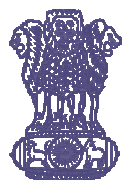


HANDBOOK FOR FIELD IDENTIFICATION OF FISH SPECIES OCCURRING IN THE INDIAN SEAS



FISHERY SURVEY OF INDIA
(Department of AHD&F)
Ministry of Agriculture
Botawala Chambers, Sir P. M. Road,
Fort, Mumbai- 400001.



सत्यमेव जयते

HAND BOOK FOR FIELD IDENTIFICATION OF FISH SPECIES OCCURING IN THE INDIAN SEAS

**Central Sector Scheme on
"Strengthening of Database and Information Networking
for Fisheries Sector"**

MAY 2009



Fishery Survey of India

Department of Animal Husbandry, Dairying and Fisheries
Ministry of Agriculture
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FOREWORD

The Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture initiated a Central Sector Scheme on “**Strengthening of Database and Information Networking for the Fisheries Sector**” during Xth Plan (2002-2007) with the objective to strengthen the data collection system by bringing the uniformity for both marine and inland fisheries. The Fishery Survey of India (FSI) was identified as the interface between maritime states / UTs and the Ministry for refining the marine catch statistics. The FSI has been assigned the task of co-ordinating activities pertaining to marine catch assessment surveys including the implementation of uniform methodology in the maritime States/UTs and to provide training to States / UT Fisheries Department officials and field data enumerators in taxonomical identification of marine fish species while collecting the landings data for proper reporting.

During the Xth Plan, the FSI had conducted training-cum-workshops on “Strengthening of Data Collection System and Fish Taxonomy” in each maritime State/ UT. During these events, a need for having a Handbook on fish identification as a useful tool/aid in the field was keenly felt. In this context, it was decided to bring out a **Handbook for Field identification of fish species occurring in Indian seas** as it was observed that the enumerators were not familiar with the identification of various fish species occurring in the marine landings.

The Department of Animal Husbandry, Dairying and Fisheries, New Delhi vide order no. 30-2(6)/2008-FY(S), dated : 15-01-2008 constituted a Sub-Committee for development of uniform species coding system considering the existing the FSI and the CMFRI systems together and adopting the species codes consistent with FAO species codes to compute the estimates of marine fish production in India. This Sub-Committee submitted its report in September 2008 and this Handbook provides the species codes for the ease of reporting their catch and effort data by the enumerators.

The Hand book contains important fish species under different Families enlisted as per the recommendations of the Sub-Committee. The Sub-Committee has also included the commercially important fin fish and shell fish species as deep-sea and oceanic resources hitherto not found in the data collection schedules being used for reporting of fish catch statistics.

I feel the Handbook will help the enumerators immensely for identifying marine fish species properly while collecting and reporting the data. Efforts are also underway to bring out this booklet in all vernacular languages for better understanding and reporting by the data enumerators in all the maritime States/UTs of India.



(V.S.SOMVANSHI)
DIRECTOR GENERAL

Mumbai
22-05-2009

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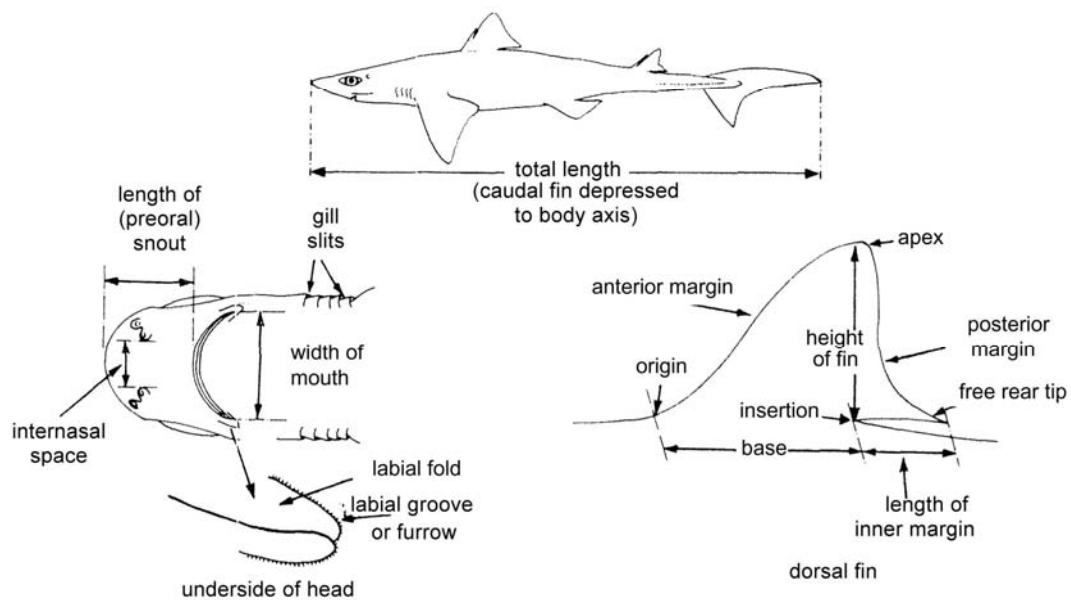
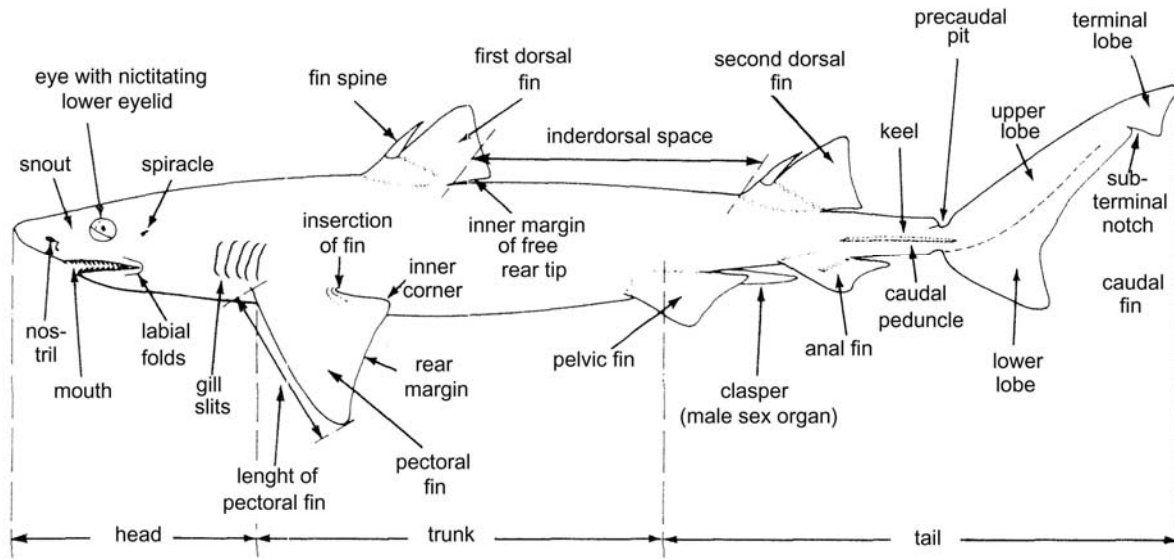
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Appendix-I Groups/ Sub-groups of species identified for marine landings data collection

1. ELASMOBRANCHS

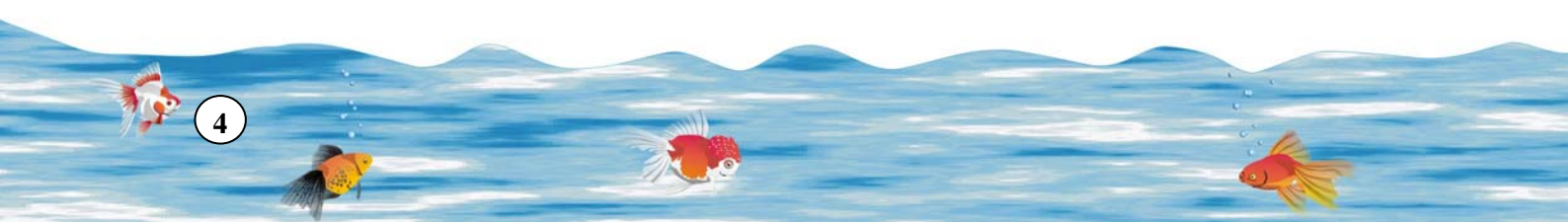






1.1 MORPHOMETRIC CHARACTERS OF SHARK



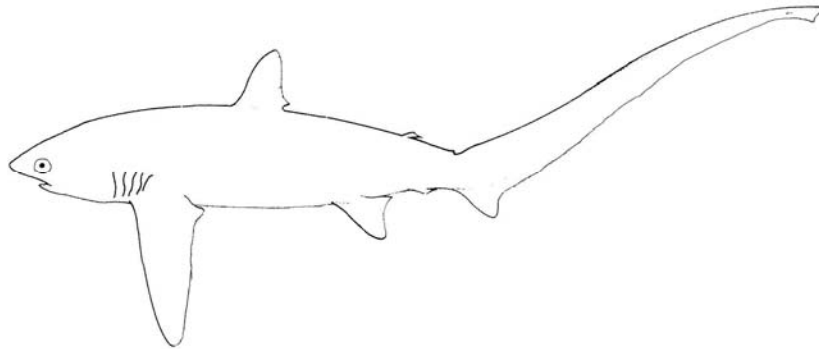


1.2. FAMILY-WISE KEY CHARACTERS OF ELASMOBRANCHS

1.2.1 . SHARKS

Alopiidae (Thresher sharks)

Resource code : 01

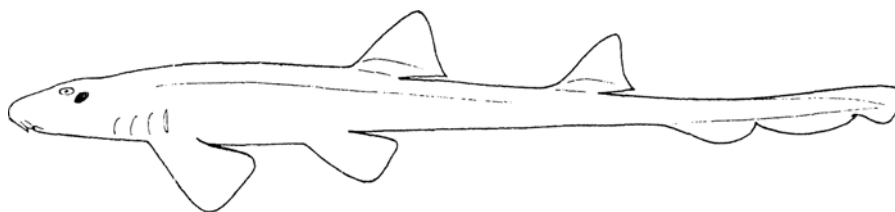


General characters:

- ❖ Large sharks. Trunk and precaudal tail cylindrical, not depressed and without lateral ridges; precaudal tail much shorter than trunk.
- ❖ Head not expanded laterally, not depressed; 5 small to medium-sized gill slits present, the last 2 behind pectoral fin origins, their ripper ends not expanded onto upper surface of head; snout moderately long, bluntly conical, not flattened.
- ❖ Caudal fin strongly asymmetrical, the upper lobe enormously enlarged, about half the total length and with a subterminal notch, and an undulated or rippled dorsal margin, the lower lobe short but strong; vertebral axis of caudal fin raised above body axis.
- ❖ Caudal peduncle not depressed, without keels; precaudal pits present.
- ❖ Colour bluish, blackish, grey or brown above, shading to white or grey below.

