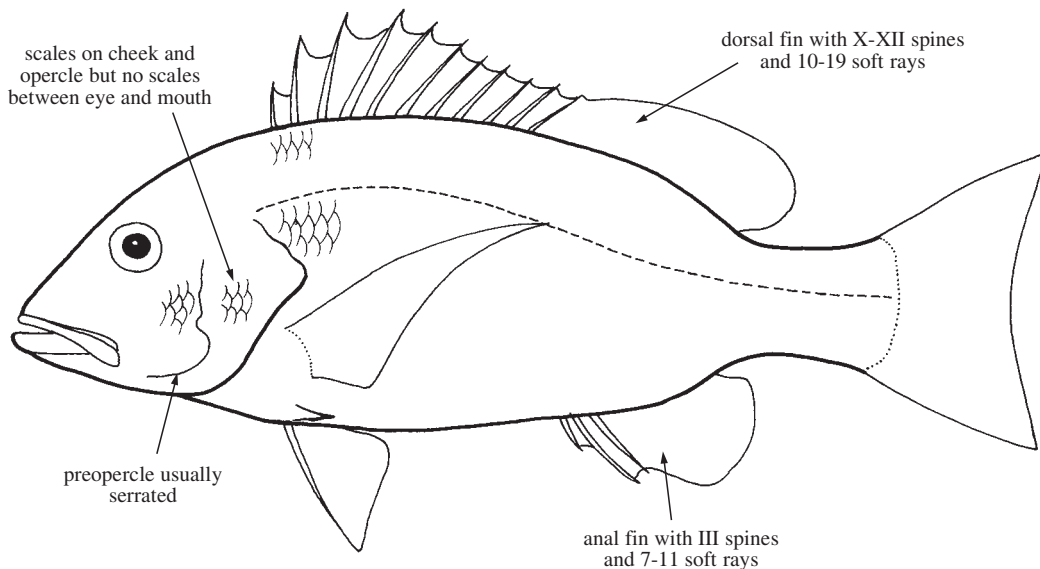


LUTJANIDAE

Snappers (jobfishes)

by W.D. Anderson, Jr. and G.R. Allen

Diagnostic characters: Typical perch-like fishes, oblong in shape, moderately compressed (size to 160 cm). Eye usually moderate. Premaxillae usually moderately protrusible (fixed in *Aphareus* and *Randallichthys*). Two nostrils on each side of snout. Mouth terminal and fairly large. **Maxilla slipping for most or all of its length under lacrimal when mouth closed.** Supramaxilla absent. Jaws usually with more or less distinct canines (canines absent in *Aphareus*, *Parapristipomoides*, and *Pinjalo*). Vomer and palatines usually with teeth. Pterygoids usually toothless. Cheek and operculum scaly; maxilla with or without scales; snout, lacrimal, and lower jaw naked. Opercular spines 2. Branchiostegal rays 7. Dorsal fin single, spinous portion sometimes deeply incised posteriorly where it joins soft portion. Caudal fin truncate to deeply forked. Dorsal fin with X to XII spines and 10 to 19 soft rays. Anal fin with III spines and 7 to 11 soft rays. Principal caudal-fin rays 17 (9 in upper lobe, 8 in lower lobe of fin). Pectoral-fin rays 14 to 19. Pelvic fins with I spine and 5 soft rays. Scales moderate to rather small, ctenoid. Lateral line complete. Pelvic axillary process usually well developed. Vertebrae 24 (10+14). **Colour:** highly variable; mainly from red through yellow to blue; often with blotches, lines, or other patterns.

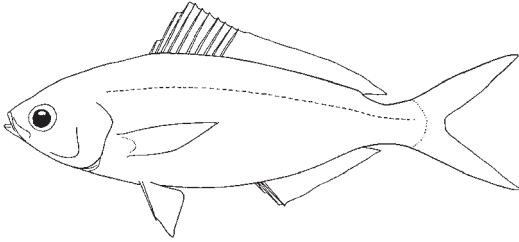


Habitat, biology, and fisheries: Found worldwide in warm seas; juveniles of several species of *Lutjanus* enter estuaries and the lower reaches of fresh-water streams; a few Indo-Pacific species of *Lutjanus* are inhabitants of fresh waters. Mostly bottom-associated fishes, occurring from shallow inshore areas to depths of about 500 m, mainly over reefs or rocky outcrops. Active predators, mostly nocturnal, feeding on fishes, crustaceans (especially crabs, shrimps, stomatopods, lobsters), molluscs (gastropods, cephalopods), and pelagic urochordates; plankton is particularly important in the diets of those species with reduced dentition and numerous well-developed gill rakers. Gonochoristic (sexes separate), reaching sexual maturity at about 40 to 50% of maximum length, with big females producing large numbers of eggs. Populations in continental waters have extended spawning throughout the summer, whereas those occurring around islands spawn throughout the year with peaks in spring and fall; lutjanids are batch spawners, with individual females usually spawning several times in a reproductive season. Spawning is apparently at night, on some occasions coinciding with spring tides. Courtship terminates in a spiral swim upward, with gametes released just below the surface. Eggs and larvae identified as lutjanid are pelagic; the larvae avoid surface waters during the day, but display a more even vertical distribution at night. Long-lived, slow-growing fishes with relatively low rates of natural mortality and with considerable vulnerability to overfishing. Snappers are important to artisanal fisheries, but seldom the prime interest of major commercial fishing activities; many are fine food fishes, frequently found in markets, although some species are ciguatoxic in certain areas. They are caught with handlines, traps, a variety of nets, and trawls. The species that reach large sizes are important recreational fishes in some areas, including the waters off the eastern coast of Australia. For 1995, the FAO Yearbook of Fishery Statistics reports a total catch of around 93 200 t of Lutjanidae from the Western Central Pacific.

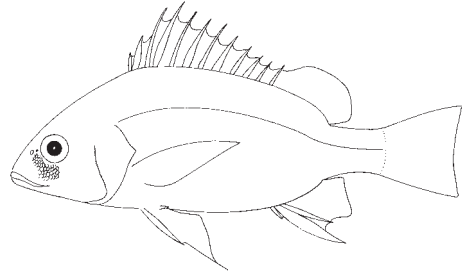
Similar families occurring in the area

Caesionidae: mouth small (fairly large in Lutjanidae); premaxillae extremely protrusible (premaxillae moderately protrusible or fixed in Lutjanidae); teeth small or minute (jaws usually with distinct canines in Lutjanidae); teeth absent on premaxilla, vomer, and palatines in some species (teeth typically well developed on those bones in Lutjanidae); caudal fin deeply forked, with pointed lobes (caudal-fin shape variable in Lutjanidae -frequently truncate, emarginate, or lunate).

