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Key for the Field Identification of the Common Clupeoid Fishes of India*

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With 18 Figures

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Introduction

The clupeoid fishes are second to none in the commercial fisheries of India and they contribute more than a third of the total marine fish production of the country. The sardines, hilsa, anchovies, whitebaits, etc., are the more important fishes of the group which support the very rich fisheries of our waters. Many other closely related clupeoid fishes also form valuable fisheries along both the east and west coasts and their identification in the field is difficult even for the specialist. This key was first prepared at the suggestion of Dr. N. K. Panikkar† for the use of the field workers on Indian fisheries, but received encouragement from the programmes initiated by the Neritic Pelagic Sub-Committee of the Indo-Pacific Fisheries Council. It is primarily intended for the rapid determination in the field of the different species of this difficult group of fishes which are invariably found in almost all the commercial catches.

In preparing this key, Misra's¹ classification given in his check list of fishes is followed. All the species of the Suborder Clupeoidei are included except those of the Superfamily Alepocephaloidea. The purely riverine and estuarine species and those known only from dried specimens have been omitted from the scope of this key. All the salient diagnostic characters given by Day², Weber and Beaufort³, Fowler⁴ and a few other

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† I am thankful to Dr. N. K. Panikkar for suggesting improvements in the format of the key.

¹ Misra, K. S., A check-list of the Fishes of India, Burma and Ceylon. Part II. Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes and Ateleopiformes. *Rec. Ind. Mus.*, Vol. 45, 1947.

² Day, F., *The Fauna of British India, including Ceylon and Burma. Fishes.* Vol. I. London, 1889.

³ Weber, M. & Beaufort, L. F. de, *The Fishes of the Indo-Australian Archipelago.* Vol. II. Leiden, 1913.

⁴ Fowler, H. W., The Fishes of the groups Elasmobranchii, Holocephali, Isopondyli and Ostarophysii obtained by the United States Bureau of Fisheries Steamer "Albatross" in 1907 to 1910, chiefly in the Philippine Islands and Adjacent Seas. *U. S. Nat. Mus. Bull.* 100, Vol. 13, 1941.

authors, supplemented by personal notes, are included and the easily recognizable important ones are given in italics. The height and head and the eye proportions given in the key are in relation to the body length (unless otherwise mentioned) and to the length of head respectively; these are more helpful in the identification of the species of a few difficult genera. The figures included in the key are after Day*.

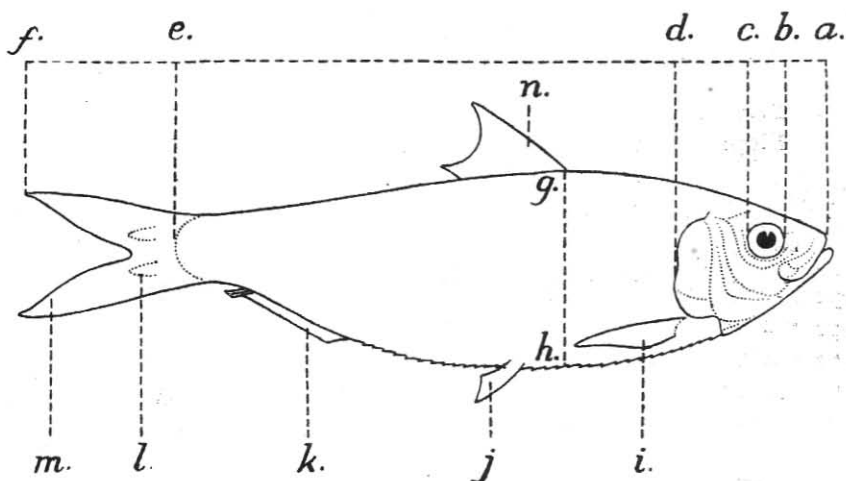


Fig. 1—*Sardinella fimbriata* (Cuv. & Val.) showing the principal parts of a fish. ab. length of snout; ad. length of head; ae. body length; af. total length; bc. diameter of eye; gh. height; i. pectoral fin; j. ventral fin; k. anal fin; l. alar scale; m. caudal fin n. dorsal fin.

Order : **Clupeiformes**

Suborder : CLUPEOIDEI

SYNOPSIS OF FAMILIES

I. Lateral line present.

A. Origin of ventrals before that of dorsal. Anal somewhat midway between caudal and dorsal. Mouth terminal.

a. Dorsal without filament

.. *Elopidae.*

b. Last dorsal ray produced into filament

.. *Megalopidae.*

B. Origin of ventrals below last half of dorsal.

Anal very near caudal. Mouth inferior

.. *Albulidae.*

II. Lateral line absent.

A. Mouth moderate, terminal

.. *Clupeidae.*

B. Mouth very large, partly or quite inferior

.. *Engraulidae.*

* Day, F., *Fishes of India*. Plates. London, 1889.

Superfamily : ELOPOIDAE

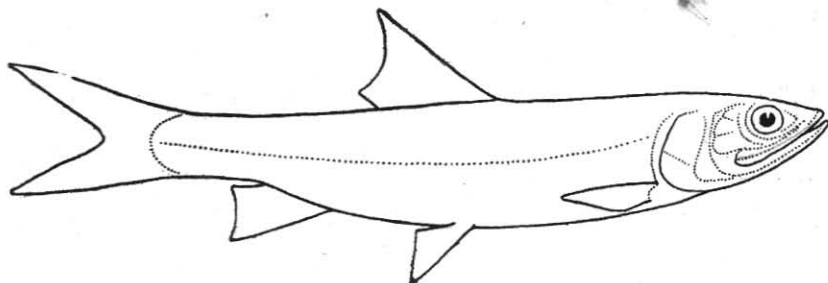
Family : ELOPIDAE

Genus : *ELOPS* Linnaeus

Body elongate, compressed. Mouth wide, terminal. Scales thin, small. Dorsal and anal depressible in basal scaly sheaths. Lateral line distinct.

Elops saurus Linnaeus

(Fig. 2)

Elops saurus, Linnaeus, 1766.*Elops indicus*, Swainson, 1839.*Elops saurus*, Day, 1878 & 1889.*Elops machnata*, Regan, 1909.*Elops machnata*, Weber & Beaufort, 1913.*Elops saurus*, Fowler, 1941.Fig. 2—*Elops saurus* Linnaeus(Height $4\frac{4}{5}$ — $5\frac{1}{4}$; head $3\frac{1}{2}$ —4; eye $4\frac{1}{8}$ — $6\frac{1}{4}$)

Snout longer than eye. Cleft of mouth oblique, maxillary reaches well beyond eye. Origin of dorsal nearer to caudal than to snout. Anal behind dorsal. Origin of ventrals before that of dorsal.

Back brown, sides and below bright silvery. Fins yellowish with a greenish tinge.

Family : MEGALOPIDAE

Genus : *MEGALOPS* Lacepede

Body oblong, compressed. Mouth very large, oblique, lower jaw conspicuous. Scales thin, large. Anal without scaly sheath. Last dorsal ray produced.

Megalops cyprinoides (Broussonet)

(Fig. 3)

Clupea cyprinoides, Broussonet, 1782.*Cyprinodon cundinga*, Hamilton, 1822.

- Megalops indicus*, Cuvier & Valenciennes, 1846.
Elops apalike, Day, 1865.
Megalops cyprinoides, Gunther, 1868.
Megalops cyprinoides, Day, 1878 & 1889.
Megalops cyprinoides, Weber & Beaufort, 1913.

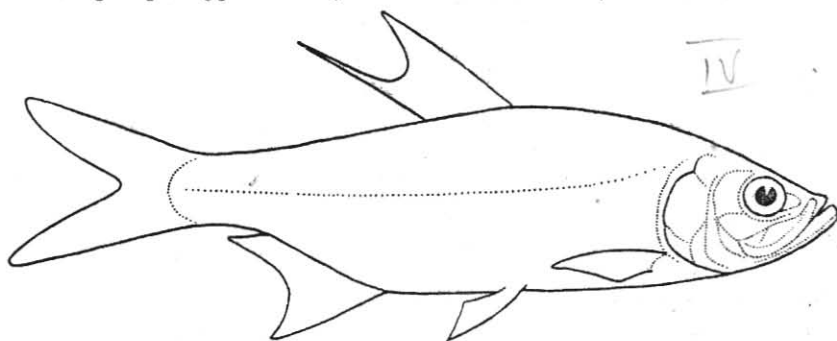


Fig. 3—*Megalops cyprinoides* (Broussonet)

(Height $3\frac{1}{2}$ —5; head $3\frac{1}{2}$ —4; eye $2\frac{3}{5}$ — $3\frac{1}{2}$)

Mouth large and oblique. Maxillary reaches opposite or little beyond hind edge of eye. Snout shorter than eye. Origin of dorsal midway between snout and base of caudal or nearer to latter. Origin of ventrals before that of dorsal. Last dorsal ray greatly elongated.

Back darkish blue, sides and below silvery white. Dorsal and caudal gray. Pectorals, ventrals and anal diaphanous with some black dots. Last dorsal and anal rays dark.

Superfamily : ALBULOIDAE
 Family : ALBULIDAE

Genus : *ALBULA* Scopoli

Body elongate, slightly compressed. Snout pointed, projecting beyond the mouth. Anal very small.

