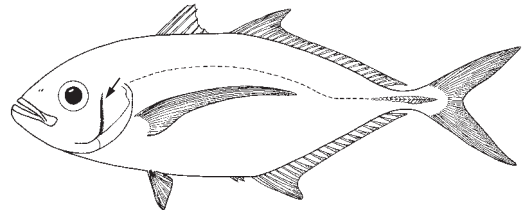


Fig. 30 *Carangoides plagiotaenia*

- 5a. Naked area of breast separated from naked base of pectoral fins by a broad band of scales (Fig. 31) → 6
- 5b. Naked area of breast uninterrupted to naked base of pectoral fins (Fig. 37) → 13
- 6a. Second dorsal fin with a conspicuous black blotch anteriorly (Fig. 28); vomerine tooth patch anchor-shaped, with a long posteromedian extension (Fig. 27a) *Carangoides praeustus*
- 6b. Second dorsal fin without a conspicuous black blotch; vomerine tooth patch without a distinct posterior extension → 7
- 7a. Soft dorsal-fin rays 25 to 34; soft anal-fin rays 21 to 26 → 8
- 7b. Soft dorsal-fin rays 17 to 23; soft anal-fin rays 15 to 19 → 10

- 8a. Naked area of breast extends posteroventrally well beyond origin of pelvic fins (Fig. 31a) *Carangoides fulvoguttatus*
- 8b. Naked area of breast does not extend posteroventrally beyond origin of pelvic fins (Fig. 31b). → 9

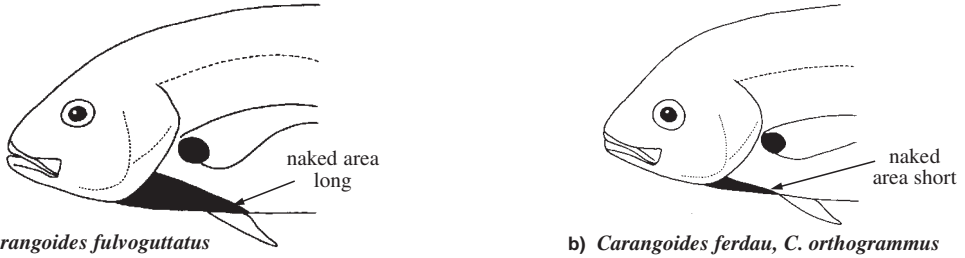


Fig. 31

- 9a. In life, typically 5 or 6 distinct dusky bands on sides of adults and yellow or orange spots on sides, if present, small, numerous and mostly above lateral line (Fig. 32); lips not papillose in adults *Carangoides ferdau*
- 9b. In life, dark bands usually absent on sides of adults and several relatively large, oblong yellow spots with dark centres present mostly below lateral line (Fig. 33); lips finely papillose in adults *Carangoides orthogrammus*

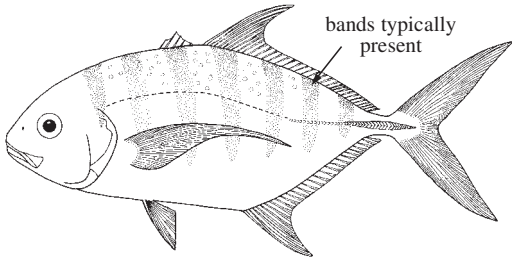


Fig. 32 *Carangoides ferdau*

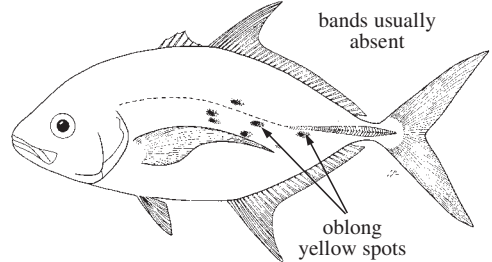


Fig. 33 *Carangoides orthogrammus*

- 10a. Straight part of lateral line slightly longer than curved part (Fig. 34); scutes 37 to 45 *Carangoides oblongus*
- 10b. Straight part of lateral line slightly shorter than curved part (Fig. 35); scutes 16 to 38 → 11

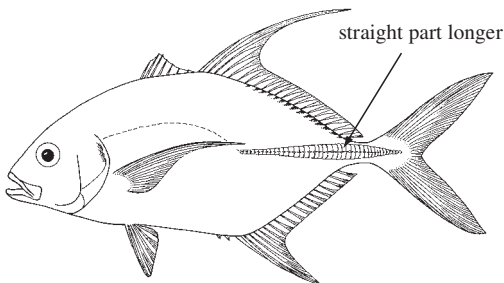


Fig. 34 *Carangoides oblongus*

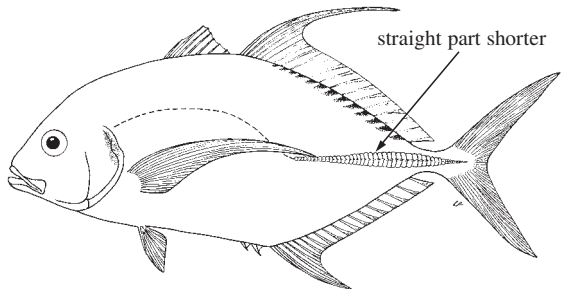


Fig. 35 *Carangoides dinema*

- 11a. No small dark blotches on dorsum between bases of dorsal-fin rays *Carangoides caeruleopinnatus*
- 11b. Small dark blotches (becoming larger posteriorly) on dorsum between bases of dorsal-fin rays → 12

- 12a. Soft dorsal-fin rays 20 to 22 (rarely 19); large black spot usually present on shoulder; naked area of breast extends posteroventrally well beyond origin of pelvic fins (Fig. 36a) *Carangoides humerosus*
- 12b. Soft dorsal-fin rays 17 to 19; no large black spot present on shoulder; naked area of breast typically does not extend posteroventrally beyond origin of pelvic fins (Fig. 36b) *Carangoides dinema*

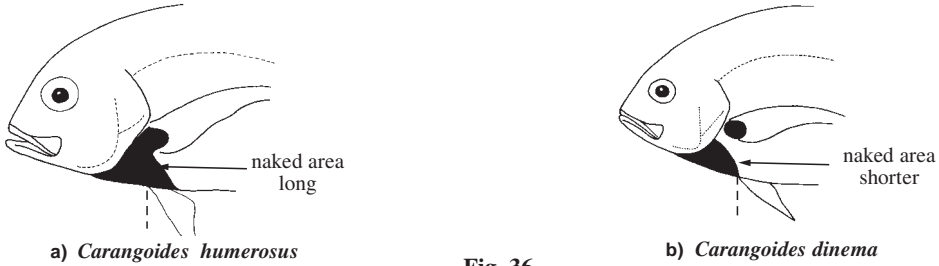


Fig. 36

- 13a. Soft dorsal-fin rays 25 to 32 (rarely 25) → 14
- 13b. Soft dorsal-fin rays 17 to 23 → 15