Haemulidae: scales present on snout and lacrimal, those on lacrimal often embedded (snout and lacrimal naked in Lutjanidae); preoperculomandibular canal of lateralis system opening under chin through median longitudinal groove or enlarged pores or both (no chin pores in Lutjanidae); usually no teeth on vomer, no teeth on palatines (teeth usually present on those bones in Lutjanidae); vertebrae 26 or 27 (24 in Lutjanidae).



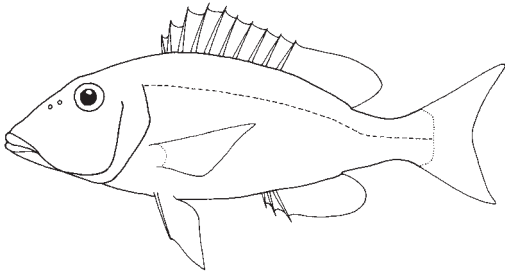
Caesionidae



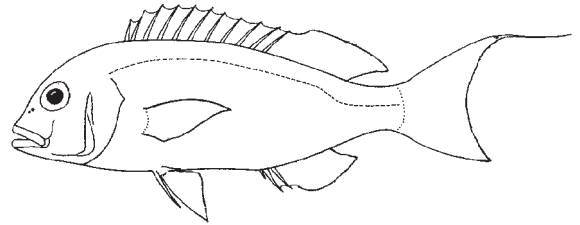
Haemulidae

Lethrinidae: gill membranes broadly united to each other (not united in Lutjanidae); preopercular margin typically smooth (usually serrate in Lutjanidae); branchiostegal rays 6 (7 in Lutjanidae); soft rays in dorsal fin 9 or 10 (usually 11 or more in Lutjanidae); no teeth on vomer or palatines (teeth usually present on those bones in Lutjanidae); most species lack scales on cheek (cheek scales present in Lutjanidae); lips frequently fleshy (usually not fleshy in Lutjanidae).

Nemipteridae: preopercular margin typically smooth (usually serrate in Lutjanidae); soft rays in dorsal fin 9 (almost always 10 or more in Lutjanidae); soft rays in anal fin usually 7, rarely 8 (almost always 8 or more in Lutjanidae); branchiostegal rays 6 (7 in Lutjanidae); no teeth on vomer or palatines (teeth usually present on those bones in Lutjanidae).

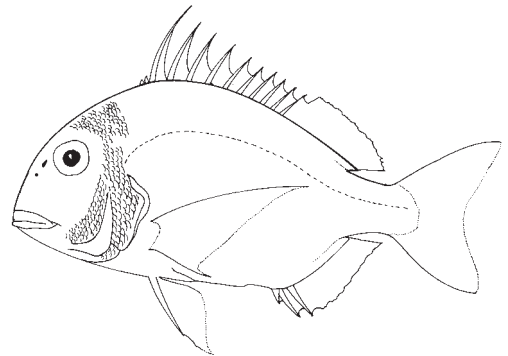


Lethrinidae



Nemipteridae

Sparidae: preopercular margin typically smooth (usually serrate in Lutjanidae); branchiostegal rays 6 (7 in Lutjanidae); teeth in jaws variable-conical, incisiform, or molariform (no incisiform teeth in Lutjanidae, molariform teeth found in jaws of only a single eastern Pacific species of Lutjanidae, submolariform teeth in jaws of the western Pacific lutjanid *Symphoricthys spilurus*).



Sparidae

Key to the genera of Lutjanidae occurring in the area

Notes: species names are given when a genus includes a single species. Counts of gill rakers include rudiments, if present.

- 1a. Dorsal and anal fins without scales; dorsal fin with X spines and 10 or 11 soft rays → 2
- 1b. Soft dorsal and anal fins with scales or sheathed with scales basally; dorsal fin with X to XII spines and 11 to 19 soft rays → 10
- 2a. Maxilla with scales → 3
- 2b. Maxilla without scales → 5
- 3a. Spinous portion of dorsal fin deeply incised at its junction with soft portion; dorsal fin with X spines and 11 (very infrequently 10) soft rays *Etelis*
- 3b. Spinous portion of dorsal fin not deeply incised at its junction with soft portion; dorsal fin with X spines and 10 soft rays → 4
- 4a. Last soft ray of both dorsal and anal fins shorter than next to last soft ray *Paracaesio*
- 4b. Last soft ray of both dorsal and anal fins about equal to or slightly longer than next to last soft ray *Parapristipomoides squamimaxillaris*
- 5a. Premaxillae essentially not protrusible, attached to snout at symphysis by a frenum → 6
- 5b. Premaxillae protrusible, not attached to snout by frenum → 7
- 6a. Vomer without teeth (small juveniles may have minute teeth on vomer); teeth in jaws very small, no caniniform teeth; pectoral fins somewhat shorter than head; lateral surface of maxilla smooth *Aphareus*
- 6b. Vomer with teeth; jaws with some caniniform teeth; pectoral fins about 1/2 to 2/3 length of head; lateral surface of maxilla with a series of well-developed longitudinal ridges *Randallichthys filamentosus*
- 7a. Dorsal fin with X spines and 11 (rarely 10) soft rays; last soft ray of both dorsal and anal fins longer than next to last soft ray → 8
- 7b. Dorsal fin with X spines and 10 soft rays; last soft ray of both dorsal and anal fins shorter than next to last soft ray → 9
- 8a. Groove present on snout below nostrils (Fig. 1); pectoral fins less than 1/2 length of head *Aprion virescens*
- 8b. No groove on snout; pectoral fins a little shorter than head to somewhat longer than head *Pristipomoides*
- 9a. Upper lip with a median fleshy protrusion, well developed in adults (Fig. 2); spines of dorsal and anal fins strong, very robust in large adults *Lipocheilus carnolabrum*
- 9b. Upper lip without a median fleshy protrusion *Paracaesio*

