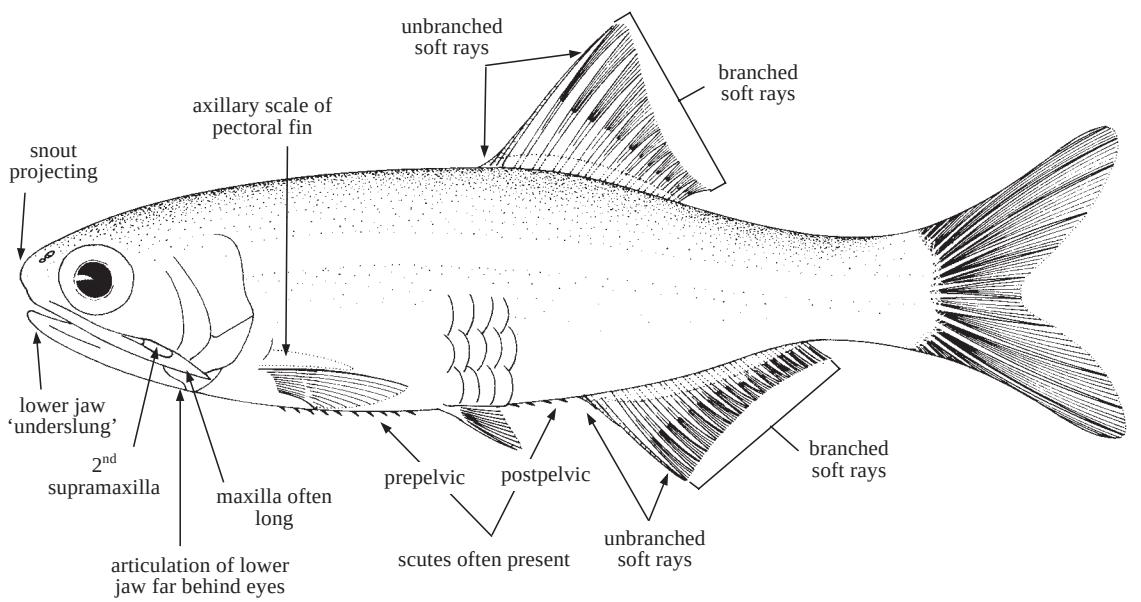
Order CLUPEIFORMES

ENGRAULIDAE

Anchovies

by T. Wongratana, T.A. Munroe, and M.S. Nizinski

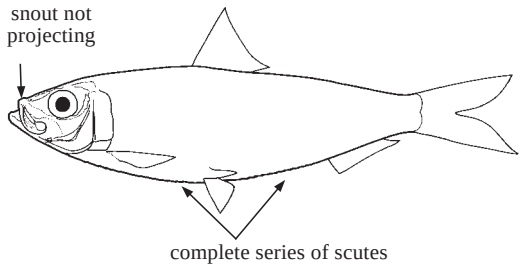
Diagnostic characters: Small or moderate-sized clupeoid fishes (10 to 20 cm standard length, sometimes larger) **characterized by a usually prominent pig-like snout projecting beyond tip of lower jaw; lower jaw almost always long, slender and underslung, its articulation posterior to vertical through posterior margin of eye, and usually to a point well beyond posterior margin of eye. Typically, with 2 supramaxillae. Jaw teeth usually small or minute (canine-like in *Lycothrissa*)**. Eyes large, with adipose eyelid completely covering eyes. **Gill rakers usually short and not numerous in Indo-Pacific genera**. **Pelvic scute with ascending lateral arms always present**; **most Indo-Pacific species with pre- and often postpelvic scutes, and with a small spine-like scute immediately anterior to dorsal-fin origin** (*Engraulis* and *Encrasicholina* lack such scutes). **Dorsal fin single, short, and usually near midpoint of body** (far forward in *Coilia*); **no adipose fin**; pectoral fins set low on body (with 5 to 19 free, unbranched upper fin rays in *Coilia*); pelvic fins anterior to, equal with, or posterior to the vertical through dorsal-fin base; **pelvic fins with i unbranched and 6 branched soft fin rays (except *Coilia ramcarati* with i unbranched and 8 or 9 branched soft fin rays)**; anal fin usually moderate (about 15 to 25 soft fin rays), but long in *Thryssa* (to 50 fin rays), *Setipinna* (to 80 fin rays), and *Coilia* (to over 100 fin rays). **Scales cycloid, moderate, about 30 to 60 in lateral series, with posterior striae or striations, very often shed upon capture**. **Colour:** typically, dorsum blue-green and flanks silvery (sometimes with distinct silver stripe or with diffuse dark saddle on nape); fins hyaline or faint yellow, sometimes chrome or orange, as also the mouth and/or gill cavity; sometimes with black markings on fin tips or margins, or on body just posterior to gill opening, but **apparently no species with black spots on flanks** (as in clupeids).



Habitat, biology, and fisheries: Anchovies are typically marine coastal and schooling fishes, occurring in all seas from about 60°N to 50°S, but some species enter brackish or fresh water to feed or spawn and some live permanently there. Most species feed on small planktonic animals (especially crustaceans), either by locating individual prey or by more indiscriminant filter-feeding. Most, perhaps all, scatter quite large numbers of eggs from which planktonic larvae hatch. Anchovies are very important commercially, with catches sometimes contributing about 25% of the total clupeoid catch. Regionally, unidentified species of *Stolephorus* and *Encrasicholina* have contributed as much as 6% of the total yearly catch of anchovies. Individual statistics are not reported for the majority of species, but individual statistics seem warranted for species (or groups of species) of *Thryssa* in the Indo-Pacific region. For 1995, FAO's Yearbook of Fishery Statistics reports a total catch of anchovies of around 365 500 t from the Western Central Pacific.

Similar families occurring in the area

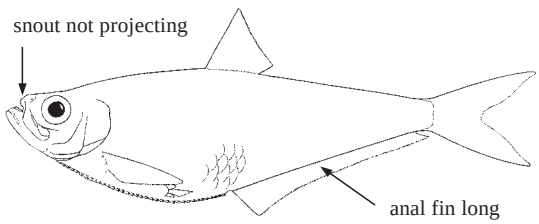
Clupeidae: snout not pig-like and projecting, lower jaw not underslung, articulation of lower jaw always anterior to vertical through middle of eye; scales without posterior striations; eyelids with vertical openings in middle (completely covered in *Etrumeus*); usually with complete series of scutes along the abdomen; pelvic fins inserting below dorsal-fin base; anal fin with less than 28 fin rays.



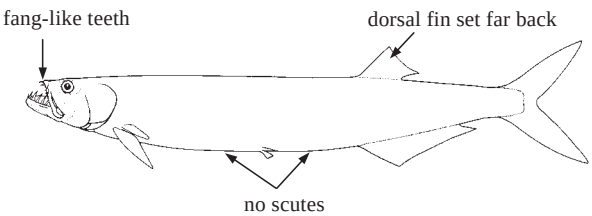
Clupeidae

Pristigasteridae: snout not pig-like and projecting, lower jaw not underslung, lower jaw projecting, mouth directed more or less upward, articulation of lower jaw always anterior to vertical through middle of eye; scales without posterior striations; eyelids with broad vertical opening in middle; usually with complete series of scutes along abdomen; pelvic fins small, inserting more or less anterior to the vertical through the dorsal-fin origin; anal fin with at least 34 fin rays.

Chirocentridae: no scutes along abdomen (even pelvic scute absent); 2 fang-like canine teeth in upper jaw, pointing forward; body highly compressed, very elongate; eyes relatively small, eyelids completely covering eyes.



Pristigasteridae



Chirocentridae

Identification note

All fin rays are soft, segmented, and either branched or unbranched at the tips. In the dorsal and anal fins, the first 2, 3, or 4 fin rays are unbranched (the first very small and easily missed), the remainder being branched (the last sometimes branched near its base, thus appearing as 2, but counted as 1). The first pectoral- and pelvic-fin rays are also unbranched. Unbranched fin rays are indicated in lower case roman numerals. Gill raker counts all refer to the first gill arch.

Key to the species of Engraulidae occurring in the area

1a. Body tapering, rat-tailed, caudal fin small, pointed; 5 to 19 upper pectoral-fin rays unbranched and free from each other (Fig.1) . . . . **(*Coilia*)** → ***2***

1b. Body normal, not greatly tapering and rat-tailed, caudal fin large, forked; anal fin not joined to caudal fin; upper pectoral-fin rays not detached from each other . . . . . → ***46***

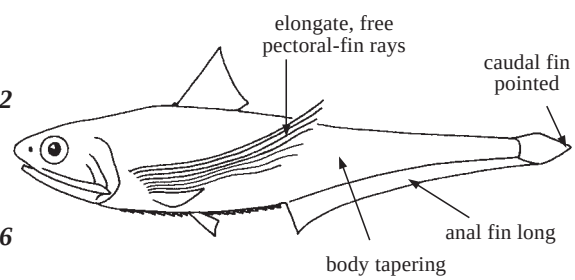
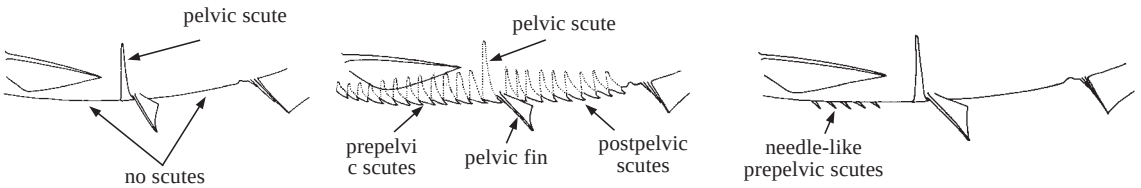


Fig. 1 *Coilia*

2a. No pre- or postpelvic scutes; body somewhat cylindrical, little compressed (Fig. 2a) . . . . . (***Engraulis***)[1/] → ***3***

2b. Prepelvic scutes present, often also postpelvic scutes and a spine-like scute before dorsal fin (Fig. 2b) . . . . . → ***4***



a) ***Engraulis*** **b)** ***Thryssa*** **etc.** **c)** ***Encrasicholina, Stolephorus***

Fig. 2 lateral view of abdomen

3a. More northern distribution (Japan, Taiwan Province of China), but occassionally found off Philippine coasts (Luzon, western Mindanao) and Manado and Ujung Pandang, Sulawesi, Indonesia . . . . . ***Engraulis japonicus***

3b. More southern distribution, found off coasts of eastern, southern, and western Australia . . . . . ***Engraulis australis***

4a. Prepelvic scutes only, needle-like (Fig. 2c; but sometimes absent in the Hawaiian *Encrasicholina purperea*); dorsal-fin origin usually just posterior to body midpoint; anal fin short, with less than 25 fin rays . . . . . (***Encrasicholina, Stolephorus***) → ***5***

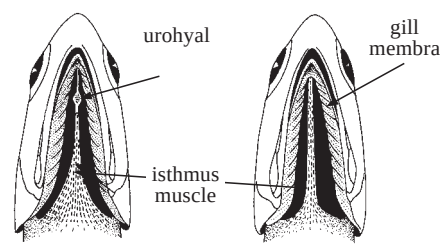
4b. Both postpelvic and prepelvic scutes present (Fig. 2b; postpelvic scutes reduced to thin plates hidden by scales in *Papuengraulis micropinna*); dorsal-fin origin about at body midpoint; anal fin long, with 27 to 81 fin rays . . . . . (***Thryssa, Setipinna, Lycothrissa, Papuengraulis***) → ***26***

5a. Isthmus muscle not reaching anteriorly to posterior margin of gill membrane, urohyal exposed (Fig. 3a); pigmented stripe along flank; preopercular canal present only on preopercle . . . . . (***Encrasicholina***) → ***6***

5b. Isthmus muscle reaching to and beyond gill membrane (Fig. 3b); lateral stripe usually more or less silvery; branches of preopercular canal extending onto opercle . . . . . (***Stolephorus***)[2/] → ***10***

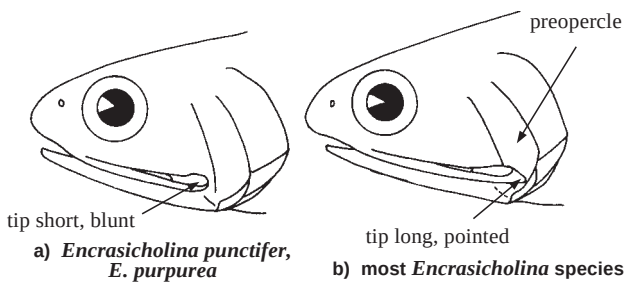
6a. Maxilla tip blunt, more or less rounded, scarcely projecting posteriorly beyond second supramaxilla, may or may not reach to anterior border of preopercle (Fig. 4a); isthmus muscle short, preceded by small fleshy knob on urohyal between branchial membranes . . . . . → ***7***

6b. Maxilla tip more or less pointed, projecting posteriorly beyond second supramaxilla (Fig. 4b); isthmus muscle short, preceded by a small bony plate on urohyal between branchial membranes . . . . . → ***8***



a) ***Encrasicholina*** **b)** ***Stolephorus***

Fig. 3 ventral view of head



a) ***Encrasicholina punctifer, E. purpurea*** **b) most** ***Encrasicholina*** **species**

Fig. 4 lateral view of head

1/ Distinguishing between *Engraulis australis* and *E. japonicus* using morphology or meristics is very difficult. At present, no evidence suggests that these species are linked geographically. Therefore, until further study is made, both names are retained and these species are distinguished in the key purely by geographic distribution.