- 14a. Profile of snout angular and, in specimens larger than about 30 cm fork length, horizontal line from tip of snout distinctly below level of eye (Fig. 37a); soft anal-fin rays 21 to 26 (rarely 25 or 26); total gill rakers (including rudiments) on first gill arch 22 to 27, of which 6 to 8 on upper limb, and 17 to 21 on lower limb; vertebrae 10+14 *Carangoides fulvoguttatus*
- 14b. Profile of snout moderately rounded and, in specimens larger than about 30 cm fork length, horizontal line from tip of snout at or through level of eye (Fig. 37b), soft anal-fin rays 24 to 26 (usually 25); total gill rakers (including rudiments) on first gill arch 27 to 31, of which 7 to 9 on upper limb, and 19 to 22 on lower limb; vertebrae 10+15 *Carangoides gymnostethus*

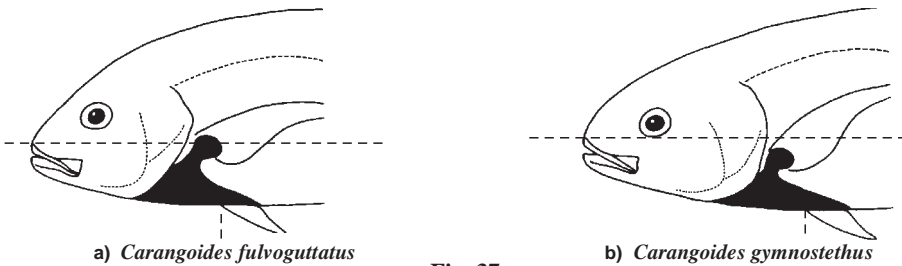


Fig. 37

- 15a. Small area naked of scales anteriorly just above pectoral-fin base (Fig. 38a) → 16
- 15b. Area anteriorly just above pectoral-fin base completely scaly (Fig. 38b) → 17

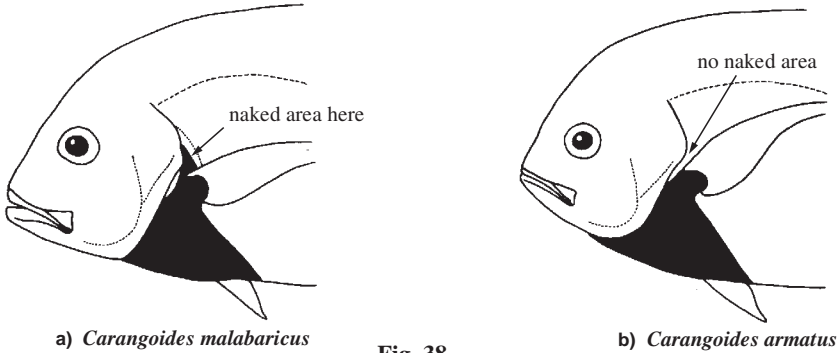


Fig. 38

- 16a. Total gill rakers (including rudiments) on first gill arch 32 to 38, of which 8 to 12 on upper limb, and 21 to 27 on lower limb; in life, tongue greyish brown to brown . . . *Carangoides malabaricus*
- 16b. Total gill rakers (including rudiments) on first gill arch 27 to 31, of which 6 to 9 on upper limb, and 19 to 22 on lower limb; in life, tongue white to pale grey *Carangoides talamparoides*

- 17a. Small dark blotches (becoming larger posteriorly) on back between bases of dorsal-fin rays; naked area of breast typically does not extend posteroventrally beyond origin of pelvic fins (Fig. 36b); soft dorsal-fin rays 17 to 19. *Carangoides dinema*
- 17b. Colour pattern not as above; naked area of breast extends posteroventrally well beyond origin of pelvic fins (Fig. 38b); soft dorsal-fin rays 18 to 23 → 18

- 18a. Total gill rakers (including rudiments) on first gill arch 31 to 37 *Carangoides armatus*
- 18b. Total gill rakers (including rudiments) on first gill arch 20 to 27 → 19

- 19a. Adults with a steep dorsal head profile, and with a distinct break (“bump”) in profile in the interorbital region (Fig. 39a); 3 to 8 (usually 5 to 7) of central soft rays of dorsal and anal fins elongated in mature males (about 17 cm fork length); eye diameter about equal to, or larger than snout length *Carangoides hedlandensis*
- 19b. Dorsal head profile not as steep in adults, and no distinct break (“bump”) in profile in the interorbital region (Fig. 39b, c); central soft rays of dorsal and anal fins not elongated in mature males; eye diameter slightly to much smaller than snout length → 20

- 20a. Dorsal profile of snout gently sloped, then abruptly vertical just above mouth cleft (Fig. 39b); soft dorsal-fin rays 18 to 20; soft anal-fin rays 15 to 17 *Carangoides chrysophrys*
- 20b. Dorsal profile of snout not as above (Fig. 39c), soft dorsal-fin rays 20 to 23 (usually 22 or 23); soft anal-fin rays 16 to 20 (usually 18 or 19) *Carangoides caeruleopinnatus*

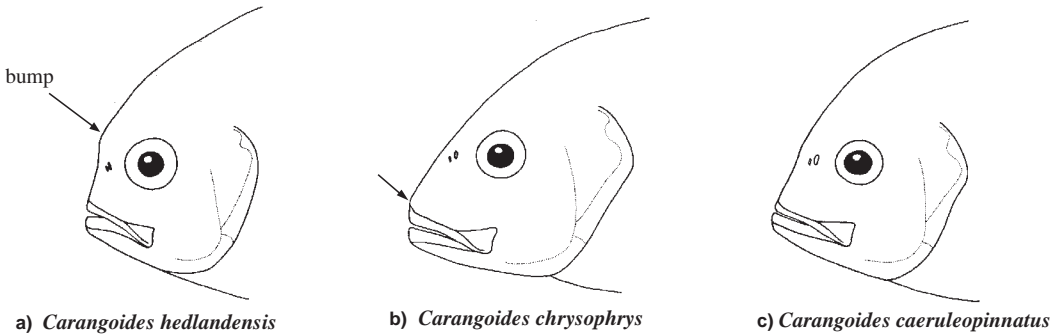


Fig. 39

Key to the species of *Caranx* occurring in the area

Note: species of *Caranx* that have variable patterns of breast squamation will key out under both sections of a couplet when this character is utilized.

- 1a. Breast completely scaly → 2
- 1b. Breast naked ventrally, frequently with small patch of prepelvic scales (Fig. 40) → 6

- 2a. In life, body coloration essentially uniform grey to brown; lobe of dorsal fin relatively long, contained 2.3 to 5.3 times in fork length; profile of head relatively steep and angular (Fig. 41) *Caranx lugubris*
- 2b. Body coloration not as above; lobe of dorsal fin contained 4.2 to 8.8 times in fork length; profile of head not noticeably steep and angular → 3