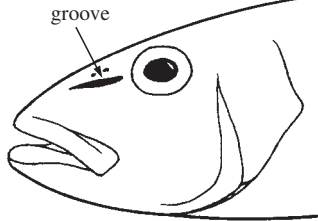


Fig. 1 *Aprion*

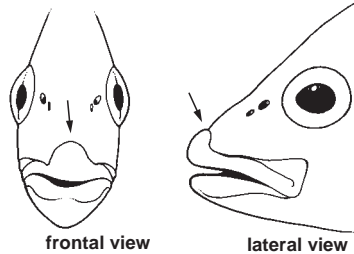


Fig. 2 head of *Lipocheilus carnolabrum*

- 10a. Vomer without teeth; dorsal fin with X spines and 14 to 19 soft rays; 1 or more anterior soft dorsal-fin rays produced as filaments (at least in juveniles) → 11
- 10b. Vomer with teeth; dorsal fin with X to XII spines and 11 to 16 soft rays; none of anterior soft dorsal-fin rays produced as filaments → 12

- 11a. Anterior profile quite steep; dorsal fin with X spines and 17 to 19 soft rays; upper and lower pharyngeals enlarged and bearing large molariform teeth. *Symphorichthys spilurus*
- 11b. Anterior profile sloping more gently; dorsal fin with X spines and 14 to 17 soft rays; upper and lower pharyngeals not particularly enlarged, not bearing molariform teeth.
 *Symphorus nematophorus*
- 12a. First gill arch with 60 or more gill rakers on lower limb *Macolor*
- 12b. First gill arch with 20 or fewer gill rakers on lower limb → 13
- 13a. Upper and lower profiles of head equally rounded; eye set toward middle of head; mouth rather small, somewhat upturned; no fang-like canines at anterior ends of jaws *Pinjalo*
- 13b. Upper and lower profiles of head not equally rounded, upper profile evenly rounded to steeply sloped, and lower profile flattened; eye closer to upper profile of head than to lower; mouth larger, usually not upturned; some fang-like canines usually present at anterior ends of jaws *Lutjanus*

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

Remark on key character: counts of gill rakers include rudiments, if present.

- 1a. First gill arch with 6 to 12 gill rakers on upper limb and 15 to 18 on lower limb (total 22 to 28); colour of body varying from steel blue to purplish brown *Aphareus furca*
- 1b. First gill arch with 16 to 19 gill rakers on upper limb and 32 to 35 on lower limb (total 49 to 52); colour of body varying from blue-grey or mauve to reddish *Aphareus rutilans*

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

Remark on key character: counts of gill rakers include rudiments, unless otherwise stated.

- 1a. Total gill rakers on first gill arch 17 to 22 (total number excluding rudiments, 10 to 13); upper lobe of caudal fin short, 26 to 30% standard length in specimens larger than 120 mm standard length *Etelis carbunculus*
- 1b. Total gill rakers on first gill arch 23 to 36 (total number excluding rudiments, 20 to 33); upper lobe of caudal fin longer, 30 to 75% standard length in individuals larger than 130 mm standard length → 2
- 2a. Total gill rakers on first gill arch 32 to 36; upper lobe of caudal fin relatively short, 30 to 34% standard length; length of pelvic fin 17 to 18% standard length *Etelis radiosus*
- 2b. Total gill rakers on first gill arch 23 to 28; upper lobe of caudal fin short to very long, 33 to 75% standard length in individuals larger than 130 mm standard length; length of pelvic fin 19 to 23% standard length in individuals larger than 80 mm standard length *Etelis coruscans*

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

- 1a. Preorbital ("suborbital") space (distance between upper jaw and eye) very narrow, 9.2 to 16.3 times in head length (Fig. 3a); body slender, usually 3 (sometimes 2.9) or more times in standard length; dorsal-fin spines usually XI (occasionally X or rarely XII); soft dorsal-fin rays 12. → 2
- 1b. Preorbital ("suborbital") space wider, 3.3 to 8.9 times in head length (Fig. 3b); body deeper, 2.1 to 3.1 times, in standard length; dorsal-fin spines variable, X to XII; soft dorsal-fin rays occasionally 12 (usually 13 or more) → 3

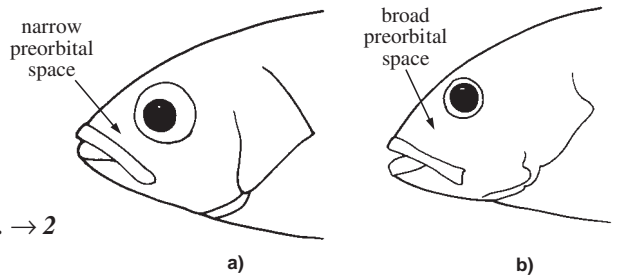


Fig. 3 lateral view of head

- 2a. Body depth 3.5 to 3.8 times in standard length; tongue usually smooth without teeth; a dark band from snout to caudal-fin base and 2 pearly spots above lateral line, 1 below spinous portion and the other below soft portion of dorsal fin *Lutjanus biguttatus*
(central Indian Ocean to Melanesia)
- 2b. Body depth 2.9 to 3.3 times in standard length; tongue with a patch of fine granular teeth; colour generally silvery white with a broad yellow stripe along middle of side to caudal-fin base, and narrow yellowish lines, corresponding with longitudinal scale rows *Lutjanus lutjanus*
(eastern Africa to western Pacific)
- 3a. Ground colour pale (mainly yellow in life) with a series of 4 or 5 longitudinal stripes (blue in life, often brownish in preservative) on side → 4
- 3b. Colour not as above → 6
- 4a. Dorsal-fin spines XI or XII *Lutjanus bengalensis*
- 4b. Dorsal-fin spines X → 5
- 5a. Four stripes on side, belly more or less abruptly whitish, frequently with thin grey lines; scale rows on cheek 5 or 6; upper pectoral-fin rays darkish. *Lutjanus kasmira*
(eastern Africa to central Pacific)
- 5b. Five stripes on side, belly not abruptly whitish and without thin lines; scale rows on cheek 10 or 11; upper pectoral-fin rays pale *Lutjanus quinquelineatus*
(central Indian Ocean to western Pacific)
- 6a. Longitudinal scale rows above lateral line obliquely positioned (Fig. 4a) → 7
- 6b. Longitudinal scale rows above lateral line entirely horizontal (Fig. 4b) or some rows rising obliquely from below middle part of dorsal fin (Fig. 4c). → 31