2/ Identification of *Stolephorus* is not easy and it should be remembered that the species *punctifer* (formerly *buccaneeri*), *heteroloba*, *devisi*, *purpurea*, and *oligobranchus* are now placed in the genus *Encrasicholina*. Among true species of *Stolephorus* the combination of characters listed in couplets 10 to 25 will help to identify certain species (or groups of species), although it is advisable to also check the diagnostic characters in the species accounts; these should be combined with geographical distribution.

7a. Lower gill rakers 23 to 26; 3 to 6 (usually 4 or 5) well-developed, needle-like, prepelvic scutes; widespread distribution . . . . . ***Encrasicholina punctifer***

7b. Lower gill rakers 26 to 29; most specimens without prepelvic scutes, some with 1 to 5 poorly-developed, needle-like prepelvic scutes . . . . . ***Encrasicholina purpurea*** (Hawaii; not yet recorded from the area)

8a. Lower gill rakers 17 or 18 . . . . . ***Encrasicholina oligobranchus***

8b. Lower gill rakers 20 to 30 . . . . . → ***9***

9a. Dorsal and anal fins with 3 unbranched fin rays; lower gill rakers 20 to 27, 6 or 7 on posterior face of third epibranchial; in life, bright silver band on flank with thin blue line above, dorsum blue/grey . . . . . ***Encrasicholina devisi***

9b. Dorsal and anal fins with 2 unbranched fin rays; lower gill rakers 22 to 30, 7 to 9 on posterior face of third epibranchial; in life, dull silver-grey band on flank, dorsum beige . . . . . ***Encrasicholina heteroloba***

10a. Predorsal spine-like scute and pelvic scute present (Fig. 5) . . . . . → ***11***

10b. No predorsal spine-like scute and pelvic scute without spine (only the former usually present, but very weak, in *Stolephorus insularis*) . . . . . → ***13***

11a. Lower gill rakers 25 to 31 (usually 26 to 28), 5 to 7 on posterior face of third epibranchial . . . . . ***Stolephorus dubiosus***

11b. Lower gill rakers 19 to 23, 3 to 6 on posterior face of third epibranchial . . . . . → ***12***

12a. Small teeth on upper edge of hyoid bones (Fig. 6); no double pigment line along midline of dorsum between occiput and dorsal fin; double pigment line on dorsum only in region posterior to dorsal fin . . . . . ***Stolephorus baganensis***

12b. No small teeth on upper edge of hyoid bones; double pigment line on dorsum both anteriorly (between occiput and dorsal fin) and posteriorly to dorsal fin . . . . . ***Stolephorus tri***

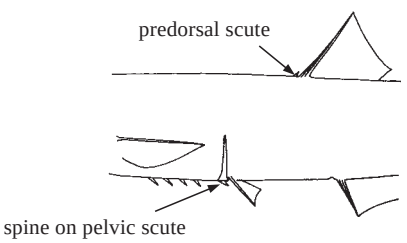


Fig. 5 *Stolephorus dubiosus, S. tri, S. baganensis*

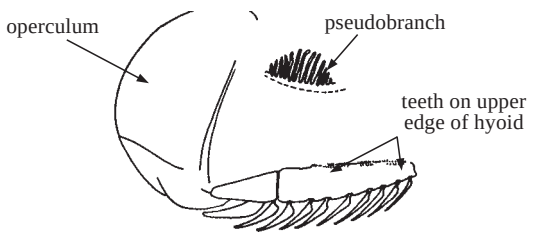


Fig. 6 details of hyoid bones

13a. Posterior border of preopercle concave, indented near maxilla tip (Fig. 7a) . . . . . → ***14***

13b. Posterior border of preopercle convex, rounded (Fig. 7b) . . . . . → ***17***

14a. Lower gill rakers 28 to 30 . . . . . ***Stolephorus ronquilloi***

14b. Lower gill rakers 20 to 28 . . . . . → ***15***

15a. Anal-fin origin moderately far forward, below base of second to sixth dorsal-fin ray; anal fin usually with iii unbranched and 19 or 20 branched rays . . . . . ***Stolephorus carpenteriae***

15b. Anal-fin origin about equal with vertical through middle of dorsal-fin base; anal fin with fewer than iii unbranched and 19 branched rays . . . . . → ***16***

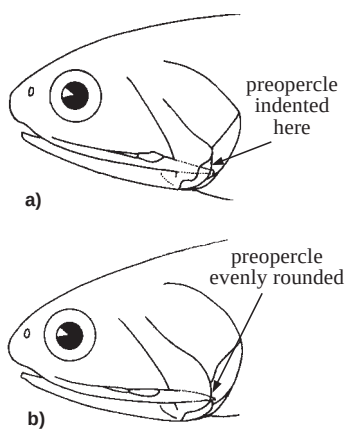


Fig. 7 lateral view of head

16a. Fine teeth on upper edge of hyoid bone; lower gill rakers 21 to 28 (usually 23 to 27); double pigment line on dorsum posterior to dorsal fin; pelvic-fin tips reaching beyond vertical through origin of dorsal fin; predorsal spine-like scute may be present . . . . . ***Stolephorus insularis***

16b. No fine teeth on upper edge of hyoid bone; fewer lower gill rakers (20 or 21); no double pigment line on dorsum posterior to dorsal fin; pelvic-fin tips not reaching beyond vertical through dorsal-fin origin; predorsal spine-like scute absent . . . ***Stolephorus andhraensis***

17a. Maxilla comparatively short, tip reaching to, or only just beyond, anterior border of preopercle . . . . . → ***18***

17b. Maxilla comparatively long, tip reaching to or beyond posterior border of preopercle (Fig. 8) . . . . . → ***20***

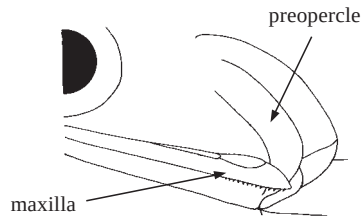


Fig. 8 detail of maxilla and gill cover

18a. Lower gill rakers 35 to 38; body somewhat compressed; bases of dorsal and anal fins with prominent dark melanophores . . . . ***Stolephorus pacificus***

18b. Lower gill rakers fewer than 30; body slender, elongate, moderately round in cross-section; bases of dorsal and anal fins with faintly pigmented melanophores or fins without melanophores . . . . . → ***19***

19a. Usually 3 to 5 (2 to 6, mostly 4) small, needle-like prepelvic scutes; post-temporal region and bases of dorsal fins with faintly pigmented melanophores . . . . . ***Stolephorus indicus***

19b. Usually 7, small, needle-like prepelvic scutes; no markings on post-temporal region or bases of dorsal and anal fins . . . . . ***Stolephorus advenus***

20a. Maxilla tip reaching well beyond posterior border of preopercle (reaching to sub- or interopercle) . . . . . → ***21***

20b. Maxilla tip reaching to or only just slightly beyond posterior border of preopercle . . . . . → ***22***

21a. Lower gill rakers 24; small teeth present on upper edge of hyoid bone; maxilla tip reaching to about posterior border of interopercle; branchiostegal rays (Fig. 9) usually 12 or 13 . . . . . ***Stolephorus nelsoni***

21b. Lower gill rakers fewer (20 to 22); no tooth patches on upper edge of hyoid bones; maxilla tip reaching to or beyond posterior border of subopercle; branchiostegal rays (Fig. 9) usually 10 or 11 . . . . . ***Stolephorus brachycephalus***

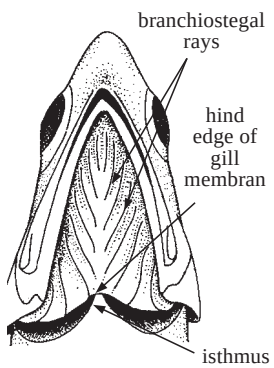


Fig. 9 ventral view of head

22a. Numerous dusky black spots below level of eye on snout and on tip of lower jaw and roof of mouth . . . . ***Stolephorus waitei***

22b. No black spots below eye and on tip of lower jaw . . . . . → ***23***

23a. Lower gill rakers numerous (32 to 35); no teeth on upper edge of hyoid bones . . . . . ***Stolephorus multibranchus***

23b. Lower gill rakers less than 31; small teeth present on upper edge of hyoid bones . . . . . → ***24***

24a. Small, needle-like, prepelvic scutes 4 to 7 (usually 5 or 6) . . . . . ***Stolephorus chinensis***

24b. Small, needle-like, prepelvic scutes fewer (0 to 5, usually 1 to 4, mostly 2 or 3) . . . . . → ***25***

25a. A pair of dark patches behind occiput, followed by a pair of dark lines on dorsum to dorsal-fin origin; lower gill rakers 23 to 28; prepelvic scutes usually 2 or 3 . . . . . ***Stolephorus commersonii***

25b. No dark patches behind occiput or paired dark lines on dorsum anterior to dorsal fin; lower gill rakers 27 to 31; prepelvic scutes usually 3 to 5 . . . . . ***Stolephorus apiensis***

26a. Upper pectoral-fin ray a filament (increasing in relative length with increasing size of fish); a single supramaxilla (Fig. 10) . . . . . **(*Setipinna*)** → ***27***

26b. Upper pectoral-fin ray not extended as a filament . . **(*Thryssa, Lycothrissa, Papuengraulis*)** → ***31***

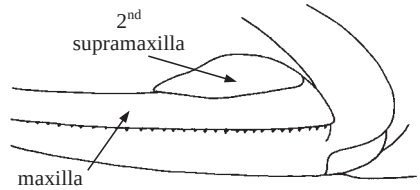


Fig. 10 lower part of head (lateral view)

27a. Lower gill rakers 12 or less . . . . . → ***28***

27b. Lower gill rakers 13 or more . . . . . → ***29***

28a. Filament of pectoral fins long, reaching posteriorly to base of 35th to 41st anal-fin ray; anal fin with iii unbranched and 56 to 61 branched rays; no dark pigment on gill cover or pectoral fin . . . . . ***Setipinna breviceps***

28b. Filament of pectoral fins short, never reaching posteriorly even to anus, or absent altogether; anal fin with iii unbranched and 45 to 50 branched rays; gill cover and main part of pectoral fin often dusky or jet black . . . . . ***Setipinna melanochir***

29a. Filament of pectoral fins only moderately long, reaching posteriorly only to base of first to 31st anal-fin ray . . . . . ***Setipinna tenuifilis***

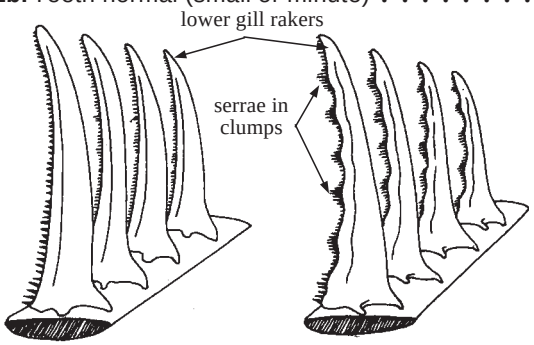
29b. Filament of pectoral fins long, reaching posteriorly to base of 23rd to last anal-fin ray . . . . . → ***30***

30a. Keeled scutes on abdomen 25 to 27; serrae on lower gill rakers not distinctly clumped (Fig. 11a) . . . . . ***Setipinna paxtoni***
(north coast of western Australia, marginal to the area)

30b. Keeled scutes on abdomen 32 to 40 (mostly 33 to 39); serrae on lower gill rakers distinctly clumped (Fig. 11b) . . . . . ***Setipinna taty***
(Thailand south to Java and Kalimantan)

31a. Teeth in jaws canine-like (Fig. 12) . . . . . ***Lycothrissa crocodilus***

31b. Teeth normal (small or minute) . . . . . **(*Thryssa, Papuengraulis*)** → ***32***



a) ***Setipinna paxtoni*** **b)** ***Setipinna taty***

Fig. 11 lower gill rakers

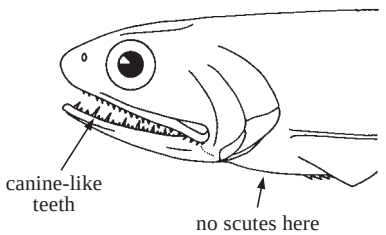


Fig. 12 *Lycothrissa crocodilas*

32a. Dorsal fin normal, with at least 12 fin rays; postpelvic scutes strong, sharply keeled . . **(*Thryssa*)**[3/] → ***33***

32b. Dorsal fin minute, with only 5 or 6 fin rays; second unbranched dorsal-fin ray filamentous; postpelvic scutes membranous, hidden by scales (Fig. 13) . . . . ***Papuengraulis micropinna***

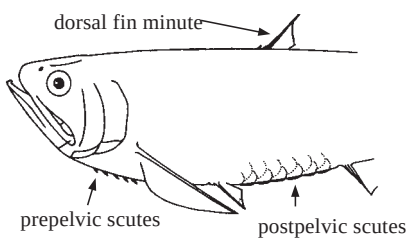


Fig. 13 *Papuengraulis micropinna*

3/ Identification of species of *Thryssa* is very difficult. To simplify comparisons, major separations are made between species with short, medium, long or very long maxillae (not to gill cover, just beyond it, to pectoral-fin base, or well beyond it); between those with or without a first supramaxilla; and between those with tip of snout distinctly above midline of eye. Numbers of gill rakers and anal-fin rays also help in identification, as also enlargement of jaw teeth. These should be combined with geographic information to help in identification.