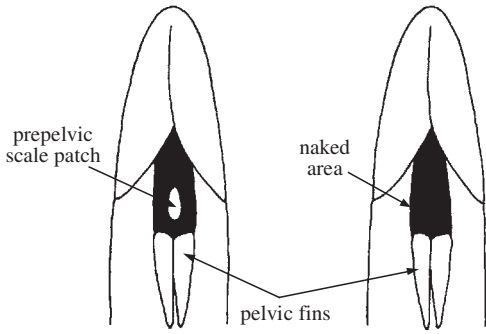


Fig. 40 ventral view

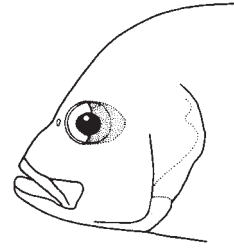


Fig. 41 *Caranx lugubris*

- 3a. Small black spots scattered on head and body (forming at about 16 to 22 cm fork length); snout length contained 9.2 to 12.7 times in fork length; total gill rakers (including rudiments) on first gill arch 25 to 29 (usually 26 or 27), and total soft dorsal- and anal-fin rays 39 to 44 *Caranx melampygus*
- 3b. No small black spots scattered on head and body; snout length contained 13.1 to 18.4 times in fork length; total gill rakers (including rudiments) on first gill arch 22 to 25, except 24 to 27 in *C. heberi* which has 34 to 38 total soft dorsal- and anal-fin rays → 4
- 4a. No small black spot present on upper margin of opercle; upper lobe of caudal fin frequently with distal half noticeably dark or black, especially in juveniles; in adults, adipose eyelid only slightly developed (Fig. 42a) *Caranx heberi*
- 4b. A small, black spot present on upper margin of opercle; upper lobe of caudal fin usually uniformly pigmented; in adults, adipose eyelid well developed, especially posteriorly (Fig. 42b, c) → 5
- 5a. In adults, dorsal-fin lobe without white tip; dorsal profile of head strongly convex and a black spot on upper margin of opercle, in adults, at least 1/2 the diameter of pupil (Fig. 42b); in specimens larger than 15 cm fork length, postorbital head length longer, contained 5.7 to 7.3 times in fork length, and dorsal-fin lobe shorter, contained 5.7 to 8.8 times in fork length; vertebrae 10+14 *Caranx tille*
- 5b. In adults, dorsal-fin lobe with white tip; dorsal profile of head moderately convex and black spot on upper margin of opercle, its size in adults no larger than twice the diameter of pupil (Fig. 42c); in specimens larger than 15 cm fork length, postorbital head length shorter, contained 6.4 to 8.2 times in fork length, and dorsal-fin lobe longer, contained 5 to 6.6 times in fork length; vertebrae 10+15 *Caranx sexfasciatus*

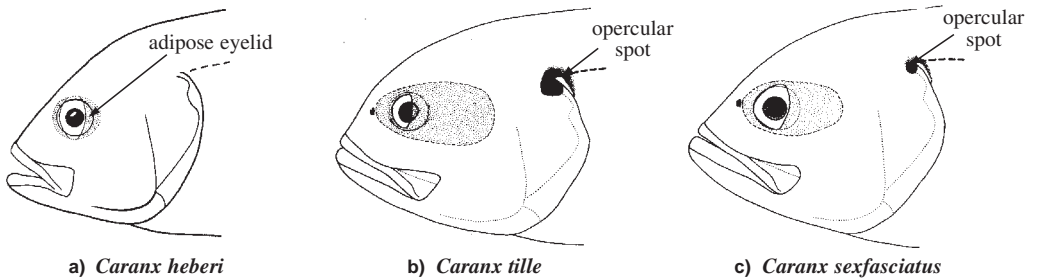


Fig. 42

- 6a. Naked area of breast uninterrupted to naked base of pectoral fins (Fig. 43); curved part of lateral line short, chord of curved part contained 2.5 to 3.3 times in straight part; scutes larger (Fig. 44a) *Caranx bucculentus*
- 6b. Naked area of breast separated from naked base of pectoral fins by a broad band of scales; curved part of lateral line moderate, with chord of curved part contained less than 1.5 times in straight part; scutes smaller (Fig. 44b) → 7

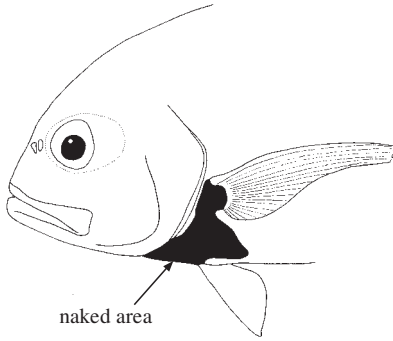


Fig. 43 *Caranx bucculentus*

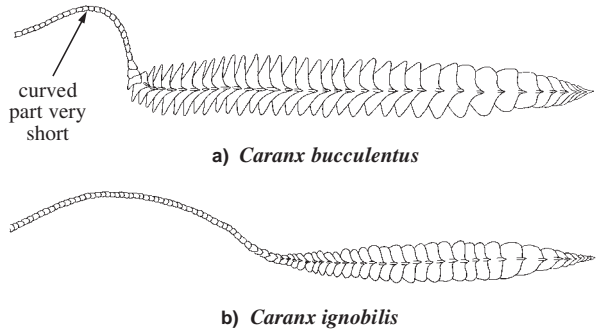


Fig. 44 lateral line

- 7a. Total gill rakers (including rudiments) 20 to 24 on first gill arch; general body colour silvery to black; in specimens larger than 15 cm fork length, body depth contained 2.5 to 3.2 times in fork length *Caranx ignobilis*
- 7b. Total gill rakers (including rudiments) 23 to 30 (rarely 23) on first gill arch; general body colour bronze to yellow-green; in specimens larger than 15 cm fork length, body depth contained 2.7 to 3.8 times in fork length → 8

- 8a. Total soft dorsal- and anal-fin rays 34 to 38 (rarely 38); upper lobe of caudal fin frequently with distal half noticeably dark or black (especially in juveniles), and posterior margin of lower lobe without a narrow white border; no pale spot on shoulder just behind posterodorsal margin of opercle; adults without small black spots *Caranx heberi*
- 8b. Total soft dorsal- and anal-fin rays 37 to 41 (rarely 37); upper lobe of caudal fin usually uniformly pigmented, and posterior margin of lower lobe with a narrow white border; in life a conspicuous pale spot, approximately the diameter of pupil, on shoulder just behind posterodorsal margin of opercle (Fig. 45); adults with small black spots on body above lateral line (forming at about 25 cm fork length) *Caranx papuensis*

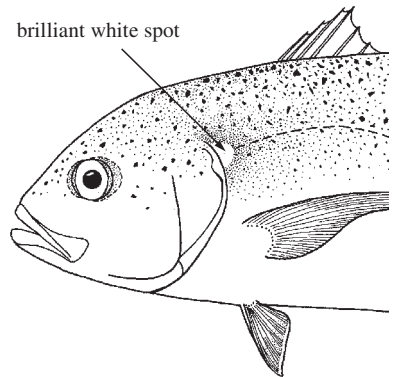


Fig. 45 *Caranx papuensis*

Key to the species of *Decapterus* occurring in the area

- 1a. Posterior end of upper jaw concave above, rounded and produced below (Fig. 46a); straight part of lateral line with 14 to 29 scales (Fig. 47a) *Decapterus macrosoma*
- 1b. Posterior end of upper jaw straight above, straight to slightly concave below (Fig. 46b-e); straight part of lateral line with 0 to 15 scales (except 18 to 39 scales in *D. macarellus*) → 2

