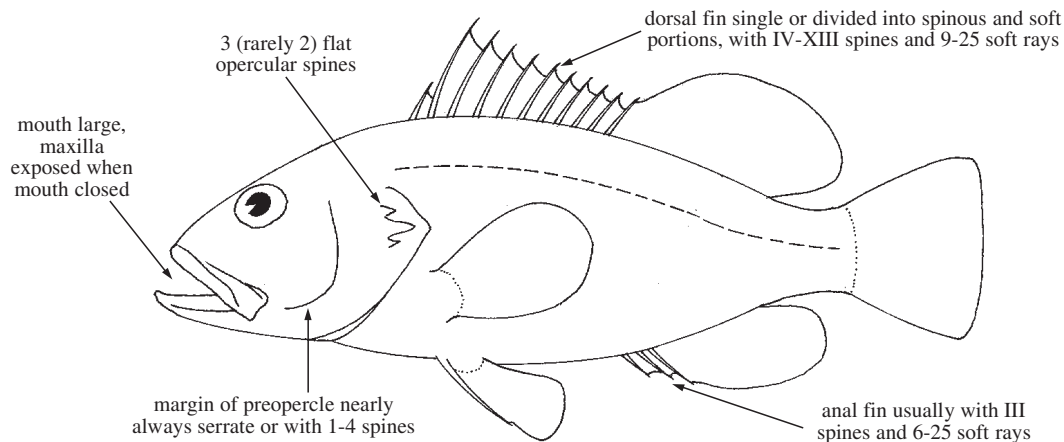


## SERRANIDAE

### Groupers and sea basses (also, soapfishes, anthiines, etc.)

by P.C. Heemstra and J.E. Randall

**Diagnostic characters:** Body variable in shape, from deep-bodied to elongate and little compressed (at least anteriorly) to notably compressed (size from a few to 250 cm). **Opercle with 3 (rarely 2) flat spines; margin of preopercle nearly always serrate (but serrae rudimentary in adults of a few species) or with 1 to 4 spines. Mouth large, terminal; maxilla exposed when mouth is closed; lower jaw usually projecting; bands of small, slender teeth in jaws; canines usually present at front of jaws and sometimes at side;** small teeth present on vomer and palatines of most species; no molars or incisiform teeth. Gill membranes separate, with 7 branchiostegal rays. **Dorsal fin single or divided into spinous and soft portions, with IV to XIII spines and 9 to 25 soft rays;** anal fin with III (rarely II) spines and 6 to 24 soft rays; last dorsal and anal-fin rays usually split to their base but counted as a single ray; caudal fin with 12 to 15 branched rays, the fin varying in shape from rounded to lunate; pelvic fins with I spine and 5 soft rays, inserted below or slightly anterior or posterior to base of pectoral fins; no scaly axillary process at base of pelvic fins. Scales small to moderate, adherent, ctenoid (or secondarily cycloid). A single complete lateral line (except *Pseudogrammini* and some species of *Plectranthias*), extending on caudal fin less than 1/2 length of middle caudal-fin rays. Vertebrae 24 to 30. **Colour:** variable with patterns of light or dark stripes, spots, vertical or diagonal bars, or nearly plain; many species are capable of rapid colour changes; xanthic (yellow) phases are known in some species and several species have distinctively coloured deep- and shallow-water forms; **colour patterns are generally the most useful field characters as the morphometric and meristic characters often overlap to a considerable degree.**

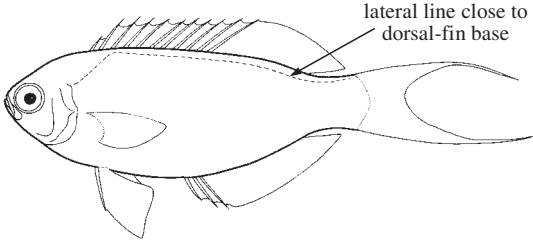
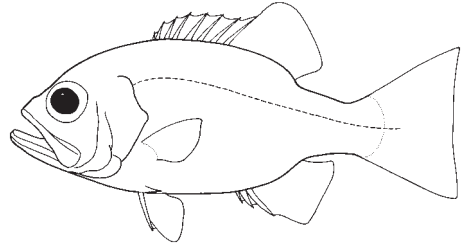


**Habitat, biology, and fisheries:** Serranids are benthic or bottom-oriented fishes, usually found on coral reefs or rocky substrata; the great majority of species occur on continental or insular shelves in depths less than 200 m. All are predaceous, the larger species feeding mainly on fishes, crustaceans, and cephalopods, while many of the smaller ones feed on zooplankton. Most serranids represented in the area are protogynous hermaphrodites, i.e. they first mature as females and, after spawning one or more times, they will then change sex, spawning thereafter as males. Fishes of the subfamily Serraninae are synchronous hermaphrodites, with both sexes combined (and functional) at the same time in a single individual. Although these synchronous hermaphrodites can fertilize their own eggs, they normally spawn in pairs and alternate the release of eggs or sperm in order to have their eggs fertilized by the other fish. Some groupers (subfamily Epinephelinae) form large aggregations at specific sites at the time of spawning, making them vulnerable to over-fishing. These spawning aggregations should be protected. Except for occasional spawning aggregations, most groupers are solitary fishes, and tagging studies have shown that they are generally resident on a particular reef for a long time (often years). This site specificity and the relatively slow growth rate of groupers make them particularly vulnerable to over-fishing. Groupers are among the most highly priced food fishes and are actively sought by commercial and sport fishermen. They are caught with hook-and-line, gill nets, spear, traps, and in trawls. For 1995, FAO's Yearbook of Fishery Statistics reports a total catch of around 45 600 t of Serranidae from the Western Central Pacific. Separate statistics per species are not available from the area. Some groupers are important in aquaculture, and a few species have been spawned in captivity. Several species are used in cage-culture operations. Some of the smaller serranids, particularly the colourful Anthiinae and Liopropomatini are of value as aquarium fishes.

**Similar families occurring in the area**

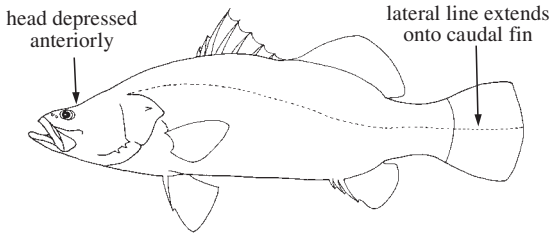
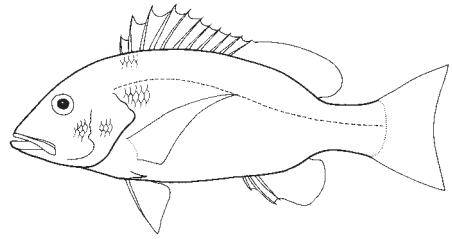
**Callanthiidae:** lateral line running close to dorsal-fin base and terminating on upper surface of caudal peduncle or below last dorsal-fin ray; nasal organ without lamellae; preopercle edge smooth; opercle with 1 or 2 spines.

**Glucosomatidae:** rear edge of opercle with 2 small, flat points; scaly axillary process at base of pelvic fins well developed; dorsal-fin spines VIII.

**Callanthiidae****Glucosomatidae**

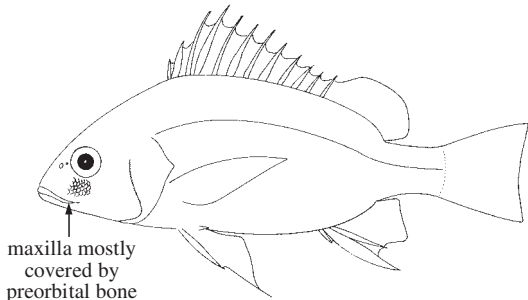
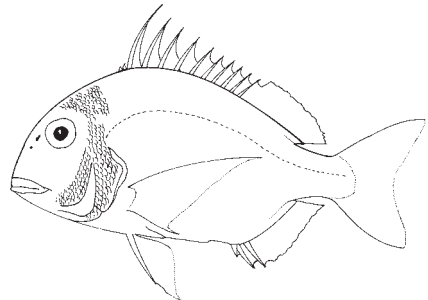
**Centropomidae:** head depressed anteriorly; pectoral fins shorter than pelvic fins; lateral line extends to rear margin of caudal fin; opercle with a single flat spine.

**Lutjanidae:** maxilla mostly covered by preorbital bone when mouth is closed; no spines on opercle; scaly axillary process at base of pelvic fins usually well developed.

**Centropomidae****Lutjanidae**

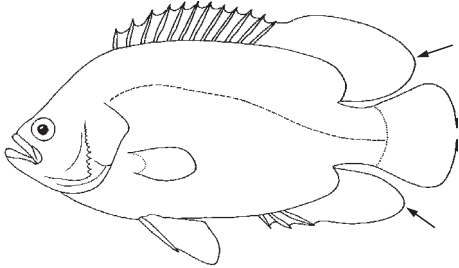
**Haemulidae:** maxilla mostly covered by preorbital bone when mouth is closed; no teeth on vomer or palatines; no spines on opercle.

**Sparidae:** jaws with incisiform and/or molariform teeth; maxilla mostly covered by preorbital bone when mouth is closed; no spines on opercle; edge of preopercle smooth.

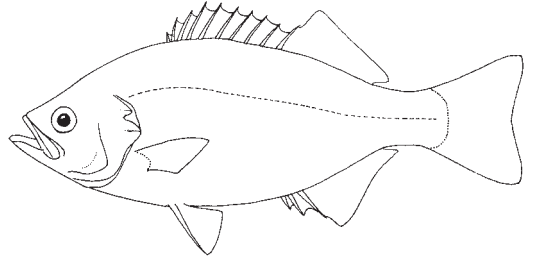
**Haemulidae****Sparidae**

Lobotidae: no spines on opercle; no teeth on vomer or palatines; soft dorsal and anal fins project well past caudal-fin base.

Kuhliidae: rear edge of opercle forming only 2 flat points; branchiostegal rays 6; scaly sheath at bases of dorsal and anal fins.

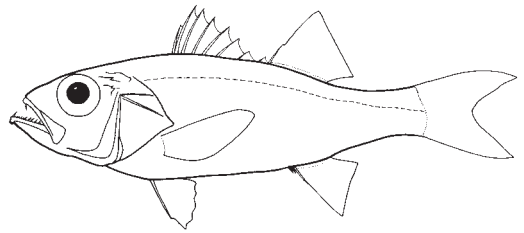


**Lobotidae**



**Kuhliidae**

Acropomatidae: rear edge of opercle forming 2 flat points, or the lower point developed as a cluster of sharp spines; dorsal fin deeply divided or as 2 separate spiny and soft-rayed fins, the first part with VII to X spines, the second with I spine and 9 or 10 soft rays; several distinct, spaced canines along lower jaw.



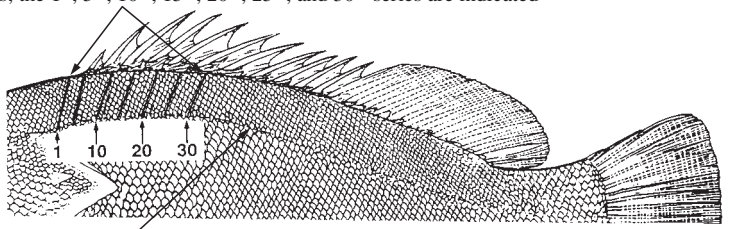
**Acropomatidae**

Moronidae (*Lateolabrax japonicus*, occurs near the northern part of the area): opercle ends in 2 flat points; vertebrae 34 to 37; swimbladder extends into hollow of first anal-fin pterygiophore.

lateral scale series; the 1<sup>st</sup>, 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup>, 20<sup>th</sup>, 25<sup>th</sup>, and 30<sup>th</sup> series are indicated

**Identification note**

Lateral scale series are the oblique series of scales that run above the lateral line from the upper end of the gill opening to the base of the caudal fin (Fig.1).



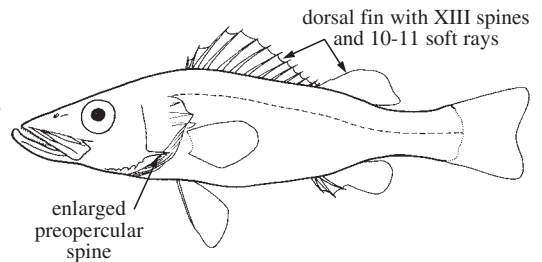
lateral-line scales

**Fig. 1** methods of counting scales

**Key to the genera of Serranidae occurring in the area**

Note: species names are given when a genus contains a single species, or if only a single species of the genus is known from the area.

- 1a. Dorsal fin with XIII spines and 10 or 11 soft rays; preopercle with enlarged spine at corner, extending past subopercle (Fig. 2) . . . . . *Niphon spinosus*
- 1b. Dorsal fin with IV to XIII spines and 10 to 25 soft rays, the rays more numerous than the spines; spine at corner of preopercle enlarged in some species, but not extending past subopercle . . . . . → 2



**Fig. 2** *Niphon spinosus*

- 2a.** Scaly flap of skin joining base of upper pectoral-fin rays to body; oblique scale series more numerous than lateral-line scales; branched caudal-fin rays 15; dorsal-fin spines IV, or VI to XI (rarely X) . . . . . → **3**
- 2b.** No scaly flap of skin joining base of upper pectoral-fin rays to body; oblique scale series not more numerous than lateral-line scales; branched caudal-fin rays 12 to 15; dorsal-fin spines VIII to XIII . . . . . → **21**
- 3a.** Less than 1/2 of upper border of opercle joined to body by skin; dorsal-fin spines VII to XI. . . . . (**tribe Epinephelini**) → **12**
- 3b.** Most of upper border of opercle joined to body by skin; dorsal-fin spines IV, or VII to IX . . . . . → **4**
- 4a.** Scales mainly ctenoid, not deeply embedded; preopercle edge strongly serrate; subopercle and interopercle serrate . . . . . (**tribe Diploprionini**) → **5**
- 4b.** Scales cycloid, deeply embedded; preopercle edge smooth, except for a few short blunt spines dorsally; subopercle and interopercle smooth; pectoral fins longer than pelvic fins . . . . . (**tribe Grammistini**) → **7**
- 5a.** Dorsal fin with VIII spines and 13 to 16 soft rays; body depth greater than head length and 2.0 to 2.4 times in standard length . . . . . *Diploprion bifasciatum*
- 5b.** Dorsal fin with IX spines and 10 to 12 soft rays; body depth less than or equal to head length and 2.9 to 3.7 times in standard length . . . . . → **6**
- 6a.** Dorsal fin cleft to base before last spine, which is more than twice length of eighth spine; dorsal-fin rays 10; anal fin with II spines and 8 soft rays; caudal fin truncate . . . . . *Belonoperca chabanaudi*
- 6b.** Dorsal fin indented before soft-rayed part but not to base, the last 2 spines subequal; dorsal-fin rays 12; anal fin with III spines and 9 soft rays; caudal fin rounded . . . . . *Aulacocephalus temmincki*
- 7a.** Lateral line interrupted; dorsal-fin rays 19 to 25; anal-fin rays 15 to 21 . . . . . → **8**
- 7b.** Lateral line complete to caudal-fin base; dorsal-fin rays 10 to 16; anal-fin rays 8 to 13 . . . . . → **10**
- 8a.** Lateral line double, upper part ends below middle dorsal-fin rays, lower line runs along midlateral part of body above anal fin; large spine on preopercle pointing dorsally; anal-fin rays 19 to 21; body of adults pale brown, with scattered, vertically-elongate dark brown spots . . . . . *Aporops bilinearis*
- 8b.** Lateral line single, ending below middle dorsal-fin rays; large spine on rear edge of preopercle pointing ventrally; anal-fin rays 15 to 18, or 19 to 22 . . . . . → **9**
- 9a.** Anal-fin rays 19 to 22; dorsal-fin rays 22 to 25; pale mid-dorsal stripe on head . . . . . *Suttonia lineata*
- 9b.** Anal-fin rays 16 to 19; dorsal-fin rays 19 to 23; no pale mid-dorsal stripe on head . . . . . *Pseudogramma*
- 10a.** No flap; body depth less than head length, 3.1 to 3.7 times in standard length; pectoral-fin rays 14 or 15 . . . . . *Grammistops ocellatus*
- 10b.** A fleshy flap on chin; body depth about equal to head length, 2.2 to 2.7 times in standard length; pectoral-fin rays 16 to 18 . . . . . → **11**
- 11a.** Chin flap large, about equal to eye diameter; anal fin with III spines and 8 soft rays; head and body brown, with numerous small dark-edged white spots; 4 triangular black saddle-blotches on body, the largest on nape, the smallest on front of caudal peduncle . . . . . *Pogonoperca punctata*
- 11b.** Chin flap shorter than pupil diameter; anal fin with II spines and 9 soft rays; head and body dark brown or black with yellow stripes which break up into a series of dashes on large adults . . . . . *Grammistes sexlineatus*