Hemiscylliidae (Longtail carpetsharks)

Resource code : 01

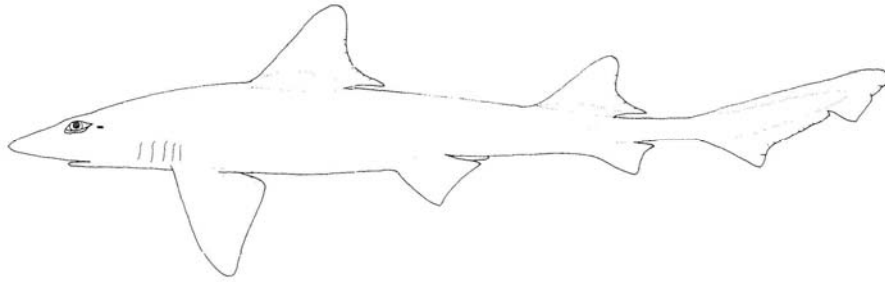


General characters:

- ❖ Small sharks. Trunk cylindrical or moderately depressed, precaudal tail cylindrical and somewhat longer than trunk, lateral ridges on sides of trunk and tail present or absent.
- ❖ Head not expanded laterally, cylindrical or moderately depressed; 5 small gill slits present, the last 3 over the pectoral fin base, their upper ends not expanded onto upper surface of head.
- ❖ Caudal fin strongly asymmetrical, much less than half of total length, without a rippled dorsal margin or lower lobe but with a strong subterminal notch; vertebral axis of caudal fin hardly raised above body axis.
- ❖ Caudal peduncle cylindrical, without precaudal pits or keels.
- ❖ Colour back yellowish, brownish or grey-brown, lighter below, with dark or light spots or dark saddles, sometimes absent in adults.

Triakidae (Houndsharks, smoothhounds, topes)

Resource code : 01

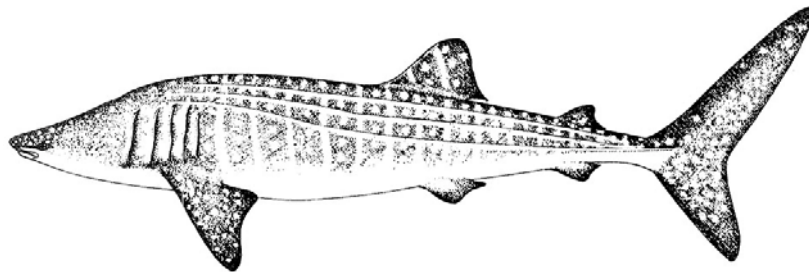


General characters:

- ❖ Body elongate and slender to moderately stout.
- ❖ Head with 5 gill slits, the last pair posterior to pectoral fin origins; small spiracles present; gill arches without rakers;
- ❖ Caudal fin asymmetrical, its lower lobe varying from virtually absent to strong, its upper edge not rippled. Caudal peduncle not flattened dorso-ventrally or expanded laterally, without keels or precaudal pits.
- ❖ Colour back usually greyish brown, belly white.
- ❖ Some species are capable of undergoing slow colour changes.

Rhiniodontidae (Whale sharks)

Resource code : 01



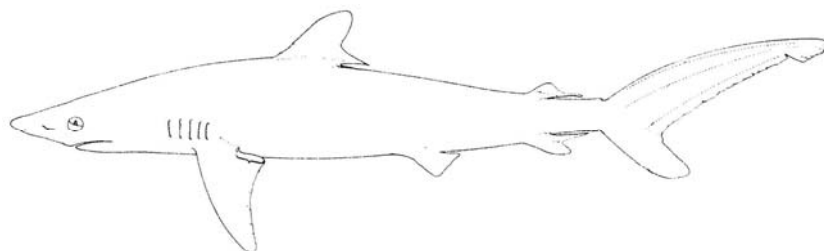
General characters:

- ❖ A very large shark. Head with 5 large gill slits, the posterior 3 over the pectoral fin bases; no gillrakers but filter grids of transverse bars and lobes across the internal gill slits;
- ❖ snout extremely short, truncated; caudal fin asymmetrical, crescentic, with a strong lower lobe but no subterminal notch.
- ❖ Caudal peduncle depressed, with a strong keel on each side continuing forward onto the back and over the gill slits as a small ridge and flanked by 2 additional ridges.
- ❖ precaudal pit present.
- ❖ Colour dark grey, reddish, or greenish grey above, with white or yellow spots and transverse stripes; white or yellowish below.



Carcharhinidae (Requiem sharks)

Resource code : 01

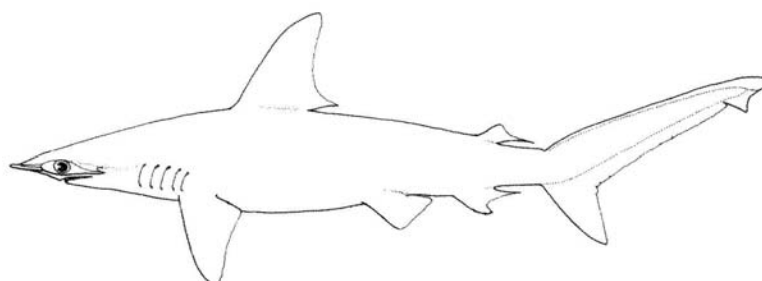


General characters:

- ❖ Small to large sharks. Trunk and precaudal tail cylindrical, not depressed and without lateral ridges; precaudal tail much shorter than trunk.
- ❖ Head not expanded laterally, conical to moderately depressed; 5 small- to medium-sized gill slits present, the last 1 to 3 over or behind pectoral fin origins.
- ❖ Caudal peduncle not strongly depressed dorsoventrally or widely expanded laterally, with weak longitudinal keels.
- ❖ Colour brown, grey, yellowish or bluish above, white to cream or yellowish below, some species with prominent dark or light markings on fins; body usually without a prominent colour pattern (except for Galeocerdo).

Sphyrnidae (Hammerhead and bonnethead sharks)

Resource code : 01



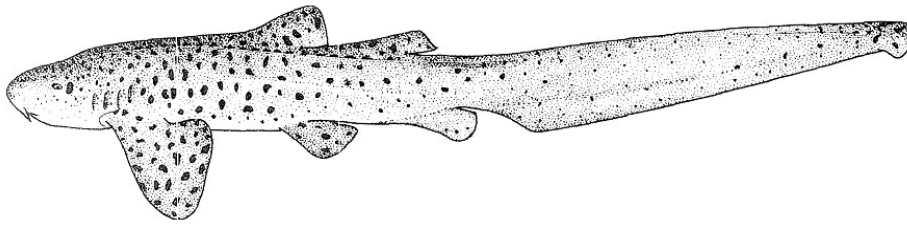
General characters:

- ❖ Medium- to large-sized sharks. Body elongate and moderately slender, anterior portion of head much flattened dorso-ventrally and widely expanded laterally in "hammer" form, with the eyes at its outer edges.
- ❖ Caudal peduncle not strongly flattened dorso-ventrally or widely expanded laterally, without longitudinal ridges but with precaudal pits.
- ❖ Colour back predominantly grey or brassy; belly white.



Stegostomatidae (Zebra sharks)

Resource code : 01

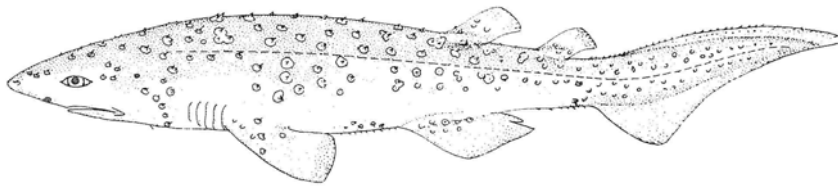


General characters:

- ❖ Head with 5 small slits, the last 3 behind pectoral fin origin and the last 2 very close to each other; no gill rakers.
- ❖ Caudal peduncle not strongly depressed, without lateral keels or precaudal pits, but with dermal ridges extending forward onto sides.
- ❖ Colour a strongly marked colour pattern, changing with growth.