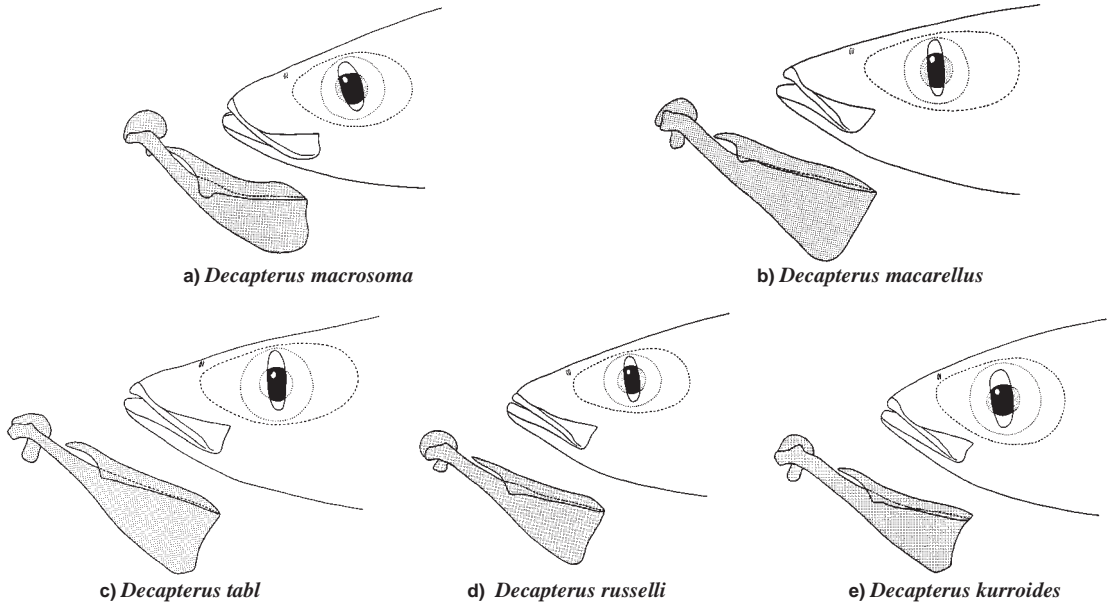


Fig. 46

- 2a. Posterior end of upper jaw noticeably slanted anteroventrally (Fig. 46b); straight part of lateral line with 18 to 39 scales and 24 to 40 scutes = 52 to 67 total (Fig. 47b); pectoral fins usually shorter in adults, 58 to 72% head length; oral valve (membrane) at symphysis of upper jaw conspicuously white (Fig. 48) *Decapterus macarellus*
- 2b. Posterior end of upper jaw not as noticeably slanted anteroventrally (Fig. 46c-e); straight part of lateral line with 0 to 10 scales and 30 to 40 scutes = 30 to 49 total (except 5 to 15 scales and 32 to 42 scutes = 41 to 50 total in *D. muroadsi*; Fig. 47c); pectoral fins usually longer in adults, 71 to 105% head length (except 62 to 83% in *D. tabl*); oral valve (membrane) at symphysis of upper jaw dusky or transparent (except white in *D. muroadsi*) → 3

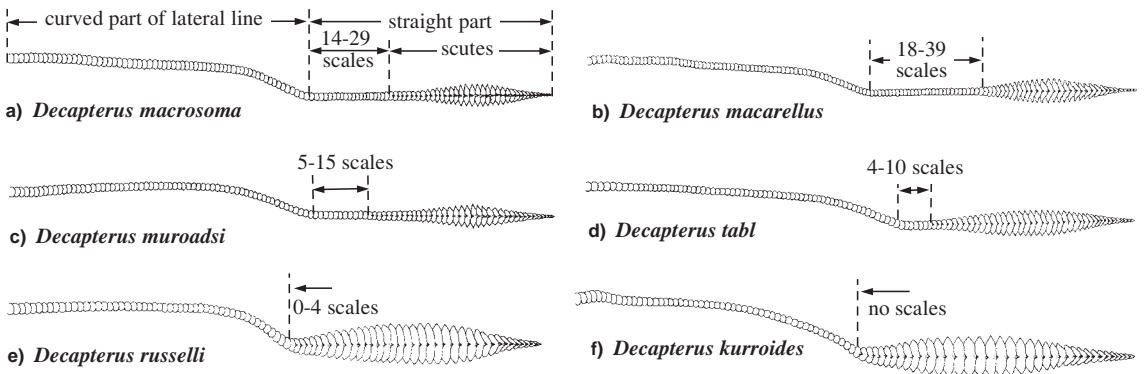


Fig. 47 lateral line

3a. In life, caudal fin with upper lobe greenish yellow and lower lobe grey; oral valve (membrane) at symphysis of upper jaw conspicuously white in adults (Fig. 48); gill rakers on lower limb of first gill arch 36 to 42 *Decapterus muroadsi*

3b. In life, caudal fin with upper and lower lobes both hyaline, brownish or red; oral valve (membrane) at symphysis of upper jaw transparent or dusky; gill rakers on lower limb of first gill arch 26 to 33 (except 30 to 39 in *D. russelli*) → 4

4a. Scutes relatively small (Fig. 47d); curved part of lateral line with 61 to 73 scales; straight part of lateral line with 4 to 12 anterior scales; total lateral-line scales and scutes (excluding scales on caudal fin) 103 to 118; in life, caudal fin red; posterodorsal margin of opercular membrane minutely serrated in large adults (Fig. 49) *Decapterus tabl*

4b. Scutes relatively large (Fig. 47e, f); curved part of lateral line with 42 to 62 scales; straight part of lateral line with 0 to 4 anterior scales; total lateral-line scales and scutes (excluding scales on caudal fin) 77 to 102; in life, caudal fin dusky or red; posterodorsal margin of opercular membrane smooth in adults → 5

5a. In life, caudal fin hyaline to dusky; gill rakers on lower limb of first gill arch usually 32 to 39; soft anal-fin rays (including finlet) 25 to 29 (rarely 25); eye usually smaller . . . *Decapterus russelli*

5b. In life, caudal fin red; gill rakers on lower limb of first gill arch usually 26 to 32; soft anal-fin rays (including finlet) 22 to 26 (rarely 26); eye usually larger *Decapterus kurroides*

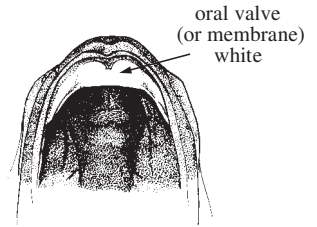


Fig. 48 ventral view of upper jaw and roof of mouth

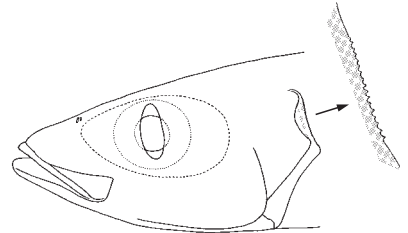
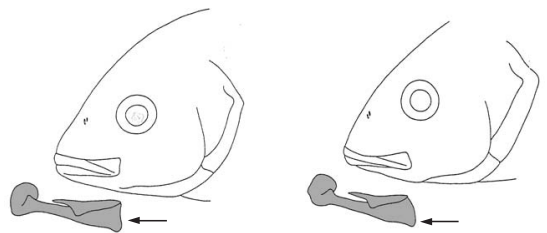