12a. Dorsal-fin spines VII or VIII; lower edge of preopercle with 1 to 3 enlarged spines (usually hidden by skin, but these spines can be detected by running a finger or probe along preopercle edge) . . . . . → 13

12b. Dorsal-fin spines IX to XI; lower edge of preopercle smooth (except for a few species of *Epinephelus* with 1 to 4 enlarged serrae) . . . . . → 14

13a. Anal-fin spines strong, all 3 distinct; preorbital depth 1/2 or less of eye diameter; head length 2.5 to 2.6 times in standard length (Fig. 3) . . . . . *Saloptia powelli*

13b. Anal-fin spines weak, the first and second covered by skin; preorbital depth 0.7 to 2 times eye diameter; head length 2.8 to 3.1 times in standard length (Fig. 4) . . . . . *Plectropomus*

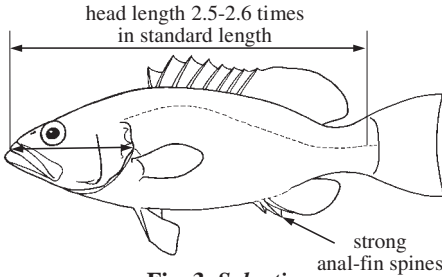


Fig. 3 *Saloptia*

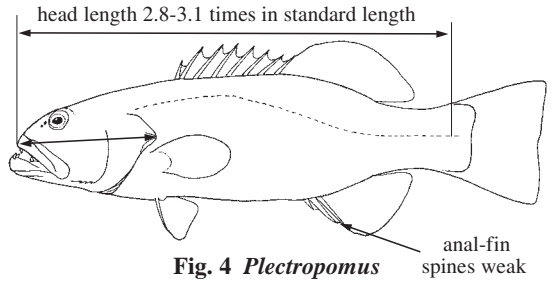


Fig. 4 *Plectropomus*

14a. Caudal fin deeply lunate or forked; dorsal-fin spines IX (Fig. 5) . . . . . *Variola*

14b. Caudal fin rounded, truncate, or concave; dorsal-fin spines IX to XI . . . . . → 15

15a. No teeth on palatines; body and head elongate and markedly compressed, the greatest body width 11 to 15% of standard length and more than 3 times in head length (Fig. 6) . . . . . *Anyperodon leucogrammicus*

15b. Palatines with teeth; body compressed in some species, but its width only 1.8 to 3 times in head length . . . . . → 16

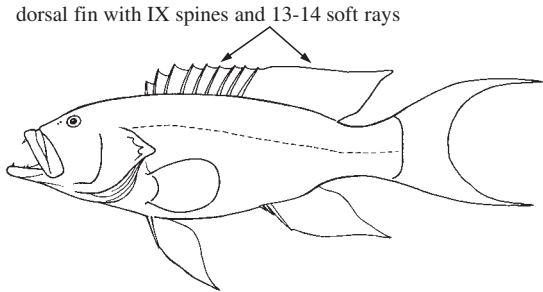


Fig. 5 *Variola*

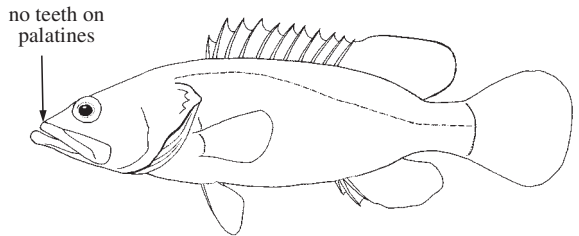


Fig. 6 *Anyperodon*

16a. Dorsal profile of head markedly concave; dorsal-fin spines X; rear nostrils of adults a long vertical slit (Fig. 7) . . . . . *Cromileptes altivelis*

16b. Dorsal profile of head straight, convex or slightly concave; dorsal-fin spines IX or XI (rarely X); rear nostrils round or oblong . . . . . → 17

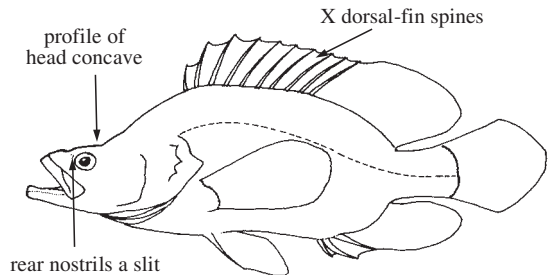


Fig. 7 *Cromileptes*

- 17a. Pectoral fins distinctly asymmetric, the fifth or sixth rays longest (Fig. 8a); dorsal fin with IX spines and 17 or 18 soft rays; caudal fin truncate (Fig. 9) . . . . . *Aethaloperca rogaa*
- 17b. Pectoral fins symmetric or nearly so, the middle rays longest (Fig. 8b); dorsal fin with IX to XI spines and 12 to 21 soft rays; caudal fin rounded, truncate, or emarginate . . . . . → 18

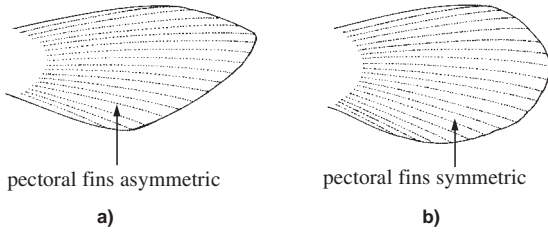


Fig. 8

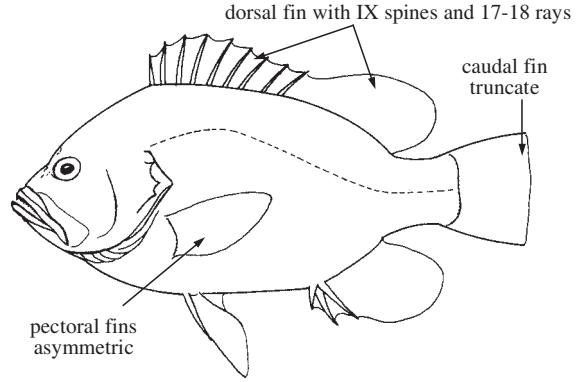


Fig. 9 *Aethaloperca*

- 18a. Dorsal-fin spines IX . . . . . → 19
- 18b. Dorsal-fin spines XI . . . . . → 20

- 19a. Caudal fin truncate; head small, 2.9 to 3.2 times in standard length; distal part of maxilla with step or hook-like process on lower edge (hidden by lip); dorsal-fin membranes not incised between spines (Fig. 10) . . . . . *Gracila albomarginata*
- 19b. Caudal fin rounded (truncate in *Cephalopholis polleni*); head length 2.2 to 3.1 times in standard length; adults with a knob at lower rear corner of maxilla (hidden by upper lip); dorsal-fin membranes distinctly incised between spines (Fig. 11) . . . . . *Cephalopholis*

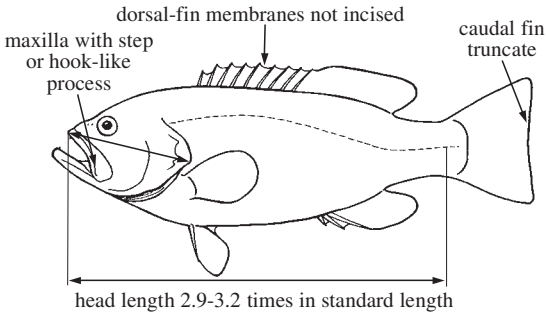


Fig. 10 *Gracila*

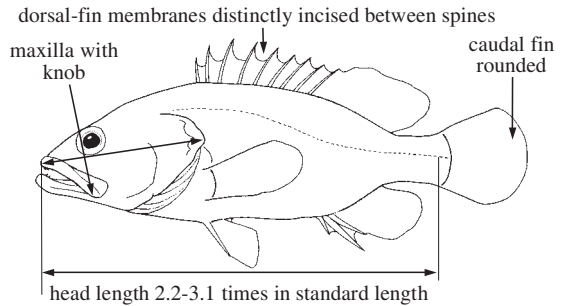


Fig. 11 *Cephalopholis*

- 20a. Body depth distinctly greater than head length and 2.4 to 2.7 times in standard length; dorsal fin with XI spines and 18 to 21 soft rays, the base of soft-rayed part longer than that of spinous part (Fig. 12) . . . . . *Triso dermopterus*
- 20b. Body depth 2.4 to 4.1 times in standard length, usually less than head length; dorsal fin with XI spines and 12 to 19 soft rays, the base of soft-rayed part shorter than or equal to that of spinous part (Fig. 13) . . . . . *Epinephelus*

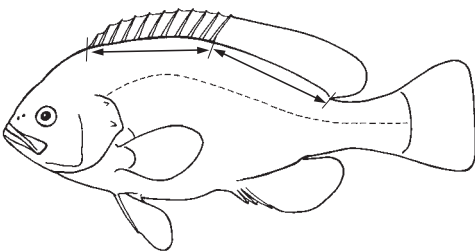


Fig. 12 *Triso*

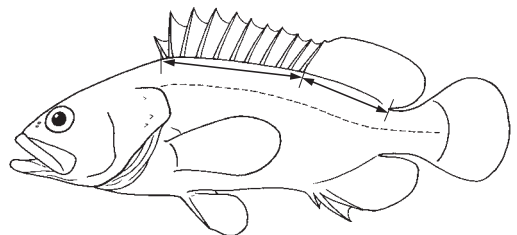


Fig. 13 *Epinephelus*

- 21a.** Dorsal fin with VIII spines and 11 to 14 soft rays; nostrils far apart, the anterior nostril tubular, at front of snout near upper lip; maxilla with well-developed supramaxillary bone . . . . . (tribe *Liopropomatini*) → 22
- 21b.** Dorsal fin with IX to XIII spines and 9 to 21 soft rays; nostrils close together on rear half of snout; supramaxilla rudimentary or absent . . . . . → 23
- 22a.** Body elongate, depth 5.4 to 5.7 times in standard length; caudal peduncle depth about 70% of body depth; pectoral fins short and rounded, about 1/2 head length . . . *Rainfordia opercularis*
- 22b.** Body depth 3 to 4.2 times in standard length; caudal peduncle depth 40 to 55% of body depth; pectoral fins long and pointed, more than 1/2 head length . . . . . *Liopropoma*
- 23a.** Branched caudal-fin rays 15; dorsal fin with X spines and 9 or 10 soft rays; lateral line parallel to dorsal contour of body; maxilla naked; vertebrae 24 . . . . . *Chelidoperca*
- 23b.** Branched caudal-fin rays 12 to 15 (usually 13); dorsal fin with X or XI spines and 13 to 20 soft rays or XIII spines and 15 soft rays; maxilla scaly or naked; vertebrae 25 to 28 . . . . . (subfamily *Anthiinae*) → 24
- 24a.** Dorsal fin divided to base between spinous and soft portions; lateral-line scales 51 to 78; body elongate, its depth 3.3 to 5.3 times in standard length . . . . . *Luzonichthys*
- 24b.** Dorsal fin continuous or deeply notched between spinous and soft portions; lateral-line scales 25 to 65 (when lateral line complete); body less elongate, its depth 1.9 to 4.2 times in standard length . . . . . → 25
- 25a.** No teeth on vomer or palatines; body depth 3.4 to 4.2 times in standard length; dorsal-fin spines slender; in adult males, all dorsal-fin spines elongated to form a tall sail-like dorsal fin . . . . . *Rabaulichthys altipinnis*
- 25b.** Teeth present on vomer and palatines; body depth 1.9 to 3.6 times in standard length . . . . . → 26
- 26a.** Patch of teeth on vomer diamond-shaped; a patch of minute teeth present on tongue . . . . . → 27
- 26b.** Patch of teeth on vomer triangular or V-shaped; no teeth on tongue . . . . . → 28
- 27a.** Dorsal-fin rays 19 to 21; lateral-line scales 57 to 61; caudal fin rounded to slightly emarginate; no elongate fin spines or rays . . . . . *Caprodon schlegelii*
- 27b.** Dorsal-fin rays 13 to 17; lateral-line scales 30 to 47; caudal fin forked; 1 or more fin spines or rays prolonged . . . . . *Holanthias*
- 28a.** Dorsal-fin spines XIII . . . . . *Acanthistius ocellatus*
- 28b.** Dorsal-fin spines X . . . . . → 29
- 29a.** Dorsal fin distinctly notched between spinous and soft part; supramaxilla present (may be rudimentary); branched caudal-fin rays 12 to 15 (usually 15); maxilla scaly or naked . . . . . → 30
- 29b.** Dorsal fin not notched between spinous and soft portions (except slightly notched in *Dactylanthias* and *Sacura*); supramaxilla absent; branched caudal-fin rays 13; maxilla scaly . . . . . → 31
- 30a.** Lateral-line scales 41 to 65; anal-fin rays 7 to 9; maxilla naked . . . . . *Hypoplectrodes*
- 30b.** Lateral-line scales 25 to 41; anal-fin rays 6 or 7; maxilla scaly or naked . . . . . → 32
- 31a.** Total gill rakers on first gill arch 28 to 33; ascending process of premaxilla extending between frontals; anterior canines of lower jaw short, stout, and projecting obliquely outward . . . . . *Selenanthias*
- 31b.** Total gill rakers on first gill arch 14 to 25; ascending process of premaxilla not extending between frontals; anterior canines not projecting obliquely outward . . . . . *Plectranthias*