Echinorhinidae (Bramble sharks)

Resource code : 81



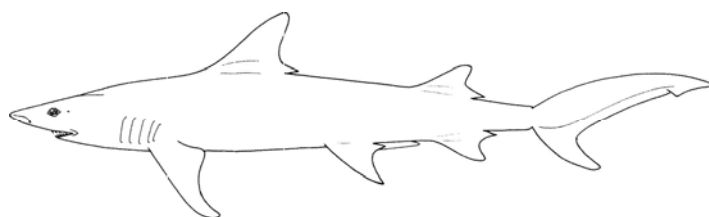
General characters:

- ❖ A medium-sized, heavy-bodied shark with very large, platelike deriticles scattered sparsely over the body and armed with one or more thornlike cusps.
- ❖ Head with 5 gill slits, all anterior to pectoral fins, the fifth abruptly elongated at lower end; snout broadly rounded; mouth extending to behind eyes.
- ❖ Dorsal fins spineless, the first originating over or posterior to pelvic fin origins; second dorsal fin about as large as first; inner corners of pectorals rounded; pelvics much larger than second dorsal; anal fin absent; caudal fin strongly asymmetrical, without a well-developed lower lobe.
- ❖ Caudal peduncle not depressed.
- ❖ Colour dark grey or purplish grey to dull brown or olive above, lighter to white below with or without darker blackish or reddish blotches on sides.



Hemigaleidae (Weasel sharks)

Resource code : 81

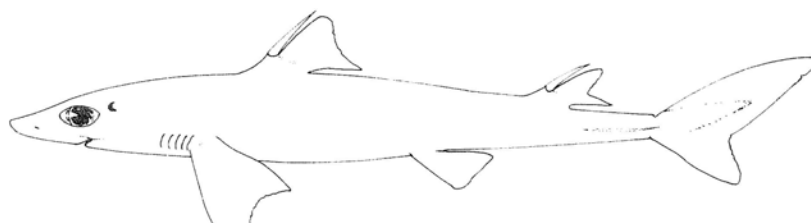


General Characters:

- ❖ Small to medium-sized sharks.
- ❖ Trunk and precaudal tail cylindrical, not depressed and without lateral ridges; precaudal tail much shorter than trunk.
- ❖ Head not expanded laterally, moderately depressed; 5 small to medium sized gill slits present, the last 2 or 3 over or behind pectoral fin origins, Caudal peduncle cylindrical, without keels but with well-developed precaudal pits.
- ❖ Intestinal valve of spiral type.
- ❖ Colour grey, grey-brown or dark grey; above, white or cream below, fins sometimes with dusky tips or white posterior margins; sometimes a few white spots but no elaborate colour pattern.

Squalidae (Dogfish sharks)

Resource code : 81



General Characters:

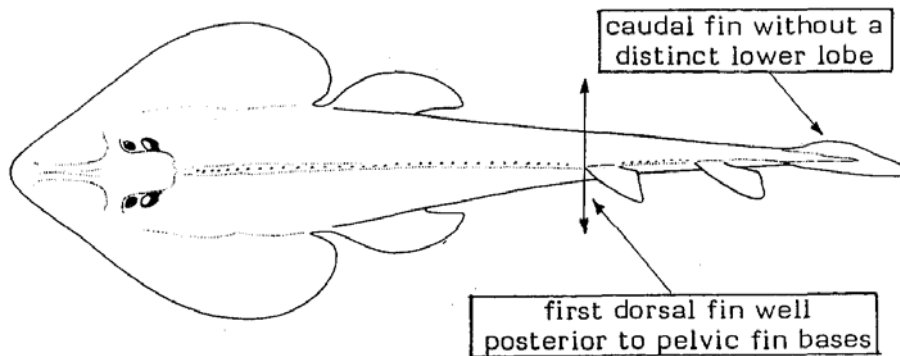
- ❖ Small to moderately large sharks, with cylindrical or slightly compressed bodies, caudal fin strongly asymmetrical to nearly symmetrical, with a lower lobe varying from virtually absent to very strong.
- ❖ Dermal denticles usually close-set, riot greatly enlarged and platelike.
- ❖ Colour back greyish in shallow-water species, dark to black in those from deep water; several species have light organs (in the area, members of the genera Etmopterus, Centroscyllium, Euprotornicrus, Squaliolus, Isistius and Heteroscymnoides).



1.2.2. SKATES

Family :Rhinobatidae (Guitar fishes)

Resource code : 02



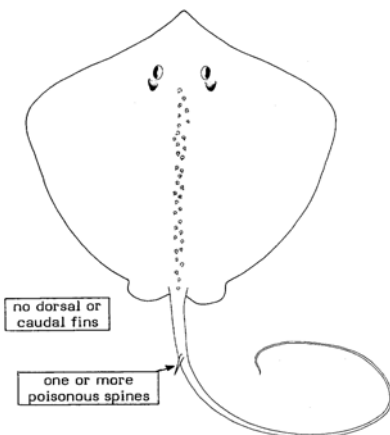
General Characters:

- ❖ Body elongate and shark-like, much depressed in front, tails stout.
- ❖ Snout wedge-shape or broadly rounded .
- ❖ Two large dorsal fins, first dorsal origin behind ventral base.
- ❖ Caudal fins well developed without a lower lobe.

1.2.3. RAYS

Family: DASYATIDAE(Sting rays)

Resource code : 03

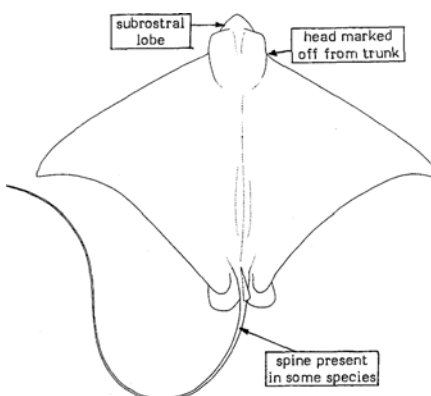


General Characters:

- ❖ Body round Disc like.
- ❖ Disc less than 1.3 times as broad as long.
- ❖ No Caudal fin, Dorsal fins are absent.
- ❖ Tail long whip-like with one or more poisonous, sharp spine.
- ❖ In some species tailfold also present.

Family :Myliobatidae (Eagle rays)

Resource code : 03



General Characters:

- ❖ Hhead, body and pectoral fins from a strongly angular disc, nearly twice as wide as long.
- ❖ Head and snout strongly marked off from rest of disc.
- ❖ Snout from a single lobe or a pair of broadly rounded lobes separated by a median notch with a bilobate shelf overhanging snout.
- ❖ No caudal fin or finfolds tail slender, whiplike.
- ❖ Disc blue or black above with numerous white spots or rings, white below.



1.3. SPECIES-WISE CHARACTERISTICS OF ELASMOBRANCHS

1.3.1. SHARKS

Family : Alopiidae

Scientific Name : *Alopias pelagicus*

Resource code : 01

Comman Name : Pelagic thresher

Local Name :



Field identification characters:

- ❖ A large shark.
- ❖ Head with 5 medium-sized gill slits, the last 2 above pectoral fin bases; upper lobe of caudal fin very long and straplike, about as long as the rest of the shark; lower lobe short but strong; terminal lobe very small.
- ❖ Upper precaudal pit present but caudal keels absent.
- ❖ Colour bluish or grey above, white below, with a silvery sheen in gill region; white colour from belly not handed over pectoral fin bases.

Family : Hemiscylliidae

Scientific Name : *Chiloscyllium indicum*

Resource code : 01

Comman Name : Slender bambooshark

Local Name :



Field identification characters:

- ❖ A small shark; body slender, with low lateral ridges; precaudal tail slender, longer than trunk.
- ❖ Snout narrowly rounded or almost pointed; 5 small gill slits; spiracles large and below eyes; eyes elevated, with a low supraorbital ridge above them, without nictitating eyelids; nostrils with short barbels, nasoral grooves and circumnarial grooves;
- ❖ Caudal fin strongly asymmetrical, with a pronounced subterminal notch but without a ventral lobe;
- ❖ Caudal fin less than 1/3 the length of rest of shark. Caudal peduncle cylindrical, without keels or precaudal pits.
- ❖ Colour light brown above, cream below, with numerous dark spots on body, tail and fins, these often forming indistinct vertical bars and saddles.

Family : Triakidae

Scientific Name : *Mustelus mosis*

Resource code : 01

Common Name : Arabian smoothhound

Local Name :



Field identification characters:

- ❖ A small shark. Body moderately elongated, head flattened above and below,
- ❖ Snout relatively long and narrowly rounded, with a hypercalcified rostrum that can be felt by pinching the snout or can be readily dissected out
- ❖ Caudal fin with lower lobe short in adults and hardly developed in young.
- ❖ An interdorsal ridge present;
- ❖ Caudal peduncle without keels or precaudal pits.
- ❖ Colour back and sides plain grey or grey-brown, underside cream-white; no spots on sides.

Family : Rhinodontidae

Scientific Name : *Rhincodon typus*

Resource code : 01

Common Name : Whale shark

Local Name :



Field identification characters:

- ❖ A very large shark. Head with 5 large gill slits, the posterior 3 over the pectoral fin bases; no gillrakers but filter grids of transverse bars and lobes across the internal gill slits;
- ❖ Snout extremely short, truncated; caudal fin asymmetrical, crescentic, with a strong lower lobe but no subterminal notch.
- ❖ Caudal peduncle depressed, with a strong keel on each side continuing forward onto the back and over the gill slits as a small ridge and flanked by 2 additional ridges above.
- ❖ precaudal pit present.
- ❖ Colour dark grey, reddish, or greenish grey above, with white or yellow spots and transverse stripes; white or yellowish below.