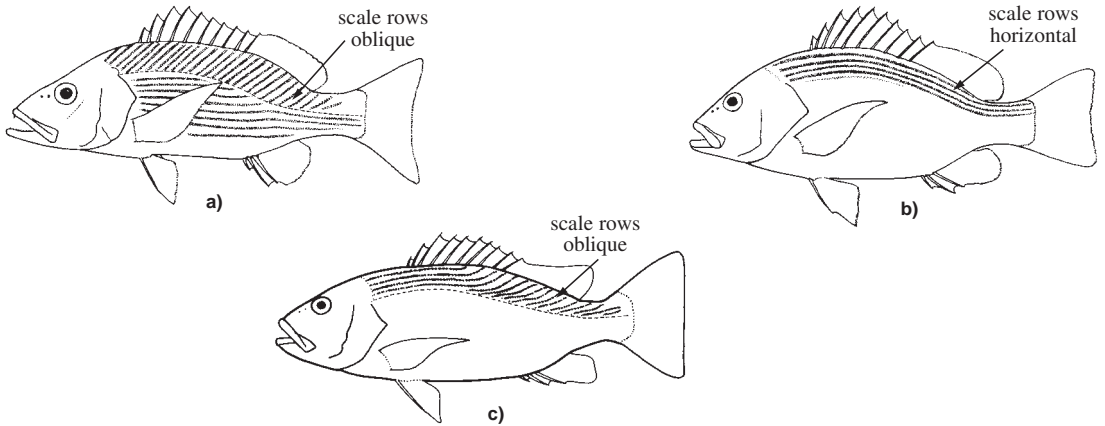


Fig. 4

- 7a. Vomerine tooth patch triangular or diamond-shaped with a medial posterior extension (Fig. 5c) → 8
- 7b. Vomerine tooth patch crescentic to triangular without a posterior extension → 13

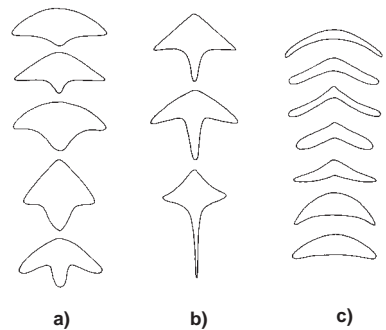


Fig. 5 shapes of the vomerine tooth patch

- 8a. Axil of pectoral fins with distinct black spot on upper portion; a series of 8 or 9 relatively broad orange or yellow stripes on side; soft dorsal-fin rays usually 15 (occasionally 14, rarely 16); soft anal-fin rays 9 *Lutjanus carponotatus*
(India to Melanesia and Australia)
- 8b. Axil of pectoral fins without black spot; colour not as above; soft dorsal-fin rays usually 13 or 14 (rarely 12); soft anal-fin rays usually 8 (rarely 9) → 9
- 9a. A large black spot usually present on upper side, juveniles sometimes with an ocellated spot and/or a series of 4 to 7 broad dark stripes on side (adults of *L. fulviflamma* with yellow stripes) → 10
- 9b. Black spot absent; a series of narrow, yellowish longitudinal lines on side, those on upper back slanting upward toward dorsal-fin base, sometimes an enlarged darker stripe from eye to middle of caudal-fin base → 11
- 10a. Soft dorsal-fin rays usually 14; a relatively wide gap between temporal scale bands of each side (Fig. 6a); spot on upper side situated mainly above lateral line; young specimens with series of 4 to 7 broad stripes (blackish to orange or yellow-brown in life) on side, these persisting as thin stripes in adults from the western Indian Ocean . . . *Lutjanus russelli*
(eastern Africa to western Pacific)
- 10b. Soft dorsal-fin rays usually 13; little or no gap between temporal scale bands of each side (Fig. 6b); spot on upper side situated mostly below lateral line or bisected by it, spot sometimes very elongated; young specimens without series of 4 to 7 broad dark stripes on side *Lutjanus fulviflamma*
(eastern Africa to central South Pacific)
- 11a. Midlateral stripe usually broader and darker than other stripes on side; transverse scale rows on cheek 7 to 10 *Lutjanus vitta*
(western Indian Ocean to western Pacific)
- 11b. Midlateral stripe not broader or darker than other stripes on side, yellow in life and faint or absent in preserved specimens; transverse scale rows on cheek usually 6 or 7 (occasionally 8) → 12
- 12a. Predorsal scales extending to mid-interorbital level; a blunt, flattened spine on upper margin of opercle, above the main centrally located spine (Fig. 7a); interorbital width 4.4 to 6.5 in head length; total gill rakers on first gill arch (including rudiments) 18 to 21 *Lutjanus madras*
(eastern Africa to Indonesia and the Philippines)
- 12b. Predorsal scales extending to level of rear part of orbit; blunt spine above central opercle spine absent (Fig. 7b); interorbital width 6.5 to 6.9 in head length; total gill rakers on first gill arch (including rudiments) 15 or 16 *Lutjanus mizenkoi*
(Indonesia to Samoa)

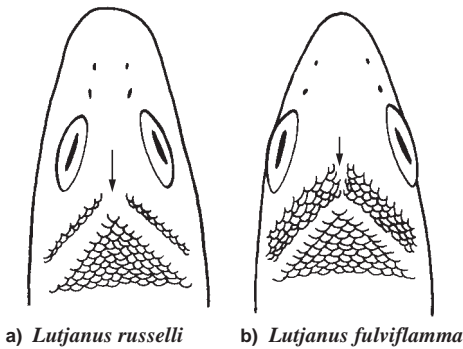


Fig. 6 dorsal view of head

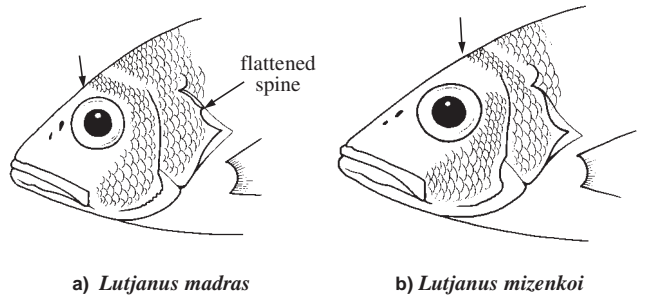


Fig. 7 lateral view of head

- 13a. Total gill rakers (including rudiments) on first gill arch (including rudiments) 25 to 30 → 14
- 13b. Total gill rakers (including rudiments) on first gill arch (including rudiments) 14 to 23 → 15

- 14a. Dorsal fin with X spines and 14 soft rays; longitudinal scale rows below lateral line parallel to axis of body (Fig. 8a); caudal fin emarginate; colour generally pale with a golden-brown midlateral stripe, slightly narrower than eye, and a series of oblique golden-brown lines ascending from lateral line to base of dorsal fin *Lutjanus adetii*
(eastern Australia and New Caledonia)
- 14b. Dorsal fin with X spines and 13 or 14 soft rays; scale rows below lateral line ascending obliquely (Fig. 8b); caudal fin distinctly forked with rounded lobes; colour deep red to grey, fins red or dark brown to blackish *Lutjanus gibbus*
(eastern Africa to central West Pacific)