33a. Maxilla very long (Fig. 14a), reaching at least to base of first pectoral-fin ray; dark blotch posterior to upper part of gill opening . . . . . → ***34***

33b. Maxilla shorter (Fig. 14a), usually not extending posterior to gill cover; dark blotch behind gill opening present or absent . . . . . → ***36***

34a. Lower gill rakers 10 to 12; high coronoid process on lower jaw . . . . . ***Thryssa setirostris***

34b. Lower gill rakers 14 to 19; coronoid process in lower jaw not rising steeply in mouth . . . . . → ***35***

35a. Lower gill rakers 14 to 16; serrae on inner edge of lower gill rakers even (Fig. 15a); keeled scutes on abdomen 25 to 32 (usually 28 to 30); first supramaxilla oval, minute (Fig. 14b) . . . . . ***Thryssa mystax***

35b. Lower gill rakers 17 to 19, serrae on inner edge of lower gill rakers clumped (Fig. 15b); keeled scutes on abdomen 21 to 24 (usually 22 or 23); first supramaxilla absent . . . . . ***Thryssa dussumieri***

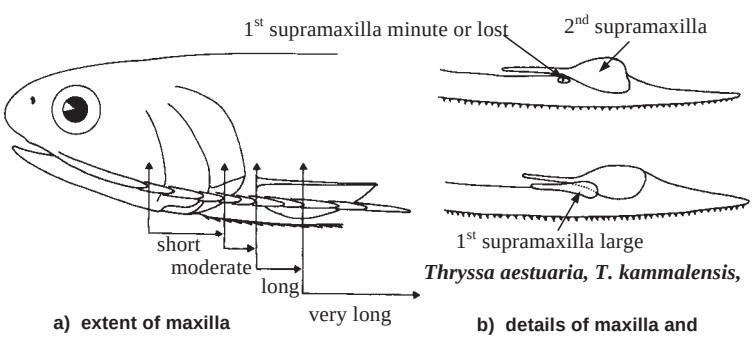


Fig. 14 *Thryssa*

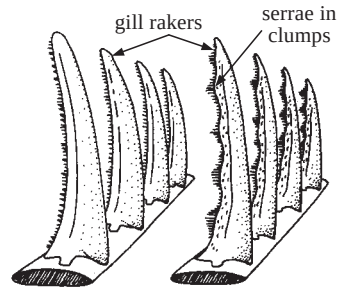


Fig. 15 lower gill rakers

36a. Maxilla moderately long (Fig. 14a), but only reaching posteriorly to border of gill cover or projecting slightly posterior to this point . . . . . → ***37***

36b. Maxilla very short (Fig. 14a), not extending posteriorly beyond posterior border of preopercle . . . . . → ***39***

37a. Lower gill rakers 26 to 32 (usually 29 or more); anal fin usually with iii unbranched and 30 to 33 branched fin rays; diffuse dark saddle on nape . . . . . ***Thryssa kammalensis***

37b. Lower gill rakers 15 or less; anal fin usually with more than iii unbranched and 35 branched fin rays; no dark saddle on nape . . . . . → ***38***

38a. Anal-fin rays iii unbranched and 32 to 39 branched (mostly 35 to 37); a dark blotch posterior to upper part of gill opening; first supramaxilla small, oval . . . . . ***Thryssa hamiltonii***

38b. Anal-fin rays iii unbranched and 41 to 45 branched; either no dark blotch posterior to upper part of gill opening, or if present, blotch rather indistinct; first supramaxilla minute, usually absent . . . . . ***Thryssa spinidens***
(Indian Ocean; not yet recorded from the area)

39a. Keeled scutes on abdomen 11 to 18 (usually 14 to 17) . . . . . → ***40***

39b. Keeled scutes on abdomen more than 20 . . . . . → ***41***

40a. Tip of maxilla pointed; prepelvic scutes ending anteriorly below pectoral fin . . . ***Thryssa baelama***

40b. Tip of maxilla more blunt; 1 or 2 prepelvic scutes immediately behind isthmus . . . . . ***Thryssa encrasicholoides***

41a. Keeled scutes on abdomen 27 to 31; no dark saddle on nape; lower gill rakers 18 to 23 . . . . . ***Thryssa scratchleyi***

41b. Keeled scutes on abdomen 22 to 29; diffuse, dark markings on dorsum anterior to dorsal-fin origin or posterior to upper part of gill opening distinct or indistinct; lower gill rakers 25 or more . . . . . → ***42***

42a. Diffuse, dark markings posterior to upper part of gill opening indistinct or absent . . . . . → ***43***

42b. Diffuse, dark saddle on dorsum anterior to dorsal-fin orgin present . . . . . → ***44***

43a. Lower gill rakers 27 to 30; first supramaxilla long, at least 1/2 length of second (Fig. 14b) . . . . . ***Thryssa chefuensis***
(Hong Kong to Korea; not yet recorded from the area)

43b. Lower gill rakers 55 to 61; first supramaxilla short, not more than 1/2 length of second; riverine environments . . . . . ***Thryssa rastrosa***

44a. Diffuse dark saddle immediately anterior to origin of dorsal fin . . . . . ***Thyrssa marasriae***

44b. Diffuse dark saddle on nape . . . . . → ***45***

45a. Pseudobranch very short . . ***Thyrssa aestuaria***

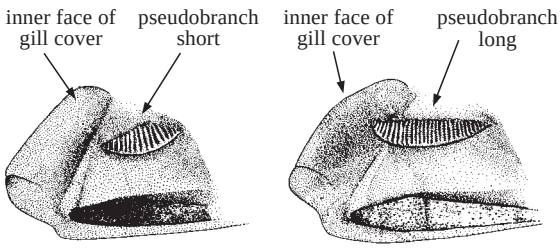
45b. Pseudobranch long . . . . ***Thyrssa brevicauda***

46a. Light organs (pearly dots) present along flanks and abdomen . ***Coilia dussumieri***

46b. No light organs present . . . . . → ***47***

47a. Pectoral fins with 6 long filaments . . . . → ***48***

47b. Pectoral fins with more than 6 long filaments . . . . . → ***50***



a) ***Thryssa aestuaria*** **b)** ***Thryssa brevicauda***

Fig. 16 internal view of gill cover

48a. Maxilla short (Fig. 14a), almost or just reaching posteriorly to border of gill cover; 12 to 15 keeled abdominal scutes . . . . . ***Coilia neglecta***

48b. Maxilla long (Fig. 14a), reaching to or beyond pectoral-fin base; 34 to 55 keeled abdominal scutes . . . . . → ***49***

49a. Keeled abdominal scutes 34 to 40; lower gill rakers 30 to 34 . . . . . ***Coilia lindmani***

49b. Keeled abdominal scutes 45 to 55; lower gill rakers 21 to 24 . . . . . ***Coilia macrognathus***

50a. Eleven to 13 keeled abdominal scutes . . . . . → ***51***

50b. More than 20 keeled abdominal scutes . . . . . → ***52***

51a. Lower gill rakers 25 to 27; 1 prepelvic scute (sometimes absent) . . . . . ***Coilia rebentischii***

51b. Lower gill rakers 32; 4 or 5 prepelvic scutes . . . . . ***Coilia borneensis***

52a. Keeled abdominal scutes 20 to 23; maxilla short (Fig. 14a), not reaching posteriorly beyond border of gill cover . . . . . ***Coilia coomansi***

52b. Keeled abdominal scutes 36 to 44; maxilla long (Fig. 14a), reaching posteriorly to or beyond base of first pectoral-fin ray . . . . . ***Coilia grayii***
(East and South China seas, most likely to Viet Nam, but confirmed records from the area pending)

List of species occurring in the area

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

◄ *Coilia borneensis* Bleeker, 1852
◄ *Coilia coomansi* Hardenberg, 1934
◄ *Coilia dussumieri* Valenciennes, 1848
? *Coilia grayii* Richardson, 1845
◄ *Coilia lindmani* Bleeker, 1858
◄ *Coilia macrognathos* Bleeker, 1852
◄ *Coilia neglecta* Whitehead, 1969
◄ *Coilia rebentischii* Bleeker, 1858

Encrasicholina devisi (Whitley, 1940)
Encrasicholina heteroloba (Rüppell, 1837)
Encrasicholina oligobranchus (Wongratana, 1983)
Encrasicholina punctifer Fowler, 1938
? *Encrasicholina purpurea* (Fowler, 1900)

Engraulis australis (White, 1790)
Engraulis japonicus Temminck and Schlegel, 1846

Lycothrissa crocodilus (Bleeker, 1851)

Papuengraulis micropinna Munro, 1964

Setipinna breviceps (Cantor, 1849)
Setipinna melanochir (Bleeker, 1849)
? *Setipinna paxtoni* Wongratana, 1987
Setipinna taty (Valenciennes, 1848)
Setipinna tenuifilis (Valenciennes, 1848)

Stolephorus advenus Wongratana, 1987
Stolephorus andhraensis Babu Rao, 1966
Stolephorus apiensis (Jordan and Seale, 1906)
Stolephorus baganensis Hardenberg, 1933
Stolephorus brachycephalus Wongratana, 1983
Stolephorus carpenteriae (de Vis, 1883)
Stolephorus chinensis (Günther, 1880)
Stolephorus commersonii Lacepède, 1803
Stolephorus dubiosus Wongratana, 1983
Stolephorus indicus (van Hasselt, 1823)
Stolephorus insularis Hardenberg, 1933
Stolephorus multibranchus Wongratana, 1987
Stolephorus nelsoni Wongratana, 1987
Stolephorus pacificus Baldwin, 1984
Stolephorus ronquilloi Wongratana, 1983
Stolephorus tri (Bleeker, 1852)
Stolephorus waitei Jordan and Seale, 1926

Thryssa aestuaria (Ogilby, 1911)
Thryssa baelama (Forsskål, 1775)
Thryssa brevicauda Roberts, 1978
? *Thryssa chefuensis* (Günther, 1874)
Thryssa dussumieri (Valenciennes, 1848)
Thryssa encrasicholoides (Bleeker, 1852)
Thryssa hamiltonii (Gray, 1830)
Thryssa kammalensis (Bleeker, 1849)
Thryssa marasriae Wongratana, 1987
Thryssa mystax (Bloch and Schneider, 1801)
Thryssa rastrosa Roberts, 1978
Thryssa scratchleyi (Ramsay and Ogilby, 1886)
Thryssa setirostris (Broussonet, 1782)
? *Thryssa spinidens* (Jordan and Seale, 1925)

References

Whitehead, P.J.P., G.J. Nelson, and T. Wongratana. 1988. FAO species catalogue. Vol. 7. Clupeoid fishes of the world. An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads, anchovies and wolf-herrings. Part 2. Engraulididae. *FAO Fish. Synop.*, (125)Vol.7,Pt.2:305-579.

Wongratana, T. 1983. Diagnoses of 24 new species and proposal of a new name for a species of Indo-Pacific clupeoid fishes. *Japan. J. Ichthyol.*, 29(4):385-407.