- 32a.** Serrae at corner of preopercle distinctly enlarged; posterior soft rays of dorsal and anal fins distinctly shorter than anterior soft rays; second to fourth dorsal-fin rays elongated in adults; third dorsal-fin spine greatly elongated in males. . . . . *Sacura*
- 32b.** Serrae at corner of preopercle not distinctly enlarged; posterior soft dorsal- and anal-fin rays not shorter than anterior soft rays, the second to fourth dorsal-fin rays not elongated . . . . → 33
- 33a.** Body deep, its depth 1.9 to 2.2 times in standard length; dorsal-fin rays 18 to 20; pectoral-fin rays 13 or 14 . . . . . *Serranocirrhitis latus*
- 33b.** Body less deep, its depth 2.4 to 3.6 times in standard length; dorsal-fin rays 13 to 18; pectoral-fin rays 13 to 21 . . . . . → 34
- 34a.** Pectoral-fin rays 16 to 21, middle rays, at least, branched; lateral-line scales 37 to 64. . . *Pseudanthias*
- 34b.** Pectoral-fin rays 13 to 18, all unbranched; lateral-line scales 31 to 39 . . . . . → 35
- 35a.** Pectoral-fin rays 18; lateral-line scales 39; body depth 2.4 to 2.5 times in standard length . . . . . *Dactylanthias haplodactylus*
- 35b.** Pectoral-fin rays 13 to 17; lateral-line scales 31 to 37; body depth 2.6 to 3.6 times in standard length . . . . . → 36
- 36a.** Dorsal-fin rays 13 to 15; anal-fin rays 6 or 7; lateral-line scales 34 to 37; body elongate, its depth 3 to 3.6 times in standard length . . . . . *Tosana niwae*
- 36b.** Dorsal-fin rays 17; anal-fin rays 8; lateral-line scales 31 to 33; body depth 2.6 to 2.7 times in standard length . . . . . *Tosanoides flavofasciatus*

#### Key to the species of *Cephalopholis* occurring in the area

- 1a.** Caudal fin rounded; head length 2.2 to 2.7 times in standard length; colour pattern not of alternating stripes of blue and orange-yellow . . . . . → 2
- 1b.** Caudal fin truncate to slightly emarginate; head small, 2.7 to 3.1 times in standard length; head and body with alternating stripes of blue and orange-yellow; juveniles golden-yellow, with wavy purple stripes along dorsal part of head and body, black spot on snout in front of eye and black maxillary streak . . . . . *Cephalopholis polleni*
- 2a.** Body deep, its depth 2 to 2.4 times in standard length; body width 2.3 to 2.6 times in body depth; lateral line strongly arched above pectoral fin; head and body red with yellow bars; pelvic-fin tips black; juveniles with large black spot in dorsal fin . . . . . *Cephalopholis igarashiensis*
- 2b.** Body depth 2.3 to 3.2 times in standard length; lateral line not strongly arched above pectoral fin; colour not as above . . . . . → 3
- 3a.** Pelvic fins short, their length 2.3 to 2.5 times in head length; pectoral-fin rays 15 or 16; dorsal-fin rays 14; anal-fin rays 8; colour reddish brown with indistinct dark blotch basally on pectoral fins . . . . . *Cephalopholis aitha*
- 3b.** Pelvic-fin length 1.5 to 2.3 times in head length; pectoral-fin rays 15 to 20; dorsal-fin rays 14 to 17; anal-fin rays 8 to 10; colour not as above . . . . . → 4
- 4a.** Anal-fin rays usually 8; colour generally brown to dark brown . . . . . → 5
- 4b.** Anal-fin rays 9 (rarely 10); colour generally red, orange, or yellow (except *C. argus* and some *C. urodeta* or *C. sonnerati*) . . . . . → 8
- 5a.** Small dark spots or dark-edged pale blue spots on head and/or body . . . . . → 6
- 5b.** No small dark spots or blue ocelli on head or body . . . . . → 7

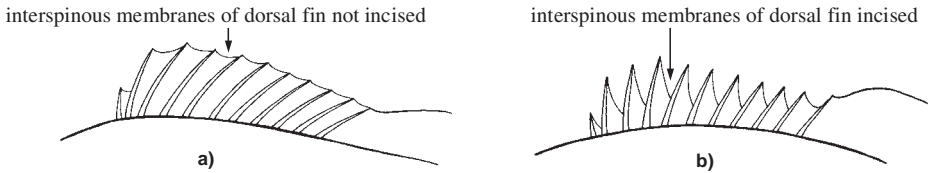
- 6a.** Dorsal-fin rays 14 to 16; lateral scale series 84 to 98; pectoral-fin length 1.4 to 1.5 times in head length; dark-edged blue spots only on head and anteriorly on body . . . *Cephalopholis microprium*
- 6b.** Dorsal-fin rays 15 to 17; lateral scale series 92 to 106; pectoral-fin length 1.5 to 1.8 times in head length; blue ocelli on head, body, and basally on median fins; juveniles greenish grey, the median fins yellow . . . . . *Cephalopholis cyanostigma*
- 7a.** Pectoral fins short, their length 1.5 to 1.8 times in head length; colour generally brown or yellowish brown, with dark blue lines on head, body, and fins; black spot between upper 2 opercular spines . . . . . *Cephalopholis formosa*
- 7b.** Pectoral-fin length 1.3 to 1.6 times in head length; body brown, with 7 or 8 more or less distinct dark bars; fins dark brown, with a pale blue line at corners of caudal fin . . *Cephalopholis boenak*
- 8a.** Dorsal-fin rays 15 to 17; lower limb of first gill arch with 17 to 19 gill rakers; auxiliary scales present on body; colour dark brown, covered with small dark-edged blue ocelli; 5 or 6 pale bars often visible on rear half of body . . . . . *Cephalopholis argus*
- 8b.** Dorsal-fin rays usually 14 or 15; lower limb of first gill arch with 13 to 16 gill rakers; no auxiliary scales on body scales; colour not as above . . . . . → 9
- 9a.** Lateral-line scales 66 to 80; lateral scale series 115 to 134; pectoral-fin rays 18 to 20; body depth 2.3 to 2.8 times in standard length; colour generally red to reddish brown (juveniles and some adults may be dark purple or brown) with widely scattered whitish blotches (Indian Ocean) or generally brownish, covered with small dark red to reddish brown spots and irregular white blotches (Pacific) . . . . . *Cephalopholis sonnerati*
- 9b.** Lateral-line scales 45 to 68; lateral scale series 79 to 121; pectoral-fin rays 16 to 19; body depth 2.6 to 3.5 times in standard length; colour not as above . . . . . → 10
- 10a.** Lateral-line scales 54 to 68; caudal fin blackish red, the corners broadly red, each set off by an oblique white stripe; pectoral fins red, shading to orange-yellow distally (Pacific); or caudal and pectoral fins uniformly blackish (Indian Ocean) . . . . . *Cephalopholis urodeta*
- 10b.** Lateral-line scales 45 to 56; colour not as above . . . . . → 11
- 11a.** Lateral scale series 79 to 90; head length 2.2 to 2.4 times in standard length; dark brown saddle spot on caudal peduncle, followed by a smaller spot; submarginal dark streak at corners of caudal fin . . . . . *Cephalopholis leopardus*
- 11b.** Lateral scale series 90 to 121; head length 2.3 to 2.6 times in standard length; colour not as above . . . . . → 12
- 12a.** Head, body, and fins covered with small blue ocelli . . . . . → 13
- 12b.** No blue spots on head, body, or fins . . . . . → 14
- 13a.** Body with 4 or 5 dark blotches along base of dorsal fin, a faint blotch on nape and 2 smaller ones on peduncle (blotches sometimes merging with or being replaced by dark red vertical bars); most specimens with dark-edged blue lines radiating from eyes . . . . . *Cephalopholis sexmaculata*
- 13b.** No dark blotches on body or blue lines radiating from eyes . . . . . *Cephalopholis miniata*
- 14a.** Edge of subopercle and interopercle distinctly serrate; pelvic fins usually reaching anus, their length 1.6 to 2 times in head length; colour generally orange-yellow to orange-red or golden, with red to orange dots on head and dorsally on body . . . . . *Cephalopholis aurantia*
- 14b.** Subopercle and interopercle usually smooth (rarely with a few small serrae); pelvic fins not reaching anus, 1.9 to 2.2 times in head length; colour pale reddish orange, mottled with dark red or brownish red . . . . . *Cephalopholis spiloparaea*

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

- 1a. Caudal fin truncate; interorbital area naked; body reddish orange, with 5 oblong black blotches along flanks . . . . . *Chelidoperca pleurospilus*
- 1b. Caudal fin emarginate; interorbital area scaly . . . . . → 2
- 2a. Scale rows from dorsal-fin origin to lateral line 3; no scales on anterior half of interorbital area . . . . . *Chelidoperca margaritifera*
- 2b. Scale rows from dorsal-fin origin to lateral line 4 or 5; interorbital scales extend to front edge of eyes . . . . . *Chelidoperca hirundinacea*

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

- 1a. Caudal fin of adults emarginate to truncate (slightly rounded on some *E. bleekeri* and juveniles, and convex if broadly spread in adults) . . . . . → 2
- 1b. Caudal fin rounded (truncate on some *E. fasciatus* from Oceania) . . . . . → 12
- 2a. Interspinous membranes of dorsal fin not incised (Fig. 14a) . . . . . → 3
- 2b. Interspinous membranes of dorsal fin incised (Fig. 14b) . . . . . → 6



**Fig. 14**

- 3a. Gill rakers elongate, no rudiments, 20 to 23 rakers on lower limb of first gill arch; dorsal-fin rays 17 to 19; colour purplish to brownish grey with yellowish brown dots on head and longitudinal brown lines on dorsal part of body (lines usually lost on large adults) . . . . . *Epinephelus undulosus*
- 3b. Gill rakers not elongate and rudiments often present, 13 to 18 rakers on lower limb of first gill arch; dorsal-fin rays 15 to 17; colour not as above . . . . . → 4
- 4a. Second dorsal-fin spine of adults elongated, its length 1.8 to 2.4 times in head length; total gill rakers on first gill arch 20 to 23; body depth 2.7 to 3.2 times in standard length; body reddish brown with a white dot on each scale; broad dark red margin on spinous portion of dorsal fin. . . . . *Epinephelus irroratus*
- 4b. Second dorsal-fin spine not elongate (third or fourth spines longest); total gill rakers on first gill arch 24 to 28; body depth 2.3 to 2.9 times in standard length . . . . . → 5
- 5a. Body dark purplish grey with scattered irregular whitish blotches; body depth 2.6 to 2.9 times in standard length . . . . . *Epinephelus multinotatus*
- 5b. Head, body, and fins bluish grey with numerous blackish dots; large adults with scattered irregular blackish spots and blotches, most smaller than pupil; body depth 2.4 to 2.7 times in standard length . . . . . *Epinephelus cyanopodus*
- 6a. Lateral-line scales 48 to 54; head and at least front of body with small spots, either yellow (pale in preservative) or brown . . . . . → 7
- 6b. Lateral-line scales 56 to 76; spots on head and body dark brown or absent . . . . . → 10

- 7a.** Caudal fin truncate to slightly rounded; body depth 3.0 to 3.5 times in standard length; head, body, dorsal fin, and upper third of caudal fin with small orange-yellow spots, the lower two-thirds of caudal fin dark grey; anal and paired fins dusky, without spots . . . . . *Epinephelus bleekeri*
- 7b.** Caudal fin slightly emarginate (truncate on some *E. chlorostigma*); body depth 2.7 to 3.4 times in standard length; spots on head, body, and fins yellow or yellowish brown to dark brown; anal fin with spots. . . . . → **8**
- 8a.** Head and front of body with small round well-separated bright yellow spots (pale in preservative); distal margin of caudal, soft dorsal, and anal fins with close-set, dark, yellowish brown spots . . . . . *Epinephelus timorensis*
- 8b.** Head, body, and fins covered with small, close-set, yellowish brown to dark brown spots (dark in preservative) . . . . . → **9**
- 9a.** Dorsal-fin rays 15 to 17; anal fin of adults rounded to slightly angular, the longest soft ray 2.0 to 2.6 times in head length; 14 to 16 gill rakers on lower limb of first gill arch; pyloric caeca 11 to 17; dark spots on body of adults about equal to pupil . . . . . *Epinephelus areolatus*
- 9b.** Dorsal-fin rays 16 to 18; anal fin of adults angular or pointed, the longest soft ray 1.9 to 2.3 times in head length; 15 to 18 gill rakers on lower limb of first gill arch; pyloric caeca 26 to 52; dark spots on body of adults distinctly smaller than pupil. . . . . *Epinephelus chlorostigma*
- 10a.** Anal-fin rays 9 or 10 (rarely 8); 1 to 4 small spines often present on ventral edge of preopercle near corner; dorsal-fin rays 14 or 15; rear nostrils of adults 2 to 4 times larger than anterior nostrils . . . . . *Epinephelus ergastularius*
- 10b.** Anal-fin rays 8; no spines on lower edge of preopercle; dorsal-fin rays 14 to 17; rear nostrils not enlarged (except *E. darwinensis*) . . . . . → **11**
- 11a.** Caudal fin truncate to slightly convex; rear nostrils and anterior nostrils subequal; pectoral-fin rays 19 or 20; depth of caudal peduncle 3.2 to 3.8 times in head length; no scales on maxilla; margin of spinous dorsal-fin membranes dark red to black . . . *Epinephelus retouti*
- 11b.** Caudal fin slightly emarginate; rear nostrils of adults more than twice diameter of anterior nostrils; pectoral-fin rays 18; depth of caudal peduncle 3.9 times in head length; maxilla with small scales; no conspicuous markings on head, body or spinous dorsal fin . . *Epinephelus darwinensis*
- 12a.** Anal-fin rays 9 (rarely 10); body with 5 dark bars below dorsal fin, the last 2 bars as broad as preceding bars; 2 pale interspaces below soft dorsal fin . . . . . *Epinephelus octofasciatus*
- 12b.** Anal-fin rays 8 (rarely 7 or 9); colour not as above. . . . . → **13**
- 13a.** Dorsal-fin rays 12 to 14 . . . . . → **14**
- 13b.** Dorsal-fin rays 14 to 18 (rarely 13 in *E. bruneus*) . . . . . → **15**
- 14a.** Lateral-line scales 52; lateral body scales rough; rear nostrils twice as large as anterior nostrils; no obvious dark or light markings . . . . . *Epinephelus perplexus*  
(1 specimen, 46.5 cm standard length, from Queensland, Australia)
- 14b.** Lateral-line scales 56 to 65; lateral body scales smooth; rear nostrils and anterior nostrils subequal; juveniles with 2 broad, longitudinal, black-edged whitish bands that disappear in adults, the dark edges breaking into dashes and spots, which may be lost in large adults . . . . . *Epinephelus latifasciatus*
- 15a.** Lateral-line scales with branched tubules; eye small, its diameter about 1/8 head length for specimens of 20 cm length, about 1/9 head length at 35 cm, and 1/13 head length at 145 cm standard length; interorbital wide, the width more than 1/5 head length for specimens of 23 to 153 cm standard length; maximum length about 270 cm; juveniles yellow, with 3 broad black bars on body and irregular black bands on head . . . . . *Epinephelus lanceolatus*
- 15b.** Lateral-line scales with single tubule (except anterior scales of large *E. bruneus*, *E. coioides*, and *E. malabaricus*); eye diameter more than 1/7 head length for specimens of 20 cm length, and more than 1/8 head length at 35 cm; interorbital width less than 1/5 head length for specimen of 23 to 153 cm length; maximum length less than 150 cm (except *E. tukula*, which may reach 200 cm) . . . . . → **16**