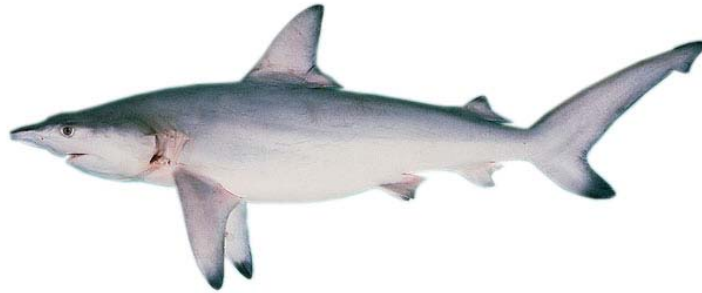
Family : Carcharhinidae

Scientific Name : *Carcharhinus limbatus*

Resource code : 01

Comman Name : Blacktip shark

Local Name :



Field identification characters:

- ❖ Body fusiform, moderately slender.
- ❖ Snout long, about equal to, or slightly less, than mouth width, greater than distance between nostrils, its tip narrowly rounded to pointed
- ❖ Colour back dark grey, ashy blue or dusky bronze; belly white or yellowish white. A dark band extending rearward along each side to about over origin of pelvic fin; tips of pelvic fins with a persistent black spot; tips of dorsals, anal, pectorals and the lower lobe of caudal fin usually black or dusky in young individuals, but these markings fade with growth.

Family : Carcharhinidae

Scientific Name : *Carcharhinus macroti*

Resource code : 01

Comman Name : Hardriose shark

Local Name :



Field identification characters:

- ❖ A small shark. Body relatively slender.
- ❖ Snout very long and narrowly rounded or pointed, its length greater than mouth width and distance between nostrils; rear tip of anal fin extending nearly to lower precaudal pit.
- ❖ No dermal ridge between dorsal fins.
- ❖ Colour back greyish or grey-brown, belly white.
- ❖ Posterior margin of pectoral fins and ventral caudal fin lobe with an inconspicuous white edge; posteroventral and dorsal margins of caudal fin with a narrow black edge.



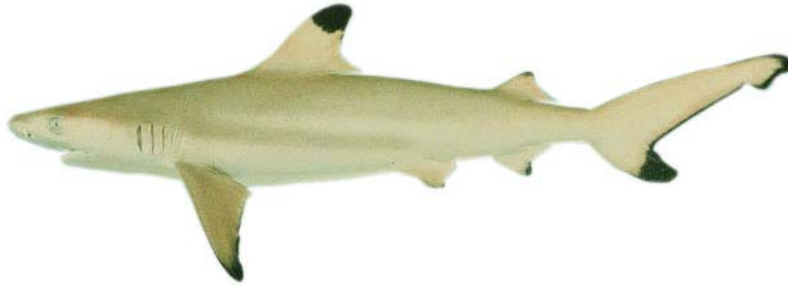
Family : Carcharhinidae

Scientific Name : *Carcharhinus melanopterus*

Resource code : 01

Common Name : Blacktip reef shark

Local Name :



Field identification characters:

- ❖ A small to medium-sized shark.
- ❖ Body moderately stout.
- ❖ Snout very short and broadly rounded, its length less than mouth width and about equal to distance between nostrils rear tip of anal fin ending well in front of lower caudal fin origin.
- ❖ No dermal ridge between dorsal fins.
- ❖ Colour yellow-brown on dorsal surface, underside white; all fins conspicuous with black or dark brown tips, also anterior and posterior dark edging on pectorals and upper lobe of caudal fin.
- ❖ A prominent black tip of first dorsal fin set off abruptly by a light band below it; a conspicuous dark band on flanks, extending rearward to pelvic fins.

Family : Sphyrnidae

Scientific Name : *Sphyrna mokarran*

Resource code : 01

Common Name : Great hammerhead

Local Name :



Field identification characters:

- ❖ Body elongate and laterally compressed.
- ❖ Head "hammer" shaped, its anterior contour moderately arched in young but nearly straight in adults, with a shallow but distinct indentation at the midline lateral expansions of head very prominent, broad transversely and narrow from front to back; caudal fin origin, and a deeply concave posterior margin; pectoral fins short and broad; pelvics with a deeply concave posterior margin; anal fin base about as long as second dorsal base.
- ❖ Colour grey or grey-brown above, paler below; fins with dusky tips in young.



Family : Stegostomatidae

Scientific Name : *Stegostoma fasciatum*

Resource code : 01

Common Name : Zebra shark

Local Name :



Field identification characters:

- ❖ A large shark.
- ❖ Head with 5 small slits, the last 3 behind pectoral fin origin and the last 2 very close to each other; no gillrakers; nostrils close to front of snout, with short barbels and nasoral grooves connecting them with the mouth but without circumnasal grooves
- ❖ Caudal peduncle not strongly depressed, without lateral keels or precaudal pits, but with dermal ridges extending forward onto sides.
- ❖ Colour a strongly marked colour pattern, changing with growth.

1.3.2. DEEPSEA SHARKS

Family : Echinorhinidae

Scientific name : *Echinorhinus brucus*

Resource code : 81

Common name : Bramble shark

Local name :



Field identification characters:

- ❖ A medium-sized, heavy-bodied shark with very large, platelike dermicles scattered sparsely over the body and armed with one or more thornlike cusps.
- ❖ Head with 5 gill slits, all anterior to pectoral fins, the fifth abruptly elongated at lower end; snout broadly rounded; mouth extending to behind eyes.
- ❖ Dorsal fins spineless, the first originating over or posterior to pelvic fin origins; second dorsal fin about as large as first; inner corners of pectorals rounded; pelvics much larger than second dorsal; anal fin absent; caudal fin strongly asymmetrical, without a well-developed lower lobe.
- ❖ Caudal peduncle not depressed.
- ❖ Colour dark grey or purplish grey to dull brown or olive above, lighter to white below with or without darker blackish or reddish blotches on sides.

Family : Hemigaleidae

Scientific name : *Chaenogaleus macrostoma*

Resource code : 81

Common name : Hooktooth shark

Local name :



Field identification characters:

- ❖ A small shark. Body moderately slender; snout long, its length slightly greater than mouth width, obtusely wedge-shaped toward tip.
- ❖ First dorsal fin moderately large, with a pointed or narrowly rounded apex and short inner margin, its origin slightly posterior to free rear tips of pectorals and the free rear tip anterior to pelvic fin origins; pectoral and pelvic fins with straight or slightly concave inner margins.
- ❖ Colour bronzy-grey above, white below when fresh, fading to greyish or greyish-brown in preservation, dorsal fins often with dusky or black tips.

Family : Squalidae

Scientific name : *Centrophorus granulosus*

Resource code : 81

Common name : Gulper shark

Local name :



Field identification characters:

- ❖ Body elongate and slightly compressed.
- ❖ Snout pointed and longer than mouth width but shorter than distance from mouth to pectoral fin origins.
- ❖ A short, strong spine with lateral grooves on anterior edges of both dorsal fins; first dorsal relatively high and short, second dorsal lower than first; caudal fin with a strong subterminal notch.
- ❖ Colour grey above, lighter below.



1.3.3. SKATES

Family : **Rhinobatidae**

Scientific name : *Rhynchobatus djiddensis*

Resource code : 02

Common name : Giant guitar fish

Local name :



Field identification characters:

- ❖ Head and snout angular.
- ❖ Wedge-shaped, with outline merging into those of Pectoral fins.
- ❖ Rows of small thorns or denticles over eyes and spiracles on back and scapular region.
- ❖ Olive green above with rows of white spots.

1.3.4. RAYS

Family: **Dasyatidae** (Sting rays)

Scientific Name : *Dasyatis brevicaudala*

Resource code : 03

Common Name : Shorttail Stingray

Local Name :



Field identification characters:

- ❖ Disc slightly wider than long, naked without medial row of enlarged denticles or thorns.
- ❖ Tail with scattered small stellate denticles.
- ❖ Tail length slightly less than disc.
- ❖ A short dorsal finfold above neutral fold.
- ❖ Colour gray-brown above, white below, no markings in disc or tail.



Family: **Myliobatidae**

Scientific name : *Myliobatis aquila*

Resource code : 03

Common name : Eagle ray

Local name :



Field identification characters:

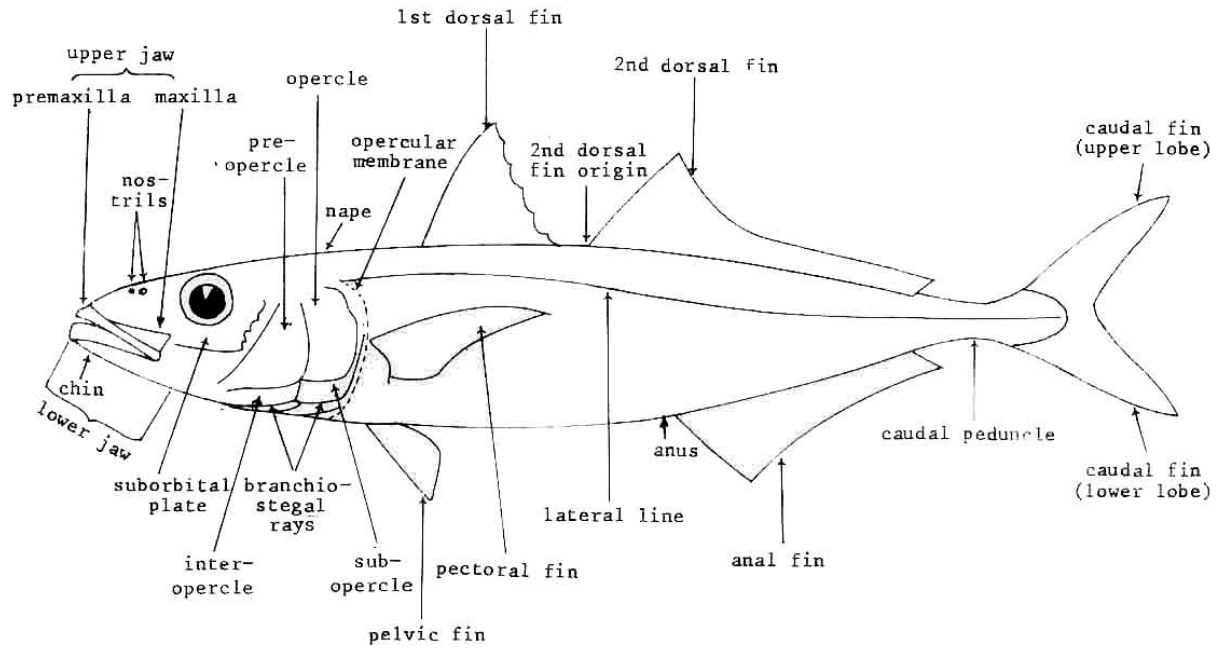
- ❖ Snout broad and short, connected to pectoral disc by a broad ridge under each eye.
- ❖ Pectoral tips blunt, hardly falcate.
- ❖ Disc chocolate-brown to black above, white below no prominent markings.