Albula vulpes (Linnaeus)

- Esox vulpes*, Linnaeus, 1758.
Albula conorhynchus, Gunther, 1868.
Albula conorhynchus, Day, 1878 & 1889.
Albula vulpes, Weber & Beaufort, 1913.

(Height 4— $5\frac{3}{4}$; head $3\frac{1}{3}$ — $3\frac{4}{5}$; eye $4\frac{1}{8}$ — $4\frac{7}{8}$)

Mouth inferior, maxillary not quite reaching eye. Dorsal much nearer to caudal than to snout. Origin of ventrals below last rays of dorsal. Anal near caudal and far behind anus.

Back grayish brown with faint dark streaks along rows of scales, sides and below bright silvery. Dorsal and caudal pale.

Superfamily : CLUPEOIDAE
Family : CLUPEIDAE

SYNOPSIS OF SUBFAMILIES

- I. No abdominal scutes .. *Dussumierini*
 II. Keeled abdominal scutes
 A. Mouth terminal, jaws mostly equal .. *Clupeini*
 B. Mouth small, inferior, transverse,
 toothless .. *Dorosomatini*

Subfamily : DUSSUMIERIINI

SYNOPSIS OF GENERA

- I. Origin of dorsal nearer to caudal than
 to snout .. *Dussumieria*
 II. Origin of dorsal nearer to snout than to
 caudal .. *Stolephorus*

Genus : *DUSSUMIERIA* Cuv. & Val.

Body elongate, somewhat compressed with rounded abdomen. Scales moderate, thin, caducous. No abdominal scutes. Snout pointed. Cleft of mouth moderate, jaws equal. Dorsal opposite to ventrals and its origin nearer to caudal than to snout. Anal small, far behind dorsal.

SYNOPSIS OF SPECIES

- I. Maxillary not reaching front margin of
 eye. Head 4 in length .. *D. acuta*
 II. Maxillary reaching front margin of eye.
 Head less than 4 in length .. *D. hasselti*

Dussumieria acuta Cuv. & Val.

(Fig. 4)

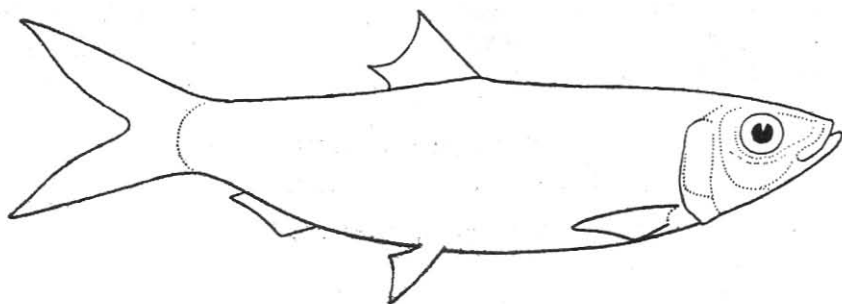
Dussumieria acuta, Cuvier & Valenciennes, 1847.

Dussumieria acuta, Day, 1878 & 1889.

(Height 4—4¹/₂; head 4; eye 3—4)

Snout longer than eye. *Maxillary not reaching below front margin of eye. Pectorals as long as head without snout.*

Upper half bluish green, lower silvery. Upper side of head emerald green. A golden lateral band from opercle to caudal. Below this a silvery one shot with pink. Fins hyaline, caudal shot with blue green and gold with a dark margin. First ray of dorsal and pectorals with a dark spot.

Fig. 4—*Dussumieria acuta* Cuv. & Val.*Dussumieria hasselti* Bleeker*Dussumieria hasselti*, Bleeker, 1851.*Dussumieria hasseltii*, Day, 1878 & 1889.*Dussumieria hasseltii*, Weber & Beaufort, 1913.(Height 4—5; head $3\frac{2}{3}$; eye about 4)

Snout longer than eye. Maxillary nearly reaching below front margin of eye. Pectorals about as long as post-ocular part of head.

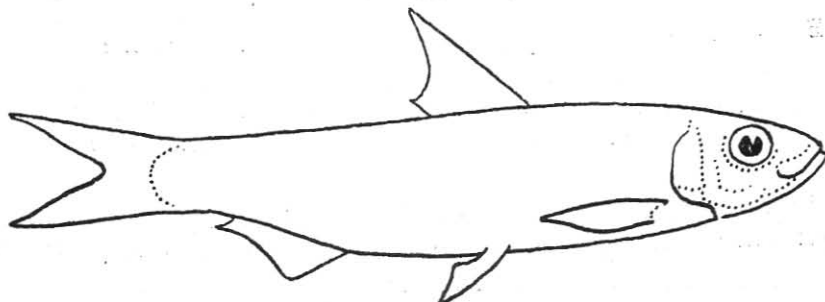
Colour similar to that of *Dussumieria acuta*.

Genus: *STOLEPHORUS* Lacepede

Small, elongate, moderately compressed with rounded abdomen. Scales large, thin, deciduous. No abdominal scutes. Snout conical. Cleft of mouth small, jaws nearly or quite equal. Dorsal short, inserted opposite ventrals, its origin nearer to snout than to caudal. Anal very short.

Stolephorus malabaricus (Day)

(Fig. 5)

Spratelloides malabaricus, Day, 1873, 1878 & 1889.Fig. 5—*Stolephorus malabaricus* (Day)(Height $5\frac{1}{4}$; head $4\frac{1}{2}$ — $5\frac{3}{4}$ in total length; eye 3)

Origin of dorsal slightly in front of that of ventrals.

Light yellowish green above, a silvery stripe along the side, abdomen silvery. Upper lobe of caudal with a bluish posterior edge. Fine black points along the back. Upper edge of eye dark green.

Subfamily : CLUPEINI

SYNOPSIS OF GENERA

- I. Anal fin moderate, jaws equal, ventrals well developed.
- A. One continuous anal.
- a. Origin of dorsal before origin of ventrals.
1. Upper jaw with distinct median notch .. *Hilsa*
2. Upper jaw without median notch.
- i. Last two anal rays enlarged .. *Sardinella*
- ii. Anal rays equal, not enlarged .. *Harengula*
- b. Origin of dorsal slightly behind origin of ventrals .. *Kowala*
- B. Anal divided, second detached as 2 enlarged connected rays .. *Corica*
- II. Anal fin very long, lower jaw prominent, ventrals small or absent.
- A. Ventrals present.
- a. Ligament between terminal end of premaxillary and middle of maxillary .. *Ilisha*
- b. Toothed bone between terminal end of premaxillary and middle of maxillary .. *Pellona*
- B. Ventrals absent.
- a. Dorsal present .. *Opisthopterus*
- b. Dorsal absent .. *Raconda*

Genus : *HILSA* Regan

Body compressed. Upper jaw with distinct median notch. Scales adherent. Anal long. Ventrals below dorsal.

SYNOPSIS OF SPECIES

- I. Caudal longer than head .. *H. toli*

II. Caudal about as long as head.

- A. A dark humeral spot followed by a series. Eye $4\frac{1}{2}$ or less in head.. *H. kanagurta*
- B. No spots in adult, but a row of them in young. Eye more than $4\frac{1}{2}$ in head .. *H. ilisha*

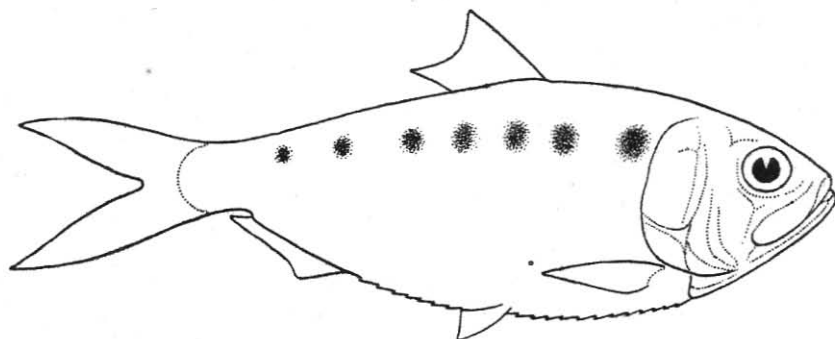
Hilsa toli (Cuv. & Val.)*Alausa toli*, Cuvier & Valenciennes, 1847.*Clupea toli*, Day, 1878 & 1889.*Clupea (Alosa) toli*, Weber & Beaufort, 1913.*Hilsa toli*, Regan, 1917.*Macrura sinensis*, Fowler, 1941.(Height $2\frac{2}{3}$ — $3\frac{1}{4}$; head $3\frac{1}{2}$ —4; eye $4\frac{1}{3}$ — $7\frac{1}{2}$)

Oblong, compressed. Snout as long as or longer than eye. Maxillary extends to below posterior part of eye or beyond. Lower jaw rather projecting beyond the upper. Ventrals below middle of dorsal. Margin of dorsal distinctly concave. Caudal much longer than head, nearly $1\frac{1}{2}$ in adult.

Back dark coloured, sides silvery shot with yellow and purple. Dark shoulder spot in the young. Edge of caudal diffusely dark.