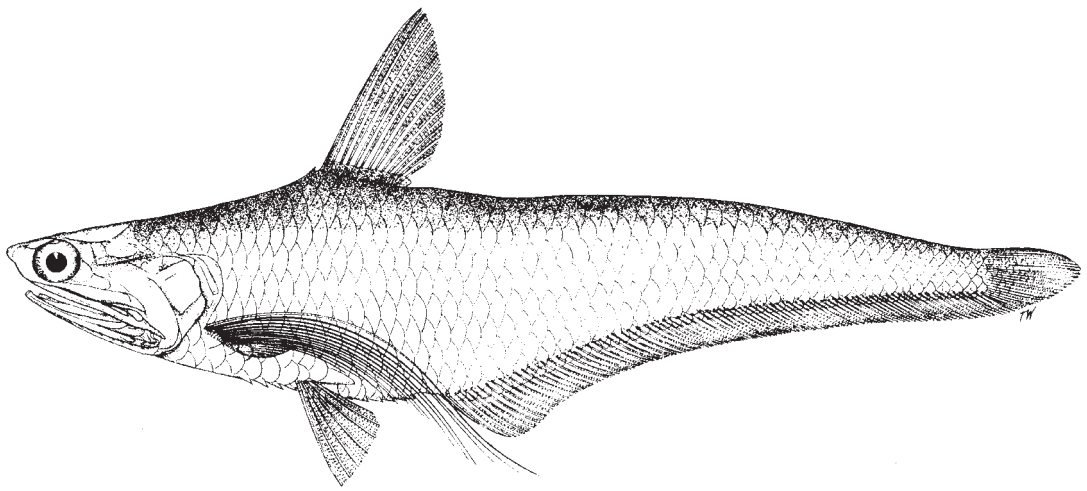
Wongratana, T. 1987. Two new species of anchovies of the genus *Stolephorus* (Engraulidae), with a key to species of *Engraulis, Encrasicholina,* and *Stolephorus. Am. Mus. Novit.*, 2876:1-8.

Wongratana, T. 1987. Four new species of clupeoid fishes (Clupeidae and Engraulidae) from Australian waters. *Proc. Biol. Soc. Wash.*, 100(1):104-111.

Coilia borneensis Bleeker, 1852

Frequent synonyms / misidentifications: *Coilia polyfilis* Volz, 1903 / *Coilia reynaldi* Valenciennes, 1848.

FAO names: En - Bornean grenadier anchovy.

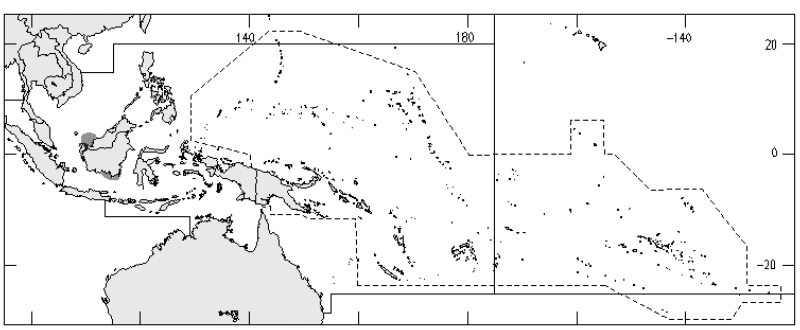


Diagnostic characters: Body long and tapering, abdomen rounded anterior to pelvic fins; **abdomen with keeled scutes only beginning immediately posterior to pectoral-fin base and continuing to anus; 4 or 5 prepelvic and 7 or 8 postpelvic scutes; total number of scutes 11 to 13. A small spine-like scute just anterior to dorsal-fin origin**. **Maxilla short, terminating anterior to border of gill cover**. **Two supramaxillae present**; first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 32**. Branchiostegal rays 10 or 11. **Dorsal fin far forward, beginning in first third of body length. Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, pointed**. **Pectoral fins with upper xiii or xiv fin rays unbranched, long and filamentous, reaching posteriorly at least to anal-fin origin, and with 5 to 7 branched fin rays,** much shorter than those of pelvic fins. Pelvic fins with i unbranched and 6 branched fin rays. Only 1 or 2 scales, or scales absent, at base of isthmus. **Striae on anterior part of scales on flanks not reticulated**. **Colour:** no distinctive colour patterns.

Size: Maximum standard length 12.4 cm, but perhaps larger.

Habitat, biology, and fisheries: Evidently riverine, or at least estuarine, but perhaps also in the sea. More data needed. Interest to fisheries unknown.

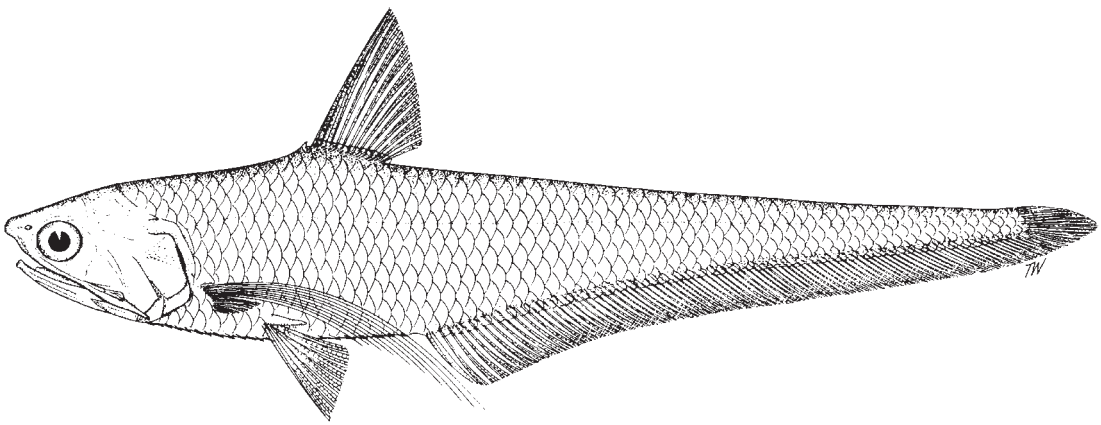
Distribution: Indonesia (Kalimantan at Pamangkat on western coast and Banjermasin on Barito River to the south).



Coilia coomansi Hardenberg, 1934

Frequent synonyms / misidentifications: None / None.

FAO names: En - Cooman's grenadier anchovy.

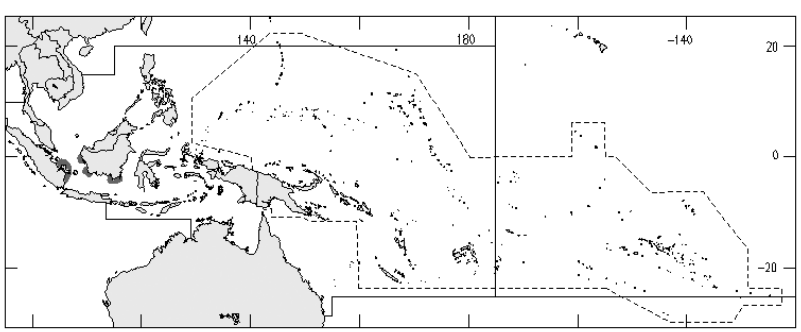


Diagnostic characters: Body long and tapering, abdomen rounded anterior to pelvic fins; **abdomen with complete series of keeled scutes from isthmus to anus; 11 or 12 prepelvic and 9 to 11 postpelvic scutes; total number of scutes 20 to 23. A small spine-like scute just anterior to dorsal-fin origin. Maxilla short, not reaching posteriorly beyond border of gill cover. Two supramaxillae present**; first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 31 to 33**. Branchiostegal rays 9 or 10. **Dorsal fin far forward, beginning in first third of body length. Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, pointed. Pectoral fins with upper x or xi fin rays unbranched, long and filamentous, reaching posteriorly at least to anal-fin origin, and with 7 or 8 branched fin rays**, much shorter than those of pelvic fins. Striae on anterior part of scales on flanks not fully reticulated. **Colour:** no distinctive colour patterns.

Size: Maximum standard length 12.3 cm, but perhaps larger.

Habitat, biology, and fisheries: Coastal and estuarine, but extent of movements into sea or rivers not known. Interest to fisheries is unknown, but its rarity in museum collections may not reflect its actual abundance.

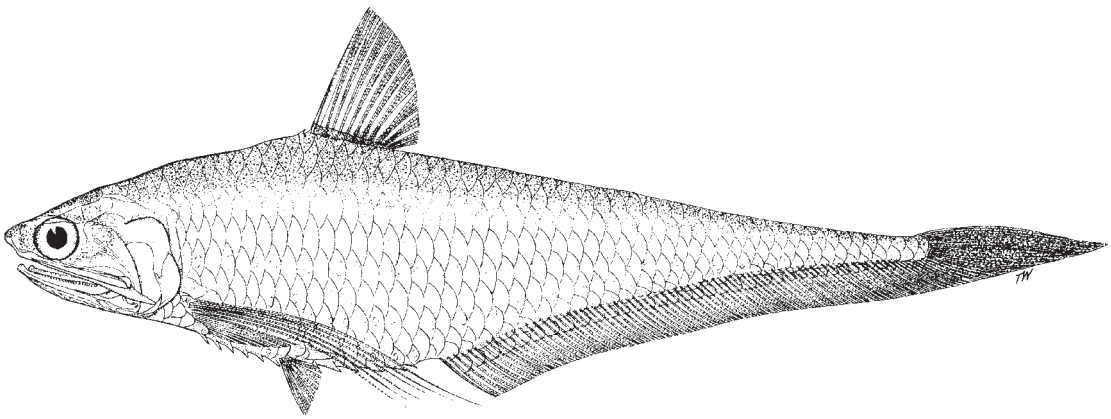
Distribution: Indonesia (southwestern coast of Kalimantan from Pontianak to Barito River; also Palembang on Musi River, Sumatra).



Coilia dussumieri Valenciennes, 1848

Frequent synonyms / misidentifications: None / None.

FAO names: En - Gold-spotted grenadier anchovy; **Fr** - Alice taches d'or; **Sp** - Anchoa granadera dorada.

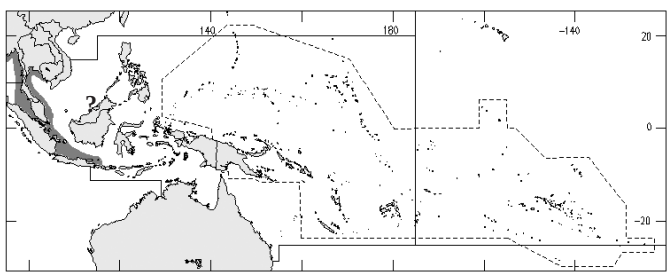


Diagnostic characters: Body tapering, abdomen rounded anterior to pelvic fins; abdomen with keeled scutes beginning only immediately posterior to pectoral-fin base and continuing to anus; 5 or 6 (rarely 4) prepelvic and 7 to 9 postpelvic scutes; total number of scutes 12 to 15. A small spine-like scute just anterior to dorsal-fin origin. Maxilla short, not quite reaching posteriorly to margin of gill cover. Two supramaxillae present; first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; lower gill rakers 23 to 26. Branchiostegal rays 10 to 12 (rarely 9). Dorsal fin far forward, beginning in first third of body length. Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, extremely pointed. Pectoral fins with upper vi fin rays unbranched, long and filamentous, reaching posteriorly at least to anal-fin origin, and with 9 to 11 (rarely 8) branched fin rays, longer than those of pelvic fins and reaching posteriorly at least to pelvic-fin origin. Pelvic fins with i unbranched and 6 branched fin rays. Isthmus entirely scaled. Striae on anterior part of scales on flanks sparsely reticulated, with many longitudinal striae anteriorly. **Colour:** dorsum brown, flanks silvery; **flanks and abdomen with longitudinal rows of golden or pearly spots (light organs, with a pocket for luminous material and a silvery reflector below) below scales, also along isthmus, along border of lower jaw, and a few on cheek and gill cover** (the disposition of the light organs varying a little between individuals).

Size: Maximum standard length presumably 20 cm, commonly between 13 and 17 cm total length.