2.FINFISHES







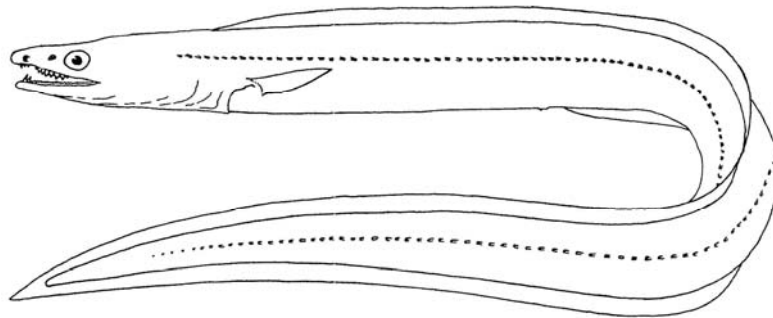
2.1. MORPHOMETRIC CHARACTERS OF FINFISHES



2.2. FAMILY-WISE KEY CHARACTERS OF FINFISHES

Muraenesocidae (Pike congers)

Resource code : 04

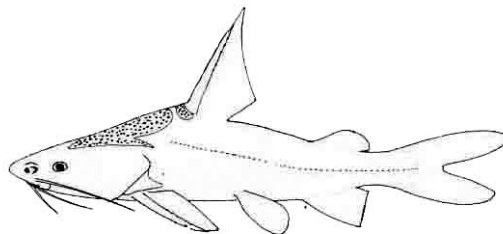


General Characters:

- ❖ Body long to very long, more or less cylindrical in front, compressed along tail. Snout very pointed, mouth terminal, large, extending well beyond eye; teeth always large, prominent.
- ❖ No spines in fins; dorsal fin begins more or less over gill opening; pectoral fins always present, although reduced to a minute flap or absent in *Gavialiceps*; no pelvic fins. No scales.
- ❖ Colour some species yellow.
- ❖ Others silvery grey to black or completely black.

Ariidae (Catfishes)

Resource code : 05

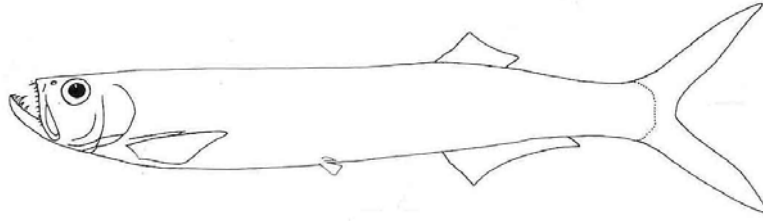


General characters:

- ❖ 3 pairs of barbels present, head shield rugose and granulated.
- ❖ First dorsal fin short with a long, often rough spine, more or less serrated on inner edge, sometimes also on outer edge, preceded by a very short spine or buckler and followed by 7 rays; a short adipose dorsal fin present.
- ❖ Pectoral fins low on sides, with a strong, mostly serrated spine and 7 to 13 rays.
- ❖ Scales absent.

Chirocentridae (Wolf-herrings)

Resource code : 06

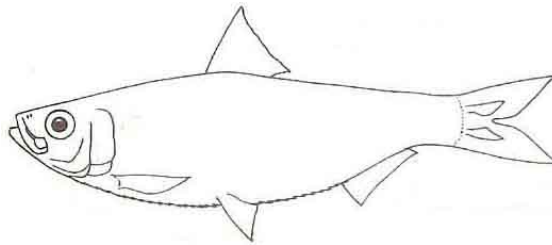


General characters:

- ❖ Very elongate, highly compressed fishes resembling the Clupeidae (herrings, sardines) but without scutes along belly.
- ❖ Colour blue/green on back, sides silvery.
- ❖ Body long slender, large canines in both jaws, dorsal fin set far back on the body.
- ❖ Caudal fin deeply forked.

Clupeidae (Herrings, shads, sardines, sardinellas, pellenas)

Resource code : 07, 08, 09, 10, 17

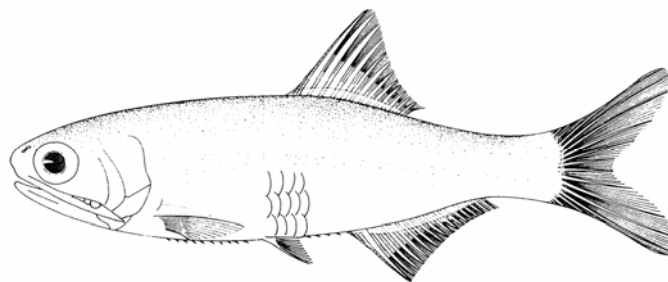


General characters:

- ❖ Small, mostly silvery fishes.
- ❖ Scutes present along belly.
- ❖ Fins lacking spiny rays.
- ❖ No lateral line, single dorsal fin.

Engraulidae (Anchovies)

Resource code : 12, 13, 14, 15, 16



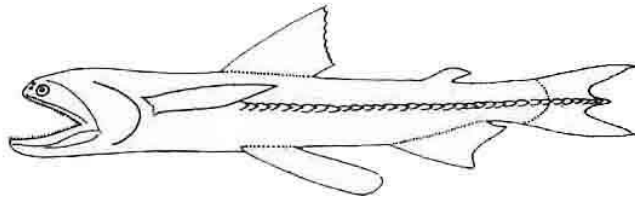
General characters:

- ❖ Small, mostly silvery fishes.
- ❖ Scutes usually present along belly.
- ❖ Snout usually pig-like and projecting.
- ❖ No spiny rays in fins.
- ❖ No lateral line.



Harpadontidae (Bombay ducks)

Resource code : 18

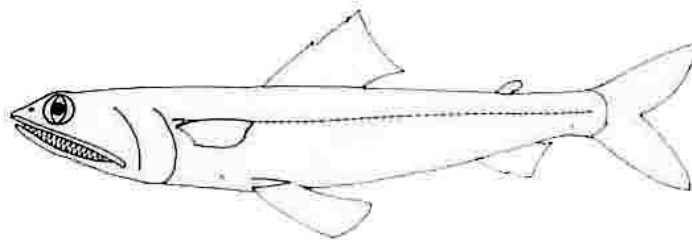


General characters:

- ❖ Mouth very wide, armed with slender, recurved and depressible teeth of unequal size.
- ❖ Dorsal fin followed by a conspicuous adipose fin.
- ❖ Pelvic fins very long.
- ❖ Lateral line extending onto pointed median lobe of caudal fin.
- ❖ Colour uniform light grey; semitransparent appearance.

Synodontidae (Lizard fishes)

Resource code : 19



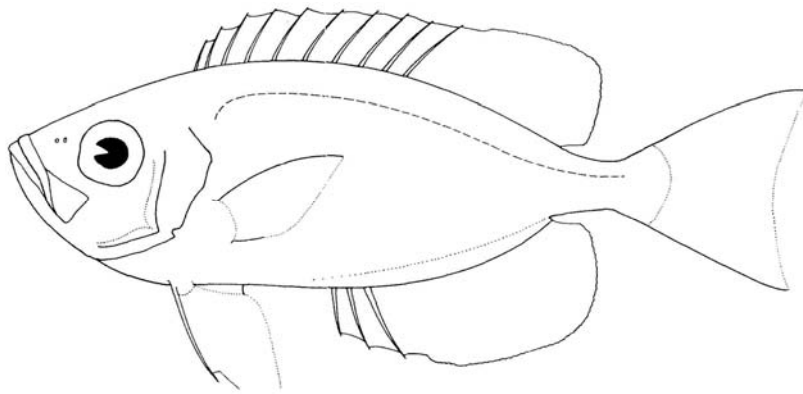
General characters:

- ❖ Head lizard like.
- ❖ Body elongate, usually cylindrical and with adipose fin.
- ❖ Mouth large and terminal, with rows of numerous small, slender and pointed teeth visible even when mouth is closed.
- ❖ Colour green/brown on back, lighter on flanks, with dark blotches or bars down flanks or on fins in certain species.



Priacanthidae

Resource code : 20

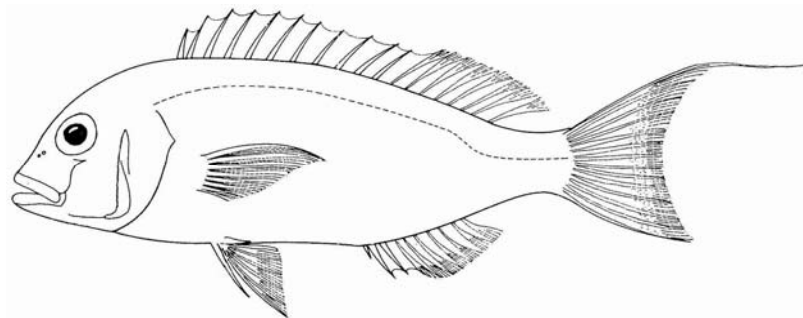


General Characters:

- ❖ Small to moderate-sized fishes with relatively deep, compressed bodies.
- ❖ Eyes very large, near dorsal profile of head; mouth large, strongly oblique, the lower jaw projecting.
- ❖ A continuous dorsal fin of 10 spines and 10 to 15 soft rays, without a notch or only slightly notched between spinous and soft portions; anal fin with 3 spines and 9 to 16 soft rays; pelvic fins large, with 1 spine and 5 rays, inserted anterior to pectoral fins, and broadly joined to the body by a membrane; caudal fin with 16 principal rays (14 branched) varying from slightly emarginated to rounded.
- ❖ Colour generally bright red, but some species can vary from pinkish silver through mottled red to solid red.