Hilsa kanagurta (Bleeker)

(Fig. 6)

Alausa kanagurta, Bleeker, 1852.*Clupea kanagurta*, Day, 1878 & 1889.*Clupea (Alosa) kanagurta*, Weber & Beaufort, 1913.*Hilsa kanagurta*, Regan, 1917.*Hilsa blochii*, Fowler, 1924.*Macrura kelee*, Fowler, 1941.Fig. 6—*Hilsa kanagurta* (Bleeker)

(Height $2\frac{1}{2}$ —3; head 3 — $3\frac{2}{5}$; eye $3\frac{2}{3}$ — $4\frac{1}{2}$)

Snout nearly as long as or a little longer than eye. Maxillary reaches below middle or posterior part of eye. Lower jaw scarcely projects beyond the upper. Ventrals below anterior half of dorsal. Caudal about as long as head with longer inferior lobe.

Silvery with bluish green back, gold dotted with purple on the sides and below. Dorsal black tipped. Caudal with black margin. A dark humeral spot which in the young is followed by 3—8 similar spots in a row.

Hilsa ilisha (Hamilton)

Clupanodon ilisha, Hamilton, 1822.

Clupea palasah, Cuvier, 1829.

Alausa palasah, Cuvier & Valenciennes, 1847.

Alausa palasah, Day, 1865.

Clupea ilisha, Day, 1878 & 1889.

Macrura ilisha, Fowler, 1941.

(Height $2\frac{1}{2}$ —3; head $3\frac{1}{4}$ — $3\frac{3}{4}$; eye $4\frac{2}{3}$ —7)

Oblong, compressed. Snout as long as or longer than eye. Maxillary extending below posterior part of eye or beyond. Lower jaw not projecting beyond the upper. Ventrals below anterior half of dorsal. Margin of dorsal slightly concave. Caudal about as long as head.

Silvery, shot with gold and purple. No spots in the adult, but a row of them along the upper side of the body in the young.

Genus: *SARDINELLA* Cuv. & Val.

Body compressed. No distinct median notch in upper jaw. Anal moderate, last two rays enlarged. Alar scales present on caudal.

SYNOPSIS OF SPECIES

- I. Height usually less than 3 in length.
 - A. Head 4 or more in length .. *S. albella*
 - B. Head less than 4 in length .. *S. dayi*
- II. Height 3—4 in length.
 - A. Edge of caudal lobes dusky, dorsal midway between caudal and snout.
 - a. Height 3 — $3\frac{1}{2}$ in length .. *S. fimbriata*
 - b. Height $3\frac{1}{2}$ —4 in length .. *S. gibbosa*
 - B. Ends of caudal lobes deep black, dorsal nearer to caudal than to snout. .. *S. melanura*
 - C. Caudal lobes sometimes dark. Lines along rows of scales in upper two-thirds of body .. *S. sindensis*

III. Height usually more than 4.

- A. A pearl coloured longitudinal band
with a series of dark spots . . . *S. sirm*
- B. No longitudinal band. . . . *S. longiceps*

Sardinella albella (Cuv. & Val.)*Kowala albella*, Cuvier & Valenciennes, 1847.*Clupea albella*, Gunther, 1868.*Clupea brachysoma*, Day, 1878 & 1889.*Clupea* (*Harengula*) *brachysoma*, Weber & Beaufort, 1913.*Sardinella brachysoma*, Regan, 1917.*Sardinella albella*, Fowler, 1941.(Height $2\frac{1}{2}$ —3; head 4— $4\frac{1}{2}$; eye 3— $3\frac{1}{3}$)

Oblong, compressed. *Abdominal profile conspicuously more convex.* Snout shorter than eye. Lower jaw somewhat prominent. Dorsal a little nearer to base of caudal than to snout, its origin nearer to snout. Anal much lower than dorsal. Ventrals below middle of dorsal.

Back dark, sides and below silvery. A dark spot at base and upper part of dorsal and behind the operculum. Ends of caudal lobes often dusky.

Sardinella dayi Regan*Sardinella dayi*, Regan, 1917.*Sardinella dayi*, Fowler, 1924 & 1941.(Height $2\frac{3}{4}$; head $3\frac{4}{5}$; eye $3\frac{2}{3}$)

Oblong. Dorsal and ventral profile evenly convex. Snout as long as eye. Dorsal nearly equidistant from snout and base of caudal. *Ventrals below middle of dorsal.*

Silvery with dark back. A blackish spot at base of anterior dorsal rays. Upper part of dorsal and edge of caudal dusky.

Sardinella fimbriata (Cuv. & Val.)

(Fig. 1)

Spratella fimbriata, Cuvier & Valenciennes, 1847.*Clupea fimbriata* (part), Day, 1878 & 1889.*Clupea* (*Harengula*) *fimbriata* (part), Weber & Beaufort, 1913.*Sardinella fimbriata*, Regan, 1917.(Height 3— $3\frac{1}{2}$; head 4; eye $3\frac{1}{2}$ — $3\frac{2}{3}$)

Oblong. Ventral profile slightly more convex than dorsal. Snout as long as eye. *Dorsal midway between snout and caudal. Origin of ventrals in advance of middle of dorsal.*

Silvery with dark back. A dark spot at base of anterior dorsal rays. Upper part of dorsal and *posterior edge of caudal dusky.*

Sardinella gibbosa (Bleeker)*Clupea gibbosa*, Bleeker, 1849.*Clupea fimbriata* (part), Day, 1878 & 1889.*Clupea (Harengula) fimbriata* (part), Weber & Beaufort, 1913.*Sardinella gibbosa*, Regan, 1917.*Sardinella jussieu*, Fowler, 1941.(Height $3\frac{1}{2}$ —4; head $4-4\frac{1}{3}$; eye $3\frac{1}{2}$ —4)

Oblong. Abdominal profile a little more convex than dorsal. Snout as long as or longer than eye. Dorsal midway between snout and caudal. Ventrals somewhat in advance of dorsal.

Silvery with dark back. A dark spot at base of anterior dorsal rays. Upper part of dorsal and posterior edge of caudal often dusky.

Sardinella melanura (Cuvier)*Clupea melanura*, Cuvier, 1829.*Clupeonia commersoni*, Cuvier & Valenciennes, 1847.*Clupea atricauda*, Day, 1878 & 1889.*Clupea (Harengula) atricauda*, Weber & Beaufort, 1913.*Sardinella melanura*, Regan, 1917.(Height $3\frac{1}{2}$ —4; head $4-4\frac{1}{4}$; eye $3\frac{1}{2}$ —4)

Oblong. Dorsal and ventral profile evenly convex. Snout a little longer than eye. Dorsal nearer to caudal than to snout. Ventrals below or a little in advance of middle of dorsal. Lower caudal lobe sometimes slightly longer.

Silvery with dark back which shows indications of darker bands along rows of scales. Tips of caudal deep black.

Sardinella sindensis (Day)*Clupea sindensis*, Day, 1878 & 1889.*Sardinella sindensis*, Regan, 1917.(Height $3\frac{1}{4}$ —4; head $3\frac{2}{3}-4\frac{1}{3}$; eye $3\frac{1}{2}-3\frac{3}{4}$)

Snout as long as or shorter than eye. Ventrals below or somewhat in advance of middle of dorsal.

Back deep blue, sides golden shot with purple and blue. Dark spots at base of anterior dorsal rays, its upper edge dark. Ends of caudal lobes sometimes dark. Usually with lines along the rows of scales in the upper two-thirds of body.

Sardinella sirm (Ruppell)*Clupea sirm*, Ruppell, 1835-40.*Sardinella leiogaster*, Cuvier & Valenciennes, 1847.*Clupea leiogaster*, Day, 1878 & 1889.

Clupea (Amblygaster) leiogaster, Weber & Beaufort, 1913.

Sardinella sirm, Regan, 1917.

(Height $4\frac{1}{2}$ —5; head 4 — $4\frac{1}{2}$; eye $3\frac{2}{3}$ — $4\frac{1}{3}$)

Elongate. Dorsal and ventral profile nearly equal. Snout longer than eye. Dorsal nearer to caudal than to snout. Origin of ventrals before middle of dorsal.

Upper side dark blue, silvery white on the sides and below. Sometimes a brownish mark on the shoulder. A pearl coloured longitudinal band along the body with 13—20 intensely blue spots. Dorsal and caudal dusky.

Sardinella longiceps Cuv. & Val.

(Fig. 7)

Sardinella longiceps, Cuvier & Valenciennes, 1847.

Sardinella neohowii, Cuvier & Valenciennes, 1847.

Alausa scombrina, Cuvier & Valenciennes, 1847.

Clupea longiceps, Gunther, 1868.

Clupea scombrina, Gunther, 1868.

Clupea longiceps, Day, 1878 & 1889.

Clupea (Harengula) longiceps, Weber & Beaufort, 1913.

Sardinella longiceps, Regan, 1917.

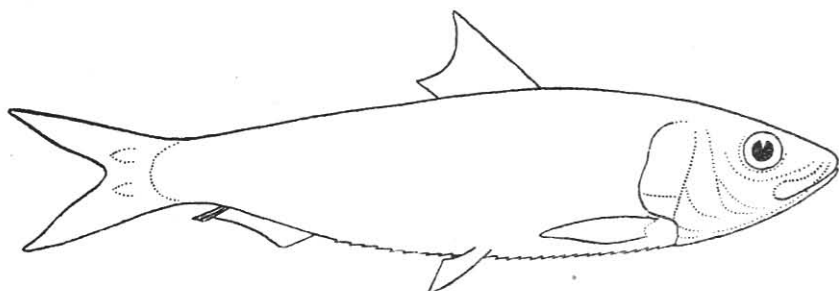


Fig. 7—*Sardinella longiceps* Cuv. & Val.