- 16a. Head and body mostly covered with small dark spots (orange, russet, brown, or black in life and persist in preservative) . . . . . → 17
- 16b. No distinct dark spots over most of head and body (yellow or orange spots may be present in life, but these usually do not persist in alcohol; or there may be some dark dots or scattered small dark spots, but not over most of head and body) . . . . . → 40
  
- 17a. Lateral-line scales 46 to 53 . . . . . → 18
- 17b. Lateral-line scales 55 to 74 (except *E. fuscoguttatus* with 52 to 58) . . . . . → 29
  
- 18a. Midlateral body scales smooth, at least on adults (may be rough in area covered by pectoral fins) . . . . . → 19
- 18b. Midlateral body scales rough (mostly smooth on adults of *E. socialis*) . . . . . → 22
  
- 19a. Dorsal profile of head nearly straight; orange-red to brownish red spots on head, body, and median and pelvic fins; 3 or 4 prominent black spots or blotches dorsally on body, the first (and largest, greater than eye diameter) at base of middle of dorsal fin, the last blotch dorsally on caudal peduncle; no blackish maxillary streak (Pl. VI, 44) . . . . .  
 . . . . . *Epinephelus trimaculatus*  
 (Japan, Korea, China, Taiwan Province of China; not yet recorded from the area)
- 19b. Dorsal profile of head convex; spots on head, body, and fins dark brown to black; black blotches on body at base of dorsal fin present or absent; blackish maxillary streak usually present . . . . . → 20
  
- 20a. Dorsal-fin rays 16 to 18; dark spots on pectoral fins progressively smaller distally; pelvic-fin length 2.2 to 2.6 times in head length . . . . . *Epinephelus faveatus*
- 20b. Dorsal-fin rays 15 to 17; no dark spots on distal part of pectoral fins; pelvic fins 1.9 to 2.3 times in head length (for specimens of 10 to 25 cm standard length) . . . . . → 21
  
- 21a. Eye-sized blackish blotch at base of last 3 dorsal-fin spines; dark spots on head, body, and fins numerous, 15 to 20 on soft dorsal fin of specimens 10 cm standard length, and 25 to 30 on soft dorsal fin of 28 cm specimens; total gill rakers on first gill arch 23 to 26 (modally 25); body width 1.7 to 2.2 times in body depth; jaws subequal . . . . . *Epinephelus howlandi*
- 21b. No large blackish blotch at base of posterior dorsal-fin spines (though 1 to 3 spots at this location are usually darker than adjacent spots); dark spots on head, body, and fins less numerous, 5 to 7 on soft dorsal fin of 11 cm specimens, and 20 or 21 on soft dorsal fin of 29 cm specimens; total gill rakers on first gill arch 21 to 24 (modally 23); body width 1.4 to 1.8 times in body depth; lower jaw strongly projecting . . . . . *Epinephelus macrospilos*

- 22a. Dark spots on body elongate, oblique, and more numerous posteriorly; dark spots on head separated by more than 2 spot diameters; ventral edge of maxilla of subadults (33 to 40 cm standard length) with a distinct step that develops into a bony knob in adults (Fig. 15a) . . . . . *Epinephelus longispinis*
- 22b. Dark spots on body not elongate and not more numerous posteriorly; dark spots on head separated by less than a spot diameter (except *E. bontoides*); no distinct step on ventral edge of maxilla (Fig. 15b) . . . . . → 23

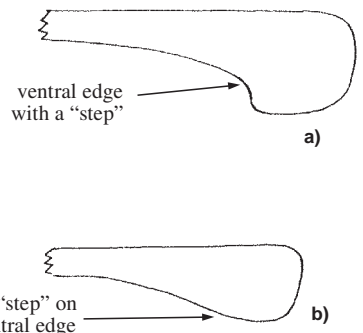
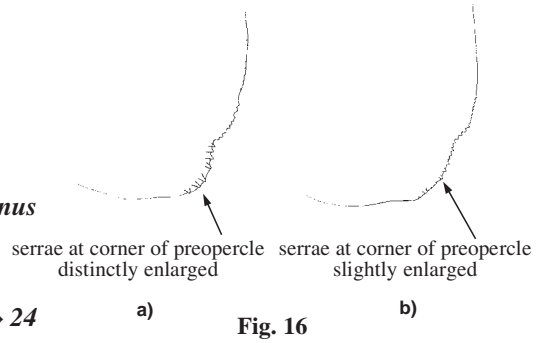


Fig. 15 left maxilla

**23a.** Pectoral fins large, their length 1.2 to 1.6 times in head length (except specimens from Northwest Australia); dorsal-fin rays 16 to 18; serrae at corner of preopercle distinctly enlarged (Fig. 16a); 2 oblique dark brown bands (or elongate dark blotches linked by narrow bands) on chest . . . . . *Epinephelus quoyanus*

**23b.** Pectoral-fin length 1.5 to 2 times in head length; dorsal-fin rays 14 to 17; serrae at preopercle corner slightly enlarged (Fig. 16b); no oblique dark bands on chest . . . . . → 24



**24a.** Lateral scale series 82 to 86; pectoral-fin rays 18 or 19; total gill rakers on first gill arch 20 to 22; head and body with small dark spots separated by spaces greater than 2 spot diameters; no dark spots on ventral parts of head and body; caudal, soft dorsal, and pectoral fins blackish brown with a pale yellow to white margin . . . . . *Epinephelus bontoides*

**24b.** Lateral scale series 92 to 120; pectoral-fin rays 16 to 19; total gill rakers on first gill arch 23 to 27 (except *E. merra* with 21 to 25); dark spots on head and body extending ventrally, and most within a spot diameter of adjacent spots; fins not dark brown to black with a distinct pale margin . . . . . → 25

**25a.** Dorsal-fin rays 14 or 15; length of longest dorsal-fin spines 2.7 to 3.3 times in head length; black saddle-blotch on caudal peduncle; head and body covered by small dark brown or orange-brown spots; head and dorsal part of body with irregular dark brown blotches superimposed over the dark spots . . . . . *Epinephelus polyphkadion*

**25b.** Dorsal-fin rays 15 to 18; longest dorsal-fin spines 2.1 to 2.7 times in head length (except *E. merra*, 2.6 to 2.9 times in head length); colour not as above (especially, no black saddle on caudal peduncle) . . . . . → 26

**26a.** Dark spots on head and body about 1/2 size of pupil; dark brown to black spots on fins (except spinous dorsal fin) much larger than those on body; maxilla not reaching vertical at rear edge of eye . . . . . *Epinephelus miliaris*

**26b.** Dark spots on body larger than pupil and larger than spots on fins; maxilla usually reaching to or past vertical at rear edge of eye . . . . . → 27

**27a.** Pectoral-fin rays 16 to 18; length of longest dorsal-fin spine 2.4 to 3.2 times in head length; some dark brown spots on body often joined to form short bands; pectoral fins with small black spots largely confined to fin rays . . . . . *Epinephelus merra*

**27b.** Pectoral-fin rays 17 to 19; longest dorsal-fin spine 2.1 to 2.6 times in head length; no confluent dark spots on body; dark spots on pectoral fins not uniformly small and not confined to fin rays . . . . . → 28

**28a.** Dorsal-fin rays 17 or 18; lateral scale series 94 to 102; 3 close-set pairs of dark brown to black spots on body at base of dorsal fin . . . . . *Epinephelus bilobatus*

**28b.** Dorsal-fin rays 15 to 17; lateral scale series 102 to 120; no pairs of dark brown to black spots along base of dorsal fin; 2 large dusky to blackish areas on body and dorsal fin, these separated by a broad whitish (though still faintly spotted) area . . . . . *Epinephelus maculatus*

**29a.** Dorsal-fin rays 17; pectoral-fin rays 20; lateral-line scales 73; body broadly marbled with brown and finely spotted with dark brown . . . . . *Epinephelus lebretonianus*  
(known only from 1 specimen, 24.8 cm standard length; locality unknown, but probably Indo-Pacific)

**29b.** Dorsal-fin rays 13 to 17 (only *E. corallicola* rarely with 17); pectoral-fin rays 17 to 20; lateral-line scales less than 71 (except *E. tauvina*) . . . . . → 30

- 30a.** Most dark spots on body polygonal and close-set, separated only by pale lines (forming a reticulum) or white dots; midlateral body scales rough . . . . . → **31**
- 30b.** Most dark spots on body round or oblong and well separated (except posteriorly on *E. socialis* where spots may be confluent to form irregular dark stripes); midlateral body scales rough or smooth . . . . . → **33**
- 31a.** Second anal-fin spine 2.1 to 2.3 times in head length; longest dorsal-fin spine 2.5 to 2.8 times in head length; dorsal-fin rays 15 to 17; polygonal dark spots on body separated mainly by white dots at corners of spots; elongate yellow-brown blotch behind eye or on opercle . . . . . *Epinephelus hexagonatus*
- 31b.** Second anal-fin spine 2.4 to 3.7 times in head length, longest dorsal-fin spine 2.8 to 3.8 times in head length; dorsal-fin rays 14 to 16; dark spots on body separated by network of pale lines; no yellow-brown blotch behind eye or on opercle . . . . . → **32**
- 32a.** A single black blotch on body at base of posterior dorsal-fin spines and extending onto fin about half-way to margin; dark spots at front of upper lip in 1 or 2 irregular horizontal rows; caudal peduncle depth 3.2 to 3.7 times in head length . . . . . *Epinephelus melanostigma*
- 32b.** Three or 4 black blotches (or groups of spots darker than others) at base of dorsal fin and 1 on top of peduncle; blotch at base of rear dorsal-fin spines not extending half-way to fin margin; small dark spots in 3 or 4 irregular rows along front of upper lip; caudal peduncle depth 3.7 to 4.3 times in head length . . . . . *Epinephelus spilotoceps*
- 33a.** Dorsal-fin rays 13 to 15; total gill rakers on first gill arch 29 to 31; lateral-line scales 53 to 58; body depth 2.6 to 2.9 times in standard length; head and body pale yellowish brown, with irregular dark brown blotches and numerous small close-set dark brown spots; black saddle spot on caudal peduncle; midlateral body scales of adults smooth . . . . . *Epinephelus fuscoguttatus*
- 33b.** Dorsal-fin rays 14 to 17; total gill rakers on first gill arch 22 to 29; lateral-line scales 53 to 74; body depth 2.7 to 3.7 times in standard length; colour not as above; midlateral body scales rough (except large *E. tauvina* which have mainly smooth scales) . . . . . → **34**
- 34a.** Irregular black spots (less than 1/2 pupil size) on head, body, dorsal fin, and a few on caudal fin; no spots on ventral parts of head or body or on anal and paired fins; no auxiliary scales; maxilla not reaching past vertical at rear edge of eye . . . *Epinephelus magniscuttis*
- 34b.** Colour not as above; auxiliary scales present on body scales of adults; maxilla usually reaching past vertical at rear edge of eye . . . . . → **35**
- 35a.** Dorsal-fin rays 15 to 17; rear nostrils (at standard length greater than 14 cm) vertically elongate, their length 2 to 3 times diameter of anterior nostrils; pectoral-fin length 1.5 to 1.7 times in head length; lateral scale series 88 to 109; grey, with well-separated black spots smaller than pupil on head, body and fins; 3 dusky to blackish blotches on body at base of rear half of dorsal fin, the largest at base of last 2 or 3 spines; dusky to blackish saddle spot on caudal peduncle; juveniles with black-edged white spots on head and body . . . . . *Epinephelus corallicola*
- 35b.** Dorsal-fin rays 13 to 16; rear nostrils not vertically elongate or more than twice diameter of anterior nostrils; pectoral-fin length 1.6 to 2.5 times in head length; lateral scale series 95 to 130; colour not as above . . . . . → **36**
- 36a.** Lateral-line scales 54 to 65, the anterior scales of large adults with branched tubules; numerous small bony platelets on side of first gill arch; body with 5 irregular dark bars which tend to bifurcate ventrally (bars may be faint or broken into series of 2 or 3 large blotches) . . . . . → **37**
- 36b.** Lateral-line scales 62 to 74, none with branched tubules; no small bony platelets on side of first gill arch; dark bars not present on body (or only faintly on *E. tauvina*). . . . . → **38**

- 37a.** Head and body with numerous small well-separated black spots (largest spots about 2 times larger than rear nostrils); irregular white or pale spots or blotches usually present on head and body . . . . . *Epinephelus malabaricus*
- 37b.** Head, body, and usually median fins with numerous orange, brownish orange or reddish brown spots (orange spots turn brown after death and poorly defined on preserved specimens; spots about 4 or 5 times larger than rear nostrils); no white or pale spots on head or body; orange spots become poorly defined and darker with growth; spots on head often coalesce and become elongated, arranged in irregular rows radiating from eye; fins brownish, with proximal parts spotted . . . . . *Epinephelus coioides*
- 38a.** Body with several large round or oval dark brown spots, arranged in 5 or 6 subvertical series; head and fins with smaller dark brown spots and irregular dark streaks; lateral scale series 113 to 130; maximum total length 200 cm . . . . . *Epinephelus tukula*
- 38b.** Colour not as above; lateral scale series 95 to 112; maximum total length 80 cm . . . . . → 39
- 39a.** Head length 2.1 to 2.4 times in standard length; head, body, and fins with orange-red to dark brown spots (those on body nearly as large as eye in young, about pupil size in large specimens; spots usually absent in outer part of pectoral fins of adults); body often with faint oblique dark bars; blackish blotch often present at base of last 4 dorsal-fin spines and extending onto lower part of fin (more evident in young) . . . . . *Epinephelus tauvina*
- 39b.** Head length 2.4 to 2.7 times in standard length; head and body with blackish brown spots much smaller than pupil, those posteriorly on body often coalescing to form irregular stripes; 4 blackish blotches often present at base of dorsal fin and 1 on caudal peduncle; caudal, dorsal, and anal fins with small white spots and white margins . . . . . *Epinephelus socialis*
- 40a.** Membranes of spinous dorsal fin usually not incised (some specimens with membranes slightly to moderately incised); head and body dark brown or greenish brown, marbled with irregular pale spots and blotches; 1 or 2 faint dark streaks running posteriorly from eye; no dark spots on head, body or fins. . . . . *Epinephelus erythrurus*
- 40b.** Interspinous dorsal-fin membranes moderately to deeply incised; colour not as above . . . . . → 41
- 41a.** Body pale greyish brown, with 5 dark bars; a narrow pale bar may be present within dark bars, nearly dividing them in 2; fins greyish, the median fins with several small dark spots; 13 to 15 gill rakers on lower limb of first gill arch . . . . . *Epinephelus sexfasciatus*
- 41b.** Colour not as above; 14 to 19 gill rakers on lower limb of first gill arch . . . . . → 42
- 42a.** Head, body, and median fins uniform dark grey; pectoral fins pale, pelvic fins blackish; body depth equal to head length, 2.4 times in standard length; lateral-line scales 67 to 69; dorsal-fin rays 16 or 17 . . . . . *Epinephelus trophis*  
(2 specimens taken off Western Australia in a depth of 130 m)
- 42b.** Colour not as above; body depth less than head length, 2.5 to 3.6 times in standard length; lateral-line scales 48 to 72; dorsal-fin rays 13 to 18 . . . . . → 43
- 43a.** Body pale, with close-set wavy, brown or brownish orange stripes, the intervening pale lines forming a maze-like pattern; head greyish brown with numerous small close-set brownish orange spots; dorsal-fin rays 15 to 17; body depth 2.5 to 2.9 times in standard length; interorbital space convex. . . . . *Epinephelus undulatostratus*
- 43b.** Colour not as above; dorsal-fin rays 13 to 18; body depth 2.6 to 3.6 times in standard length . . . . . → 44
- 44a.** Dorsal-fin rays 15 to 18 (rarely 15); body usually with vertical or slightly oblique broad dark bars (faint or absent on some species) . . . . . → 45
- 44b.** Dorsal-fin rays 13 to 16 (rarely 16); body without dark vertical bars (except juvenile *E. bruneus* and *E. daemeli* which have dark oblique bars containing pale spots and streaks) . . . . . → 53