Fig. 49 *Decapterus tabl*

Key to the species of *Pseudocaranx* occurring in the area

1a. Scales in curved part of lateral line 57 to 78; no scales on preorbital bone below and in front of eye and on expanded part of maxilla; posterior end of upper jaw essentially vertical (Fig. 50a); total gill rakers (including rudiments) 29 to 35 on first gill arch *Pseudocaranx dentex*

1b. Scales in curved part of lateral line 37 to 48; scales present on preorbital bone below and in front of eye and on expanded part of maxilla; posterior end of upper jaw slanted posteroventrally (Fig. 50b); total gill rakers (including rudiments) 36 to 44 on first gill arch *Pseudocaranx wrighti*
(western and southern Australia; not yet recorded from the area, but easily confused with *P. dentex* and therefore included here)

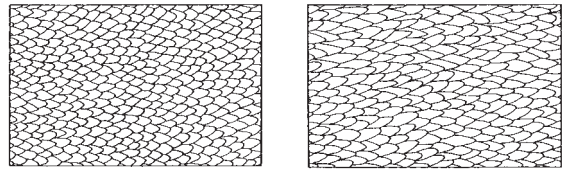


a) *Pseudocaranx dentex* b) *Pseudocaranx wrighti*

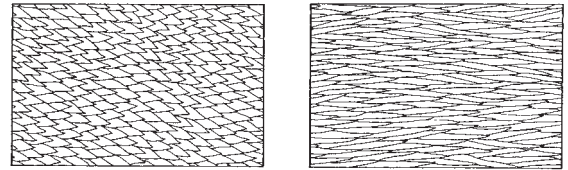
Fig. 50

Key to the species of *Scomberoides* occurring in the area

- 1a. Total gill rakers 8 to 15 on first gill arch; scales on midbody below lateral line broadly oblong or bluntly lanceolate (Fig. 51a, b); lobe of dorsal fin uniformly pigmented (Figs 52 and 53) → 2
- 1b. Total gill rakers 21 to 27 on first gill arch; scales on midbody below lateral line sharply lanceolate or needle-like (Fig. 51c, d); distal half of dorsal-fin lobe abruptly and heavily pigmented (Figs 55 and 56) → 3



a) *Scomberoides commersonnianus* b) *Scomberoides tala*



c) *Scomberoides lysan* d) *Scomberoides tol*

Fig. 51 scales on midbody below lateral line

2a. Upper jaw extends well beyond posterior margin of eye, especially in adults (Fig. 52); in adults, teeth of inner and outer rows in lower jaw subequal in size (Fig. 54a); in life, large oval blotches above or touching lateral line . . . *Scomberoides commersonnianus*

2b. Upper jaw extends slightly beyond posterior margin of eye (Fig. 53); in adults, inner row of teeth in lower jaw distinctly larger than those in outer row (Fig. 54b); in life, vertically elongate blotches intersecting lateral line *Scomberoides tala*

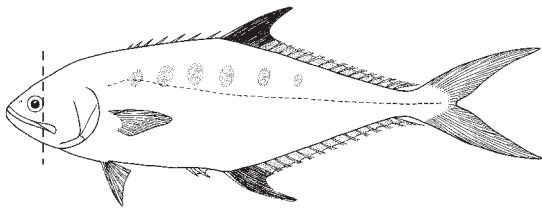


Fig. 52 *Scomberoides commersonnianus*

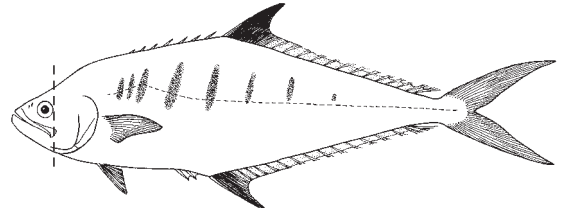


Fig. 53 *Scomberoides tala*



a) *Scomberoides commersonnianus*



b) *Scomberoides tala*

Fig. 54 teeth in lower jaw (teeth in inner row black)

3a. Scales on midbody below lateral line sharply lanceolate (Fig. 51c); in adults, upper jaw extends to or slightly beyond posterior margin of eye (Fig. 55); in life, a double series of 6 to 8 dusky, roundish blotches above and below lateral line, occasionally connected by narrow isthmus *Scomberoides lysan*

3b. Scales on midbody below lateral line slender, needle-like (Fig. 51d); in adults, upper jaw does not extend to posterior margin of eye (Fig. 56); in life, oval or vertically oblong dark blotches, the first 4 or 5 intersecting lateral line *Scomberoides tol*

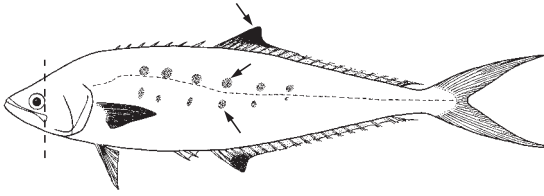


Fig. 55 *Scomberoides lysan*

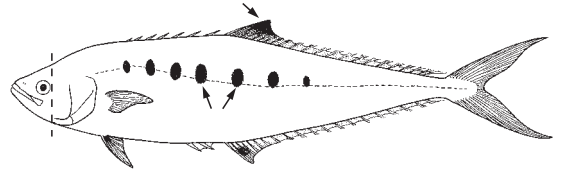


Fig. 56 *Scomberoides tol*

Key to the species of *Selar* occurring in the area

- 1a. Curved part of lateral line with 48 to 56 scales; curved part of lateral line moderate, with chord of curved part contained 0.7 to 1.2 times in straight part; scutes smaller (Fig. 57a) *Selar crumenophthalmus*
- 1b. Curved part of lateral line with 21 to 24 scales; curved part of lateral line short, chord of curved part contained 2.1 to 3 times in straight part; scutes larger (Fig. 57b) *Selar boops*

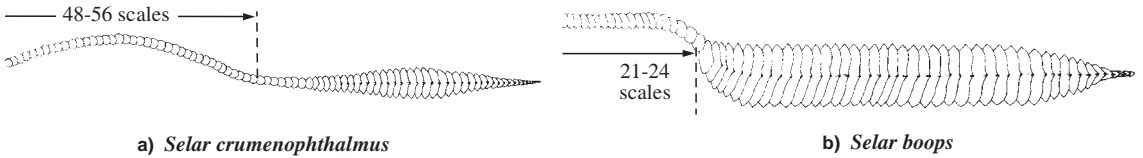


Fig. 57 lateral line

Key to the species of *Seriola* occurring in the area

- 1a. Soft dorsal- and anal-fin rays 22 to 25 and 15 to 17 (rarely 17), respectively; in specimens larger than about 20 cm fork length, total gill rakers (excluding rudiments) on first gill arch 10 to 12; in life, papillae surrounding broad band of teeth in both jaws engaged with blood giving teeth a red appearance *Seriola hippos*
- 1b. Soft dorsal- and anal-fin rays 27 to 35 and 18 to 22, respectively; in specimens larger than about 20 cm fork length, total gill rakers (excluding rudiments) on first gill arch 11 to 29; in life, papillae surrounding broad band of teeth in both jaws not engaged with blood, appearance of teeth white → 2
- 2a. Upper jaw moderately slender posteriorly, with slender supramaxilla (Fig. 58a); caudal fin yellowish; in adults, a moderate cutaneous keel laterally on caudal peduncle; vertebrae 11+14 *Seriola lalandi*
- 2b. Upper jaw relatively broad posteriorly, with broad supramaxilla (Fig. 58b-d); caudal fin dark to dusky sometimes with a lighter posterior margin; in adults, cutaneous keel on caudal peduncle absent to slightly developed; vertebrae 10+14 → 3