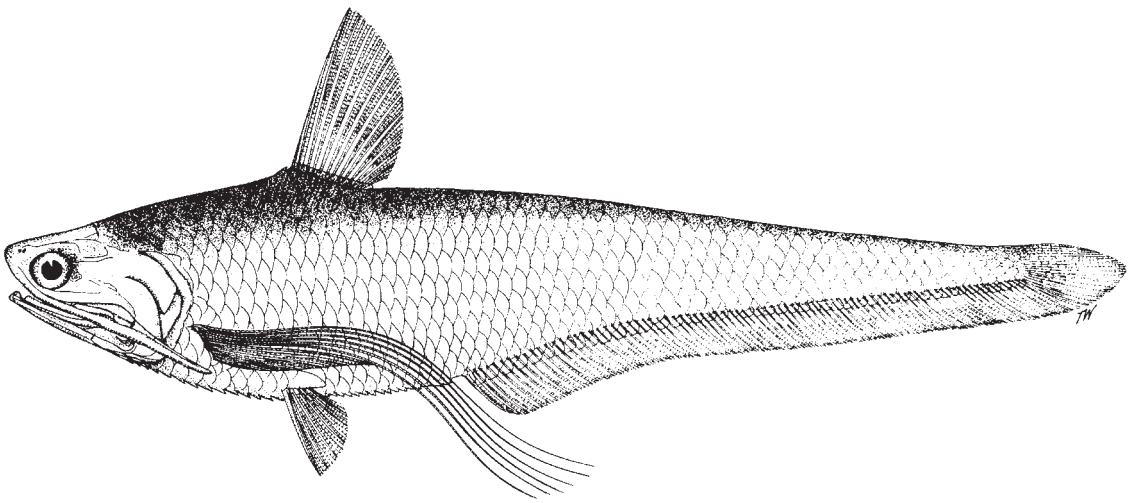
Habitat, biology, and fisheries: Coastal and estuarine, in fully saline water, but also able to tolerate lowered salinities, perhaps almost fresh water. Feeds on copepods, prawn and fish larvae, various unidentified crustaceans and cypris, also stomatopod larvae, mysids, polychaete larvae, isopods, and *Sagitta*. Breeding season protracted over entire year. Spawning and nursery grounds located inshore of 40 m isobath. Premonsoon months (March to May) are peak spawning and recruitment season (May to June) in India. Females mature at 6 or 7 months, and 12 cm total length. Individual females may spawn twice each year with duration between successive spawnings a maximum of 6 months. Fecundity 100 to 5 000 eggs/female (females 15.7 to 19 cm total length). Separate statistics not reported for this common species. Appreciable numbers present in coastal waters and at mouths of estuaries in certain regions. Caught mainly with fixed bagnet beach seines, purse seines, bamboo-stake traps; also incidentally with bottom trawls. An important food item locally. Marketed fresh, dried, dried-salted or made into fish sauce or fish balls.

Distribution: Western Central Pacific (Thailand to Java, presumably also Kalimantan) and Indian Ocean (coasts of India from Bombay to Calcutta, probably also Myanmar, Thailand, and Malaysia).



Coilia lindmani Bleeker, 1858

Frequent synonyms / misidentifications: *Coilia macrognathos aequidentata* Chabanaud, 1924 / None.
FAO names: En - Lindman's grenadier anchovy.

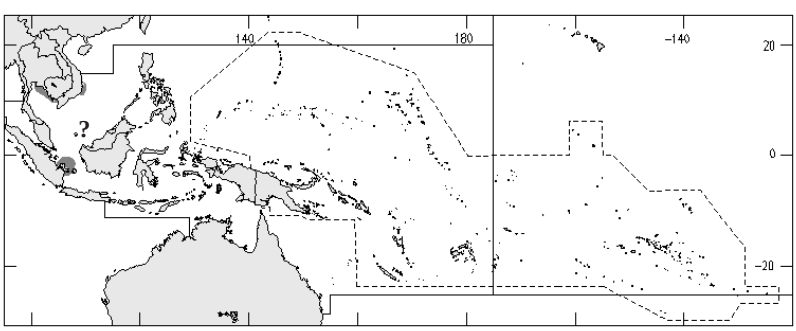


Diagnostic characters: Body long and tapering; abdomen rounded anterior to pelvic fins; **with complete series of keeled scutes from basal part of isthmus to anus; 13 to 15 prepelvic and 20 to 25 postpelvic scutes; total number of scutes 34 to 40. A small spine-like scute just anterior to dorsal-fin origin. Maxilla long, reaching posteriorly to or beyond vertical through base of first pectoral-fin ray. Two supramaxillae present**, first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 30 to 34 (rarely 29). Branchiostegal rays 10 or 11 (rarely 9 or 12). Dorsal fin far forward, beginning in first third of body length. Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, pointed. Pectoral fins with upper vi fin rays unbranched, long and filamentous, reaching posteriorly at least to vertical through anal-fin origin, and with 9 to 11 (rarely 9) branched fin rays**, longer than those of pelvic fins, and reaching beyond, or nearly beyond, pelvic-fin tip. Pelvic fins with i unbranched and 6 branched rays. Isthmus covered with about 3 scales at its base. Anterior part of scales on flanks with many longitudinal striae. **Colour:** no distinctive colour pattern.

Size: Maximum standard length 20 cm.

Habitat, biology, and fisheries: Riverine, but insufficient data to determine if this species also occurs in coastal habitats or whether it is found strictly in estuaries rather than in fresh water. Interest to fisheries unknown, but presumably enters artisanal catches.

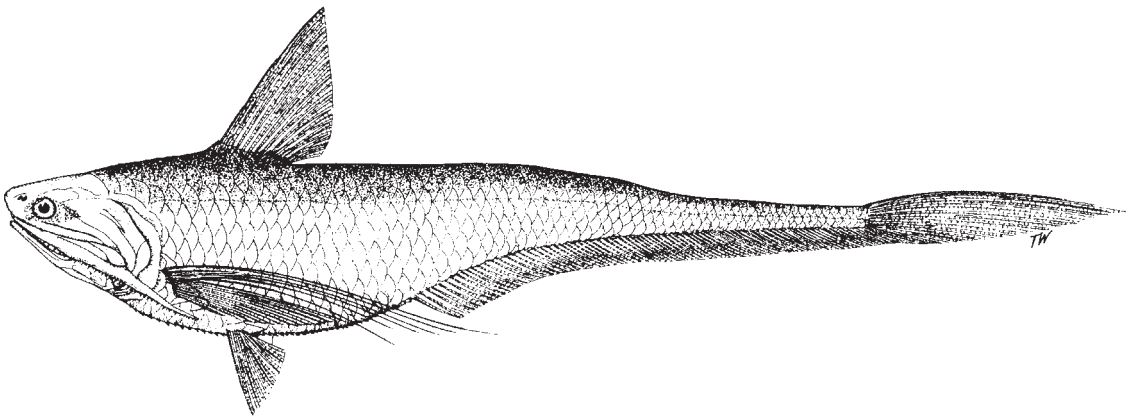
Distribution: Western Central Pacific (rivers of Viet Nam, Thailand, and southeastern Sumatra; perhaps also eastern Malaysia and western Kalimantan).



Coilia macrognathos Bleeker, 1852

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longjaw grenadier anchovy.

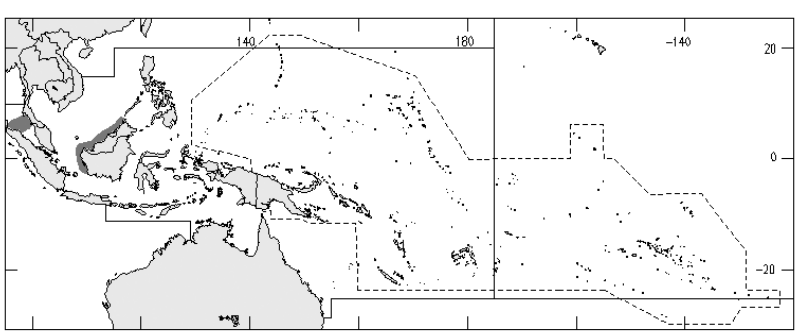


Diagnostic characters: Body long and tapering, abdomen rounded anterior to pelvic fins; **with complete series of keeled scutes from isthmus to anus; 14 to 16 prepelvic and 31 to 39 postpelvic scutes; total number of scutes 47 to 54. A small spine-like scute just before dorsal-fin origin. Maxilla long, reaching posteriorly beyond vertical through pectoral-fin base. Two supramaxillae present**; first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 21 to 24. Branchiostegal rays 10 or 11. Dorsal fin far forward, beginning in first third of body length. Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, extremely pointed. Pectoral fins with vi unbranched fin rays, long and filamentous, reaching posteriorly at least to vertical through anal-fin origin, and with 10 to 12 branched fin rays**, much longer than those of pelvic fins. Pelvic fins with i unbranched and 6 branched fin rays. Isthmus covered with about 3 scales at its base. Anterior part of scales on flanks with numerous fine vertical striations. **Colour:** no distinctive colour patterns.

Size: Maximum standard length 26 cm, commonly to 20 cm.

Habitat, biology, and fisheries: Presumably estuarine, like other *Coilia* species, but more data needed. Caught mainly with bamboo-stake traps, lift nets, and beach seines; also incidentally with bottom trawls. Marketed fresh, dried, dried-salted, or made into fish sauce or fish balls.

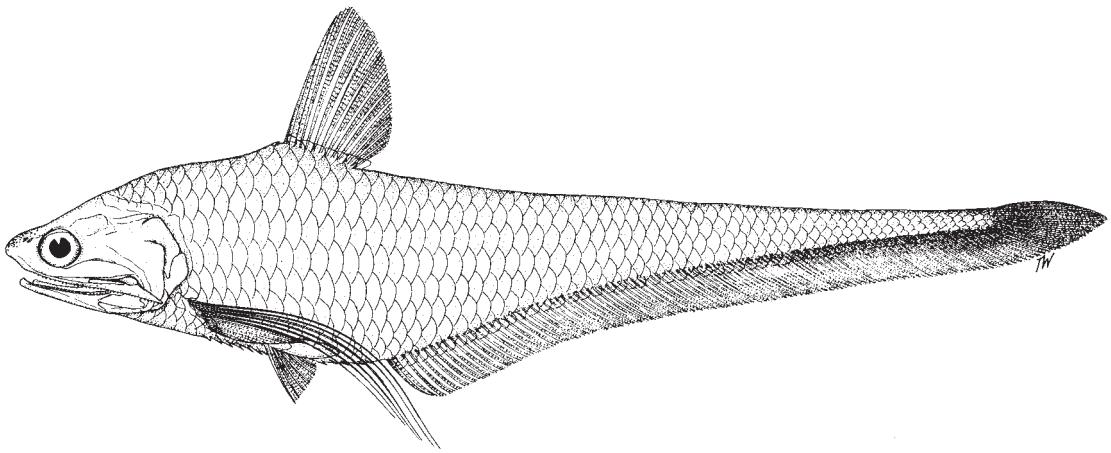
Distribution: Western Central Pacific (Sarawak and western coast of Kalimantan), also 2 specimens from Phuket Island, Thailand (Andaman Sea); the true origin of the Phuket specimens is uncertain.



Coilia neglecta Whitehead, 1969

Frequent synonyms / misidentifications: None / *Coilia mystus* (Linnaeus, 1758).

FAO names: En - Neglected grenadier anchovy; **Fr** - Alice franche; **Sp** - Anchoa granadera plebeya.

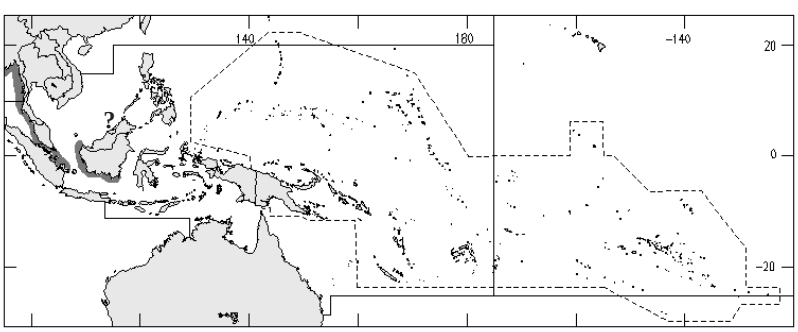


Diagnostic characters: Body long and tapering, abdomen rounded anterior to pelvic fins; **with incomplete series of keeled scutes beginning from just posterior to pectoral-fin base and continuing to anus; 5 to 7 prepelvic and 7 to 9 postpelvic scutes; total number of scutes 12 to 16. A small spine-like scute just before dorsal-fin origin. Maxilla short, almost or just reaching posteriorly to margin of gill cover. Two supramaxillae present**, first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 23 to 27**. Branchiostegal rays 10 to 12 (mostly 11, rarely 13). Dorsal fin far forward, beginning in first third of body length. **Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, rather pointed. Pectoral fins with upper vi rays unbranched, long and filamentous, reaching posteriorly at least to vertical through anal-fin origin, and with 10 or 11 (rarely 9) branched fin rays**, longer than those of pelvic fins. Pelvic fins with i unbranched and 6 branched fin rays. Isthmus entirely covered with scales. Striations on anterior part of scales on flanks sparsely reticulated, with many longitudinal striae anteriorly. **Colour:** no distinctive colour pattern.