**45a.** Head, body, and fins tan dorsally; belly and rear part of body whitish ventrally; chest and ventral part of head reddish orange; dark orange-brown to black dots (less than 2 mm diameter) on head (behind eye) and body (anteriorly); body with 5 faint, oblique, dark bars (midlateral part of each bar may be darker, representing a series of squarish dark blotches continued from the dark band running from eye to end of operculum) soft dorsal and caudal fins with narrow dark brown margin; dark line along base of soft dorsal fin; lateral-line scales 48 to 51. . . . . *Epinephelus stictus*

**45b.** No dark brown to black dots on body or head (some species with black spots, but these are larger than 2 mm); 48 to 75 lateral-line scales . . . . . → **46**

**46a.** Margin of interspinous dorsal-fin membranes black (red in specimens from Western Australia and deep water); edge of orbit (around eye) narrowly black, surrounded by pale blue line; body usually with 5 faint dark bars often containing irregular pale spots. . . . . *Epinephelus fasciatus*

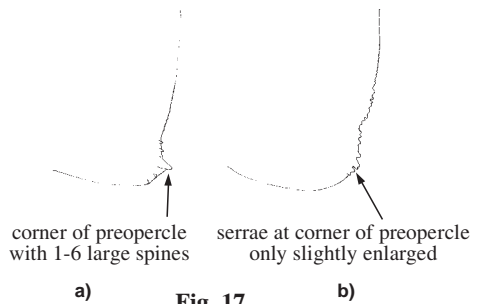
**46b.** Margin of spinous dorsal fin not black; rim of orbit not black; dark bars on body present or absent . . . . . → **47**

**47a.** Nape and front of body above lateral line with minute cycloid scales and numerous pores; body scales with a whitish dot (may be lost in alcohol); semicircular dark red to reddish brown blotch at base of pectoral fin; dark pigment in groove along base of spinous dorsal fin; usually some violet lines and spots on cheek . . . . . *Epinephelus rivulatus*

**47b.** Nape and dorsoanterior part of body without minute scales and numerous pores; colour not as above. . . . . → **48**

**48a.** Corner of preopercle with 1 to 6 large spines (2 or 3 times longer than serrae above corner) (Fig. 17a); dark bars on body vertical or nearly vertical . . . . . → **50**

**48b.** Serrae at corner of preopercle only slightly to moderately enlarged (Fig. 17b); dark bars on body oblique (may be faint or absent) . . . . . → **49**



**49a.** Head large, its length 2.1 to 2.4 times in standard length; adults with 4 dark brown bars on body and brown bands on head; small black spots on edges of brown bars and bands; no dark spots on fins; juveniles with black bars on body and small black spots on fins; 14 to 16 gill rakers on lower limb of first gill arch . . . . . *Epinephelus amblycephalus*

**49b.** Head length 2.3 to 2.6 times in standard length; 4 dark bars (sometimes faint or absent) on dorsal part of body; head and body with numerous small yellow spots (but no black spots); body and median fins also with pale grey spots; rear margin of median fins with a broad yellow border; 16 to 18 gill rakers on lower limb of first gill arch . . . . . *Epinephelus awoara*

**50a.** Head and body brownish grey, covered (except ventrally) with red, orange, or gold spots (pale in alcohol); dorsal-fin margin yellow or orange; dusky yellow or orange spots (1 per membrane) along middle of spinous dorsal fin and another row along base of fin; black blotch at base of last 3 dorsal-fin spines . . . . . *Epinephelus akaara*

**50b.** Colour not as above. . . . . → **51**

**51a.** Head and body with numerous small dark brown, brownish yellow, or russet spots (dark in alcohol); body usually with 5 broad dark bars, the first 4 extend onto dorsal fin (first 2 bars darker dorsally, extending to margin of dorsal fin), the last bar on caudal peduncle . . . . . *Epinephelus fasciatomaculosus*

**51b.** Colour not as above. . . . . → **52**



- 59a.** Large oval dark brown blotch (or group of small spots on larger specimens) on body at base of middle dorsal-fin spines, this blotch not joined to lower dark bands; broadly-curved dark bands or rows of spots on head and body paralleling curvature of isolated dark blotch; dark markings faint or absent on large adults . . . . . *Epinephelus poecilnotus*
- 59b.** Dark brown blotch on body at base of middle dorsal-fin spines joined to dark brown band passing to upper edge of operculum; a second dark band from upper end of gill opening, bifurcating above pectoral fin, with branches to anterior and posterior dorsal-fin rays; 2 bands from eye, the upper branch to nape, the lower a broad curve or broken line to upper part of caudal peduncle . . . . . *Epinephelus morrhua*
- 60a.** Head and body pale brownish or greenish grey, with small, brownish black spots on dorsolateral part of body and sometimes on rear part of head and median fins; body depth 3.0 to 3.3 times in standard length . . . . . *Epinephelus epistictus*
- 60b.** Head and body with intricate pattern of irregular dark lines, spots, and blotches; body depth 2.6 to 3.0 times in standard length . . . . . → **61**
- 61a.** Five irregular dark brown bands (with age only the edges remain dark) passing downward and forward from dorsal surface of body, the first from nape to eye, the second band from middle dorsal-fin spines to upper end of gill opening, third and fourth bands from dorsal-fin rays, branching as they pass ventrally, the fifth band on caudal peduncle . . . . . *Epinephelus radiatus*
- 61b.** Dark markings on postorbital head and body forming a coarse broken reticulum, none passing downward and forward from dorsal surface of body . . . . . *Epinephelus tuamotuensis*

#### Key to the species of *Holanthias* occurring in the area

- 1a.** Dorsal-fin rays 13 or 14; lateral-line scales 30 to 39; third dorsal-fin spine elongate in adult males; rear part of body with small silvery spots . . . . . → **4**
- 1b.** Dorsal-fin rays 15 to 18; lateral-line scales 36 to 43; third dorsal-fin spine not elongate; no silvery spots on rear part of body . . . . . → **2**
- 2a.** Body depth 2.0 to 2.3 times in standard length; dorsal-fin rays 17 or 18; lateral-line scales 39 to 43; body pink with large yellow to dark brown blotches (most larger than eye) . . . . . *Holanthias borbonius*
- 2b.** Body depth 2.2 to 2.45 times in standard length; dorsal-fin rays 15 to 17; lateral-line scales 36 to 41; no large blotches on body . . . . . → **3**
- 3a.** Caudal-fin lobes 1.3 to 1.6 times in standard length; total gill rakers on first gill arch 42 to 47; scales on top of head extending in front of nostrils; dorsal fin lavender, with yellow submarginal line in spinous part and yellow filamentous soft rays . . . . . *Holanthias tapui*
- 3b.** Caudal-fin lobes 2.1 to 3.0 times in standard length; total gill rakers on first gill arch 39 to 41; no scales in front of nostrils; dorsal fin yellow, except for magenta spines and ray tips and purple spots in soft portion . . . . . *Holanthias chrysostictus*
- 4a.** Dorsal-fin rays 14; lateral-line scales 35 to 39; no black and white bars at base of caudal fin . . . . . *Holanthias unimaculatus*
- 4b.** Dorsal-fin rays 13; lateral-line scales 30 to 32; curved dark brown bar preceded by white bar at base of caudal fin . . . . . *Holanthias rhodopeplus*

#### Key to the species of *Hypoplectrodes* occurring in the area

- 1a.** Body with 6 narrow, dark brown vertical bars, the last 2 on caudal peduncle; 2 similar bands from eye to eye over the nape; dorsal-fin rays 17 to 19; anal-fin rays 7 . . . . . *Hypoplectrodes annulatus*
- 1b.** No narrow dark bars on body; dorsal-fin rays 17 to 21; anal-fin rays 7 to 9 . . . . . → **2**
- 2a.** Body covered with close-set dark brown blotches; lateral-line scales 38 to 42; dorsal-fin rays 17 to 19 . . . . . *Hypoplectrodes jamesoni*
- 2b.** Body pale pink to brownish red, with 5 broad dark saddle-blotches at base of dorsal fin; lateral-line scales 45 to 49; dorsal-fin rays 19 to 21 . . . . . *Hypoplectrodes maccullochi*

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

- 1a.** Dorsal fin continuous (though it may be deeply notched, all spines and soft rays are connected above their bases by membranes) . . . . . → **2**
- 1b.** Dorsal fin divided into separate spinous and soft-rayed fins . . . . . → **5**
- 2a.** First gill arch with 8 gill rakers on upper limb, and on lower limb 19 or 20 (only 2 rudiments); pectoral-fin rays 14; dorsal-fin rays 11 or 12; caudal fin truncate to slightly rounded; no scales on front of snout or on preorbital; head and body with 6 or 7 broad dark stripes; prominent dark ocellus in soft dorsal and anal fins . . . . . *Liopropoma swalesi*
- 2b.** First gill arch with 5 to 7 gill rakers on upper limb, and on lower limb 11 to 16 (including 9 to 12 rudiments); pectoral-fin rays 14 to 16; dorsal-fin rays 12 to 14; caudal fin slightly to deeply emarginate; head covered with scales; no dark stripes on body; no ocelli in fins . . . . . → **3**
- 3a.** Last dorsal-fin spine shorter than sixth and seventh spines; caudal fin with broadly rounded corners; anterior nostril tube not reaching lip; anal-fin rays 9; pectoral-fin rays 15 or 16 . . . . . *Liopropoma erythraeum*
- 3b.** Last (eighth) dorsal-fin spine longer than sixth and seventh spines; caudal fin corners pointed; anterior nostril tube overlaps upper lip; anal-fin rays 8; pectoral-fin rays 14 or 15 . . . . . → **4**
- 4a.** Body with scattered, small, dark brown spots (often semicircular); caudal concavity 4 or 5 times in head length; pectoral-fin rays 15 . . . . . *Liopropoma lunulatum*
- 4b.** No dark spots on body; caudal concavity 12 or 13 times in head length; pectoral-fin rays 14 . . . . . *Liopropoma incomptum*
- 5a.** Head and body with 4 to 8 dark brown longitudinal stripes . . . . . → **6**
- 5b.** No dark longitudinal stripes on head and body . . . . . → **7**
- 6a.** Body with 6 to 8 dark stripes; pectoral-fin rays 15 or 16 . . . . . *Liopropoma susumi*
- 6b.** Body with 4 or 5 dark stripes; pectoral-fin rays 14 or 15 . . . . . *Liopropoma collettei*
- 7a.** Pectoral-fin rays 15 or 16; no enlarged pore in front of rear nostrils; body reddish grey-brown anteriorly, dusky or brownish orange-red posteriorly, with faint brownish orange lines along scale rows . . . . . *Liopropoma pallidum*
- 7b.** Pectoral-fin rays 13 to 15; 1 or 2 enlarged pores in front of each rear nostril; colour not as above . . . . . → **8**
- 8a.** Two to 10 small pores in a group on each side of anterior interorbital space; scales rarely extend dorsally on snout more than half-way from rear nostrils to upper lip; body red to brownish red, often with faint lines following scale rows; yellow stripe from front of snout to eye, another between eyes, and 1 to 3 running posteriorly from eye . . . . . *Liopropoma mitratum*
- 8b.** A pair of large pores, 1 on each side of interorbital space on a vertical through anterior edge of pupil; scales dorsally on snout extend more than half-way from rear nostrils to upper lip . . . . . → **9**
- 9a.** Head, body, and fins immaculate yellow; pelvic fins short, 22% of standard length and 1.75 times in head length . . . . . *Liopropoma flavidum*
- 9b.** Colour not entirely yellow; pelvic fins 23 to 28% of standard length, 1.4 to 1.7 times in head length . . . . . → **10**
- 10a.** Body with 2 red bands separated by midlateral white stripe from head to caudal fin; body depth 3.5 to 3.7 times in standard length . . . . . *Liopropoma tonstrinum*
- 10b.** Body dusky yellow with red lines following scale rows; caudal peduncle reddish, with midlateral white stripe; body depth 3.0 to 3.5 times in standard length . . . . . *Liopropoma multilineatum*

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

- 1a.** Anal-fin rays with II spines and 9 soft rays; pectoral-fin rays 21 to 23; lateral-line scales 70 to 78; body elongate, its depth 4.2 to 5.3 times in standard length; some scales on head and dorsoanterior part of body with enlarged ctenii; body lavender-pink with a dark-edged orange-yellow stripe between lateral line and dorsal-fin base. . . . *Luzonichthys williamsi*
- 1b.** Anal fin with III spines and 7 soft rays; pectoral-fin rays 17 to 22; lateral-line scales 51 to 74; body depth 3.2 to 5.0 times in standard length; scale ctenii not enlarged; no dark-edged orange-yellow stripe on back . . . . . → 2
- 2a.** Lateral-line scales 65 to 74; pectoral-fin rays usually 21 or 22; body depth 4.2 to 5.0 times in standard length; upper third of body yellow or orange-yellow, the lower two-thirds lavender-pink . . . . . *Luzonichthys whitleyi*
- 2b.** Lateral-line scales 51 to 68; pectoral-fin rays 17 to 20; body depth 3.2 to 4.1 times in standard length; colour not as above . . . . . → 3
- 3a.** Pectoral-fin rays modally 20; lateral-line scales 59 to 68; caudal fin lunate, the caudal concavity 6.1 to 7.2 times in standard length; scales dorsally on snout not extending in front of nostrils . . . . . *Luzonichthys earlei*
- 3b.** Pectoral-fin rays modally 19; lateral-line scales 51 to 60; caudal-fin lobes elongate, the caudal concavity 4.0 to 5.6 times in standard length; scales dorsally on snout extending in front of anterior nostrils . . . . . → 4
- 4a.** Caudal peduncle depth 2.4 to 2.5 times in head length; snout length 3.7 to 4.1 in head length; pectoral-fin length 3.2 to 3.4 and pelvic-fin length 3.7 to 4.7 times in standard length; first gill arch with 7 to 10 gill rakers on upper limb, 20 to 22 on lower limb; no linear colour pattern . . . . . *Luzonichthys waitei*
- 4b.** Caudal peduncle depth 2.6 to 2.7 times in head length; snout length 4.2 to 4.4 in head length; pectoral-fin length 3.5 to 3.7 and pelvic-fin length 4.6 to 4.9 times in standard length; first gill arch with 7 gill rakers on upper limb, 10 on lower limb; orange and pale yellow stripes on front of body . . . . . *Luzonichthys taeniatus*