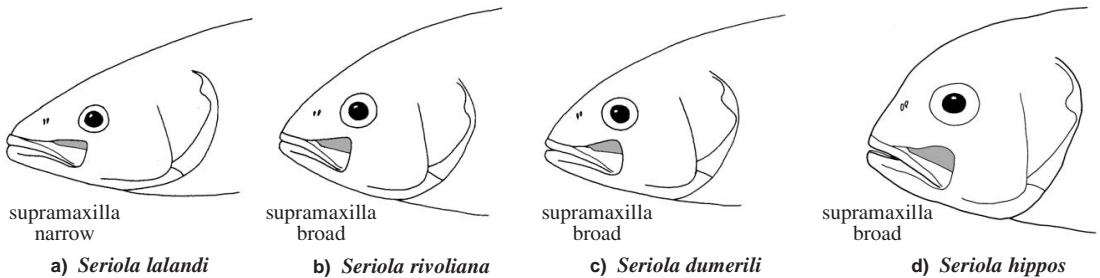


Fig. 58 lateral view of head (supramaxilla shaded)

- 3a. In adults, length of dorsal-fin lobe about 1.3 to 1.6 times longer than pectoral fins (Fig. 59a) and 18 to 22% of fork length; in specimens larger than about 20 cm fork length, total gill rakers (excluding rudiments) 22 to 26 on first gill arch; first pterygiophore of anal fin straight in specimens larger than about 10 cm fork length (Fig. 60a) *Seriola rivoliana*
- 3b. In adults, length of dorsal-fin lobe about equal to, or slightly longer than pectoral fins (Fig. 59b) and 13 to 18% of fork length; in specimens larger than about 20 cm fork length, total gill rakers (excluding rudiments) 11 to 19 on first gill arch; first pterygiophore of anal fin moderately curved (Fig. 60b) *Seriola dumerili*

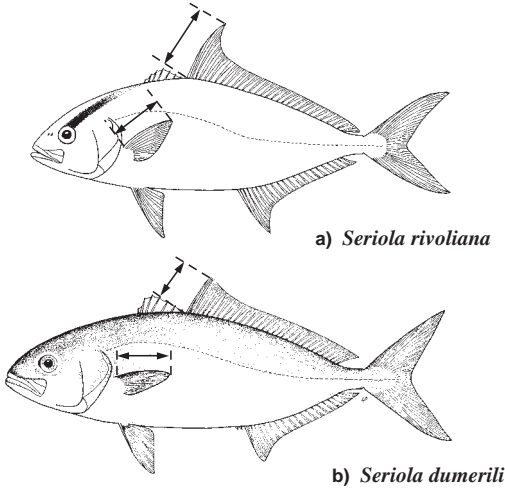


Fig. 59

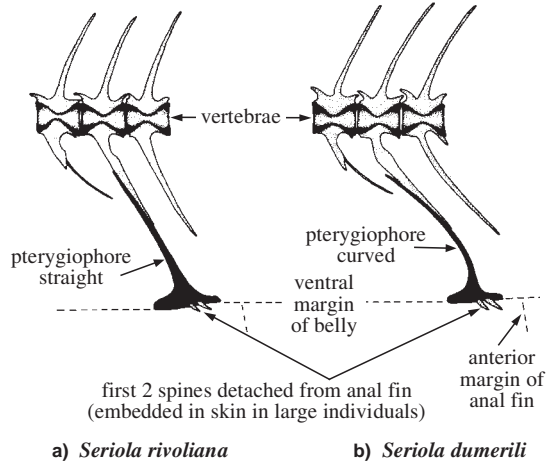


Fig. 60

Key to the species of *Trachinotus* occurring in the area

- 1a. One to 7 spots in a longitudinal row on or near lateral line (spots absent on specimens smaller than about 10 to 13 cm fork length); soft dorsal-fin rays 21 to 25 → 2
- 1b. No spots in a longitudinal row on or near lateral line; soft dorsal-fin rays 18 to 20 (except 21 to 23 in *T. africanus*) → 4
- 2a. In adults, all spots equal to, or smaller than eye diameter, and with about half of spot below lateral line (Fig. 61); gill rakers (including rudiments) on lower limb of first gill arch 15 to 19; vomerine and palatine tooth patches typically type "A" (Fig. 62a) *Trachinotus baillonii*

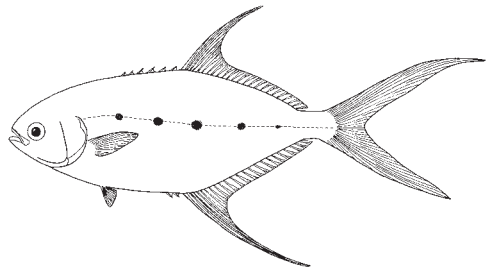


Fig. 61 *Trachinotus baillonii*

- 2b. In adults, anterior 2 spots larger than eye diameter and at least two-thirds of spot above lateral line (Figs 63 and 64); gill rakers (including rudiments) on lower limb of first gill arch 11 to 15; vomerine and palatine tooth patches usually type "B" or "C" (Fig. 62b, c) → 3

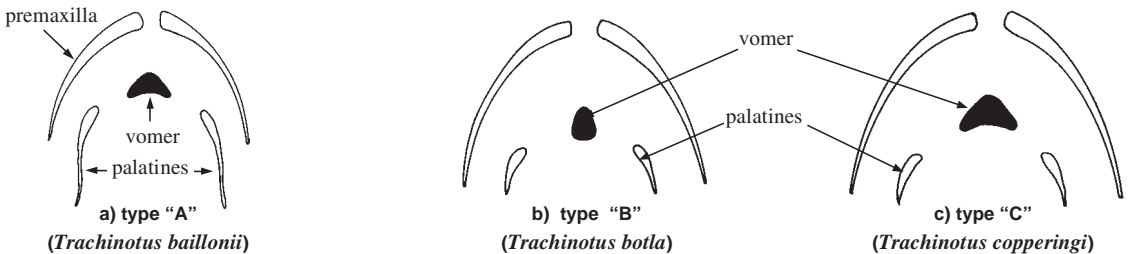


Fig. 62 tooth patches on roof of mouth and upper jaw

- 3a. Soft anal-fin rays 19 to 21; in adults only 1 dark spot above pectoral fins, and in large specimens spots oval-shaped (Fig. 63); dorsal-fin lobe usually longer than anal-fin lobe in specimens larger than about 25 cm fork length; pelvic fins long, their length contained 1.5 to 1.7 times in pectoral-fin length in specimens larger than about 25 cm fork length; vomerine tooth patch usually type "B" (Fig. 62b) *Trachinotus botla*
- 3b. Soft anal-fin rays 22 to 24; in adults 2 dark spots above pectoral fins, and in large specimens spots more vertically elongate (Fig. 64); dorsal-fin lobe consistently shorter than anal-fin lobe in specimens larger than about 25 cm fork length; pelvic fins relatively short, their length contained 1.7 to 2.2 times in pectoral-fin length in specimens larger than about 25 cm fork length; vomerine tooth patch usually type "C" (Fig. 62c)
 *Trachinotus copperingi*