Nemipteridae (Threadfin breams, monocle breams and dwarf monocle breams)

Resource code : 21, 87



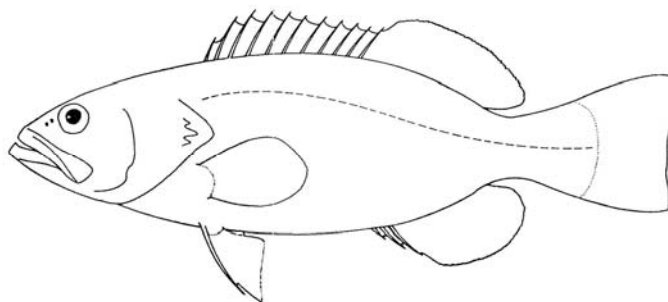
General Characters:

- ❖ Small to moderate-sized, slightly compressed fishes.
- ❖ Mouth terminal; small teeth in bands.
- ❖ A single, curved lateral line with small to moderately large scales.
- ❖ Colour extremely variable. Overall colour may be brownish, reddish, red and yellow, or greenish; usually, but not always, a few longitudinal or vertical broad bands on body, these bands often disappearing; filaments of fins usually yellow; a spot sometimes present near origin of lateral line and dark saddle-like markings occasionally on back. Colour pattern of juveniles often differs from adult fish.



Serranidae (Groupers, seabasses, rockcods, hinds, combers, coral trouts, lyretails)

Resource code : 22

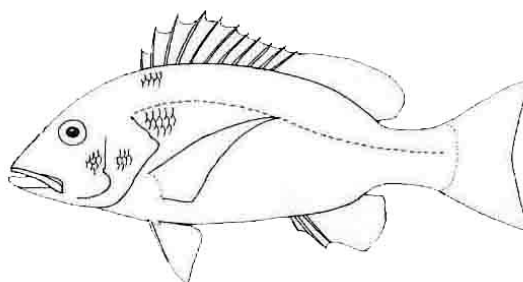


General Characters:

- ❖ Body robust or somewhat compressed, oblong-oval to rather elongate. Mouth large.
- ❖ A single dorsal fin with 7 to 12 strong spines and 10 to 19 soft rays.
- ❖ Edge of preopercle serrate; opercle with 2 or 3 flat points or spines (most species with 3 distinct spines).
- ❖ Colour variable with patterns of light or dark stripes, spots, vertical or diagonal bars, or nearly plain. Many species are capable of rapid colour changes.

Lutjanidae (Snappers)

Resource code : 23



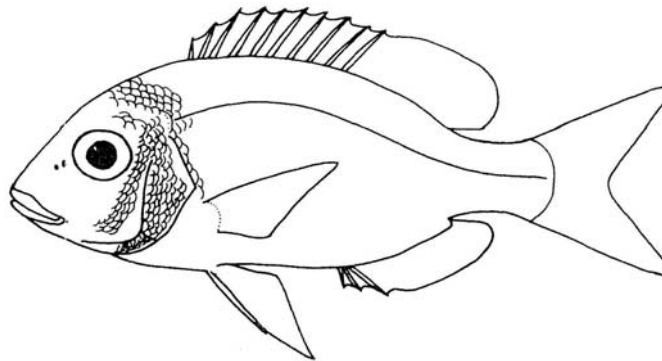
General characters:

- ❖ Mouth terminal, moderate to large extending somewhat when opened (protrusible); maxilla broadest posteriorly, sliding (at least partly) under the suborbital bone (lachrymal) for the greater part of its edge; jaw teeth usually in a few rows, conical and sharp, often developed as more or less distinct canines but no canines in *Aphareus*);
- ❖ preopercle usually serrate
- ❖ Dorsal fin continuous, with 10 to 12 spines and 10 to 17 soft rays; anal fin with 3 spines and 7 to 11 soft rays
- ❖ Anterior part of head (snout and preorbital area) without scales; some rows of scales on cheek, preopercle and on gill cover.
- ❖ No scales between eye and mouth, scales present on cheek.



Lethrinidae (Emperors, pig-face breams, large-eye breams)

Resource code : 24

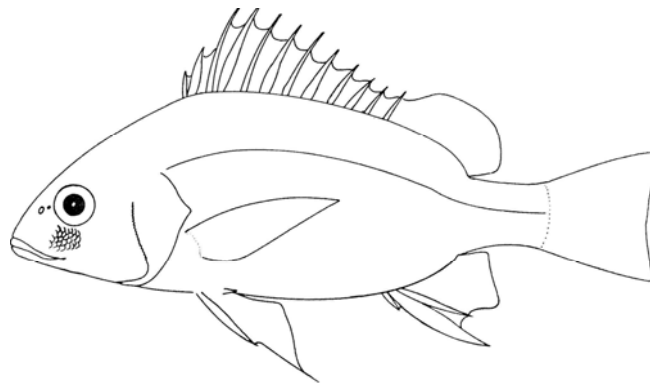


General Characters:

- ❖ Perchlike fishes with a large head: suborbital space deep; mouth moderate, terminal; lips often thick and fleshy; maxilla concealed.
- ❖ A single, continuous dorsal fin with 10 spines and 9 or 10 branched (soft) rays; pectoral fins moderately long and pointed, with 13 to 15 branched rays; caudal fin emarginate to forked.
- ❖ Cheeks, upper surface of head and preorbital area scaleless in Lethrinus.
- ❖ Lateral line continuous, with simple tubes. Pyloric caeca few, usually 3.
- ❖ Colour ground colour of body and head brown, green or grey with tints of red, pink, yellow or blue.

Haemulidae (Grunts, sweetlips, rubberlips, hotlips)

Resource code : 25



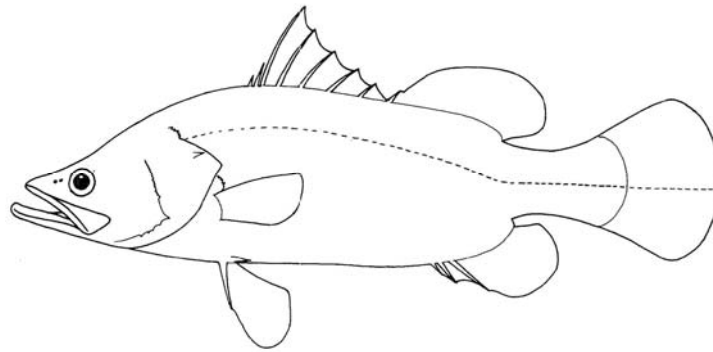
General Characters:

- ❖ Oblong, compressed, perch-like fishes.
- ❖ Head profile strongly convex; scales present on entire head (except front of snout, lips and chin).
- ❖ Colour highly variable, ranging from uniformly coloured to banded, blotched and spotted.



Centropomidae (Barramundis, sea perches)

Resource code : 26

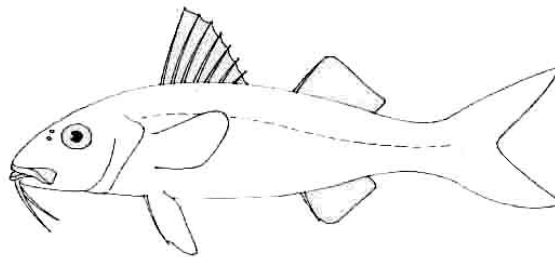


General Characters:

- ❖ Body elongate or oblong, compressed, dorsal profile concave at nape.
- ❖ Mouth large, jaws equal or with lower longer than upper; preopercle with a serrated posterior border or with 2 ridges; opercle with a single spine.
- ❖ Dorsal fin almost wholly separated into 2, with 7 or 8 strong spines in front, followed by 1 spine and 10 to 15 soft rays; pelvic fins below pectoral fins, with a strong spine and 5 soft rays; anal fin short, with 3 spines and 8 to 13 soft rays; caudal fin rounded.
- ❖ Colour usually dark grey or green above and silvery below.

Mullidae (Goatfishes)

Resource code : 27



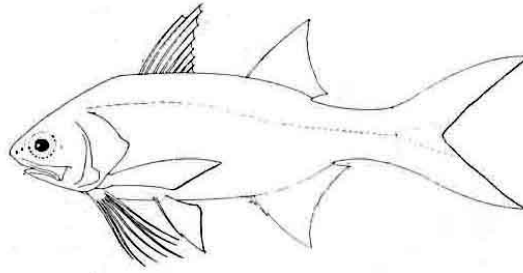
General characters:

- ❖ One pair of barbels present at the tip of chin.
- ❖ Body elongate and somewhat compressed.
- ❖ Two long unbranched barbels on chin.
- ❖ Two well-separated dorsal fins, the first of 7 or 8 (usually 8) slender spines.
- ❖ The second of 9 rays (first unbranched); anal fin with 1 spine and 6 rays; caudal fin deeply forked.
- ❖ Colour variable; ground colour generally pale, some species with distinctive dark, yellow, orange or brown bands or stripes and spots or blotches.