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

- 1a.** Some pectoral-fin rays branched; lateral line complete . . . . . → 2
- 1b.** No pectoral-fin rays branched; lateral line complete or incomplete . . . . . → 15
- 2a.** Head, including maxilla and chin, covered with scales . . . . . → 3
- 2b.** Head not completely scaly (most of snout, chin, and maxilla naked). . . . . → 4
- 3a.** Caudal fin rounded or truncate with rounded corners; no dorsal-fin rays elongated; no canine teeth in lower jaw; 10 to 12 gill rakers on lower limb of first gill arch; head and body nearly uniform light red . . . . . *Plectranthias japonicus*
- 3b.** Caudal fin slightly emarginate, the second upper ray usually elongate; second dorsal-fin ray elongate; 2 stout canine teeth at front of lower jaw and another pair on side of jaw; 14 to 17 gill rakers on lower limb of first gill arch; dark red bars on body and a small red spot on upper basal part of caudal fin . . . . . *Plectranthias kelloggi*
- 4a.** Body depth 3.4 times in standard length; eye diameter 2.9 times in head length; no canine teeth; preopercle smooth; colour mainly yellow . . . . . *Plectranthias megalophthalmus*
- 4b.** Body depth 2.2 to 3.2 times in standard length; eye diameter 3.0 to 4.8 in head length; canine teeth present; preopercle serrate and lower margin with 2 antrorse spines; colour (when known) not mainly yellow . . . . . → 5

- 5a.** Dorsal-fin rays 14 or 15; fourth or fifth dorsal-fin spines longest . . . . . → **6**
- 5b.** Dorsal-fin rays 16 to 18; third or fourth dorsal-fin spine longest . . . . . → **8**
- 6a.** Dorsal-fin rays 14; preopercle edge smooth; maxilla scaly . . . . . *Plectranthias lasti*
- 6b.** Dorsal-fin rays 15; preopercle edge serrate; maxilla scaly or naked . . . . . → **7**
- 7a.** Lateral-line scales 29; maxilla and lower jaw naked; pectoral-fin rays 14; body pink, with 3 orange-red bars below dorsal fin, a Y-shaped orange-red bar on nape, and 7 red spots on caudal peduncle. . . . . *Plectranthias rubrifasciatus*
- 7b.** Lateral-line scales 32 to 35; maxilla and rear part of lower jaw scaly; pectoral-fin rays 16; colour tan, becoming silvery white ventrally; first 4 lateral-line scales dusky . . . *Plectranthias robertsi*
- 8a.** Lateral-line scales 40 or 41; oblique rows of large scales on cheek between eye and corner of preopercle 8 or 9; body red, with no distinctive markings . . . . . *Plectranthias taylori*
- 8b.** Lateral-line scales 28 to 36; oblique rows of large cheek scales 5 to 7; colour (when known) not entirely red . . . . . → **9**
- 9a.** Fourth dorsal-fin spine longest, 2.9 times in head length; pectoral fins just reaching vertical at base of first anal-fin ray; body pale red with 2 rows of large dark red blotches dorsally; fins yellow . . . . . *Plectranthias whiteheadi*
- 9b.** Third dorsal-fin spine longest, 1.8 to 2.9 times in head length; pectoral fins reaching past vertical at base of first anal-fin ray; colour not as above . . . . . → **10**
- 10a.** Lateral-line scales 33 to 36; dorsal-fin rays 17 or 18 . . . . . → **11**
- 10b.** Lateral-line scales 28 to 31; dorsal-fin rays 16 . . . . . → **12**
- 11a.** Oblique rows of large cheek scales 5; body with 6 faint dark saddle blotches, first from nape to dorsal-fin origin, second below middle dorsal-fin spines, sixth at base of last 4 dorsal-fin rays; another 2 diffuse saddle blotches on caudal peduncle . . . *Plectranthias anthioides*
- 11b.** Cheek scale rows 7; body with 4 dark saddle-bars, first from nape to first 2 dorsal-fin spines, the fourth bar below twelfth to sixteenth dorsal-fin rays, and 2 more dark bars on rear half of peduncle . . . . . *Plectranthias jothyi*
- 12a.** Inner teeth on side of lower jaw about twice as long as teeth in outer rows; length of longest caudal-fin ray about 1.4 times in head length; body pale, with red bar from middle of dorsal fin to front of anal fin and another on caudal peduncle . . . . . *Plectranthias retrofasciatus*
- 12b.** Teeth on side of lower jaw equal in size; longest caudal-fin ray 1.6 to 1.9 times in head length . . . . . → **13**
- 13a.** Pectoral-fin rays 14; eye diameter 3.35 times in head length . . . . . *Plectranthias knappi*
- 13b.** Pectoral-fin rays 13; eye diameter 3.8 to 4.4 times in head length . . . . . → **14**
- 14a.** Body depth 2.7 to 2.8 times in standard length; third dorsal-fin spine and second anal-fin spine 2.0 times in head length; life colour unknown . . . . . *Plectranthias pallidus*
- 14b.** Body depth 2.6 to 2.65 times in standard length; third dorsal-fin spine 2.4 to 2.5 times in head length, second anal-fin spine 2.2 to 2.3 times in head length; body whitish, with large orange-red blotches suffused with yellow . . . . . *Plectranthias wheeleri*
- 15a.** Lateral-line usually incomplete, 12 to 22 scales in anterior series . . . . . → **16**
- 15b.** Lateral-line complete, 25 to 31 scales in series to caudal-fin base . . . . . → **19**

- 16a.** Third dorsal-fin spine elongate, with a pennant-like flap near tip; edge of preopercle smooth or with a few weak serrae; pectoral fins reaching past anal-fin base, the length 2.2 to 2.5 times in standard length; body pale, with large close-set red blotches . . . . . *Plectranthias inermis*
- 16b.** Fourth dorsal-fin spine longest; upper edge of preopercle strongly serrate and 2 antrorse spines on lower edge; pectoral-fin length 2.4 to 3.2 times in standard length; colour not as above . . . . . → **17**
- 17a.** Pectoral-fin rays 12 or 13; lateral-line scales 12 to 15; subopercle with 2 to 7 coarse serrae and interopercle with 1 to 8 serrae; body pale, with brown blotches forming irregular bars; dark brown spot at rear end of dorsal-fin base, another at base of upper caudal-fin rays, a third at base of last anal-fin ray, and a fourth spot between second and third spots; small dusky spots along bases of dorsal and anal fins. . . . . *Plectranthias longimanus*
- 17b.** Pectoral-fin rays 14 to 18; lateral-line scales 14 to 22; subopercle serrae 0 to 2 (1 of 46 *P. nanus* with 4), and none on interopercle (a single *P. nanus* with 1); colour not exactly as above (but that of *P. nanus* similar) . . . . . → **18**
- 18a.** Dorsal-fin rays 13 to 15; pectoral-fin rays 14 to 16; colour as in 17a except a vertical brown line on caudal-fin base separated by a pale zone from 2 dark spots on caudal peduncle . . . . . *Plectranthias nanus*
- 18b.** Dorsal-fin rays 16 or 17; pectoral-fin rays 16 to 18; body mottled orange anteriorly, becoming red and white posteriorly, with red spot at dorsal-fin origin and white spot at base of last soft ray . . . . . *Plectranthias winniensis*
- 19a.** Caudal fin emarginate, with 1 or more filamentous rays . . . . . → **20**
- 19b.** Caudal fin truncate or rounded, without elongated rays . . . . . → **21**
- 20a.** No antrorse spines on lower edge of preopercle; several rays of caudal-fin lobes filamentous; dorsal-fin rays 14 or 15, the second to fourth elongated; small dark blotches on nape, 5 or 6 at base of dorsal fin, and 2 dorsally on caudal peduncle; 2 dark blotches just below lateral line, 1 below last dorsal-fin spines and the other just behind head; 2 faint dark blotches on side of caudal peduncle (life colour unknown) . . . . . *Plectranthias foresti*
- 20b.** Two large antrorse spines on lower edge of preopercle; only the second branched caudal-fin ray elongated; dorsal-fin rays 15 to 17, none elongated; body pale, mottled with red and yellow . . . . . *Plectranthias sagamiensis*
- 21a.** Preopercle with 18 to 21 serrae; oblique rows of cheek scales 6; lower pectoral-fin rays not enlarged; caudal fin truncate; body rose, with blackish blotches dorsally; colour in alcohol essentially as in *P. foresti* . . . . . *Plectranthias megalepis*  
(1 specimen, 62 mm standard length, from Kai Islands, Indonesia)
- 21b.** Preopercle with 1 to 4 serrae; cheek scale rows 4 or 5; lower pectoral-fin rays enlarged; caudal fin rounded; dark bars on body and large black spot basally in anal fin . . . . . → **22**
- 22a.** Palatine teeth absent; pectoral-fin rays 12 or 13, the long lower rays slightly enlarged; dorsal-fin rays 16 to 18; lateral-line scales 25; interorbital area without scales; body pale, with 4 or 5 brown bars, first in front of dorsal fin, last at base of caudal fin; 4 prominent black spots as follows: covering rear third of spinous dorsal fin, below base of last 6 dorsal-fin rays, at base of last 4 anal-fin rays and midventrally on abdomen. . . . . *Plectranthias fourmanoiri*
- 22b.** Palatine teeth present; pectoral-fin rays 14, the lower 6 rays about twice as thick as shorter upper rays; dorsal-fin rays 15; lateral-line scales 29 or 30; top of head scaled anterior to nostrils; body pale, with 6 broad brown bars, the first on nape, the last on caudal-fin base, the ones between tending to form double bars (upper ends extending into basal part of dorsal fin where darker); large dark spot at base of anal fin, another at pectoral-fin base, and 2 dark spots, one above the other, on caudal-fin base . . . . . *Plectranthias cirrhitoides*

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

- 1a. Anterior rays of soft dorsal and anal fins elevated, the fin margin with a distinct lobe anteriorly; longest dorsal-fin rays 1.6 to 2.1 times in head length; pectoral-fin rays 14 to 16; adults with vertical blue lines anteriorly on side of body and head . . . *Plectropomus oligacanthus*
- 1b. Anterior rays of dorsal and anal fins not elevated to form a lobe; longest dorsal-fin rays 2.2 to 3.2 times in head length; pectoral-fin rays 15 to 18; adults not coloured as above . . . . . → 2
- 2a. Body uniform brown or brown marbled with olive-green, brownish orange, or white; juveniles brownish with pale horizontally elongate spots and streaks; pectoral-fin rays 16 to 18 . . . . . *Plectropomus punctatus*
- 2b. Body with numerous blue spots or with saddle-like black blotches and a few blue spots; pectoral-fin rays 15 to 18 . . . . . → 3
- 3a. Caudal fin truncate to slightly emarginate, the caudal concavity (difference between lengths of longest [upper] ray and shortest [middle] rays) 13 or more times in head length; interorbital area with small embedded scales; head, body (including ventral parts), and median fins covered with close-set, round to slightly oval, dark-edged blue spots; distance between spots subequal to spot diameters; 2 to 7 developed gill rakers on lower limb of first gill arch . . . . . *Plectropomus areolatus*
- 3b. Caudal fin emarginate, the caudal concavity 5 to 12 times in head length; no scales on interorbital area; blue spots round to oblong; 4 to 10 developed gill rakers on lower limb of first gill arch . . . . . → 4
- 4a. Pectoral-fin rays 16 to 18; caudal-fin length 1.5 to 1.8 times in head length; pectoral and pelvic fins 2.1 to 2.4 times in head length; head and body pale, with 4 or 5 saddle-like dark brown or black blotches and a few small blue spots, the fins yellow; or head and body brownish with numerous small blue spots and with or without faint dark saddle blotches . . . . . *Plectropomus laevis*
- 4b. Pectoral-fin rays 15 to 17; caudal fin length 1.3 to 1.5 times in head length; pectoral and pelvic fins 1.7 to 2.3 times in head length; no dark saddle-like blotches on body . . . . . → 5
- 5a. Head and body covered (except ventrally) with small blue spots, about size of nostrils, the distance between spots more than twice their diameter; median fins also covered with blue spots . . . . . *Plectropomus leopardus*
- 5b. Most blue spots on head and body more than twice size of nostrils; some spots on head and body elongate (except juveniles) . . . . . → 6
- 6a. Pelvic fins without blue spots; some spots on body of adults horizontally elongate; gill raker at angle of first gill arch longer than longest gill filaments; pelvic fins 1.7 to 2.1 times in head length; nostrils subequal . . . . . *Plectropomus maculatus*
- 6b. Pelvic fins with blue spots; some spots on body of adults vertically elongate; gill raker at angle of first arch shorter than longest gill filaments; pelvic fins 1.9 to 2.3 times in head length; rear nostrils of adults over 50 cm distinctly larger than anterior nostrils . . . . . *Plectropomus pessuliferus*

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

- 1a. Dorsal and anal fins nearly covered by small scales; auxiliary scales (small scales basally on large scales) present; third dorsal-fin spine longest, greatly elongated in males (longer than head length) . . . . . → 2
- 1b. Dorsal and anal fins naked or with only a few small scales basally; auxiliary scales present or absent; third dorsal-fin spine, if longest, not longer than head . . . . . → 3

- 2a.** Band from eye to middle of pectoral fins (band yellow in females, orange in males) as broad or broader than pupil and not distinctly edged in violet; outer edges of caudal-fin lobes broadly edged in blue or violet; first 2 soft rays and adjacent membranes of pelvic fins of males dark brownish red, in sharp contrast to pale rest of fins; spot on distal upper part of pectoral fins of males brownish red and smaller than eye . . . . . *Pseudanthias huchtii*
- 2b.** Orange band from eye to middle of pectoral fins usually narrower than pupil and broadly edged in violet; outer edge of caudal-fin lobes narrowly blue or violet; pelvic fins of males not divided into outer brownish red and inner pale zones; spot on distal upper part of pectoral fins of males pink to magenta, much larger than eye . . . . . *Pseudanthias squamipinnis*
- 3a.** Upper lip of males thickened at symphysis, forming a pointed fleshy protuberance (only slightly developed in *P. parvirostris*); patch of villiform teeth on vomer roundish or quadrangular; caudal fin of adults deeply forked . . . . . → **4**
- 3b.** Upper lip of males not thickened at symphysis; vomerine tooth patch chevron-shaped or subtriangular; caudal fin of adults slightly emarginate, slightly forked, or lunate . . . . . → **13**
- 4a.** Lateral-line scales 44 to 52; pectoral-fin rays 15 to 19; a series of prominent papillae along rear half of orbit . . . . . → **5**
- 4b.** Lateral-line scales 53 to 64; pectoral-fin rays 18 to 22; papillae along rear half of orbit present or absent . . . . . → **10**
- 5a.** Fourth to tenth dorsal-fin spines longest; 2 or 3 opercular spines . . . . . → **6**
- 5b.** Third dorsal-fin spine longest; 3 opercular spines . . . . . → **8**
- 6a.** Lateral-line scales 41 to 44; no auxiliary scales; 3 opercular spines; snout length 4.6 to 5.6 times in head length; caudal fin yellow, the upper and lower edges violet. . . . .  
. . . . . *Pseudanthias parvirostris*
- 6b.** Lateral-line scales 45 to 52; auxiliary scales present; 2 opercular spines; snout length 3.2 to 3.8 times in head length; caudal fin entirely violet or with yellow lobes . . . . . → **7**
- 7a.** Lateral-line scales 45 to 49; pectoral-fin rays 15 to 17; females with a bright yellow band dorsally on body, and caudal-fin lobes broadly yellow . . . . . *Pseudanthias tuka*
- 7b.** Lateral-line scales 48 to 52 (rarely 48); pectoral-fin rays 16 to 19; no yellow band on body, and no yellow on caudal fin . . . . . *Pseudanthias pascalus*
- 8a.** Opercular spines 2; dorsal-fin rays 15; body lavender-pink with 2 red stripes dorsally, the lower as a series of contiguous blotches, and irregular yellow stripes on head which break up into rows of small yellow spots on side of body . . . . . *Pseudanthias aurulentus*
- 8b.** Opercular spines 3; dorsal-fin rays 15 to 17; colour not as above . . . . . → **9**
- 9a.** Lateral-line scales 44 to 48; body depth 3.1 to 3.3 times in standard length; body pink with small yellow spots dorsally, shading ventrally to pale lavender; yellow stripe near base of dorsal fin . . . . . *Pseudanthias smithvanizi*
- 9b.** Lateral-line scales 49 to 52; body depth 3.4 to 4 times in standard length; body salmon pink, shading to pinkish white ventrally, with a row of red blotches dorsally (except anteriorly) and a broad red stripe along upper half of caudal peduncle . . . . . *Pseudanthias lori*
- 10a.** No greatly elongated dorsal-fin spines (second dorsal-fin spine of males may be slightly elongate); 2 opercular spines; rear half of orbit with several papillae; dorsal fin primarily red. . . . . *Pseudanthias dispar*
- 10b.** Second and/or third dorsal-fin spines of adults greatly elongate; 3 opercular spines; no orbital papillae; dorsal fin not primarily red . . . . . → **11**