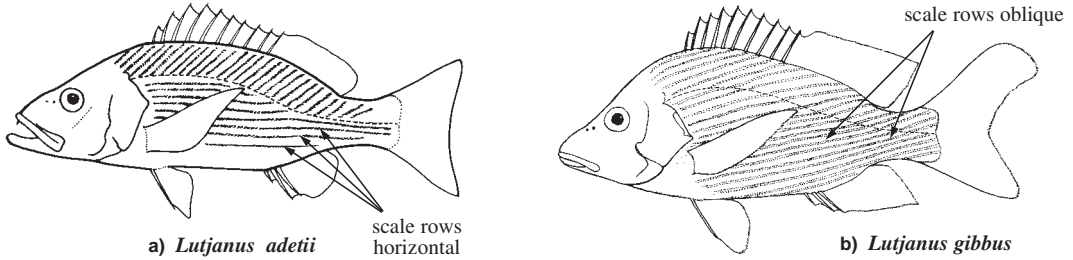


Fig. 8

- 15a. Soft anal-fin rays 10; dorsal fin with XI spines and 16 rays (rarely 15); colour pattern consisting of 3 dark brown to red transverse bars (may be indistinct in large adults) . . . *Lutjanus sebae*
(eastern Africa to western Pacific)
- 15b. Soft anal-fin rays 8 or 9; dorsal-fin elements variable, the fin with X or XI spines and 12 to 16 soft rays; colour not as above → 16

- 16a. Preopercular notch distinctive (moderately to well developed, Fig. 9a) → 17
- 16b. Preopercular notch indistinct (shallow or absent, Fig. 9b) → 21

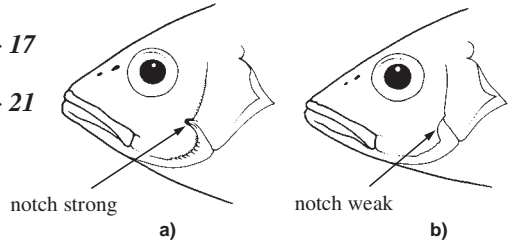


Fig. 9 lateral view of head

- 17a. Soft dorsal-fin rays 15 or 16; body relatively deep, 2.1 to 2.4 times in standard length; head usually with numerous wavy lines (bluish in life); a chalky spot often present below junction of spinous and soft parts of dorsal fin, bordered with black in juveniles, but lost with age; lips thick in large adults *Lutjanus rivulatus*
(eastern Africa to central South Pacific)
- 17b. Soft dorsal-fin rays 13 or 14; body usually more slender, 2.3 to 2.8 times in standard length; colour not as above; lips not thick in adults → 18
- 18a. Caudal fin and distal third of dorsal fin blackish or dusky brown with a narrow white border *Lutjanus fulvus*
(eastern Africa to central West Pacific)
- 18b. Caudal fin yellow or grey basally and yellow distally (tan to medium brown in preservative) without narrow white border; distal third of dorsal fin not noticeably darker than remainder of fin → 19

- 19a. A small (much less than pupil size) chalk-white spot on back just above lateral line at level of anterior part of soft dorsal fin; colour generally brown to purplish; body depth 2.4 to 2.5 times in standard length; snout 2.6 times and preorbital 4.1 to 5.2 times in head length; total gill rakers on first gill arch 16 to 19; dorsal-fin spines X *Lutjanus stellatus*
- 19b. No white spot on back, often a large brownish spot in this position, but usually faint or absent in fresh dead or preserved specimens; colour generally pink, sometimes with faint yellow stripes (absent in preservative) on side, margin of dorsal fin sometimes blackish; snout 2.8 to 3.2, preorbital 5.3 to 6.6 times, both in head length; total gill rakers on first gill arch 20 to 23; dorsal-fin spines X or XI. → 20

- 20a. Dorsal-fin spines X; no yellow stripes on side of body *Lutjanus bouton*
(Indo-Malayan Archipelago to New Guinea)
- 20b. Dorsal-fin spines XI; 10 to 12 faint yellow stripes on side of body *Lutjanus rufolineatus*
(West Pacific to Samoa and Tonga)

- 21a. Eight broad transverse bands or saddles on upper half of body and a large black blotch in centre of caudal peduncle *Lutjanus semicinctus*
(Indonesia to central South Pacific)
- 21b. Colour pattern not as above → 22

- 22a. Colour pattern consisting of a series of 5 dark stripes on whitish ground colour; 2 or 3 uppermost stripes crossed by dark vertical bars forming a network of light and dark squares; a large dark spot at base of caudal fin *Lutjanus decussatus*
(central Indian Ocean to western Pacific)
- 22b. Colour pattern not as above → 23

- 23a. Nostrils set in a prominent groove running forward from eye in specimens exceeding about 20 cm standard length (Fig. 10); specimens under this size frequently with 2 whitish spots on upper back, anterior spot below last 4 dorsal-fin spines and posterior one under last 6 dorsal-fin rays and meeting that of other side across top of caudal peduncle; colour generally dark brown on upper back grading to tan or light brownish (white or pink in life) ventrally; dorsal and caudal fins dusky; outer portion of anal and pelvic fins distinctly blackish; upper third of pectoral fins dusky brown; tongue with a patch of fine granular teeth *Lutjanus bohar*
(eastern Africa to central Pacific)
- 23b. Nostrils not set in a groove at all sizes; colour pattern not as above; tongue smooth or with a patch of granular teeth → 24

- 24a. Caudal fin with a distinctive crescentic black marking, remainder of body and fins uniformly yellowish tan (yellow in life) with a silvery sheen on lower sides. *Lutjanus lunulatus*
(central Indian Ocean to Melanesia)
- 24b. Caudal fin without a distinctive black marking (although a dark smudge or blotch present on middle caudal-fin rays of *L. bitaeniatus* under about 20 cm standard length); colour of body and fins variable → 25

- 25a. A black spot on upper side at level of lateral line below soft dorsal fin (faint or occasionally absent in large adults); remainder of body and fins mainly pale (fins yellow, body pink or yellow in life); tongue with a patch of fine granular teeth, although sometimes absent in juveniles *Lutjanus monostigma*
(eastern Africa to central Pacific)
- 25b. Black spot on upper side of body absent, although a saddle or spot sometimes present on upper portion of caudal peduncle; tongue smooth → 26