Size: Maximum standard length 17 cm, perhaps more.

Habitat, biology, and fisheries: Coastal and estuarine, certainly in fully saline water, but able to tolerate at least some degree of freshening (e.g. at Aluhaluh on Barito River, Kalimantan). Perhaps occurring commonly and contributing to artisanal clupeoid catches in some areas. Presumably mainly in estuaries.

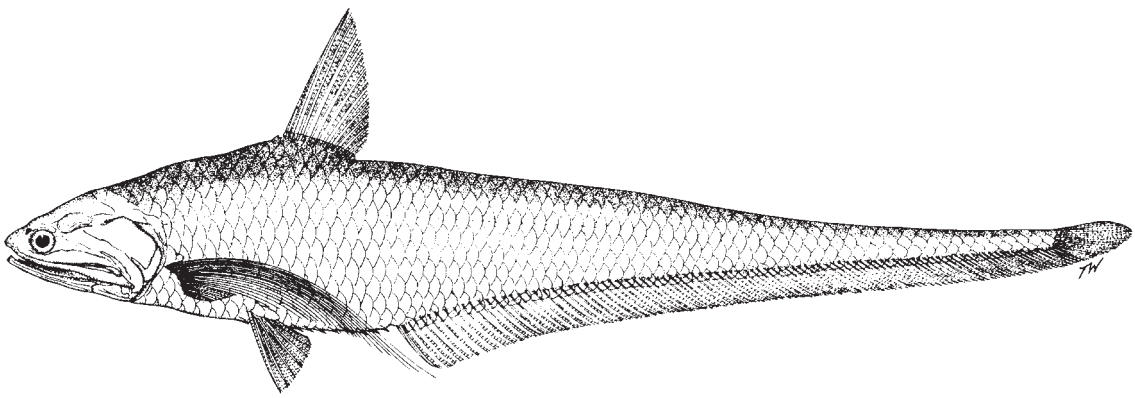
Distribution: Western Central Pacific (Singapore south to Barito River, Kalimantan) and Indian Ocean (from Karachi eastward to Andaman Sea and Penang).



Coilia rebentischii Bleeker, 1858

Frequent synonyms / misidentifications: *Coilia rutherfurdi* Fowler, 1939 / None.

FAO names: En - Many-fingered grenadier anchovy.

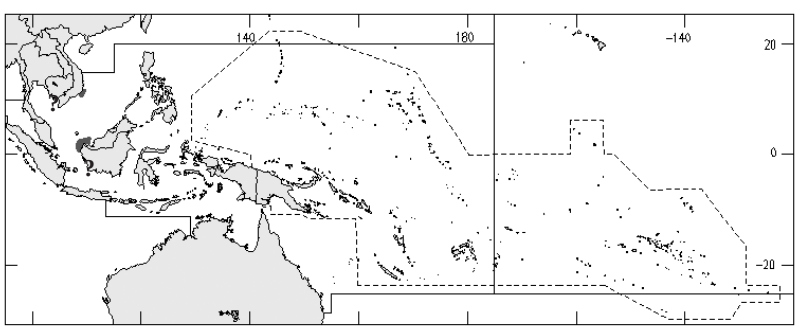


Diagnostic characters: Body long and tapering, abdomen rounded anterior to pelvic fins; **with an incomplete series of keeled scutes beginning just anterior to pelvic-fin base and continuing posteriorly to anus; with at most a single prepelvic scute plus 10 to 12 postpelvic scutes; total number of scutes 11 to 13. A small spine-like scute just anterior to dorsal-fin origin. Maxilla short, not reaching posteriorly beyond margin of gill cover. Two supramaxillae present**; first elongate. Jaw teeth small. Gill rakers fairly short, their serrae not clumped; **lower gill rakers 25 to 27**. Branchiostegal rays usually 10, sometimes 11. Dorsal fin far forward, beginning in first third of body length. **Anal fin long, with 80 or more fin rays; posteriormost fin ray joined to caudal fin. Caudal fin very small, pointed. Pectoral fins with upper xvii to xix (rarely xvi) fin rays unbranched, long and filamentous, reaching posteriorly at least to vertical through anal-fin origin, and with 7 to 10 (mostly 8) branched fin rays**, much shorter than those of pelvic fins. Pelvic fins with i unbranched and 6 branched fin rays. Anterior 1/3 to 1/4 of isthmus naked. Striations on anterior part of scales on flanks with reticulations and with numerous longitudinal striae anteriorly. **Colour:** no distinctive colour patterns.

Size: Maximum standard length 15.2 cm.

Habitat, biology, and fisheries: Coastal and estuarine, but extent of movements into the sea or up rivers is unknown. Unknown to what extent contributes to fishery landings, but its scarcity in museum collections may not reflect the actual abundance of this species.

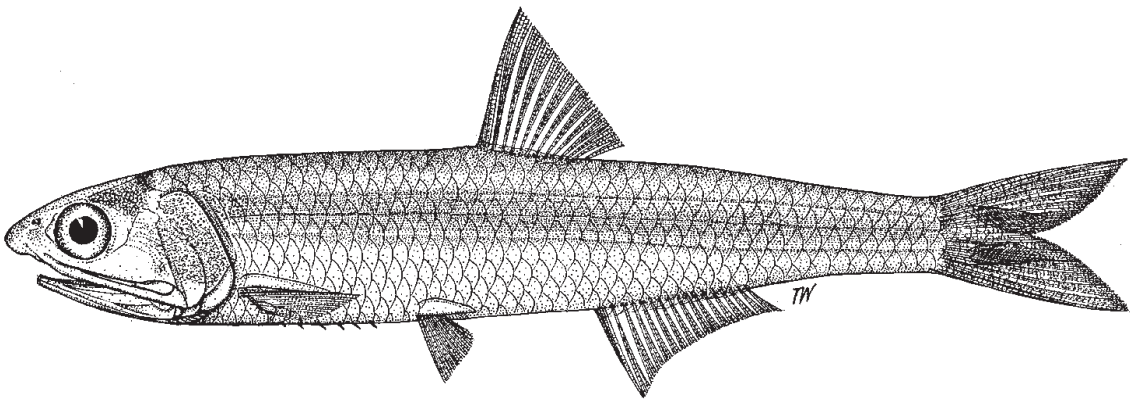
Distribution: Indonesia (western coast of Kalimantan) and Viet Nam (Saigon).



Encrasicholina devisi (Whitley, 1940)

Frequent synonyms / misidentifications: *Stolephorus devisi* (Whitley, 1940) / None.

FAO names: En - Devis' anchovy.

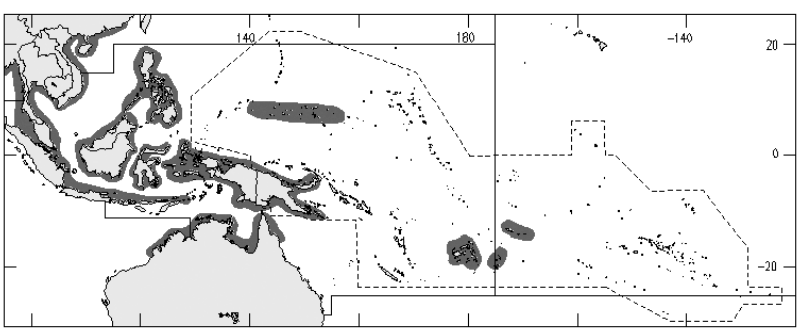


Diagnostic characters: A small-sized anchovy; body nearly cylindrical, **abdomen rounded, with 5 or 6 (rarely 3 or 4) sharp needle-like prepelvic scutes**; **no postpelvic scutes; no spine on prepelvic scute. Posterior fontanelles (on top of head near occiput) remain open in adults**. **Maxilla tip pointed, projecting posteriorly beyond second supramaxilla and reaching to subopercle; maxilla tip deeper than long**. **Isthmus muscle short, not reaching anteriorly to posterior border of branchial membrane and preceded by a small exoposed bony portion of urohyal between branchial membranes**. **Preopercular canal present only on preopercle. Gill rakers slender; lower gill rakers 20 to 27 (usually 23 or 24); 6 or 7 on posterior face of third epibranchial**. **No predorsal spine-like scute**. **Unbranched dorsal- and anal-fin rays iii** (separation of this species on number of unbranched dorsal- and anal-fin rays requires a scalpel for finding the first ray, since it is a thin splinter and can be easily missed); **anal fin short, with usually iii unbranched and 15 to 17 branched fin rays, its origin slightly posterior to vertical through base of posteriormost dorsal-fin ray**. Scales moderate, about 39 to 42 in lateral series. **Colour:** in life, body with golden hue; **a bright silver band on flank, with a thin blue line above**, **dorsum blue-grey**.

Size: Maximum standard length 7.7 cm.

Habitat, biology, and fisheries: Marine, pelagic, schooling, inshore. Like other species, probably feeds mainly on planktonic crustaceans. Females mature at 4.4 to 4.5 cm standard length. Serial spawner, breeds throughout year around full moon, with peaks in New Ireland waters during May to June or July and possibly also in September to November; in March to May in Solomon Islands. Spawning peaks usually followed by several months when only a small proportion of population spawning. Spawning frequency varies unpredictably with local environmental conditions. Eggs oval, without a knob at one end. At least in some areas (e.g. Micronesia) almost as abundant as *Encrasicholina heteroloba*, and makes a significant contribution to "*Stolephorus*" catches. An excellent baitfish for tuna.

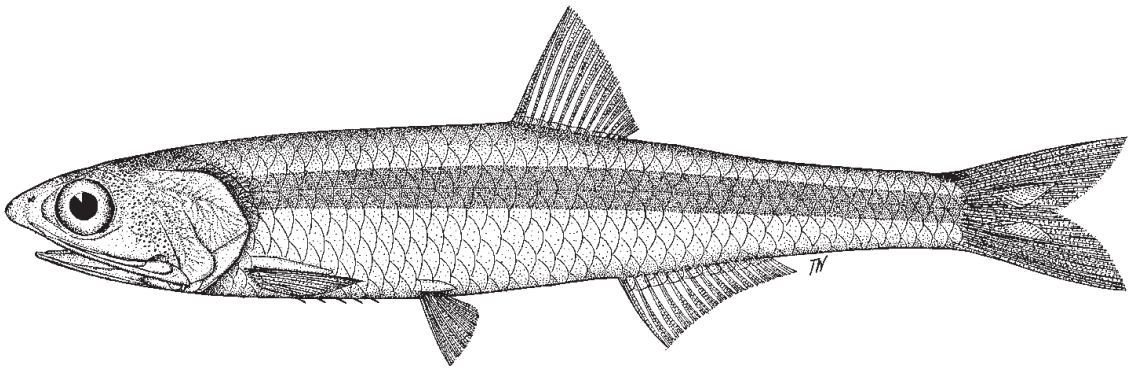
Distribution: Very widespread Indo-Pacific from the Persian Gulf, Gulf of Aden, but apparently not Red Sea and not to Kenya coast, to coasts of India, Andaman Islands, Gulf of Thailand, and Indonesia; north to at least Taiwan Province of China, and south to northern Australia including Gulf of Carpenteria and northeast coast to Cooktown, Queensland; also, north to Caroline Islands, and eastward to Samoa.



Encrasicholina heteroloba (Rüppell, 1837)

Frequent synonyms / misidentifications: *Anchoviella heteroloba* (Rüppell, 1837); *Stolephorus heterolobus* (Rüppell, 1837); *S. pseudoheterolobus* Hardenberg, 1933 / None.

FAO names: En - Shorthead anchovy.

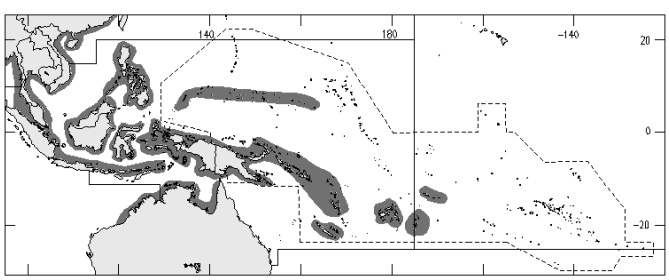


Diagnostic characters: A small-sized anchovy; body nearly cylindrical, **abdomen rounded, with 4 to 6 (mostly 5) sharp needle-like prepelvic scutes**; **no postpelvic scutes; no spine on prepelvic scute**. **Posterior fontanelles (on top of head near occiput) remain open in adults**. **Maxilla tip pointed, projecting posteriorly beyond second supramaxilla and reaching to subopercle; maxilla tip longer than deep**. **Isthmus muscle short, not reaching anteriorly to posterior border of branchial membrane but preceded by a small bony plate on urohyal between branchial membranes. Preopercular canal present only on preopercle**. Gill rakers slender; **lower gill rakers 22 to 30 (usually 23 to 27); 7 to 9 on posterior face of third epibranchial. No predorsal spine-like scute**. **Unbranched dorsal and anal-fin rays only ii** (separation of this species on number of unbranched dorsal- and anal-fin rays requires a scalpel to find the first ray, since it is a thin splinter and can be easily missed); **anal fin short, with usually ii unbranched and 14 to 16 branched fin rays, its origin slightly posterior to vertical through base of posteriormost dorsal-fin ray**. Scales moderate, about 39 to 43 in lateral series. **Colour: in life, pale cream-coloured (when scales lost) with a dull silver-grey band on flank, with distinct blue upper edge (when alive); dorsum beige**.