- 11a.** Second anal-fin spine slightly longer than third; second and third dorsal-fin spines elongated in adults (the 2 spines nearly equal and with yellow membranous tips in males); maximum number of preopercular serrae 36 (serrae increasing with size, in general); maximum total length about 15 cm . . . . . *Pseudanthias bicolor*
- 11b.** Third anal-fin spine longer than second; second dorsal-fin spine elongated in adults (very long in males); maximum number of preopercular serrae 24; maximum total length about 9 cm. . . . . → 12
- 12a.** Lateral-line scales 54 to 58; circumpeduncular scales 29 to 32; 3 to 5 irregular rows of small teeth on palatines at widest place; pelvic fins of large males not reaching past anal-fin base; dorsal and caudal fins yellow; head and body yellow dorsally, purple below . . . . . *Pseudanthias bartlettorum*
- 12b.** Lateral-line scales 56 to 62; circumpeduncular scales 32 to 36; 2 irregular rows of teeth on palatines at widest place; pelvic fins of large males elongate, reaching past anal-fin base; females orange-yellow, becoming red posteriorly; males violet, with top of head and nape yellow . . . . . *Pseudanthias regalis*
- 13a.** Anal-fin rays 9; first gill arch with 7 or 8 gill rakers on upper limb, 21 to 24 on lower limb; pelvic fins elongated, in males reaching past base of anal fin; females lavender-pink with broad yellow band dorsally on head and body and narrow magenta band across rear of interorbital area; fins yellow with magenta margins; males with dorsal yellow area invaded by lavender-magenta stripes and spots, and red and blue areas in dorsal and caudal fins . . . . . *Pseudanthias ventralis*  
(Central Pacific to Great Barrier Reef; subspecifically different in Hawaii)
- 13b.** Anal-fin rays 7 or 8; first gill arch with 8 to 12 gill rakers on upper limb, 22 to 29 on lower limb; pelvic fins of males not reaching past anal-fin base; colour not as above . . . . . → 14
- 14a.** Pectoral-fin rays 15; dorsal-fin rays 14; lateral-line scales 35 (39 other side); pale brown in alcohol with diffuse midlateral silvery stripe . . . . . *Pseudanthias albofasciatus*  
(1 specimen, 75 mm standard length, taken off Hong Kong in 114 m; not yet recorded from the area)
- 14b.** Pectoral-fin rays 16 to 20; dorsal-fin rays 15 to 18 (except *P. hutomoi* with 13 to 15 and *P. xanthomaculatus* with 14); lateral-line scales 38 to 54 . . . . . → 15
- 15a.** First dorsal-fin spine as long as second spine; females lavender-pink, shading to yellow posteriorly; median fins yellow; caudal fin of males orange, with large yellow elliptical spot in basal half . . . . . *Pseudanthias pictilis*
- 15b.** First dorsal-fin spine distinctly shorter than second spine; caudal fin emarginate to lunate; colour not as above . . . . . → 16
- 16a.** Dorsal-fin rays 13 to 15 (modally 14) . . . . . → 17
- 16b.** Dorsal-fin rays 14 to 18 (none modally 14) . . . . . → 18
- 17a.** Eighth to thirteenth dorsal-fin rays with a single branch projecting as a short filament free of membrane; eye diameter 2.8 or more times in head length; body with 3 small white blotches dorsally, the first below last dorsal-fin spine; males develop a large irregular whitish area below rear dorsal-fin rays . . . . . *Pseudanthias hutomoi*
- 17b.** Posterior dorsal-fin rays without free filamentous tips; eye diameter 2.6 times in head length; body rose with yellow blotch dorsally below middle of dorsal fin and another behind eye . . . . . *Pseudanthias xanthomaculatus*  
(1 specimen, 45 mm standard length, taken off New Caledonia in 200 m)
- 18a.** Third dorsal-fin spine of adults elongate, with a membranous filament at tip, 1.2 to 1.5 times in head length (spine of males, including filament, as long or longer than head length); dorsal profile of head of males straight; females orange, with dusky yellow spot on scales of upper two-thirds of body, the snout and chin yellow, the caudal fin yellow except orange at base and violet on outer edges of lobes; males fuchsia with 2 broad orange stripes, the dorsal, anal, and pelvic fins with a broad deep orange submarginal band (on anal fin only anteriorly) . . . . . *Pseudanthias randalli*
- 18b.** Third dorsal-fin spine more than 1.5 times in head length; dorsal profile of head of males slightly to moderately convex; colour not as above . . . . . → 19

- 19a.** Lateral-line scales 38 to 43; dorsal-fin rays 15 or 16 . . . . . → **20**
- 19b.** Lateral-line scales 41 to 54; dorsal-fin rays 16 to 18 . . . . . → **21**
- 20a.** Body depth 3.2 times in standard length; pectoral-fin rays 18 or 19; first gill arch with 12 gill rakers on upper limb, 26 on lower limb; body orange-red anteriorly, shading to yellow posteriorly and on caudal fin; narrow rose band from snout to subopercle . . . *Pseudanthias cichlops*  
(1 specimen, 72 mm standard length, from Sumatra)
- 20b.** Body depth 2.6 to 2.9 times in standard length; pectoral-fin rays 17 or 18; first gill arch with 9 to 11 gill rakers on upper limb, 22 to 25 on lower limb; pinkish orange with a pale yellow stripe, edged in violet, from front of upper lip through lower part of eye to pectoral-fin base . . . . . *Pseudanthias lunulatus*
- 21a.** Third dorsal-fin spine clearly longest (at least in males and large females) . . . . . → **22**
- 21b.** Third dorsal-fin spine not elongated (may be equal to longest spine) . . . . . → **26**
- 22a.** Females with midlateral lavender-edged orange-red band from eye to caudal fin, body below band with alternating yellow and lavender-pink lines along scale rows, fins yellow; males yellowish, the front third of body reddish; soft dorsal, anal, and caudal fins with blue margin; lavender-edged red band from eye to pectoral-fin base; lateral-line scales 41 to 45; maximum size about 21 cm . . . . . *Pseudanthias fasciatus*
- 22b.** Colour not as above; lateral-line scales 42 to 50; maximum size 15 cm . . . . . → **23**
- 23a.** Lateral-line scales 42 to 45; pectoral-fin rays 17; lower limb of first gill arch with 24 or 25 gill rakers; body lavender-pink, the scale centres yellow; fins pale lavender, suffused with yellow . . . . . *Pseudanthias engelhardi*
- 23b.** Lateral-line scales 44 to 50; pectoral-fin rays 17 to 19; lower limb of first gill arch with 24 to 29 gill rakers; body and/or fins with distinctive colour pattern, at least in males . . . . . → **24**
- 24a.** Pelvic fins not reaching anal fin; dorsal-fin rays 15 to 17; lateral-line scales 44 to 48; lower limb of first gill arch with 24 to 27 gill rakers; female pale orange-red, the scale centres yellow to dusky yellow, the fins pale yellow; male with yellow-orange lines or rows of spots along dorsal scale rows of body, red spot in rear part of spinous dorsal fin, and broad red border on caudal fin . . . . . *Pseudanthias luzonensis*
- 24b.** Pelvic fins reaching to or beyond anal-fin origin; dorsal-fin rays 16 to 18; lateral-line scales 45 to 50; lower limb of first gill arch with 25 to 29 gill rakers; colour not as above . . . . . → **25**
- 25a.** Body of females yellow, the scale edges magenta, with 2 magenta lines from eye to pectoral-fin base thence to lower caudal peduncle; males orange-magenta with a large, nearly square, lavender blotch on side of body preceded by a broad orange band curving dorsally to nape . . . . . *Pseudanthias pleurotaenia*
- 25b.** Coloration of females similar as above, but lighter yellow, and ventral part of body pale lavender; males also similarly coloured, but no lavender blotch on body . . . . . *Pseudanthias sheni*
- 26a.** Lateral-line scales 50 to 54; female brownish yellow, shading to pale lavender ventrally, the scale centres pink, the dorsal-fin margin broadly lavender-pink; male lavender-orange, with narrow orange bar below eighth dorsal-fin spine between pectoral fins and lateral line . . . . . *Pseudanthias mooreanus*
- 26b.** Lateral-line scales 43 to 50; colour not as above . . . . . → **27**
- 27a.** Female with emarginate caudal fin, the caudal concavity 4 to 6 times in head length, the rear margin red; caudal fin of male convex to truncate, pink, shading distally to red, the corners lavender; male with red spot between seventh and tenth dorsal-fin spines; maximum length 19 cm . . . . . *Pseudanthias hypselosoma*
- 27b.** Caudal fin emarginate to lunate, the caudal concavity 1 to 5 times in head length; colour not as above; maximum length about 16 cm . . . . . → **28**

- 28a. Dorsal-fin rays 15 or 16; caudal fin emarginate, the caudal concavity 2.3 to 4.6 times in head length; body depth 2.4 to 2.9 times in standard length; female pink, the scale centres yellow, forming irregular oblique lines on upper rear part of body; median fins yellow; male lavender-pink, the scales edged with orange (especially dorsally), the body ventrally with faint yellow stripes; caudal fin with irregular bars of orange-yellow and violet, the corners violet-blue with yellow tips; dorsal fin with a dark red spot on fourth and fifth interspinous membranes . . . . . *Pseudanthias bimaculatus*
- 28b. Dorsal-fin rays 16 to 18; caudal fin emarginate to lunate, the concavity 0.8 to 2.6 times in head length; body depth 2.7 to 3.2 times in standard length; colour not as above . . . . . → 29
- 29a. Last dorsal-fin spine usually longest (but fourth to last subequal); lateral-line scales 46 to 52; scales dusky yellow and lavender-pink; pale lavender line from below eye to lower pectoral-fin base; head and chest below this line whitish to lavender; first 4 dorsal-fin membranes fuchsia with broad oblique orange band (more evident in males); males with orange-red bar below lateral line and under ninth dorsal-fin spine; caudal-fin tips of females bright red; caudal fin of male largely red, the filamentous tips yellow and lavender . . . . . *Pseudanthias cooperi*
- 29b. Fourth dorsal-fin spine longest (but adjacent spines nearly as long); lateral-line scales 42 to 49; colour not as above . . . . . → 30
- 30a. No auxiliary scales; dorsal-fin rays 16; lateral-line scales 42 to 47; female pink with yellow spot or line on each scale, shading ventrally to whitish; rear edge of caudal fin narrowly red, this colour broadening onto pointed lobe tips; male with a lavender-edged red bar from below last 4 dorsal-fin spines to beneath pectoral fins, the body anterior to bar, lavender-pink, posterior to bar, yellow shading dorsally to lavender-pink; caudal fin yellow, upper and lower edges lavender, the lobe tips red . . . . . *Pseudanthias rubrizonatus*
- 30b. Auxiliary scales present on body; dorsal-fin rays 17 or 18; lateral-line scales 44 to 49; female olive-grey, with irregular horizontal rows of small orange-yellow spots laterally and ventrally; front of snout and chin reddish orange; dorsal fin orange-red distally; caudal fin yellow; male dark olive-grey with 3 orange squares in a row on front half of body, followed by horizontal series of small orange spots; caudal fin yellow with orange lobes edged with blue distally; dark red (almost black) spot distally in upper part of pectoral fins . . . . . *Pseudanthias olivaceus*

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

- 1a. Dermal tentacle on upper surface of eye; rows of red dots extending posteriorly from eye and forming a circle opercular ocellus . . . . . *Pseudogramma australis*
- 1b. No tentacle on top of eye; no rows of red dots behind eye . . . . . → 2
- 2a. Pectoral-fin rays 13, the middle rays unbranched; caudal-peduncle length (from anal-fin base to caudal-fin base) 6.2 to 6.9 times in head length; first gill arch with 10 gill rakers on lower limb . . . . . → 3
- 2b. Pectoral-fin rays 14 to 18, the rays branched except upper and lowermost rays of some specimens; caudal-peduncle length 4.3 to 5.5 times in head length; first gill arch with 10 to 13 gill rakers on lower limb . . . . . → 4
- 3a. Lateral scale series 43; pectoral-fin length 3.3 times in standard length; anal-fin rays 17; body red, with pale pink blotches . . . . . *Pseudogramma erythreum*
- 3b. Lateral scale series 52 or 53; pectoral-fin length 2.6 to 2.9 times in standard length; anal-fin rays 18 or 19; body yellow, with a faint brown reticulum . . . . . *Pseudogramma pectoralis*
- 4a. Dark brown spot on opercle; lateral-line scales of adults 31 to 41; rear ends of dorsal and anal fins not reaching past vertical at caudal-fin base; pectoral fins not reaching vertical at anal-fin origin . . . . . *Pseudogramma polyacantha*
- 4b. No dark spot on opercle; lateral-line scales 21 to 26; rear ends of dorsal and anal fins project well past vertical at caudal-fin base; pectoral fins reaching past anal-fin origin . . . . . *Pseudogramma astignum*

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

- 1a. Dorsal fin with X spines and 14 soft rays; body depth 2.2 to 2.3 times and pectoral fins 2.7 to 2.9 times in standard length . . . . . *Sacura parva*  
(2 specimens, 17 and 67 mm standard length, taken in Timor Sea in 130 m)
- 1b. Dorsal fin with X spines and 15 soft rays; body depth 2.0 to 2.1 times and pectoral fins 2.3 to 2.5 times in standard length . . . . . *Sacura speciosa*  
(1 specimen, 95 mm, off Sulawesi in 150 m)

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

- 1a. Bony interorbital space wide, 3.4 to 3.8 times in head length; lower limb of first gill arch with 19 to 21 gill rakers; large black spot at rear of anal fin . . . . . *Selenanthias analis*
- 1b. Interorbital width 4.3 to 5.0 times in head length; lower limb of first gill arch with 22 to 24 gill rakers; no black spot in anal fin . . . . . → 2
- 2a. Body depth about 2.7 times in standard length; interorbital width 4.7 to 5.0 times in head length; oblique rows of large cheek scales 7; body rose, with dark orange spot at base of last 4 dorsal-fin spines; head orange, with oblique rose band across cheek . . . *Selenanthias barroi*
- 2b. Body depth 2.3 to 2.6 times in standard length; interorbital width 4.3 to 4.5 times in head length; cheek scale rows 6; life colour unknown . . . . . *Selenanthias myersi*

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

- 1a. Rear margin of caudal fin with a black submarginal line and narrow white edge; dorsal, anal, and pectoral fins without a distinct yellow posterior border; 13 to 16 gill rakers on lower limb of first gill arch; pelvic fins usually not reaching anus; juveniles without a dark stripe on body dorsally and no dark spot at base of upper caudal-fin rays . . . *Variola albimarginata*
- 1b. Caudal, dorsal, anal, and pectoral fins with a broad yellow rear margin; 15 to 18 gill rakers on lower limb of first gill arch; pelvic fins reach beyond anus; juveniles with irregular dark brown stripe along dorsal part of body and a dark spot at base of upper caudal-fin rays . . . . . *Variola louti*

**List of species occurring in the area**

The symbol ← is given when species accounts are included. A question mark indicates that presence in the area is uncertain.