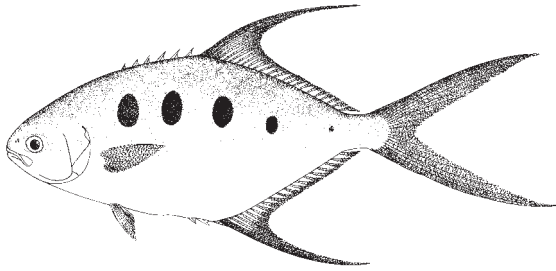


Fig. 63 *Trachinotus botla*

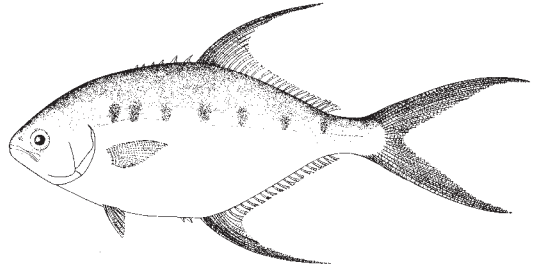


Fig. 64 *Trachinotus copperingi*

- 4a. Soft dorsal- and anal-fin rays 21 to 23 and 19 to 21, respectively; body often with a black oval-shaped blotch in axillary base under pectoral fins *Trachinotus africanus*
- 4b. Soft dorsal- and anal-fin rays 18 to 20 and 16 to 18, respectively; body uniformly pigmented in axillary base under pectoral fins. → 5
- 5a. First predorsal bone inverted teardrop- or oval-shaped (Fig. 65a, this character is easily observed by simple dissection along midline of nape); height of dorsal-fin lobe longer, 35 to 60% of fork length in specimens 10 to 40 cm fork length *Trachinotus blochii*
- 5b. First predorsal bone shaped like an inverted "L" with the arm projecting anteriorly (Fig. 65b, c); anal-fin lobe yellow without a brownish anterior margin; height of dorsal-fin lobe moderate, 24 to 37% of fork length in specimens 10 to 40 cm fork length → 6

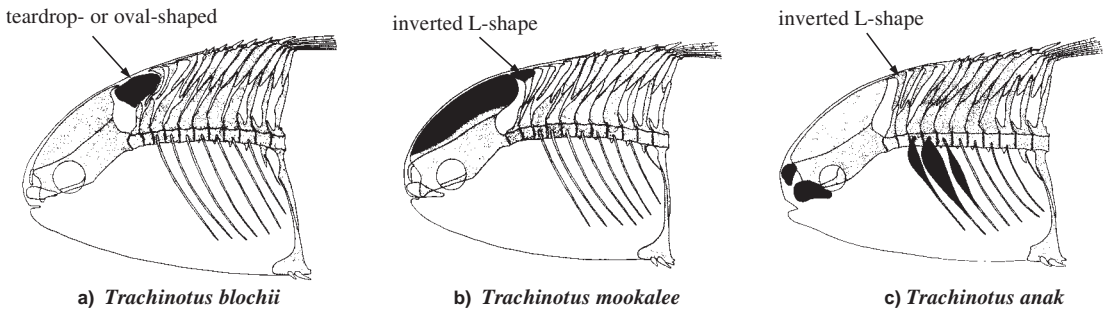


Fig. 65 anterior part of skeleton in lateral view (hyperossified bones shown in black)

6a. Teeth in a narrow band on tongue, persisting to about 50 cm fork length; supraoccipital bone of skull becoming broad and sausage-shaped (Fig. 66a) in specimens larger than about 30 cm fork length; profile of snout evenly rounded in specimens larger than about 20 cm fork length; preorbital and nasal bones never exhibiting hyperostosis *Trachinotus mookalee*

6b. No teeth on tongue; supraoccipital bone of skull thin and blade-like in adults (Fig. 66b); profile of snout essentially straight immediately above upper lip in specimens larger than about 20 cm fork length; preorbital and nasal bones hyperossified in specimens larger than about 30 cm fork length (Fig. 65c) *Trachinotus anak*

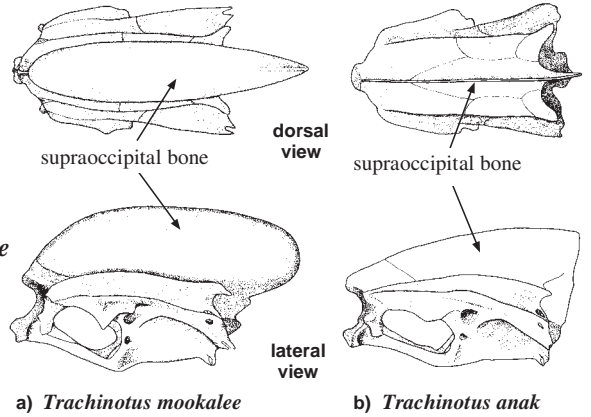


Fig. 66 skull

Note: the skull of *Trachinotus africanus* is used here for *T. anak*; the supraoccipital bone shape is nearly identical in both species

Key to the species of *Trachurus* occurring in the area

- 1a.** Dorsal accessory lateral line immediately below base of dorsal fin terminates below fifth to eleventh (usually seventh to ninth) soft dorsal-fin ray; total scales and scutes in lateral line 71 to 89 (usually more than 75); curved part of lateral line essentially parallel to axis of body for most of its length (Fig. 67) *Trachurus declivis*
- 1b.** Dorsal accessory lateral line immediately below base of dorsal fin terminates below first to fifth (usually first or second) soft dorsal-fin ray; total scales and scutes in lateral line 67 to 81 (rarely more than 76); curved part of lateral line slanted for most of its length (Fig. 68) *Trachurus novaezelandiae*

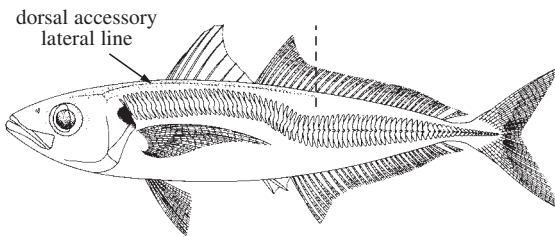


Fig. 67 *Trachurus declivis*

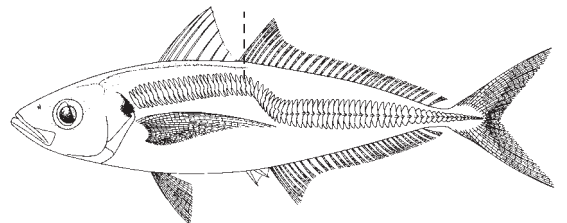


Fig. 68 *Trachurus novaezelandiae*

Key to the species of *Ulua* occurring in the area

- 1a.** Total gill rakers on first gill arch 54 to 61, of which 16 to 21 on upper limb, and 37 to 41 on lower limb; tongue with central band of villiform teeth; in specimens smaller than about 15 cm fork length, first anal-fin ray produced but not filamentous, not extending beyond caudal peduncle *Ulua aurochs*
- 1b.** Total gill rakers on first gill arch 74 to 86, of which 23 to 27 on upper limb, and 51 to 61 on lower limb; tongue without central band of villiform teeth; in specimens smaller than about 15 cm fork length, first anal-fin ray filamentous, extending beyond caudal peduncle *Ulua mentalis*