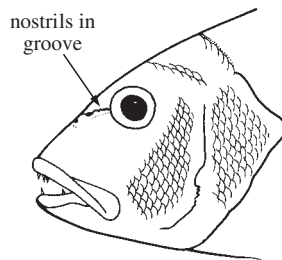


Fig. 10 *Lutjanus bohar*

26a. Dorsal-fin spines XII; a series of 5 or 6 dusky stripes (yellow in life, may be faint in preservative); longitudinal rows of scales below lateral line rising obliquely *Lutjanus dodecacanthoides*
(Indonesia and the Philippines)

26b. Dorsal-fin spines X or XI; colour not as above; longitudinal rows of scales below lateral line parallel to axis of body or rising obliquely → 27

27a. Axil of pectoral fins black (Fig. 11); colour overall deep red in life; posterior dorsal- and anal-fin rays elongated to form pointed fins; soft anal-fin rays 8 *Lutjanus timorensis*
(eastern Indian Ocean to western Pacific)

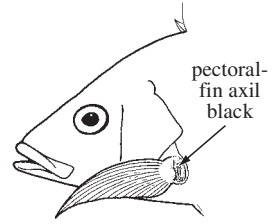


Fig. 11 *Lutjanus timorensis*

27b. Axil of pectoral fins without black marking; colour variable, although often red in life; posterior dorsal- and anal-fin rays low and rounded or tall and pointed, but specimens having latter condition usually with 9 soft anal-fin rays → 28

28a. Dorsal-fin spines X; soft anal-fin rays usually 8 (rarely 9); tongue with a patch of fine, granular teeth; colour variable, pink to grey-brown (tan to brown in preservative); juveniles without black saddle on upper caudal peduncle → 29

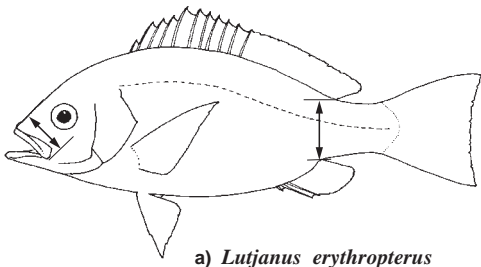
28b. Dorsal-fin spines usually XI (rarely X); soft anal-fin rays usually 9 (occasionally 8); tongue smooth; colour largely reddish (brown in preservative); juveniles usually with a black saddle on upper caudal peduncle → 30

29a. Interorbital width 4.9 to 5.2 times in head length; body relatively deep, its depth 2.3 to 2.5 times in standard length; snout-forehead profile straight or convex; colour generally red or pink (brown to yellowish in preservative), fins pale except in juveniles which may have a crescentic blotch in middle of caudal fin *Lutjanus bitaeniatus*
(eastern Indian Ocean and Indonesia)

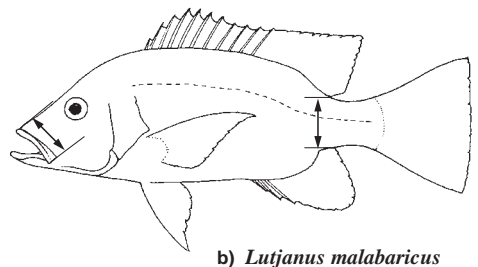
29b. Interorbital width 5.5 to 7.6 times in head length; body generally more slender, its depth 2.5 to 2.8 times in standard length; snout-forehead profile concave in specimens over about 15 to 20 cm standard length; colour generally grey-brown, reddish or pink ventrally, dorsal and caudal fins dusky brown or black, frequently with a narrow white border posteriorly; juveniles with a broad, black, midlateral stripe *Lutjanus lemniscatus*
(eastern Africa to western Pacific)

30a. Mouth relatively small, maxilla length much less than distance between bases of last dorsal- and anal-fin rays (Fig. 12a); interorbital width 3.5 to 4.8 times in head length (specimens in excess of 15 cm standard length); some longitudinal scale rows below lateral line slanting obliquely in posterior direction toward dorsal profile; head profile convex (in specimens over about 15 cm standard length) *Lutjanus erythropterus*
(northwestern Indian Ocean to western Pacific)

30b. Mouth larger, maxilla length about equal to distance between bases of last dorsal- and anal-fin rays (Fig. 12b); interorbital width 5.1 to 6.6 times in head length (specimens in excess of 12 cm standard length); longitudinal scale rows below lateral line horizontal, although some rows may slant obliquely in juveniles under about 10 cm standard length; head profile straight or slightly concave *Lutjanus malabaricus*
(eastern Africa to western Pacific)



a) *Lutjanus erythropterus*



b) *Lutjanus malabaricus*

Fig. 12

- 31a.** Colour pattern consisting of 4, relatively wide dusky brown or blackish stripes on pale ground; only juveniles to 15 cm standard length known *Lutjanus maxweberi*
(fresh-water streams and mangroves of the Philippines, Indonesia, and New Guinea)
- 31b.** Colour pattern not as above → 32
- 32a.** Vomerine tooth patch triangular with medial posterior extension (Fig. 5a, b); preorbital space narrow, 8.6 to 10.3 times in head length; a prominent black spot, larger than eye, bisected by the lateral line below posterior part of spinous dorsal fin *Lutjanus ehrenbergii*
(eastern Africa to western Pacific)
- 32b.** Vomerine tooth patch crescentic to triangular without a medial posterior extension (Fig. 5c); preorbital space wider, 4.7 to 4.9 times in head length; black spot on back present or absent → 33
- 33a.** A large black spot on upper back usually present, if absent ground colour pale → 34
- 33b.** Black spot on upper back absent, ground colour dark → 35
- 34a.** Ground colour pale, each scale on side often with a brownish spot forming longitudinal rows on side; large spot on back, if present, situated mainly above lateral line; interorbital width 5.6 to 7.3 times in head length; preorbital space 4.9 to 6 times in head length; tongue with a patch of fine granular teeth *Lutjanus johnei*
(eastern Africa to central South Pacific)
- 34b.** Ground colour dusky brown; large spot on back bisected equally by the lateral line; interorbital width 5 to 5.6 times in head length; preorbital space about 6.8 times in head length; tongue smooth *Lutjanus fuscescens*
(fresh waters of China, the Philippines, Indonesia, and New Guinea)
- 35a.** Body depth 2.5 to 2.9 (average about 2.7) times in standard length; least depth of caudal peduncle 3 to 3.5 times in head length; longitudinal scale rows on upper back parallel to lateral line anteriorly and some rows usually ascend obliquely below posterior dorsal-fin spines *Lutjanus argentimaculatus*
(a marine species also dwelling in brackish estuaries and lower reaches of fresh-water streams; eastern Africa to central Pacific)
- 35b.** Body depth 2.2 to 2.6 times in standard length; least depth of caudal peduncle 2.5 to 3 times in head length; longitudinal scale rows on upper back entirely parallel to lateral line (Fig. 4c) *Lutjanus goldiei*
(fresh-water species; southern New Guinea north to Japan)

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

Remark on key character: counts of gill rakers include rudiments, if present.