(Height 4 — $4\frac{2}{3}$; head 3 — $3\frac{3}{5}$; eye 5—6)

Elongate. Dorsal and ventral profile evenly convex. Snout longer than eye. Upper jaw with slight median notch. Lower jaw slightly longer. Dorsal somewhat nearer to caudal than to snout. Origin of ventrals behind middle of dorsal.

Bluish brown along the back with golden reflections. Abdomen silvery shot with purple. Sometimes a golden line divides the colour of the back from that of the sides. A large greenish gold spot on the upper margin of operculum. Dorsal and caudal greenish brown.

Genus : *HARENGULA* Cuv. & Val.

Small. Body compressed, oblong or partly oblong. Upper jaw

without median notch. Scales thin, firmly adnate. Dorsal with low scaly basal sheath. Hind anal rays equal. Ventrals below dorsal.

SYNOPSIS OF SPECIES

- I. Edge of caudal lobes gray brown .. *H. punctata*
 II. Edge of caudal lobes black .. *H. vittata*

Harengula punctata (Ruppell)

(Fig. 8)

Clupea punctata, Ruppell, 1835-40.

Sardinella lineolata, Cuvier & Valenciennes, 1847.

Clupea moluccensis, Gunther, 1868.

Clupea klunzei, Day, 1878.

Clupea kunzei, Day, 1889.

Clupea (*Harengula*) *moluccensis*, Weber & Beaufort, 1913.

Harengula ovalis, Fowler, 1941.

Harengula punctata, Herre, 1941.

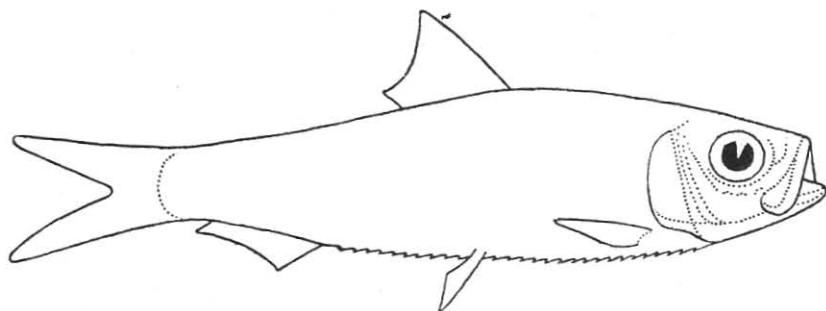


Fig. 8—*Harengula punctata* (Ruppell)

(Height $3\frac{1}{3}$ —4; head $3\frac{1}{3}$ —4; eye 3— $3\frac{1}{3}$)

Abdominal profile a little more convex than dorsal. Snout as long as eye. Lower jaw prominent. Dorsal slightly nearer to caudal than to snout. Anal shorter than dorsal. Origin of ventrals below or slightly before middle of dorsal. Caudal longer than head.

Bluish along back, sides and below silvery white. Dorsal often dark coloured anteriorly. Caudal tinted gray brown.

Harengula vittata Cuv. & Val.

Clupeonia vittata, Cuvier & Valenciennes, 1847.

Clupea melanura, Day, 1878 & 1889.

Clupea (Harengula) melanura, Weber & Beaufort, 1913.

Harengula vittata, Fowler, 1941.

(Height $3\frac{1}{3}$ — $3\frac{2}{3}$; head $3\frac{3}{4}$ —4; eye $3\frac{2}{5}$ — $3\frac{3}{5}$)

Oblong, dorsal and ventral profile evenly convex or dorsal profile slightly more convex. Snout shorter than eye. Lower jaw longer than upper. Dorsal nearer to caudal than to snout. Anal as long as dorsal. Ventrals below anterior half of dorsal.

Brownish above, sides and below silvery. Outer third of caudal lobes black.

Genus : KOWALA Cuv. & Val.

Oblong, compressed. Abdominal profile more convex than dorsal. Scales thin and firm. Origin of dorsal slightly behind that of ventrals.

Kowala coval (Cuvier)

(Fig. 9)

Clupea coval, Cuvier, 1829.

Kowala thoracata, Cuvier & Valenciennes, 1847.

Meletta lile, Cuvier & Valenciennes, 1847.

Clupea lile, Gunther, 1868.

Clupea lile, Day, 1878 & 1889.

Clupeoides lile, Weber & Beaufort, 1913.

Clupea (Harengula) thoracata, Weber & Beaufort, 1913.

Kowala coval, Fowler, 1941.

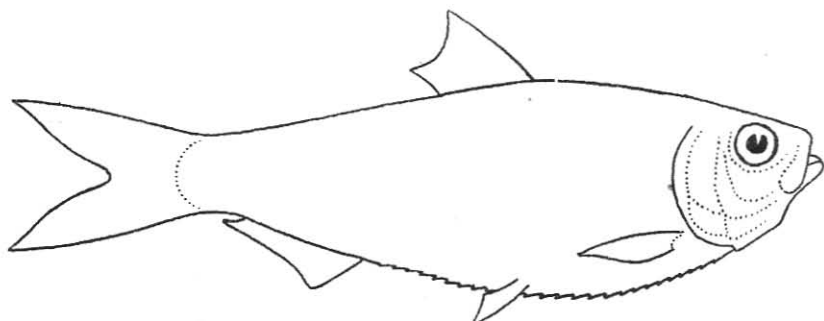


Fig. 9—*Kowala coval* (Cuvier)

(Height $2\frac{2}{3}$ — $3\frac{1}{3}$; head 4— $4\frac{1}{2}$; eye 3— $3\frac{1}{3}$)

Oblong, very compressed. Abdominal profile more convex than dorsal. Front of head concave. Snout shorter than eye. Origin of dorsal nearer to snout than to caudal. Origin of ventrals slightly before that of dorsal.

Yellowish white. Head, abdomen and a median lateral band silvery.

Black dots on snout, top of head and in some in a row along each side of the base of the anal. Caudal dark and black tipped. *Belly occasionally with an orange tinge.*

Genus : *CORICA* Hamilton

Oblong, compressed. Scales moderate, thin, smooth. *Anal fin of moderate extent, its rays grouped as two fins, second fin formed by two thickened rays, cleft to base and much longer than last rays of first anal fin.*

Corica soborna Hamilton

Corica soborna, Hamilton, 1822.

Corica guberni, Gray, 1833-34.

Corica soborna, Day, 1878 & 1889.

(Height 4; head $4\frac{1}{4}$; eye $3\frac{1}{4}$)

Snout shorter than eye. Origin of dorsal nearer to base of caudal than to snout. *Origin of ventrals slightly before that of dorsal. Anal with its last two rays thickened and detached. Lower lobe of caudal longer.*

Silvery, with a light band.

Genus : *ILISHA* Richardson*

Elongate, compressed. Mouth moderate, terminal, lower jaw prominent. Eyes large. Scales moderate, thin, deciduous. Origin of dorsal behind ventrals. Anal elongate, its origin below or behind dorsal. Ventrals small.

SYNOPSIS OF SPECIES

- I. 16 to 20 preventral scutes.
 - A. Height $2\frac{1}{2}$ — $2\frac{3}{5}$.
 - a. Origin of anal below last dorsal ray .. *I. indica*
 - b. Origin of anal behind dorsal .. *I. brachysoma*
 - B. Height $3\frac{3}{4}$ —4.
 - a. Origin of anal below hind part of dorsal .. *I. kampeni*
 - b. Origin of anal just behind dorsal .. *I. motius*
- II. 20 to 28 preventral scutes.
 - A. Origin of anal below hind half of dorsal.

Height 3— $3\frac{1}{2}$.

 - a. Origin of ventrals little nearer pectoral base than origin of anal .. *I. filigera*

* Species of this genus are somewhat difficult to distinguish owing to individual variation (Day, 1889).

- b. Origin of ventrals midway between pectoral base and origin of anal .. *I. melastoma*
- B. Origin of anal nearly opposite end of dorsal. Height $3-3\frac{3}{4}$.. *I. elongata*

Ilisha indica (Swainson)

(Fig. 10)

Platygaster indicus, Swainson, 1839.

Pellona indica, Day, 1878 & 1889.

Pellona ditchoa, Weber & Beaufort, 1913.

Ilisha indica, Norman, 1923.