Key to the species of *Uraspis* occurring in the area

- 1a. Naked area of breast extends uninterrupted to naked base of pectoral fins (Fig. 69a); scales in curved part of lateral line 61 to 82 *Uraspis uraspis*
- 1b. Naked area of breast separated from naked base of pectoral fins by a broad band of scales (Fig. 69b); scales in curved part of lateral line 48 to 66 *Uraspis helvola* and *U. secunda*
(no verified records from the area; adults of these 2 species are virtually impossible to distinguish)

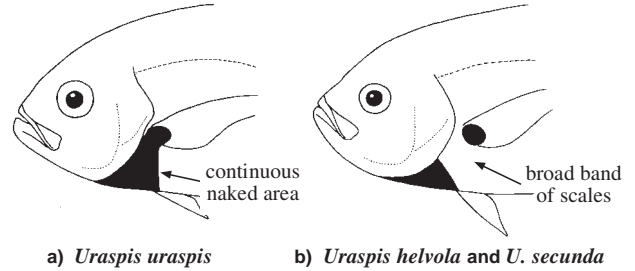



























Fig. 69

List of species occurring in the area

The generic limits and intrafamilial relationships of carangids are not well established; a few of the generic units recognized here are subject to change and are used for convenience. At least 5 additional species, "*Caranx*" *koheru* Hector, *Pseudocaranx wrighti* (Whitley), *Seriola quinqueradiata* Temminck and Schlegel, *Trachurus japonicus* (Temminck and Schlegel), and *T. murphyi* Nichols, occur in the western Pacific Ocean outside of the area of coverage.

The symbol  is given when species accounts are included. Species with a question mark have not yet been recorded from the area but should be watched for.

-  *Alectis ciliaris* (Bloch, 1788)
-  *Alectis indica* (Rüppell, 1830)
-  *Alepes apercna* Grant, 1987
-  *Alepes djedaba* (Forsskål, 1775)
-  "*Alepes*" *kleinii* (Bloch, 1793)^{1/}
-  *Alepes melanoptera* Swainson, 1839
-  *Alepes vari* (Cuvier, 1833)
-  *Atropus atropos* (Schneider, 1801)
-  *Atule mate* (Cuvier, 1833)
-  *Carangoides armatus* (Rüppell, 1830)
-  *Carangoides bajad* (Forsskål, 1775)
-  *Carangoides caeruleopinnatus* (Rüppell, 1830)
-  *Carangoides chrysophrys* (Cuvier, 1833)
-  *Carangoides dinema* Bleeker, 1851
-  *Carangoides equula* (Temminck and Schlegel, 1844)
-  *Carangoides ferdau* (Forsskål, 1775)
-  *Carangoides fulvoguttatus* (Forsskål, 1775)
-  *Carangoides gymnostethus* (Cuvier, 1833)
-  *Carangoides hedlandensis* (Whitley, 1933)
-  *Carangoides humerosus* (McCulloch, 1915)
-  *Carangoides malabaricus* (Bloch and Schneider, 1801)
-  *Carangoides oblongus* (Cuvier, 1833)
-  *Carangoides orthogrammus* (Jordan and Gilbert, 1882)
-  *Carangoides plagiotaenia* Bleeker, 1857
-  *Carangoides praeustus* (Bennett, 1830)
-  *Carangoides talamparoides* Bleeker, 1852
-  *Caranx bucculentus* Alleyne and Macleay, 1877
-  *Caranx ignobilis* (Forsskål, 1775)
-  *Caranx heberi* (Bennett, 1830)
-  *Caranx lugubris* Poey, 1860

1/ Generic allocation of this species uncertain; might eventually be assigned to a separate, monotypic genus.

- *Caranx melampygius* Cuvier, 1833
- *Caranx papuensis* Alleyne and Macleay, 1877
- *Caranx sexfasciatus* Quoy and Gaimard, 1825
- *Caranx tille* Cuvier, 1833
- *Decapterus kurroides* Bleeker, 1855
- *Decapterus macarellus* (Cuvier, 1833)
- *Decapterus macrosoma* Bleeker, 1851
- *Decapterus muroadsi* (Temminck and Schlegel, 1844)
- *Decapterus russelli* (Rüppell, 1830)
- *Decapterus tabl* Berry, 1967
- *Elagatis bipinnulata* (Quoy and Gaimard, 1825)
- *Gnathanodon speciosus* (Forsskål, 1775)
- *Megalaspis cordyla* (Linnaeus, 1758)
- *Naucrates ductor* (Linnaeus, 1758)
- *Pantolabus radiatus* (Macleay, 1881)
- *Parastromateus niger* (Bloch, 1795)^{2/}
- *Pseudocaranx dentex* (Bloch and Schneider, 1801)
- *Scomberoides commersonianus* Lacepède, 1801
- *Scomberoides lysan* (Forsskål, 1775)
- *Scomberoides tala* (Cuvier, 1832)
- *Scomberoides tol* (Cuvier, 1832)
- *Selar boops* (Cuvier, 1833)
- *Selar crumenophthalmus* (Bloch, 1793)
- *Selaroides leptolepis* (Cuvier, 1833)
- *Seriola dumerili* (Risso, 1810)
- *Seriola hippos* Günther, 1876
- *Seriola lalandi* Valenciennes, 1833
- *Seriola rivoliana* Valenciennes, 1833
- *Seriolina nigrofasciata* (Rüppell, 1829)
- *Trachinotus africanus* Smith, 1967
- *Trachinotus anak* Ogilby, 1909
- *Trachinotus baillonii* (Lacepède, 1801)
- *Trachinotus blochii* (Lacepède, 1801)
- *Trachinotus botla* (Shaw, 1803)
- *Trachinotus copperingi* (Günther, 1884)
- *Trachinotus mookalee* Cuvier, 1832
- *Trachurus declivis* (Jenyns, 1841)
- *Trachurus novaezelandiae* Richardson, 1843
- *Ulua aurochs* (Ogilby, 1915)
- *Ulua mentalis* (Cuvier, 1833)
- ? *Uraspis helvola* (Forster, 1801)
- ? *Uraspis secunda* (Poey, 1860)
- *Uraspis uraspis* (Günther, 1860)

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- Gunn, J.S. 1990. A revision of selected genera of the family Carangidae (Pisces) from Australia. *Rec. Aust. Mus.*, Supp. (12):77 p.
- Gushiken, S. 1983. Revision of the carangid fishes of Japan. *Galaxea*, 2:135-264.
- Lin, P.-L. and K.-T. Shao. 1999. A review of the carangid fishes (family Carangidae) from Taiwan with descriptions of five new records. *Zool. Stud.*, 38(1):33-68.

^{2/} Many previous authors have assigned this species to a separate family, Apolectidae (or Formionidae)