Polynemidae (Threadfins)

Resource code : 28

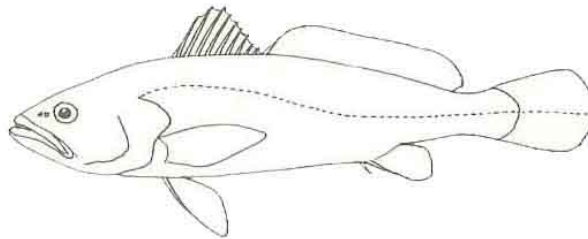


General characters:

- ❖ Lower pectoral fin rays present, mouth inferior.
- ❖ Head scaly, with a conical snout, projecting beyond the large mouth
- ❖ Pectoral fins in 2 parts, the upper normal, the lower with 3 or more free filamentous rays.
- ❖ lateral line extending onto caudal fin.
- ❖ Colour silvery, golden or light brown, sometimes with a dark blotch at the shoulder or dark longitudinal lines on body; fins yellowish or more or less dusky.

Sciaenidae (Croakers)

Resource code : 29

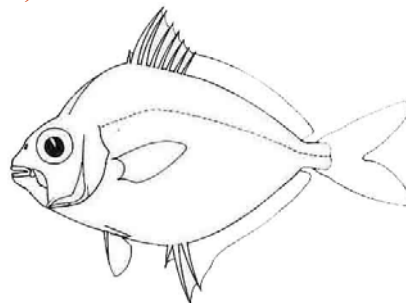


General characters:

- ❖ Fishes with fairly elongate bodies, moderately compressed.
- ❖ sensory pores often conspicuous on tip of snout (rostral pores), on lower edge of snout (marginal pores) and on chin (mental pores).
- ❖ Opercular spines present. Lateral line continues upto tip of caudal fin

Leiognathidae (Silverbellies)

Resource code : 30



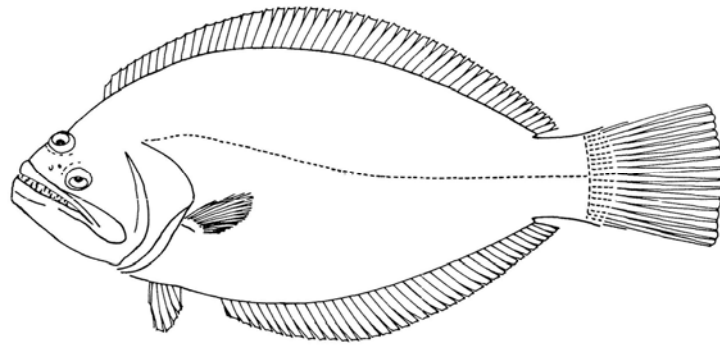
General characters:

- ❖ Small to medium-sized fishes with oblong or round bodies
- ❖ Mouth protrucible in downward or upward directions.
- ❖ Moderately to strongly compressed.
- ❖ A well developed nuchal crest or spine.
- ❖ Body silvery, with dark vermiculations on back.



Psettodidae (Spiny turbot)

Resource code : 31

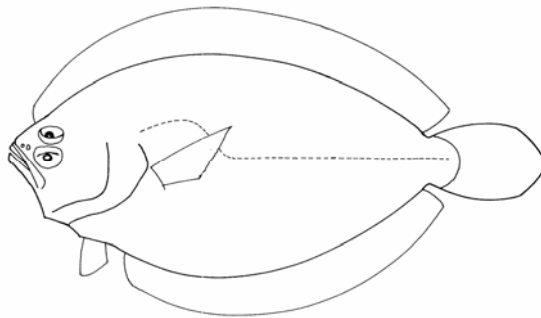


General Characters:

- ❖ Body oval and flat, but thicker than in most other flatfishes.
- ❖ Mouth large with strong teeth. Both the eyes on same side; upper eye lying immediately below dorsal edge.
- ❖ Dorsal fin origin well posterior to eyes.
- ❖ Body usually brown/ grey, sometimes with 4 broad, dark crossbars. Dorsal anal and caudal fin tips black.

Bothidae (Lefteye flounders)

Resource code : 32



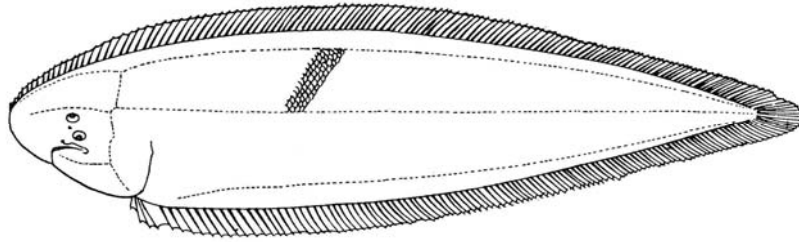
General characters:

- ❖ Flatfishes with eyes on left side of body
- ❖ Preopercle exposed, its hind margin free and visible.
- ❖ dorsal fin origin above or in front of eyes
- ❖ Colour eyed side brownish, often with spots, blotches or ring-like markings; blind side pale.



Cynoglossidae (Tonguesoles)

Resource code : 33

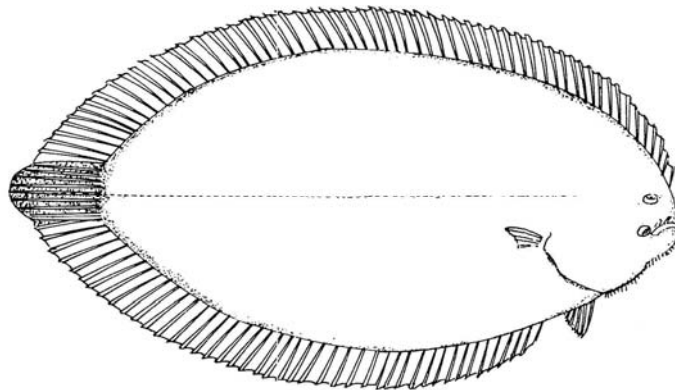


General Characters:

- ❖ Tongue-shaped flatfishes with eyes on left side of body, which is highly compressed and tapers posteriorly. Mouth asymmetrical, lips sometimes fringed.
- ❖ Dorsal fin reaching forward onto head; both dorsal and anal fins joined to caudal fin; pectoral fins absent; only left pelvic fin present; no spiny rays present in dorsal and pelvic fins.
- ❖ Colour usually brownish, sometimes with indistinct cloudy patches or darker spots united into irregular crossbands on eyed side, lighter on blind side; fins greyish.

Soleidae (Soles)

Resource code : 33



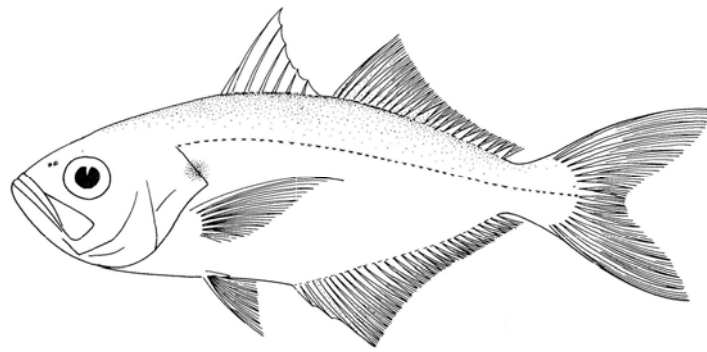
General Characters:

- ❖ Oval or somewhat elongate and strongly compressed flat fishes with eyes on right side of body.
- ❖ Preopercle without a free margin, embedded in skin.
- ❖ No spines in fins; dorsal fin extending far forward on head; dorsal and anal fins completely separate from, adherent to, or fused with caudal fin.
- ❖ Lateral line single and straight on body, but sometimes branched on head.
- ❖ Colour usually brown, sometimes with scattered black spots or blotches or dark crossbands on eyed side of body and vertical fins; blind side yellow/white.



Lactariidae (False trevallies, milk trevallies)

Resource code : 34

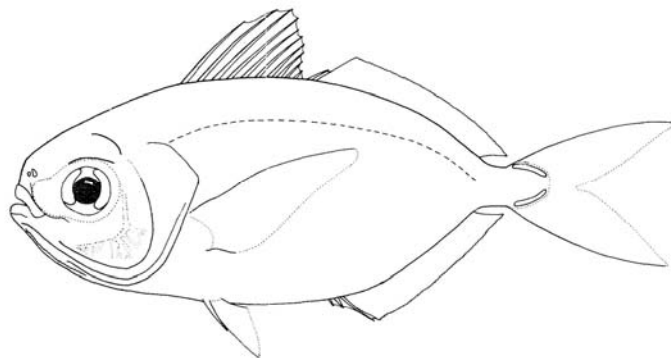


General Characters:

- ❖ Mouth large and oblique, with a prominent lower jaw; one pair of small, sharp canine teeth at front of each jaw.
- ❖ Two dorsal fins of about equal height.
- ❖ Colour silvery grey with a blue iridescence above; silvery white below.
- ❖ A dusky spot on upper part of gill cover.

Ariommidae (Ariommas)

Resource code : 35



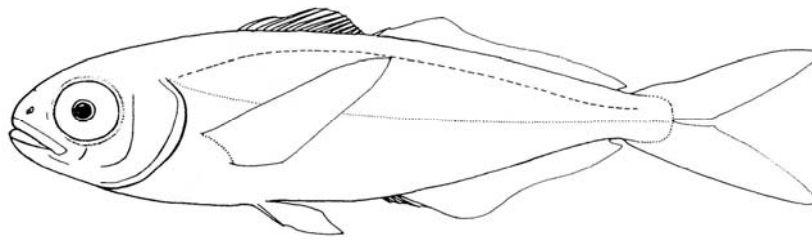
General Characters:

- ❖ Body either deep and compressed or elongate and rounded, caudal peduncle short and slender; musculature firm and oily.
- ❖ Head fairly large, snout blunt; eyes large, with a prominent supraorbital ridge, centrally located and surrounded by thick adipose tissue.
- ❖ Lacrimal bone covering upper jaw when mouth is closed.
- ❖ Pelvic fins inserting under posterior end of pectoral fin base; caudal fin stiff and deeply forked.
- ❖ Lateral line high, following dorsal profile and not extending onto caudal peduncle, a branch of the lateral line arching forward over the eye in a conspicuous bony tract.
- ❖ Colour deep-bodied Indian species quite silvery, with a bluish tinge on the back.