- 1a.** First gill arch with 37 to 42 gill rakers on upper limb and 71 to 81 on lower limb (total 110 to 122); anal fin with III spines and usually 10 (occasionally 11) soft rays; pelvic fins very long and pointed in young, but short and rounded in adults *Macolor macularis*
- 1b.** First gill arch with 26 to 38 gill rakers on upper limb and 60 to 71 on lower limb (total 89 to 107); anal fin with III spines and usually 11 (occasionally 10) soft rays; pelvic fins short and rounded at all sizes *Macolor niger*

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

Remark on key character: counts of lateral-line scales are of tubed scales; teeth are measured from points where they emerge from jaws to their distal tips.

- 1a.** Lateral-line scales 68 to 72; caudal fin forked → 2
- 1b.** Lateral-line scales 48 to 50; caudal fin lunate or emarginate → 4

- 2a. Several prominent exerted canine teeth at anterior ends of upper and lower jaws (longest anterior tooth in upper jaw 6.3 to 8.7% postorbital head length, longest anterior tooth in lower jaw 6.5 to 6.9% postorbital head length); maxilla without scales *Paracaesio paragrapsimodon*
- 2b. Teeth at anterior ends of jaws smaller, rarely prominent (longest anterior tooth in upper jaw 2.4 to 5.9% postorbital head length; longest anterior tooth in lower jaw 1.3 to 6% postorbital head length); maxilla with or without scales → 3

3a. General body colour dark grey, dark purplish brown, dark violet, or bluish; preopercle with 1 to 3 rows of scales peripheral to and usually distinctly separated from main group of cheek scales; maxilla without scales (Fig. 13a) . . . *Paracaesio sordida*

3b. Caudal fin, upper part of caudal peduncle, and upper side of body to anterior end of dorsal fin yellow; remainder of body mostly blue; preopercle almost always without scales peripheral to main group of cheek scales; maxilla with or without scales (Fig. 13b) . . . *Paracaesio xanthura*

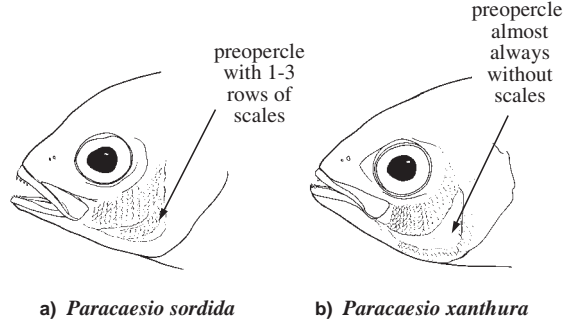


Fig. 13

- 4a. Maxilla without scales; caudal fin emarginate; general body colour light brown dorsally and silver ventrally with 4 or 5 broad brown to dark grey vertical bars on body extending from dorsal surface to midline or below midline laterally *Paracaesio stonei*
- 4b. Maxilla with scales; caudal fin lunate to emarginate (middle of distal margin of caudal fin of *P. kusakarii* becoming rounded with age). → 5
- 5a. Yellow band running from anterior end of lateral line obliquely to about middle of dorsal fin; in life sometimes with 8 broad dark vertical bars; nape without pronounced hump; middle of distal margin of caudal fin not rounded with age *Paracaesio gonzalesi*
- 5b. No oblique yellow band on side of body; 4 broad dark vertical bars on upper side of body; large individuals with pronounced hump on nape as a result of higher supraoccipital crest; middle of distal margin of caudal fin becoming rounded with age *Paracaesio kusakarii*

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

Remark on key character: caudal concavity is the horizontal distance between the tips of the longest and shortest caudal-fin rays.

- 1a. Dorsal fin with XI spines and 14 or 15 soft rays; anal fin with III spines and 9 or (usually) 10 soft rays; longest anal-fin spine 2.1 to 2.65 times in head length; pectoral-fin length 3.05 to 3.9 times in standard length; pelvic-fin length 1.4 to 1.65 times in head length; caudal fin deeply emarginate, caudal concavity 2.1 to 3.6 times in head length; diagonal dark lines following scale rows on nape and upper half to two-thirds of body *Pinjalo pinjalo*
- 1b. Dorsal fin with XII spines and 13 soft rays; anal fin with III spines and 8 or 9 soft rays; longest anal-fin spine 2.7 to 3.2 times in head length; pectoral-fin length 2.5 to 3.05 times in standard length; pelvic-fin length 1.65 to 1.8 times in head length; caudal fin slightly emarginate, caudal concavity 3.55 to 5.45 times in head length; no diagonal dark lines on nape and body *Pinjalo lewisi*

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

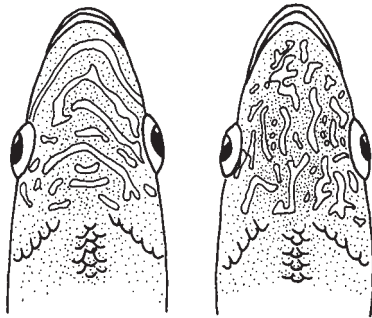
Remarks on key characters: counts of gill rakers include rudiments, if present; counts of lateral-line scales are of tubed scales.

- 1a. Lateral-line scales 48 to 50 → 2
- 1b. Lateral-line scales 57 to 74 → 3

- 2a. Two golden stripes bordered with blue on snout and cheek; transverse vermiculations on top of head (Fig. 14a); suborbital wide, its width 7 times in head length at 15 cm standard length, 5.5 times at 25 cm, 4 times at 40 cm *Pristipomoides multidentis*
- 2b. No golden stripes on snout and cheek; longitudinal vermiculations on top of head (Fig. 14b); suborbital narrow, its width 8.4 times in head length at 15 cm standard length, 7.3 times at 25 cm, 5.8 times at 40 cm *Pristipomoides typus*