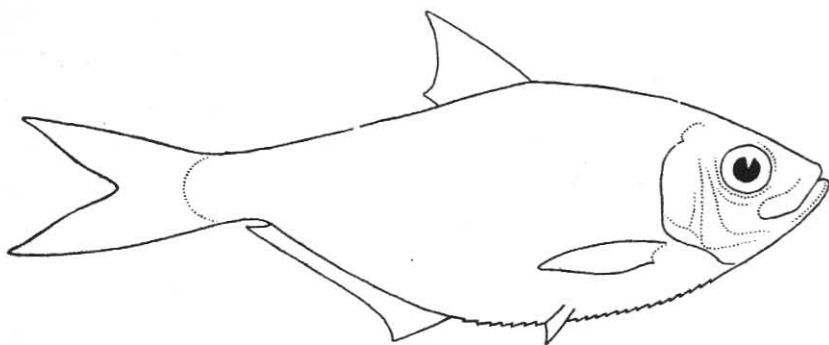


Fig. 10—*Ilisha indica* (Swainson)

(Height $2\frac{1}{2}-2\frac{3}{5}$; head $3\frac{1}{5}-3\frac{4}{5}$; eye $2\frac{1}{2}-3$)

Oblong, compressed. Abdominal profile more convex than dorsal. *Strongest convexity below ventrals*. Snout shorter than eye. Origin of dorsal nearer to snout than to caudal and behind that of ventrals. *Origin of anal below base of last dorsal ray*.

Greenish along back, becoming silvery shot with purple and gold on the sides and below. Dorsal and caudal powdered with brown.

Ilisha brachysoma (Bleeker)

Pellona brachysoma, Bleeker, 1852.

Pellona brachysoma, Day, 1878 & 1889.

Pellona brachysoma, Weber & Beaufort, 1913.

Ilisha brachysoma, Norman, 1923.

(Height $2\frac{1}{2}-2\frac{3}{5}$; head $3\frac{1}{2}-3\frac{2}{3}$; eye $2\frac{1}{2}-3\frac{3}{4}$)

Oblong, compressed. Abdominal profile more convex than dorsal. Snout shorter than eye. Origin of dorsal distinctly nearer to snout than to caudal and behind that of ventrals. *Origin of anal behind dorsal*.

Silvery with dark back. Dorsal and caudal grayish.

Ilisha kampeni (Weber & Beaufort)

Pellona kampeni, Weber & Beaufort, 1913.

Ilisha kampeni, Norman, 1923.

(Height $3\frac{3}{4}$; head $3\frac{4}{5}$; eye $3\frac{1}{4}$)

Snout equal to eye. Origin of dorsal a little nearer to snout than to base of caudal and behind ventrals. Origin of anal below posterior part of dorsal.

Caudal dark edged.

Ilisha motius (Hamilton)

Clupandon motius, Hamilton, 1822.

Clupea motius, Gray, 1833-34.

Pellona motius, Cuvier & Valenciennes, 1847.

Pellona motius, Day, 1878 & 1889.

Ilisha motius, Norman, 1923.

(Height $3\frac{3}{4}$ —4; head $4\frac{1}{4}$ — $4\frac{1}{2}$; eye $2\frac{2}{3}$)

Abdominal profile more convex than that of back. Snout shorter than eye. Origin of dorsal much nearer to snout than to base of caudal. Origin of anal just behind dorsal.

Silvery, with mother-of-pearl reflections and a burnished lateral band. Caudal fin with a dark outer edge. A dark band along the middle of dorsal.

Ilisha filigera Cuv. & Val.

Pellona filigera, Cuvier & Valenciennes, 1847.

Pellona filigera, Day, 1878 & 1889.

Ilisha filigera, Norman, 1923.

(Height 3; head $3\frac{3}{4}$; eye $2\frac{3}{6}$)

Abdominal profile more convex than that of back. Snout shorter than eye. Origin of ventrals little nearer to pectoral base than to origin of anal.

A coppery tinge along back. Sides silvery with mother-of-pearl reflections. Dorsal and pectorals black-tipped.

Ilisha melastoma (Cuvier)

Clupea melastoma, Cuvier, 1829.

Platygaster megaloptera, Swainson, 1839.

Pellona dussumieri, Cuvier & Valenciennes, 1847.

Pellona micropus, Cuvier & Valenciennes, 1847.

Pellona megaloptera, Day, 1878 & 1889.

Ilisha megaloptera, Norman, 1923.

Ilisha melastoma, Fowler, 1941.

(Height 3— $3\frac{1}{4}$; head $3\frac{1}{5}$ — $3\frac{1}{2}$; eye 3— $3\frac{1}{4}$)

Oblong, compressed. Abdominal profile slightly more convex than dorsal. Snout shorter than eye. Origin of dorsal about midway between snout and base of caudal. Origin of anal below hindermost rays of dorsal. *Origin of ventrals midway between pectoral base and origin of anal.*

Back brown, sides and below silvery white. Upper surface of snout and mandible brownish. Dorsal and caudal with dark border.

Ilisha elongata (Bennett)

Alosa elongata, Bennett, 1830.

Clupea affinis, Gray, 1833-34.

Pellona elongata, Day, 1878 & 1889.

Pellona elongata, Weber & Beaufort, 1913.

Ilisha elongata, Norman, 1923.

(Height $3-3\frac{3}{4}$; head $3\frac{2}{3}-4$; eye $3\frac{1}{4}-4$)

Oblong, compressed. Abdominal profile more convex than dorsal, especially before ventrals. Snout equal to eye. Origin of dorsal midway between snout and base of caudal, far behind origin of ventrals. *Origin of anal below end of dorsal.*

Dark above, sides silvery shot with mother-of-pearl. Edge of dorsal and caudal dark-tipped.

Genus: PELLONA Cuv. & Val.

A small group resembling Ilisha but differing chiefly in the structure of upper jaw, edge of which is provided with a small toothed bone (ligament in Ilisha) extending from lateral end of premaxillary to middle of maxillary.

Pellona ditchela Cuv. & Val.

Pellona ditchela, Cuvier & Valenciennes, 1847.

Pellona ditchela, Day, 1878.

Pellona hoevenii, Day, 1878.

Pellona ditchela, Day, 1889.

Neosteus ditchela, Norman, 1923.

Ilisha ditchela, Herre, 1940.

Pellona ditchela, Fowler, 1941.

(Height $2\frac{3}{4}-3$; head $3-3\frac{1}{4}$; eye $2\frac{3}{4}-3$)

Oblong, compressed. Abdominal profile not more convex than dorsal. Snout shorter than eye. Origin of dorsal midway between caudal and snout or a little nearer to the latter and slightly behind that of ventrals. Origin of anal below or a little before base of last dorsal ray.

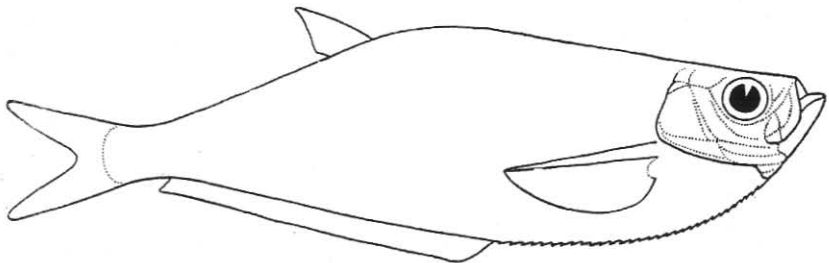
Brownish back, sides and below silvery white. Margin of dorsal and caudal dark.

Genus: *OPISTHOPTERUS* Gill

Elongate, strongly compressed. Ventral profile convex especially below chin and pectorals. Scales moderate, thin and very deciduous. Strongly serrated abdomen. Lower jaw projecting. Maxillary more or less vertical. Small teeth. Dorsal fin short, inserted far behind origin of anal, which is long. Ventrals absent.

Opisthopterus tardoore (Cuvier)

(Fig. 11)

Pristigaster tardoore, Cuvier, 1829.*Pristigaster tartoor*, Cuvier & Valenciennes, 1847.*Pristigaster tartoor*, Day, 1865.*Opisthopterus tartoor*, Day, 1878 & 1889.*Opisthopterus tartoor*, Weber & Beaufort, 1913.*Opisthopterus indicus*, Norman, 1923.*Opisthopterus tardoore*, Fowler, 1941.Fig. 11—*Opisthopterus tardoore* (Cuvier)(Height $3\frac{1}{3}$ — $3\frac{3}{4}$; head 4 — $4\frac{2}{5}$; eye $2\frac{3}{4}$ — 3)

Elongate, very compressed. Highly convex from chin to anal. Dorsal profile of head concave, of back slightly convex. Dorsal short, its origin far behind that of anal. Anal elongate. No ventrals.

Silvery. Pectorals and caudal with dull dusky dots.

Genus: *RACONDA* Gray

Oblong, much compressed. Belly very convex and feebly serrated. Scales moderate, thin and very deciduous. Projecting lower jaw. Teeth minute. Dorsal and ventrals absent. Anal long. Upper pectoral ray enlarged.

Raconda russelliana Gray

(Fig. 12)

Raconda russelliana, Gray, 1831.*Apterygia ramcarata*, Gray, 1833-34.

Pristigaster russellianus, Gunther, 1868.

Raconda russelliana, Day, 1878 & 1889.

Raconda russelliana, Weber & Beaufort, 1913.