Size: Maximum standard length at least 8 cm, but probably not much larger.

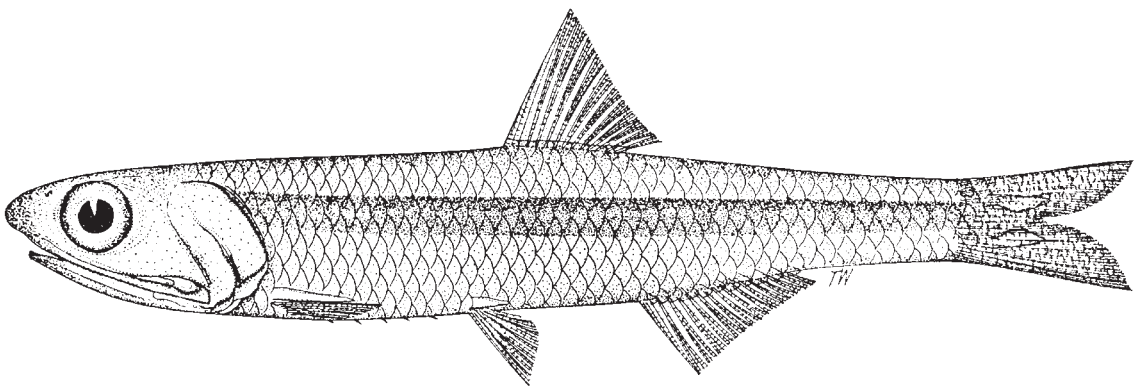
Habitat, biology, and fisheries: Marine, pelagic, and schooling, inshore. Like other species, probably feeds mainly on planktonic crustaceans. Short-lived species, less than 1 year. Breeds throughout the year around full moon, with peak during first part of northeast monsoon in Manila Bay (October to January), in New Ireland waters in May to June or July and again in September to November (especially this latter period), and in March to May in Solomon Islands. Serial spawner, may spawn as frequently as every 2 days; but spawning frequency within population may show marked variations within a year. Spawning time 21.30 to 23.00 h. Mature females are 4.3 to 8.5 cm total length. Batch fecundity varies with female size, location, and food supply. Batch fecundity estimates (females 4.8 to 8.5 cm total length) range from 100 to 2 400 eggs per spawning. Eggs oval, without a knob at one end. Forms bulk of "*Stolephorus*" catches in Singapore, Thailand, and the Philippines. Caught mainly with purse seines, beach seines, and fish traps often using light, also incidentally with bottom trawls. Marketed fresh, dried, dried-salted or made into fish meal, fish sauce, or fish balls; also used as bait. A delicate, but important, baitfish in the West Pacific, and probably less robust than *Encrasicholina devisi*.

Distribution: Very widespread Indo-Pacific from Red Sea, East Africa to at least northern Madagascar, eastward to Bay of Bengal, Gulf of Thailand, and Indonesia; northward to southern Japan; southward to Cape York, Queensland, also Palau, Caroline Islands to Kosrae, and eastward to Samoa.



Encrasicholina oligobranchus (Wongratana, 1983)

Frequent synonyms / misidentifications: *Stolephorus oligobranchus* Wongratana, 1983 / None.
FAO names: En - Philippine anchovy.

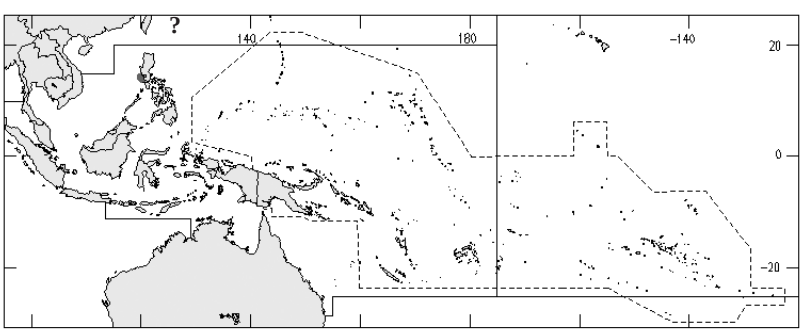


Diagnostic characters: A small-sized anchovy; body nearly cylindrical, **abdomen rounded, with 5 sharp needle-like prepelvic scutes; no postpelvic scutes; no spine on prepelvic scute. Posterior fontanelles (on top of head near occiput) remain open in adults. Maxilla tip pointed, deeper than long, projecting posteriorly beyond second supramaxilla and not quite reaching to subopercle. Isthmus muscle short, not reaching anteriorly to posterior border of branchial membrane but preceded by a small bony plate on urohyal between branchial membranes. Preopercular canal present only on preopercle**. Gill rakers slender; **lower gill rakers 17 or 18**. **No predorsal spine-like scute. Unbranched dorsal and anal-fin rays iii**; **anal fin short, with 15 branched fin rays, its origin slightly posterior to vertical through base of posteriormost dorsal-fin ray**. Scales moderate, about 40 or 41 in lateral series. **Colour: a lateral stripe along flanks**.

Size: Maximum standard length 6.2 cm.

Habitat, biology, and fisheries: Marine, pelagic, and presumably schooling with other species of *Encrasicholina* or *Stolephorus*, although the 3 type (and only known) specimens were caught after 20 months of sampling in Manila Bay; evidently rare. Apparently no importance as a commercial fishery species.

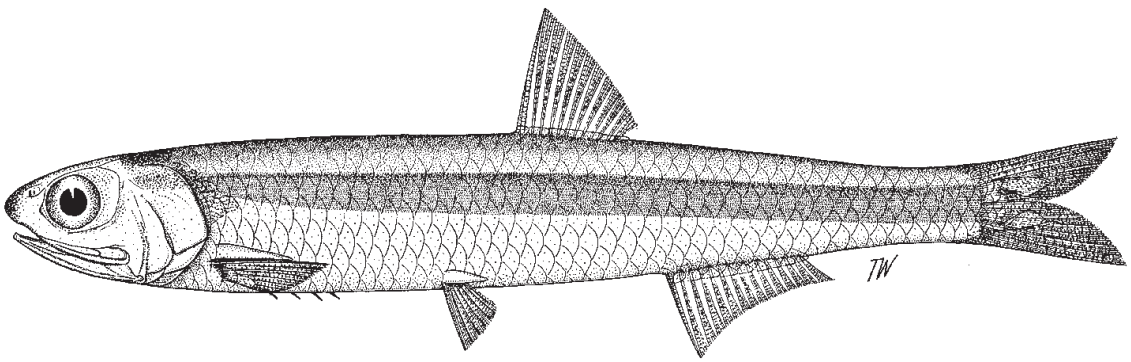
Distribution: West Pacific in Manila Bay, Philippines; a doubtful record from Taiwan Province of China.



Encrasicholina punctifer (Fowler, 1938)

Frequent synonyms / misidentifications: *Stolephorus buccaneeri* Strasburg, 1960; *S. punctifer* (Fowler, 1938); *S. zollingeri* (non Bleeker, 1849) / None.

FAO names: En - Buccaneer anchovy.

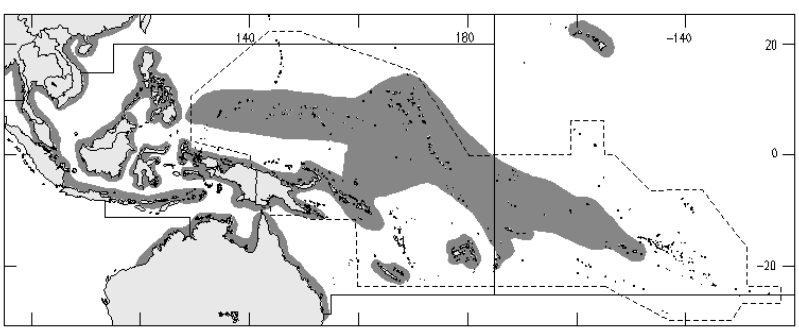


Diagnostic characters: A small-sized anchovy; body nearly cylindrical, **abdomen rounded, with 3 to 6 (usually 4 or 5, rarely 2 or 7) sharp needle-like prepelvic scutes; no postpelvic scutes; no spine on prepelvic scute. Posterior fontanelles (on top of head near occiput) remain open in adults. Maxilla tip blunt, scarcely projecting posteriorly beyond second supramaxilla, not reaching to anterior border of preopercle. Isthmus muscle short, not reaching anteriorly to posterior border of branchial membrane but preceded by small fleshy knob on urohyal between branchial membranes. Preopercular canal present only on preopercle**. Gill rakers slender; **lower gill rakers usually 23 to 26**. **No predorsal spine-like scute. Unbranched dorsal and anal-fin rays iii**; **anal fin short, with usually 13 or 14 branched fin rays, its origin posterior to vertical through base of posteriormost dorsal-fin ray**. Scales moderate, about 39 to 43 in lateral series. **Colour:** body pale cream (when scales lost), **with a bright silver lateral stripe along flanks**.

Size: Maximum standard length 8.5 cm (to 13 cm total length).

Habitat, biology, and fisheries: Marine, pelagic, and schooling; inshore but also oceanic and found hundreds of miles from land. A detailed biological study is needed. Said to comprise up to 22% of Philippine "*Stolephorus*" catch, and probably makes a significant contribution elsewhere in its wide range. Caught mainly with purse seines, beach seines, and bamboo-stake traps, often using light; also incidentally with bottom trawls. Marketed fresh, dried, dried-salted, or made into fish meal, fish sauce, or fish balls. Considered the most attractive anchovy for bait.

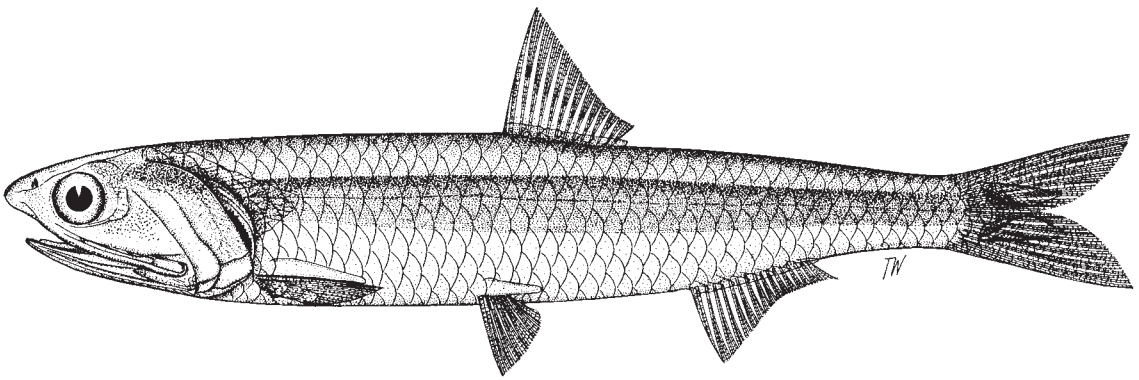
Distribution: Very widespread Indo-Pacific from the Persian Gulf and Red Sea south to perhaps Durban, but not Madagascar, to India, probably also Myanmar; Gulf of Thailand, Indonesia, northern Australia to at least Brisbane in the east, and as far eastward as Tahiti; also known from the Philippines, southern Japan, and eastward to at least 155°W longitude, and Hawaii.



Engraulis australis (White, 1790)

Frequent synonyms / misidentifications: *Engraulis encrasicholus* var. *antipodum* Günther, 1868; *E. australis fraseri* Blackburn, 1950; *E. antarcticus* Castelnau, 1872 / None.