**Subfamily ANTHIINAE**

- Acanthistius ocellatus* (Günther, 1859)
- Caprodon schlegelii* (Günther, 1859)<sup>1/</sup>
- Dactylanthias haplodactylus* (Bleeker, 1858)<sup>2/</sup>
- Holanthias borbonius* (Valenciennes, 1828)
- Holanthias chrysostictus* (Günther, 1871)  
(= *Holanthias katayamai* Randall, Maugé, and Plessis, 1979)
- Holanthias rhodopeplus* (Günther, 1871)
- Holanthias tapui* Randall, Maugé, and Plessis, 1979
- Holanthias unimaculatus* (Tanaka, 1917)
- Hypoplectrodes annulatus* (Günther, 1859)
- Hypoplectrodes jamesoni* (Ogilby, 1908)
- Hypoplectrodes maccullochi* Whitley, 1929
- Luzonichthys earlei* Randall, 1981
- Luzonichthys taeniatus* Randall and McCosker, 1992
- Luzonichthys waitei* (Fowler, 1931)
- Luzonichthys whitleyi* (Smith, 1955)
- Luzonichthys williamsi* Randall and McCosker, 1992

1/ Not yet known from the area, but should be expected; occurs in New South Wales at 31°51'S, Western Australia at 24°25'S, Taiwan Province of China, and Hawaii.

2/ Known from a single specimen (17 cm standard length) from Ambon, Indonesia.

- Plectranthias anthioides* (Günther, 1871)  
 (= *Plectranthias kami* Randall, 1980)  
*Plectranthias cirrhitooides* Randall, 1980  
*Plectranthias foresti* Fourmanoir, 1977  
*Plectranthias fourmanoiri* Randall, 1980  
*Plectranthias inermis* Randall, 1980  
*Plectranthias japonicus* (Steindachner, 1884)  
*Plectranthias jothyi* Randall, 1996  
*Plectranthias kelloggi* (Jordan and Evermann, 1903)  
*Plectranthias knappi* Randall, 1996  
*Plectranthias lasti* Randall and Hoese, 1995  
*Plectranthias longimanus* (Weber, 1913)  
*Plectranthias megalepis* (Günther, 1880)  
*Plectranthias megalophthalmus* (Fourmanoir and Randall, 1979)  
*Plectranthias nanus* Randall, 1980  
*Plectranthias pallidus* Randall and Hoese, 1980  
*Plectranthias retrofasciatus* Randall and Fourmanoir, 1979  
*Plectranthias robertsi* Randall and Hoese, 1980  
*Plectranthias rubrifasciatus* Randall and Fourmanoir, 1979  
*Plectranthias sagamiensis* (Katayama, 1963)  
*Plectranthias taylori* Randall, 1980  
*Plectranthias wheeleri* Randall, 1980  
*Plectranthias whiteheadi* Randall, 1980  
 (= *Plectranthias chungchowensis* Shen and Lin, 1984)  
*Plectranthias winniensis* (Tyler, 1966)
- ? *Pseudanthias albofasciatus* (Fowler and Bean, 1930)  
*Pseudanthias aurulentus* Randall and McCosker, 1981  
*Pseudanthias bartlettorum* Randall and Lubbock, 1981  
*Pseudanthias bicolor* Randall, 1979  
*Pseudanthias bimaculatus* (Smith, 1955)  
*Pseudanthias cichlops* (Bleeker, 1853)  
*Pseudanthias cooperi* (Regan, 1902)  
 (= *Anthias kashiwae* Tanaka, 1918)  
*Pseudanthias dispar* (Herre, 1955)  
*Pseudanthias fasciatus* (Kamohara, 1954)  
 (= *Anthias rubrolineatus* Fourmanoir and Rivaton, 1979)  
*Pseudanthias huchtii* (Bleeker, 1857)  
*Pseudanthias hutomoi* (Allen and Burhanuddin, 1976)  
*Pseudanthias hypselosoma* Bleeker, 1878  
 (= *Anthias truncatus* Katayama and Masuda, 1983)  
*Pseudanthias lori* Randall and Lubbock, 1981  
*Pseudanthias luzonensis* (Katayama and Masuda, 1983)  
*Pseudanthias mooreanus* (Herre, 1935)  
*Pseudanthias olivaceus* Randall and McCosker, 1981  
*Pseudanthias parvirostris* Randall and Lubbock, 1981  
*Pseudanthias pascalus* (Jordan and Tanaka, 1927)  
*Pseudanthias pictilis* (Randall and Allen, 1978)  
*Pseudanthias pleurotaenia* (Bleeker, 1857)  
*Pseudanthias randalli* (Lubbock and Allen, 1978)  
*Pseudanthias regalis* Randall and Lubbock, 1981  
*Pseudanthias rubrizonatus* Randall, 1983  
*Pseudanthias sheni* Randall and Allen, 1989  
*Pseudanthias smithvanizi* Randall and Lubbock, 1981  
*Pseudanthias squamipinnis* (Peters, 1855)  
*Pseudanthias tuka* (Herre and Montalban, 1927)  
*Pseudanthias ventralis* Randall, 1979  
*Pseudanthias xanthomaculatus* (Fourmanoir and Rivaton, 1979)
- Rabaulichthys altipinnis* Allen, 1984

- Sacura parva* Heemstra and Randall, 1979  
*Sacura speciosa* Heemstra and Randall, 1979  
*Selenanthias analis* Tanaka, 1918  
 (= *Plectranthias maculatus* Fourmanoir, 1982)  
*Selenanthias barroii* (Fourmanoir, 1982)  
*Selenanthias myersi* Randall, 1995  
*Serranocirrhitis latus* Watanabe, 1949  
*Tosana niwae* Smith and Pope, 1906  
*Tosanoides flavofasciatus* Katayama and Masuda, 1980

## Subfamily EPINEPHELINAE

### Tribe EPINEPHELINI

- *Aethaloperca rogae* (Forsskål, 1775)  
 ➤ *Anyperodon leucogrammicus* (Valenciennes, 1828)  
 ➤ *Cephalopholis aitha* Randall and Heemstra, 1991  
 ➤ *Cephalopholis argus* Bloch and Schneider, 1801  
 ➤ *Cephalopholis aurantia* (Valenciennes, 1828)  
 ➤ *Cephalopholis boenak* (Bloch, 1790)  
 ➤ *Cephalopholis cyanostigma* (Valenciennes, 1828)  
 ➤ *Cephalopholis formosa* (Shaw and Nodder, 1812)  
 ➤ *Cephalopholis igarashiensis* Katayama, 1957  
 ➤ *Cephalopholis leopardus* (Lacepède, 1801)  
 ➤ *Cephalopholis microprion* (Bleeker, 1852)  
 ➤ *Cephalopholis miniata* (Forsskål, 1775)  
 ➤ *Cephalopholis polleni* (Bleeker, 1868)  
 ➤ *Cephalopholis sexmaculata* (Rüppell, 1830)  
 ➤ *Cephalopholis sonnerati* (Valenciennes, 1828)  
 ➤ *Cephalopholis spiloparaea* (Valenciennes, 1828)  
 ➤ *Cephalopholis urodeta* (Bloch and Schneider, 1801)  
 ➤ *Cromileptes altivelis* (Valenciennes, 1828)  
 ➤ ? *Epinephelus akaara* (Temminck and Schlegel, 1842)  
 ➤ *Epinephelus amblycephalus* (Bleeker, 1857)  
 ➤ *Epinephelus areolatus* (Forsskål, 1775)  
 ➤ *Epinephelus awoara* (Temminck and Schlegel, 1842)  
 ➤ *Epinephelus bilobatus* Randall and Allen, 1987  
 ➤ *Epinephelus bleekeri* (Vaillant, 1877)  
 ➤ *Epinephelus bontoides* (Bleeker, 1855)  
 ➤ *Epinephelus bruneus* Bloch, 1793  
 ➤ *Epinephelus caeruleopunctatus* (Bloch, 1790)  
 ➤ *Epinephelus chlorostigma* (Valenciennes, 1828)  
 ➤ *Epinephelus coioides* (Hamilton, 1822)  
 ➤ *Epinephelus corallicola* (Valenciennes, 1828)  
 ➤ *Epinephelus cyanopodus* (Richardson, 1846)  
 ➤ *Epinephelus daemeli* (Günther, 1876)  
 ➤ *Epinephelus darwinensis* Randall and Heemstra, 1991  
 ➤ *Epinephelus epistictus* (Temminck and Schlegel, 1842)  
 ➤ *Epinephelus ergastularius* Whitley, 1930  
 ➤ *Epinephelus erythrurus* (Valenciennes, 1828)  
 ➤ *Epinephelus fasciatomaculosus* (Peters, 1866)  
 ➤ *Epinephelus fasciatus* (Forsskål, 1775)  
 ➤ *Epinephelus faveatus* (Valenciennes, 1828)  
 ➤ *Epinephelus fuscoguttatus* (Forsskål, 1775)  
 ➤ *Epinephelus heniochus* Fowler, 1904  
 ➤ *Epinephelus hexagonatus* (Forster, 1801)  
 ➤ *Epinephelus howlandi* (Günther, 1873)

- ✦ *Epinephelus irroratus* (Forster, 1901)
- ✦ *Epinephelus lanceolatus* (Bloch, 1790)
- ✦ *Epinephelus latifasciatus* (Temminck and Schlegel, 1842)
- ✦ *Epinephelus longispinis* (Kner, 1864)
- ✦ *Epinephelus macrospilos* (Bleeker, 1855)
- ✦ *Epinephelus maculatus* (Bloch, 1790)
- ✦ *Epinephelus magniscuttis* Postel, Fourmanoir, and Guézé, 1963
- ✦ *Epinephelus malabaricus* (Bloch and Schneider, 1801)
- ✦ *Epinephelus melanostigma* Schultz, 1953
- ✦ *Epinephelus merra* Bloch, 1793
- ✦ *Epinephelus miliaris* (Valenciennes, 1830)
- ✦ *Epinephelus morrhua* (Valenciennes, 1833)
- ✦ *Epinephelus multinotatus* (Peters, 1876)
- ✦ *Epinephelus octofasciatus* Griffin, 1926
- ✦ *Epinephelus ongus* (Bloch, 1790)
- ✦ *Epinephelus perplexus* Randall, Last, and Hoese, 1991
- ✦ *Epinephelus poecilonotus* (Temminck and Schlegel, 1842)
- ✦ *Epinephelus polypekadion* (Bleeker, 1849)
- ✦ *Epinephelus polystigma* (Bleeker, 1853)
- ✦ *Epinephelus quoyanus* (Valenciennes, 1830)
- ✦ *Epinephelus radiatus* (Day, 1867)
- ✦ *Epinephelus retouti* Bleeker, 1868
- ✦ *Epinephelus rivulatus* (Valenciennes, 1830)
- ✦ *Epinephelus sexfasciatus* (Valenciennes, 1828)
- ✦ *Epinephelus socialis* (Günther, 1873)
- ✦ *Epinephelus spilotoceps* Schlultz, 1953
- ✦ *Epinephelus stictus* Randall and Allen, 1967
- ✦ *Epinephelus tauvina* (Forsskål, 1775)
- ✦ *Epinephelus timorensis* Randall and Allen, 1987
- ? *Epinephelus trimaculatus* (Valenciennes, 1828)
- ✦ *Epinephelus trophis* Randall and Allen, 1987
- ✦ *Epinephelus tuamotuensis* Fourmanoir, 1971
- ✦ *Epinephelus tukula* Morgans, 1959
- ✦ *Epinephelus undulatostratus* (Peters, 1867)
- ✦ *Epinephelus undulosus* (Quoy and Gaimard, 1824)
- ✦ *Gracila albomarginata* (Fowler and Bean, 1930)
- ✦ *Plectropomus areolatus* (Rüppell, 1830)
- ✦ *Plectropomus laevis* (Lacepède, 1801)
- ✦ *Plectropomus leopardus* (Lacepède, 1802)
- ✦ *Plectropomus maculatus* (Bloch, 1790)
- ✦ *Plectropomus oligacanthus* Bleeker, 1854
- ✦ *Plectropomus pessuliferus* Fowler, 1904
- ✦ *Saloptia powelli* Smith, 1964
- ✦ *Triso dermopterus* (Temminck and Schlegel, 1842)
- ✦ *Variola albimarginata* Baissac, 1952
- ✦ *Variola louti* (Forsskål, 1775)

#### Tribe NIPHONINI

- ✦ *Nippon spinosus* Cuvier, 1828

#### Tribe LIOPROPOMATINI

- Liopropoma collettei* Randall and Taylor, 1988
- Liopropoma erythraeum* Randall and Taylor, 1988
- Liopropoma flavidum* Randall and Taylor, 1988
- Liopropoma incomptum* Randall and Taylor, 1988
- Liopropoma lunulatum* (Guichenot, 1862)
- Liopropoma mitratum* Lubbock and Randall, 1978
- Liopropoma multilineatum* Randall and Taylor, 1988

*Liopropoma pallidum* (Fowler, 1938)  
*Liopropoma susumi* (Jordan and Seale, 1906)  
*Liopropoma swalesi* Fowler and Bean, 1930  
*Liopropoma tonstrinum* Randall and Taylor, 1988

*Rainfordia opercularis* McCulloch, 1923

#### Tribe DIPLOPRIONI

*Aulacocephalus temmincki* Bleeker, 1857

*Belonoperca chabanaudi* Fowler and Bean, 1930

*Diploprion bifasciatum* Kuhl and van Hasselt, 1828

#### Tribe GRAMMISTINI

*Aporops bilinearis* Schultz, 1943

*Grammistes sexlineatus* (Thunberg, 1792)

*Grammistops ocellatus* Schultz, 1953

*Pogonoperca punctata* Valenciennes, 1830)

*Pseudogramma astigmum* Randall and Baldwin, 1997

*Pseudogramma australis australis* Randall and Baldwin, 1997

*Pseudogramma erythreum* Randall and Baldwin, 1997

*Pseudogramma pectoralis* Randall and Baldwin, 1997

*Pseudogramma polyacantha* (Bleeker, 1856)

*Suttonia lineata* Gosline, 1960

#### Subfamily SERRANINAE

*Chelidoperca hirundinacea* (Valenciennes, 1831)

*Chelidoperca margaritifera* Weber, 1913

*Chelidoperca pleurospilos* (Günther, 1860)

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