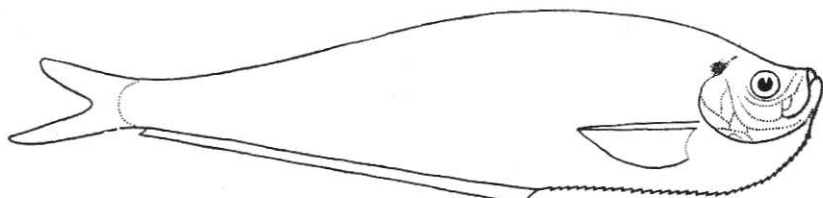


Fig. 12—*Raconda russelliana* Gray

(Height $3\frac{4}{5}$; head $5\frac{3}{4}$; eye $3-3\frac{1}{4}$)

Oblong, strongly compressed. End of the lower jaw forms a portion of dorsal profile, which is concave above the orbit. Anterior portion of abdominal profile very convex. Snout shorter than eye. Dorsal and ventrals absent. Lower lobe of caudal longer.

A narrow dark band along the back, yellowish sides, silvery below. A deep brown or black spot on the shoulder.

Subfamily : DOROSOMATINI

SYNOPSIS OF GENERA

- I. Last dorsal ray prolonged into a filament .. *Nematalosa*
- II. Last dorsal ray not prolonged .. *Anodontostoma*

Genus : NEMATALOSA Regan

Mouth small, inferior and transverse. Toothless. Dorsal with scaly basal sheath and last ray prolonged into a filament.

Nematalosa nasus (Bloch)

(Fig. 13)

Clupea nasus, Bloch, 1795.

Chatoessus altus, Gray, 1833-34.

Chatoessus nasus, Cuvier & Valenciennes, 1848.

Chatoessus altus, Day, 1865.

Chatoessus nasus, Day, 1878 & 1889.

Dorosoma nasus. Chaudhuri, 1915.

Nematalosa nasus, Regan, 1917.

(Height $2\frac{2}{5}-2\frac{4}{5}$; head $3\frac{2}{3}-4$; eye $3\frac{1}{3}-4$)

Oblong, compressed. Snout prominent, as long as or shorter than eye. Last dorsal ray produced, in some reaching the base of the caudal fin. Ventrals below origin or anterior third of dorsal.

Silvery, back grayish green. Dark longitudinal streaks along upper

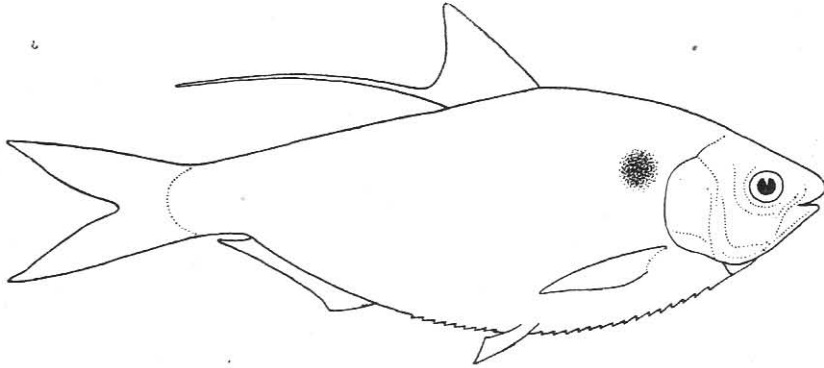


Fig. 13.—*Nematalosa nasus* (Bloch)

rows of scales. A large black spot on the shoulder. Fins yellowish, dorsal and caudal with dark margin.

Genus: *ANDONTOSTOMA* Bleeker

Mouth small, inferior, transverse. Toothless. Dorsal with broad basal scaly sheath extending to tip of last ray, which is not prolonged. Anal depressible in a scaly sheath.

Anodontostoma chacunda (Hamilton)

(Fig. 14)

Clupanodon chacunda, Hamilton, 1822.

Chatoessus chacunda, Day, 1878 & 1889.

Dorosoma chacunda, Weber & Beaufort, 1913.

Dorosoma indicus, Chaudhuri, 1915.

Anodontostoma chacunda, Regan, 1917.

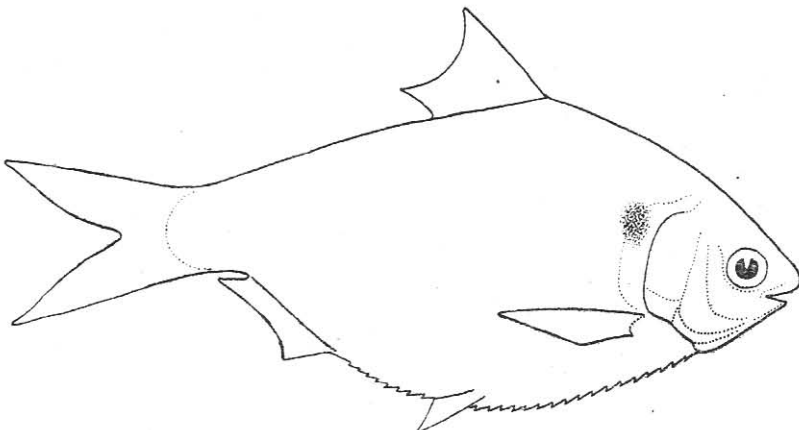


Fig. 14—*Anodontostoma chacunda* (Hamilton)

(Height $2-2\frac{1}{2}$; head $3\frac{1}{3}-4$; eye $3-3\frac{3}{4}$)

Oblong, slightly compressed. Snout prominent, shorter than eye. *Ventral profile rounded. Profile between dorsal and snout especially above operculum convex. Dorsal without elongated ray.* Ventrals inserted below middle or anterior part of dorsal.

Silvery. Upper half darker with indistinct brown longitudinal lines running along rows of scales. A large black spot on the shoulder.

Family : ENGRAULIDAE

SYNOPSIS OF GENERA

- I. Body greatly elongate. Tail long and tapering. Caudal little or not forked, lower portion continuous with long anal. Upper pectoral rays prolonged as slender filaments .. *Coilia*
- II. Body moderately long. Anal free from strongly forked caudal. Upper pectoral rays not prolonged as slender filaments.
 - A. Silvery colouration absent only on back. Abdominal scutes at least between pectorals and anal.
 - a. Upper pectoral ray produced. Anal less than 3 in length .. *Setipinna*
 - b. Upper pectoral ray not produced. Anal 3 or more in length .. *Thrissocles*
 - B. Silvery colouration limited chiefly to a conspicuous lateral band. Abdominal scutes largely or only between pectorals and ventrals .. *Anchoviella*

Genus : *COILIA* Gray

Body compressed, very elongate, narrowing behind in a long slender tail. Scales rather small, deciduous. Abdomen trenchant. Mouth oblique, snout pointed and projecting. Dorsal short, its origin before that of anal, which is very long and confluent with the pointed caudal. 4 to 19 upper pectoral rays free, filamentous and prolonged.

SYNOPSIS OF SPECIES

- I. 6 free pectoral filaments. Golden with 2 or 3 rows of round yellow spots along the lower side .. *C. dussumieri*

- II. 12 to 14 free pectoral filaments. Golden
without spots .. *C. borneensis*

Coilia dussumieri Cuv. & Val.

(Fig. 15)

Coilia dussumieri, Cuvier & Valenciennes, 1848.

Coilia dussumieri, Day, 1878 & 1889.

Coilia dussumieri, Weber & Beaufort, 1913.

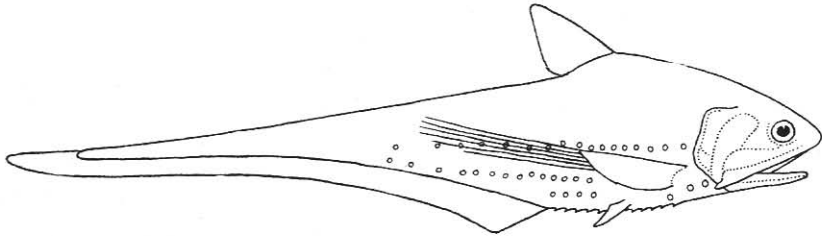


Fig. 15—*Coilia dussumieri* Cuv. & Val.

(Height $4-5\frac{1}{3}$; head $5-5\frac{2}{3}$; eye $3\frac{1}{2}-4\frac{1}{4}$)

Elongate, compressed. *Snout prominent, conical, shorter than eye. Dorsal about twice nearer to snout than to caudal. Origin of ventrals opposite to that of dorsal. Six upper pectoral rays filiform and produced to about the middle of the length of the fish.*

Golden, with 2 or 3 rows of round golden spots along the lower half of body.

Coilia borneensis Bleeker

Coilia borneensis, Bleeker, 1851.

Coilia borneensis, Day, 1878 & 1889.

Coilia borneensis, Weber & Beaufort, 1913.

(Height $4-5$; head $4\frac{2}{3}-5$; eye $3\frac{1}{3}-4$ or more)

Oblong, compressed. Snout prominent, shorter than eye. Ventrals inserted before origin of dorsal. 12 to 14 upper pectoral rays produced reaching first rays of anal or farther to about the middle of the length of the fish.

Golden with yellowish fins.

Genus: *SETIPINNA* Swainson

Elongate, compressed. Head small. Mouth very oblique. Scales moderate, thin, more or less deciduous. Free spine before dorsal. Origin of dorsal before or behind that of anal, which is very long and 2 to 2 1/2 in length. Uppermost pectoral ray produced.