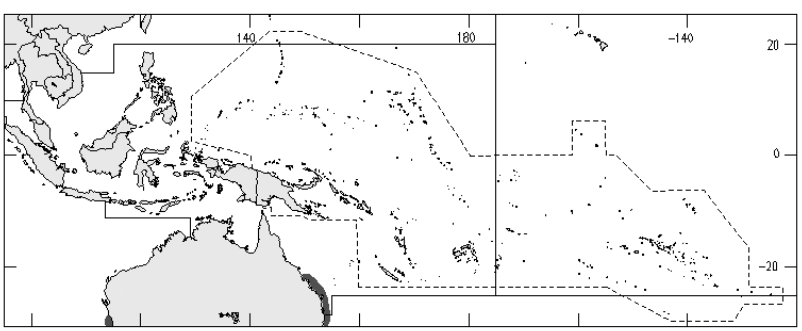
FAO names: En - Australian anchovy.



Diagnostic characters: Body slender, elongate, oval in cross-section and little compressed, depth about 6 times in standard length. No pre- or postpelvic scutes; pelvic scute with ascending arms present. Snout pointed; **maxilla short, tip blunt, reaching posteriorly almost to anterior border of preopercle, not projecting beyond tip of second supramaxilla**; **anterior tip of lower jaw only reaching to vertical through nostril**. Fine teeth on lower jaw. Gill rakers slender and numerous, lower gill rakers 27 to 43; **gill rakers present on posterior face of third epibranchial**. **Pseudobranch longer than eye, reaching onto inner face of opercle**. Dorsal-fin origin at about midpoint of body. **Anal fin short, with iii unbranched and 13 to 15 branched fin rays**, its origin well posterior to vertical through base of posteriormost dorsal-fin ray. **Colour:** body brownish or greenish above, silvery-white below with a broad silver stripe along flank (its upper edge dark or black in preserved specimens), disappearing with age; all fins hyaline; caudal fin pale yellow.

Size: Maximum standard length perhaps 14 cm, but usually between 8 and 12 cm.

Habitat, biology, and fisheries: Marine, pelagic, mostly inshore, forming compact schools (much preyed upon by larger fishes, common dolphins, and birds); chiefly found in bays, inlets, and estuaries, sometimes in lowered salinities, but older fishes tending to move out to sea in winter and returning to inshore waters again in the spring. Feeds on plankton. Spawns in inlets, bays, and estuaries, probably throughout the year, but mainly from late spring to early autumn especially in warm summer months (about November-February); eggs ellipsoidal. In Australia, mainly exploited in Victoria (especially in Port Phillip Bay), in earlier times used chiefly as a baitfish for anglers and caught by lift net; after 1946 caught in greater quantities by beach seines and used for fish paste, but never a large fishery. No special fishery in New Zealand. Catches probably rarely more than about 100 t. Marketed mostly fresh.



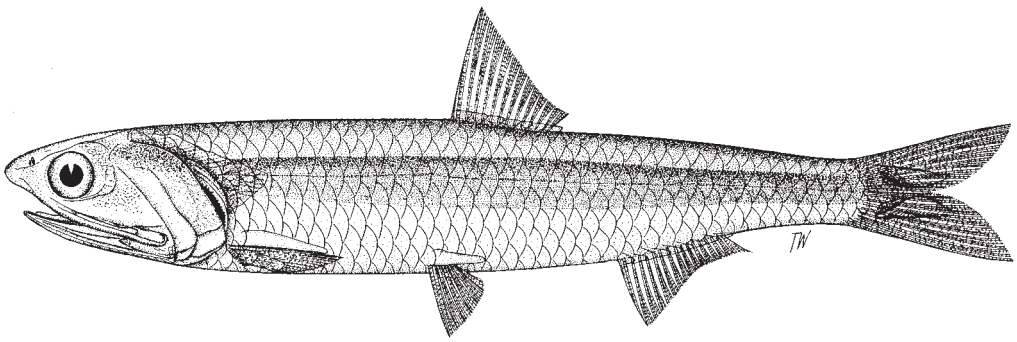
Distribution: Subtropical Western Pacific from Heron Island, Queensland, south to southern Tasmania, entire southern coast of Australia (except Great Australian Bight), and north to about Red Bluff, Western Australia, also New Zealand (most of North Island and all but southeast coast of South Island).

Remarks: Three subspecies recognized: *Engraulis australis australis* (southern Queensland to almost southern boundary of New South Wales); *E. australis antipodum* (extreme south of New South Wales, Victoria, Tasmania, eastern part of south Australia), and *E. australis fraseri* (Western Australia). More work is needed to confirm that these really are distinct and not merely a trend to higher counts of meristic features in cooler waters. (See also remarks on following page.)

Engraulis japonicus Temminck and Schlegel, 1846 JAN

Frequent synonyms / misidentifications: *Stolephorus celebicus* Hardenberg, 1933 / *Engraulis zollingeri* Bleeker, 1849; *Stolephorus zollingeri* (Bleeker, 1849).

FAO names: En - Japanese anchovy; **Fr** - Anchois japonais; **Sp** - Anchoita japonesa.

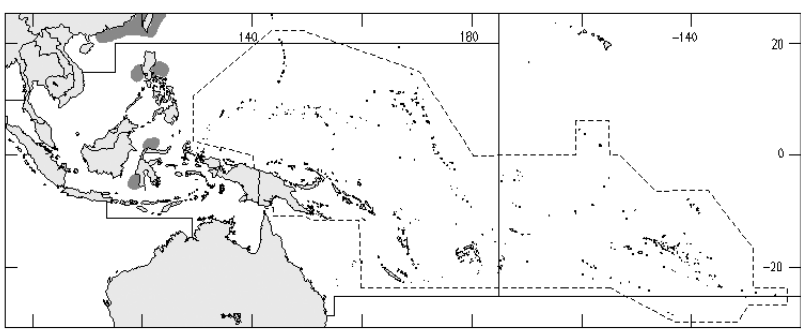


Diagnostic characters: Body slender, elongate, oval in cross-section and little compressed, depth about 6 times in standard length. No pre- or postpelvic scutes; pelvic scute with ascending arms present. Snout pointed; **maxilla short, tip blunt, reaching posteriorly almost to anterior border of preopercle; not projecting beyond tip of second supramaxilla**; **anterior tip of lower jaw only reaching to vertical through nostril**. Fine teeth on lower jaw. Gill rakers slender and numerous, lower gill rakers 26 to 30; **gill rakers present on posterior face of third epibranchial**. **Pseudobranch longer than eye, reaching onto inner face of opercle**. Dorsal-fin origin just posterior to midpoint of body. **Anal fin short, with iii unbranched and 14 to 16 branched fin rays**, its origin well posterior to vertical through base of posteriormost dorsal-fin ray. **Colour:** body brownish or greenish above, silvery white below with a broad silver stripe along flank (its upper edge dark or black in preserved specimens), becoming paler with age; all fins hyaline; caudal fin pale yellow.

Size: Maximum standard length perhaps 14 cm, but usually between 8 and 12 cm.

Habitat, biology, and fisheries: Marine, pelagic, mostly inshore, forming compact schools (much preyed upon by larger fishes, common dolphins, and birds); chiefly found in bays, inlets, and estuaries; sometimes in lowered salinities, but older fishes tending to move out to sea in winter and returning to inshore waters again in the spring. Feeds on plankton. Spawns in inlets, bays, and estuaries, probably throughout the year; eggs ellipsoidal. Caught by lift net and beach seines, but never a large fishery. No special fishery in Western Central Pacific. Catches probably rarely more than about 100 t. Marketed mostly fresh, and used for fish paste.

Distribution: Western North and Central Pacific (southern Sakhalin Island, Sea of Japan, and Pacific coast of Japan, and south almost to Canton, Taiwan Province of China). The only verified records from the Philippine coasts (Luzon, western Mindanao) and Indonesian waters (Manado and Ujung Pandang, Sulawesi) seem to represent stray fishes from the above areas.

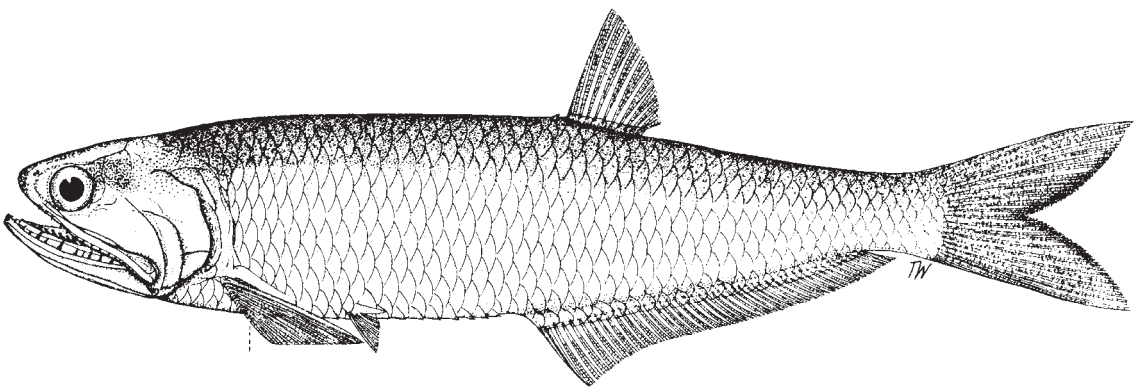


Remarks: Hardly differs from *Engraulis australis*. The differences between *E. japonicus* and *E. australis* are slight, with many overlapping morphological features. However, there is no indication that the Japanese anchovy is geographically linked to the Australian anchovy. Meristic characters used to separate the species may only represent clinal differences. More work is needed to confirm that these really are distinct species and not merely populations with trends to higher counts of meristic features in cooler waters.

Lycothrissa crocodilus (Bleeker, 1851)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Sabretoothed thryssa.

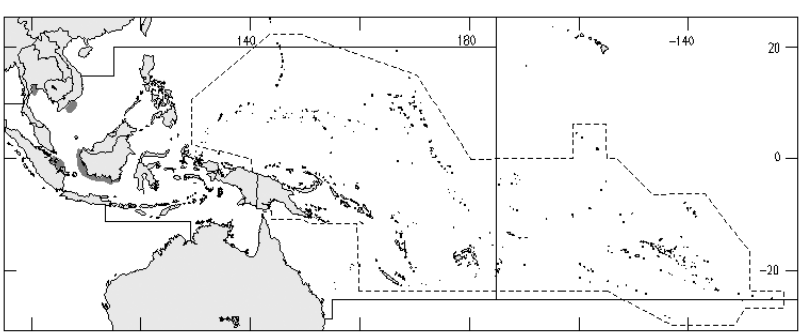


Diagnostic characters: Body elongate, not strongly compressed, **abdomen with incomplete series of scutes**; scutes absent from isthmus to below pectoral-fin base; 7 or 8 (rarely 9) prepelvic and 9 or 10 (rarely 8 or 11) postpelvic scutes; total number of scutes 16 to 19. **A small spine-like scute just anterior to dorsal-fin origin**. Maxilla short, reaching posteriorly only to anterior margin of preopercle, tip blunt; **first supramaxilla absent**; maxilla projecting slightly beyond second supramaxilla. **Teeth in jaws moderate, but interspersed with large canine-like teeth. Lower gill rakers 8 to 10 (usually 9), short, with large tooth-like serrae; serrae not clumped**. Inner face of third epibranchial without rakers. Branchiostegal rays 12 to 15. Pseudobranch very small, with 2 to 5 filaments or entirely hidden under skin. **Dorsal-fin origin distinctly posterior to body midpoint, between verticals through bases of seventh to eleventh anal-fin rays. Anal fin with iii (rarely iv) unbranched and 44 to 48 branched fin rays.** Pectoral fins with uppermost ray moderately ossified, **not extended as a filament**; pectoral-fin tips reaching posteriorly to or slightly posterior to pelvic-fin base. Pelvic fins very small (5.2 to 7.3% standard length), with i unbranched and 5 or 6 branched fin rays; distinctly in advance of dorsal- or anal-fin origin. Scales moderate, oval-shaped, 45 to 49 in lateral series; with a few interrupted vertical striae or radii. **Colour:** pectoral fins wholly or partly black, caudal yellow with a black border; no humeral spot.

Size: Maximum standard length 23 cm, perhaps to 25 cm.

Habitat, biology, and fisheries: Riverine and lacustrine, but perhaps passing from estuaries into the sea. Large teeth suggest a diet of fishes or shrimps. More data needed; only few specimens in museum collections. Interest to fisheries is unknown, but perhaps slight considering the few specimens recorded.

Distribution: Rivers, lakes, and estuaries of Western Central Pacific (Banjermasin, Pontianak, Sinkawang, middle part of Kapuas River, Kalimantan; Banjuasin, Palembang, Djambi, Sumatra; Chao Phya River as far up as Lake Bueng-borapet or 310 km from the sea, Thailand; Tonle Sap, Cambodia).



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