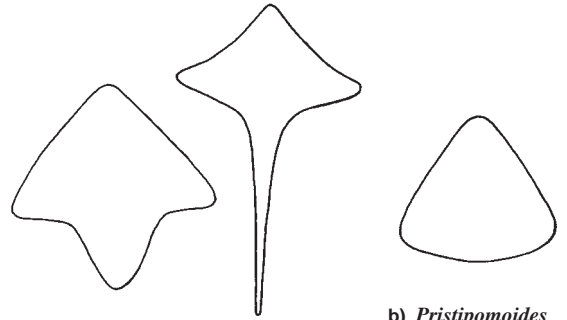
- 3a. Total gill rakers on first gill arch 27 to 33; lateral-line scales 67 to 74 → 4
- 3b. Total gill rakers on first gill arch 17 to 27; lateral-line scales 57 to 67 → 5

- 4a. Vomerine tooth patch with backward prolongation in midline (Fig. 15a; vomerine tooth patch sometimes diamond-shaped); patch of teeth on tongue *Pristipomoides sieboldii*
- 4b. Vomerine tooth patch triangular in shape, without backward prolongation in midline (Fig. 15b); no teeth on tongue *Pristipomoides auricilla*



a) *Pristipomoides multidentis* b) *Pristipomoides typus*

Fig. 14 dorsal view of head



a) *Pristipomoides sieboldii* b) *Pristipomoides auricilla*


Fig. 15 shapes of vomerine tooth patch





















































- 5a. Lateral-line scales 63 to 67; side of body with alternating oblique red and yellow bars *Pristipomoides zonatus*
- 5b. Lateral-line scales 57 to 63; side of body without red and yellow bars → 6

- 6a. Total gill rakers on first gill arch 17 to 21; depth of body 2.8 to 3.1 times in standard length; side of body with numerous irregular dark markings, including zigzag line that runs at about level of lateral line anteriorly and then onto dorsolateral part of caudal peduncle posteriorly *Pristipomoides argyrogrammicus*
- 6b. Total gill rakers on first gill arch 22 to 27; depth of body 3 to 3.8 times in standard length; side of body without irregular dark markings → 7

- 7a. Length of upper jaw 2.4 to 2.7 times in head length; caniniform teeth at anterior ends of jaws not appreciably enlarged; pyloric caeca 7 to 9 (usually 8) *Pristipomoides filamentosus*
- 7b. Length of upper jaw 2.1 to 2.4 times in head length; canine teeth at anterior ends of both jaws usually enlarged; pyloric caeca 4 to 6 (usually 5) *Pristipomoides flavipinnis*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Aphareus furca* (Lacepède, 1801)
-  *Aphareus rutilans* Cuvier, 1830
-  *Aprion virescens* Valenciennes, 1830
-  *Etelis carbunculus* Cuvier, 1828
-  *Etelis coruscans* Valenciennes, 1862
-  *Etelis radiosus* Anderson, 1981
-  *Lipocheilus carnotabrum* (Chan, 1970)
-  *Lutjanus adetii* (Castelnau, 1873)
-  *Lutjanus argentimaculatus* (Forsskål, 1775)
-  *Lutjanus bengalensis* (Bloch, 1790)
-  *Lutjanus biguttatus* (Valenciennes, 1830)
-  *Lutjanus bitaeniatus* (Valenciennes, 1830)
-  *Lutjanus bohar* (Forsskål, 1775)
-  *Lutjanus bouton* (Lacepède, 1803)
-  *Lutjanus carponotatus* (Richardson, 1842)
-  *Lutjanus decussatus* (Cuvier, 1828)
-  *Lutjanus dodecacanthoides* (Bleeker, 1854)
-  *Lutjanus ehrenbergii* (Peters, 1869)
-  *Lutjanus erythropterus* (Bloch, 1790)
-  *Lutjanus fulviflamma* (Forsskål, 1775)
-  *Lutjanus fulvus* (Schneider, 1801)
-  *Lutjanus fuscescens* (Valenciennes, 1830)
-  *Lutjanus gibbus* (Forsskål, 1775)
-  *Lutjanus goldiei* (Macleay, 1882)
-  *Lutjanus johnii* (Bloch, 1792)
-  *Lutjanus kasmira* (Forsskål, 1775)
-  *Lutjanus lemmiscatus* (Valenciennes, 1828)
-  *Lutjanus lunulatus* (Park, 1797)
-  *Lutjanus lutjanus* (Bloch, 1790)
-  *Lutjanus madras* (Valenciennes, 1831)
-  *Lutjanus malabaricus* Schneider, 1801
-  *Lutjanus maxweberi* Popta, 1921
-  *Lutjanus mizenkoi* Allen and Talbot, 1985
-  *Lutjanus monostigma* (Cuvier, 1828)
-  *Lutjanus quinquelineatus* (Bloch, 1790)
-  *Lutjanus rivulatus* (Cuvier, 1828)
-  *Lutjanus rufolineatus* (Valenciennes, 1830)
-  *Lutjanus russelli* (Bleeker, 1849)
-  *Lutjanus sebae* (Cuvier, 1828)
-  *Lutjanus semicinctus* (Quoy and Gaimard, 1824)
-  *Lutjanus stellatus* Akazaki, 1983
-  *Lutjanus timorensis* (Quoy and Gaimard, 1824)
-  *Lutjanus vitta* (Quoy and Gaimard, 1824)
-  *Macolor macularis* Fowler, 1931
-  *Macolor niger* (Forsskål, 1775)
-  *Paracaesio gonzalesi* Fourmanoir and Rivaton, 1979
-  *Paracaesio kusakarii* Abe, 1960
-  *Paracaesio paragrapsimodon* Anderson and Kailola, 1992
-  *Paracaesio sordida* Abe and Shinohara, 1962
-  *Paracaesio stonei* Raj and Seeto, 1983
-  *Paracaesio xanthura* (Bleeker, 1869)
-  *Parapristipomoides squamimaxillaris* (Kami, 1973)

- *Pinjalo lewisi* Randall, Allen, and Anderson, 1987
- *Pinjalo pinjalo* (Bleeker, 1850)
- *Pristipomoides argyrogrammicus* (Valenciennes, 1832)
- *Pristipomoides auricilla* (Jordan, Evermann, and Tanaka, 1927)
- *Pristipomoides filamentosus* (Valenciennes, 1830)
- *Pristipomoides flavipinnis* Shinohara, 1963
- *Pristipomoides multidentis* (Day, 1871)
- *Pristipomoides sieboldii* (Bleeker, 1857)
- *Pristipomoides typus* Bleeker, 1852
- *Pristipomoides zonatus* (Valenciennes, 1830)
- *Randallichthys filamentosus* (Fourmanoir, 1970)
- *Symphorichthys spilurus* (Günther, 1874)
- *Symphorus nematophorus* (Bleeker, 1860)

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