SYNOPSIS OF SPECIES

- I. Lower jaw projecting. Origin of anal
before that of dorsal .. *S. breviceps*.
- II. Lower jaw not projecting. Origin of anal
below dorsal .. *S. taty*.

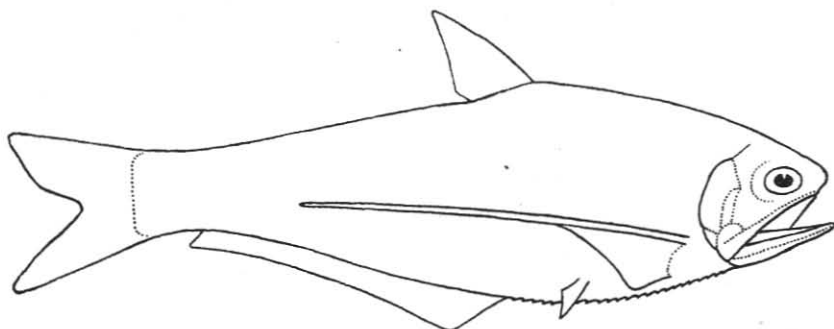
Setipinna breviceps (Cantor)*Engraulis breviceps*, Cantor, 1849.*Engraulis breviceps*, Day, 1878 & 1889.*Setipinna breviceps*, Weber & Beaufort, 1913.(Height $3\frac{1}{2}$ — $3\frac{1}{5}$; head $5\frac{3}{4}$ — $6\frac{1}{4}$; eye 5—6)

Elongate, dorsal profile more convex between head and dorsal. Ventral profile nearly straight. Snout equals eye. *Mouth very oblique, lower jaw slightly longer. Chin forms the most prominent part of the head. Origin of dorsal far behind that of anal.* Pectorals with the upper ray produced reaching to the middle or the hind part of the anal.

Silvery, with greenish yellow back. Some dark blotches in the upper half of body.

Setipinna taty Cuv. & Val.

(Fig. 16)

Engraulis taty, Cuvier & Valenciennes, 1848.*Engraulis taty*, Day, 1878 & 1889.*Setipinna taty*, Weber & Beaufort, 1913.Fig. 16—*Setipinna taty* Cuv. & Val.(Height 3; head $4\frac{3}{4}$ — $5\frac{3}{4}$; eye $3\frac{1}{2}$ —4)

Oblong, strongly compressed. Dorsal and ventral profile evenly convex. *Snout prominent and projects slightly, shorter than eye. Origin of dorsal far in front of that of anal. Lower lobe of caudal longer.*

Silvery with greenish yellow back. Sparingly dotted with black.

Fins yellow. Dorsal with black dots. Pectorals sometimes dark. Edge of caudal blackish.

Genus: *THRISSOCLES* Jordon & Evermann

Oblong or elongate, compressed. Scales more or less deciduous. *Abdominal scutes well developed, extend from gill opening to vent.* Maxillary produced, sometimes reaching anal. Mouth oblique. Origin of dorsal before that of anal which is long.

SYNOPSIS OF SPECIES

- I. Abdominal keel before pectorals without scutes. Anal behind dorsal . . . *T. baelama.*
- II. Keeled scutes from mouth to vent
 - A. Maxillary not reaching beyond gill opening.
 - a. Origin of anal distinctly behind end of dorsal.
 - 1. Snout very prominent, equal to eye. 23 abdominal scutes .. *T. kammalensis.*
 - 2. Snout slightly produced, $3\frac{3}{4}$ of eye. 27 abdominal scutes .. *T. malabaricus.*
 - b. Origin of anal below or slightly behind end of dorsal .. *T. hamiltonii.*
 - B. Maxillary reaching at least to pectorals.
 - a. Anal below or a little behind end of dorsal.
 - 1. Maxillary reaches origin of pectorals.
 - i. Anal more than 3 in length .. *T. mystax.*
 - ii. Anal $2\frac{2}{3}$ in length .. *T. purava.*
 - 2. Maxillary reaches beyond pectorals.
 - i. Maxillary surpasses ventrals. 28 abdominal scutes .. *T. setirostris.*
 - ii. Maxillary reaches or nearly reaches ventrals. 25 abdominal scutes .. *T. dussumieri.*
 - b. Anal before end of dorsal .. *T. valenciennesi.*

Thrissocles baelama (Forsk.)

Clupea baelama, Forskal, 1775.

Engraulis baelama, Bleeker, 1866-72.

Engraulis baelama, Day, 1878 & 1889.

Engraulis baelama, Weber & Beaufort, 1913.

Thrissina baelama, Herre, 1940.

Thrissocles baelama, Fowler, 1941.

(Height $3\frac{2}{3}$ —4; head $3\frac{3}{5}$ —4; eye 4— $4\frac{3}{5}$)

Oblong, compressed. Dorsal and ventral profile evenly convex. Eye as long as or longer than snout which is prominent. *Maxillary obliquely rounded behind, reaching slightly beyond mandibular joint.* Origin of dorsal nearer to snout than to caudal. *Anal $3\frac{1}{2}$ to 4 in length and its origin behind dorsal.* About 15 abdominal scutes.

Bluish above becoming silvery on the sides and below. Head glossed with gold. A dark patch on the shoulder. Margin of caudal dark.

Thrissocles kammalensis Bleeker

Engraulis kammalensis, Bleeker, 1849.

Engraulis rhinorhynchus, Day, 1869.

Engraulis kammalensis, Day, 1878 & 1889.

Engraulis kammalensis, Weber & Beaufort, 1913.

Thrissocles kammalensis, Fowler, 1941.

(Height $3\frac{1}{4}$ — $3\frac{2}{5}$; head $3\frac{3}{4}$ —4; eye 3— $3\frac{1}{2}$)

Oblong, compressed. Ventral profile more convex than dorsal. *Eye about as long as snout which is very prominent. Maxillary tapering and extending to the gill opening.* Origin of dorsal about midway between snout and base of caudal. *Anal about 3 in length and its origin behind dorsal.* About 23 abdominal scutes.

Silvery, tinged with gold, darker above. Usually a blackish spot across the nape. Fins hyaline, dorsal and caudal usually blackish along the margin.

Thrissocles malabaricus (Bloch)

(Fig. 17)

Clupea malabaricus, Bloch, 1795.

Thryssa cuvieri, Swainson, 1839.

Engraulis malabaricus, Cuvier & Valenciennes, 1848.

Engraulis malabaricus, Day, 1878 & 1889.

Engraulis malabaricus, Weber & Beaufort, 1913.

Thrissocles malabarica, Fowler, 1941.

(Height $2\frac{9}{10}$; head 4; eye $4\frac{1}{2}$ — $4\frac{2}{3}$)

Snout projecting, shorter than eye. Maxillary extending posteriorly to the gill opening. Origin of dorsal nearer to snout than to base of caudal. Anal $2\frac{5}{6}$ in length and its origin behind the last dorsal ray. About 27 abdominal scutes.

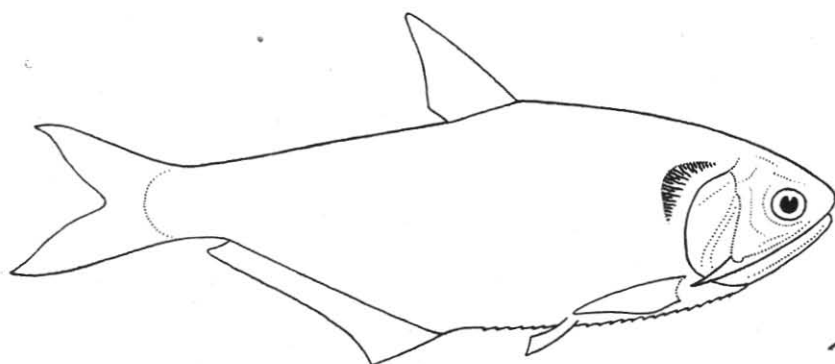


Fig. 17—*Thrissocles malabaricus* (Bloch)

Silvery, shot with gold and purple. Black venules on shoulder. Fins yellow, dorsal and caudal dark edged, pectorals sometimes black.

Thrissocles hamiltonii (Gray)

Thrissa hamiltonii, Gray, 1833-34.

Thryssus subspinosa, Swainson, 1839.

Engraulis hamiltonii, Cuvier & Valenciennes, 1848.

Engraulis hamiltonii, Day, 1878 & 1889.

Engraulis grayi, Weber & Beaufort, 1913.

Thrissocles hamiltonii, Fowler, 1941.

(Height $3-3\frac{3}{4}$; head $4-4\frac{1}{5}$; eye $3\frac{3}{4}-4$)

Oblong, compressed. Dorsal and ventral profile evenly convex. Snout shorter than eye. Maxillary tapering and extending as far as the gill opening. Origin of dorsal midway between snout and caudal. Anal about 3 in length and its origin below or a little behind end of dorsal. About 26 abdominal scutes.

Back bronze coloured, divided in the fresh condition by a silvery band from the purple and gold tinted abdomen. Black venules on the shoulder. Fins yellowish, dorsal and caudal with dark gray margin.

Thrissocles mystax (Schneider)

Clupea mystax, Schneider, 1801.

Thryssa mystax, Richardson, 1846.

Engraulis mystax, Cuvier & Valenciennes, 1848.

Engraulis mystax, Day, 1878 & 1889.

Engraulis mystax, Weber & Beaufort, 1913.

Scutengraulis mystax, Herre, 1940.

Thrissocles mystax, Fowler, 1941.

(Height $3\frac{2}{3}$ —4; head 4; eye $3\frac{3}{4}$ —4)

Oblong, compressed. Ventral profile more convex than dorsal which is nearly straight. Snout shorter than eye. *Maxillary tapering and reaching pectorals.* Origin of dorsal nearer to caudal than to snout. *Anal more than 3 in length and its origin below or a little behind end of dorsal.* About 28 abdominal scutes.

Silvery, back dark. Black venules on the shoulder. Dorsal and caudal yellow, latter with a dark margin.

Thrissocles purava (Hamilton)

Clupea purava, Hamilton, 1822.

Thryssa megastoma, Swainson, 1839.

Engraulis purava, Cuvier & Valenciennes, 1848.

Engraulis purava, Day, 1878 & 1889.

Engraulis purava, Weber & Beaufort, 1913.

Thrissocles purava, Fowler, 1941.

(Height 4; head 5; eye $4\frac{1}{2}$ —5)

Oblong, compressed. Snout shorter than eye. *Maxillary tapering and reaching pectorals.* Origin of dorsal midway between snout and caudal or a little nearer to the latter. *Anal $2\frac{2}{3}$ in length and its origin below last dorsal ray.* About 27 abdominal scutes.

Silvery, back steel blue. Head with golden tinge. Dorsal and caudal yellowish.

Thrissocles setirostris (Broussonet)

Clupea setirostris, Broussonet, 1782.

Engraulis setirostris, Cuvier & Valenciennes, 1848.

Engraulis setirostris, Day, 1878 & 1889.

Engraulis setirostris, Weber & Beaufort, 1913.

Thrissocles setirostris, Herre, 1940.

(Height $3\frac{4}{5}$ —more than 4; head $4\frac{3}{5}$ — $5\frac{1}{5}$; eye $3\frac{1}{2}$ —4)

Elongate, compressed. Dorsal and ventral profile about equal. Snout bluntly rounded and shorter than eye. *Maxillary produced into a long filament, surpassing ventrals and often reaching vent.* Origin of dorsal midway between snout and caudal. *Anal about 3 in length and its origin below last dorsal ray.* 28 abdominal scutes.

Greenish along back, becoming silvery on the sides and below. Black venules on the scapular region.

Thrissocles dussumieri Cuv. & Val.

Engraulis dussumieri, Cuvier & Valenciennes, 1848.

Engraulis auratus, Day, 1865.

Engraulis dussumieri, Day, 1878 & 1889.

Engraulis dussumieri, Weber & Beaufort, 1913.

Thrissocles dussumieri, Fowler, 1941.

(Height $3\frac{1}{4}$ — $3\frac{1}{2}$; head $3\frac{2}{3}$ — $4\frac{1}{5}$; eye $4\frac{1}{2}$ —3)

Oblong, compressed. Dorsal and ventral profile evenly convex. Snout conspicuously rounded, prominent, less than eye. *Maxillary tapering and reaching nearly to ventrals*. Origin of dorsal nearer to snout than to caudal. *Anal 3 to $3\frac{1}{3}$ in length and its origin behind end of dorsal*. About 25 abdominal scutes.

Silvery, back dark. A large black shoulder spot passing over the back. Caudal with dark margin.

Thrissocles valenciennesi (Bleeker)

Stolephorus (Thryssa) valenciennesi, Bleeker, 1866.

Engraulis valenciennesi, Weber & Beaufort, 1913.

Thrissocles valenciennesi, Fowler, 1941.

(Height $3\frac{1}{3}$ — $3\frac{2}{3}$; head 4— $4\frac{1}{3}$, eye $3\frac{1}{2}$ — $3\frac{2}{3}$)

Oblong, compressed. Dorsal profile much more convex than ventral which is nearly straight. Snout rounded, prominent and less than eye. *Maxillary tapering and surpassing base of pectorals*. Origin of dorsal nearer to caudal than to snout. *Anal $2\frac{4}{5}$ to 3 in length and its origin a little before end of dorsal*. About 23 abdominal scutes.

Silvery, back dark. Scapular region with black venules. Margin of caudal dark.

Genus: ANCHOVIELLA Fowler

Elongate. Scales thin and very deciduous. Snout prominent. *Not more than 7 prominent spiny scutes between pectorals and ventrals*. Maxillary may reach gill opening. Dorsal entirely or partly before anal which is short. *Distinct silvery lateral band*.

SYNOPSIS OF SPECIES

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|---|----------------------------|
| I. Origin of anal behind dorsal | .. <i>A. heterolobus</i> . |
| II. Origin of anal below dorsal. | |
| A. 7 preventral abdominal scutes. Maxillary reaches gill opening | .. <i>A. commersonii</i> . |
| B. 4 to 5 preventral abdominal scutes. | |
| a. Maxillary reaches front edge of preopercle. Anal more than 5 in length | .. <i>A. indica</i> . |
| b. Maxillary reaches gill opening. Anal 5 or less in length | .. <i>A. tri</i> . |

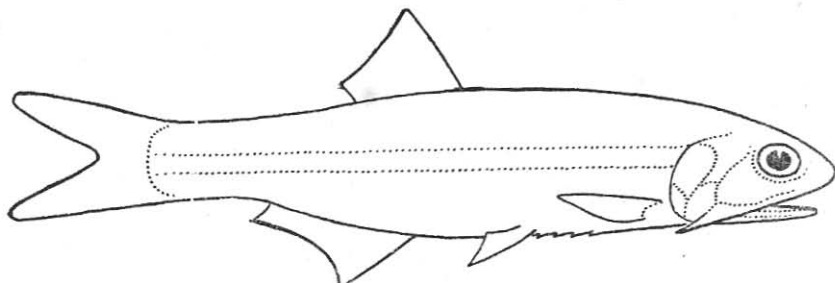
Anchoviella heterolobus (Ruppell)*Engraulis heterolobus*, Ruppell, 1835.*Stolephorus heterolobus*, Weber & Beaufort, 1913.*Anchoviella heteroloba*, Fowler, 1941.(Height $5-5\frac{1}{2}$; head $3\frac{3}{5}-4$; eye $3\frac{1}{2}-4$)

Elongate. Snout very prominent, shorter than eye. Maxillary tapering and reaching hind border of preopercle. Anal about 6 in length and its origin just behind last dorsal ray. 5 abdominal scutes.

Yellowish with a silvery lateral band. A black spot on occiput. Back and caudal powdered with black.

Anchoviella commersonii (Lacepede)

(Fig. 18)

Stolephorus commersonii, Lacepede, 1803.*Engraulis commersonianus*, Gunther, 1868.*Engraulis commersonianus*, Day, 1878 & 1889.*Stolephorus commersonii*, Weber & Beaufort, 1913.*Anchoviella commersonii*, Fowler, 1941.Fig. 18—*Anchoviella commersonii* (Lacepede)(Height $4\frac{1}{4}-4\frac{4}{5}$; head 4; eye $3-3\frac{2}{3}$)

Elongate. Snout prominent and bluntly rounded, shorter than eye. Maxillary pointed and reaching gill opening. Anal 5 to $5\frac{1}{2}$ in length and its origin below the beginning of posterior third of dorsal. 7 abdominal scutes.

Brownish with a silvery lateral band, becoming wider behind. A large black spot on occiput. Two broad pigment lines from head to dorsal. Back pigmented. Caudal powdered with black.

Anchoviella indica (van Hasselt)*Engraulis indica*, van Hasselt, 1823.*Engraulis albus*, Swainson, 1839.*Engraulis brownii*, Day, 1865.*Engraulis indicus*, Day, 1878.

Engraulis indica, Day, 1889.

Stolephorus indicus, Weber & Beaufort, 1913.

Anchoviella indicus, Fowler, 1941.

(Height $5\frac{1}{2}$; head $3\frac{3}{4}$ — $4\frac{1}{3}$; eye $3\frac{2}{5}$ — $3\frac{3}{4}$)

Elongate. Snout very prominent, bluntly rounded, shorter than eye. Maxillary pointed and reaching front border of preopercle. Anal $5\frac{2}{3}$ to 6 in length and its origin below the middle of dorsal. 4 to 5 abdominal scutes.

Brownish with a silvery lateral band, broadest in the middle. A dark spot behind occiput. Green along the back. Back and caudal powdered with black.

Anchoviella tri (Bleeker)

Engraulis tri, Bleeker, 1852.

Engraulis tri, Day, 1878 & 1889.

Stolephorus rex, Jordan & Seale, 1926.

Anchoviella tri, Fowler, 1941.

(Height $3\frac{2}{3}$ —4; head 4; eye 3— $3\frac{1}{2}$)

Oblong. Snout pointed, shorter than eye. Maxillary produced to gill opening. Anal $4\frac{1}{2}$ to 5 in length and its origin below last $\frac{1}{4}$ of dorsal. 4 to 5 abdominal scutes.

Silvery shot with purple. A silvery lateral band. A dark spot behind occiput. Two broad pigment lines from head to dorsal and two narrow ones from dorsal to caudal. Caudal yellowish with black margin.