Nomeidae (Man-of-war fishes, also driftfishes)

Resource code : 36

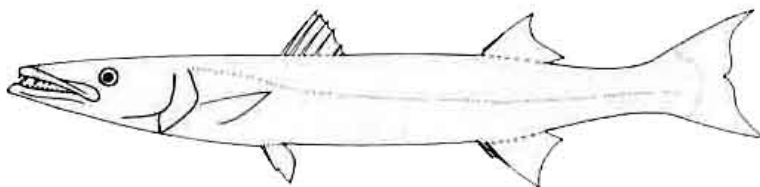


General Characters:

- ❖ Slender to deep, laterally compressed fishes; caudal peduncle deep.
- ❖ Adipose tissue around eyes developed in most species; opercular and preopercular margins entire or finely denticulate.
- ❖ Two dorsal fins; pectoral fins becoming long and wing-like with growth, their bases; pelvic fins attached to abdomen by a thin membrane and folding into a narrow groove, the fins greatly produced and expanded; caudal fin forked, the lobes often folded to overlap one another.
- ❖ Lateral line high, following dorsal profile and often not extending onto caudal peduncle.
- ❖ Colour Cubiceps species are generally dark blue to brownish on back, light-coloured or silvery on sides with no mottling or stripes, but they may become uniformly dark with age.
- ❖ Nomeus is bright blue above, with a mottled blue pattern overlying the silvery sides and black pelvic fins; large specimens may be more uniformly coloured, resembling Cubiceps.
- ❖ Young Psenes may be striped or mottled, dark over light on sides and back, but older individuals are uniformly dark blue or black.

Sphyraenidae (Barracudas)

Resource code : 37



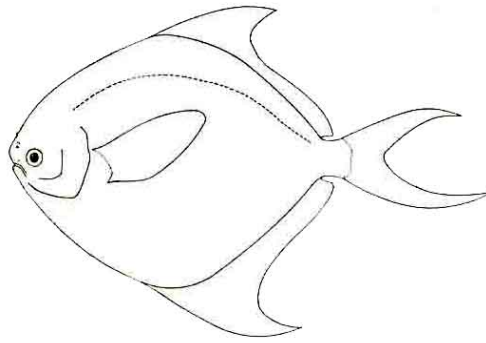
General characters:

- ❖ Body elongated, usually slightly compressed.
- ❖ Head large, with a long, pointed snout; mouth large, horizontal, the lower jaw projecting beyond the upper.
- ❖ Strong canine teeth of unequal size in jaws and on palatines (roof of mouth).
- ❖ Two short and widely separated dorsal fins
- ❖ Colour usually grey to blue above, with silvery reflections, lighter to white below.



Stromateidae (Silver pomfrets)

Resource code : 38, 39

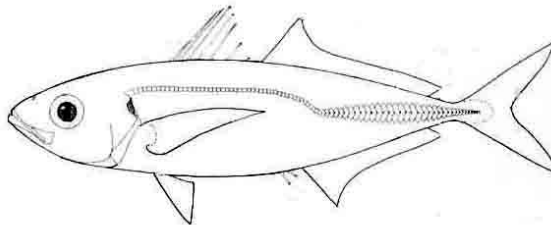


General characters:

- ❖ Body very deep and compressed, caudal peduncle short and compressed, with no keels or scutes.
- ❖ Single dorsal and anal fins.
- ❖ Pelvic fins absent, mouth small, maxilla immobile covered with skin and united to cheek.
- ❖ Scales small, cycloid (smooth) very easily shed; head naked.
- ❖ Colour conspicuously silvery with a bluish cast on back; gill membranes and inside of mouth dark.

Carangidae (Pompanos, scads, trevallies, yellowtails)

Resource code : 40, 41, 42, 43, 44, 45, 47, 48



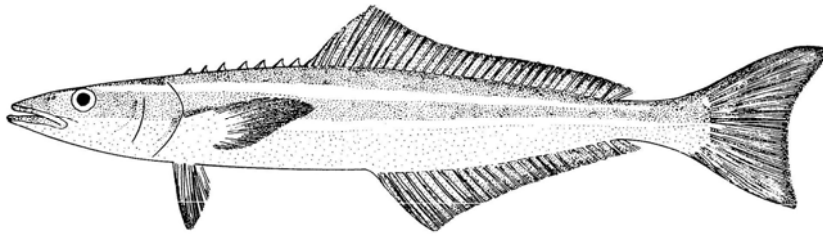
General characters:

- ❖ Scutes present on caudal peduncle.
- ❖ Body extremely variable in shape, ranging from elongate and fusiform to deep and strongly compressed.
- ❖ Two dorsal fins that are separate in small juveniles, the first of moderate height or very low, with 4 to 8 spines.
- ❖ caudal fin forked, with the lobes equal in most species.



Rachycentridae (Cobias)

Resource code : 46



General Characters:

- ❖ Head broad and depressed; first dorsal fin with 7 to 9 short but strong isolated spines, not connected by membrane.
- ❖ Caudal fin lunate, upper lobe longer than lower lobe.
- ❖ Back and sides dark brown, with 2 sharply defined narrow-light bands; belly yellowish.

Trichiuridae (Cutlassfishes, hairtailfishes, frostfishes, scabbardfishes)

Resource code : 49

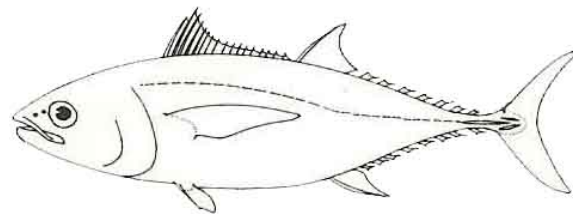


General Characters:

- ❖ Body extremely elongate, compressed and ribbon-like.
- ❖ Mouth large, usually not protrusible, lower jaw projecting; usually a dermal process at tip of each jaw; strong canine teeth in jaws, those at front of upper jaw fang-like; maxilla concealed by preorbital bone; a single nostril on each side.
- ❖ Dorsal fin low and long, beginning shortly behind eye, its anterior spinous part shorter than the posterior soft portion, pelvic fins reduced to a scale-like spine or completely absent; caudal fin either small and forked or absent, the body tapering to a point. Lateral line single. Scales absent.
- ❖ Colour body generally silvery.

Scombridae (Mackerels, tunas, albacores, seerfishes)

Resource code : 50 to 64



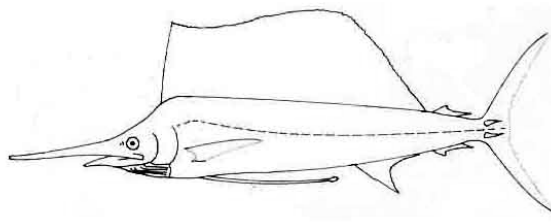
General characters:

- ❖ Body elongate and fusiform.
- ❖ 2 to 3 keels present on caudal peduncle, finlets are present after 2nd dorsal and anal fin.
- ❖ Colour usually bluish or greenish above with a pattern of wavy bands on upper sides and silvery below.



Istiophoridae (Marlins, sailfishes)

Resource code : 65, 67, 68, 69

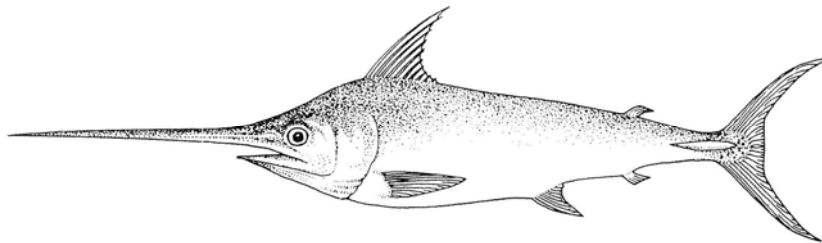


General characters:

- ❖ Body elongate and more or less compressed.
- ❖ Upper jaw prolonged into a long spear which is round in cross section.
- ❖ 1st dorsal fin large and sail-like, upper jaw prolonged into slender spear.
- ❖ The first dorsal and anal fins can both be folded back into grooves.
- ❖ Colour back and upper sides blue (sometimes dark), lower sides and belly silvery white.

Xiphiidae (Swordfishes)

Resource code : 66

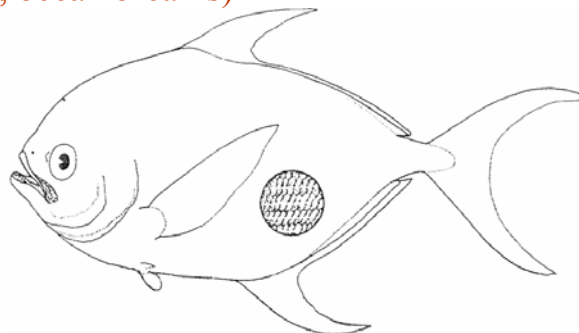


General Characters:

- ❖ A long, flat, sword-like bill and no pelvic fins.
- ❖ Pelvic fins absent.
- ❖ A large keel present on each side of caudal peduncle.
- ❖ Colour dorsal and lateral sides of body blackish-brown.
- ❖ Blackish-brown fading to light-brown below; 1st dorsal fin with blackish-brown membrane, other fins brown or blackish-brown.

Bramiidae (Pomfrets, ocean breams)

Resource code : 70

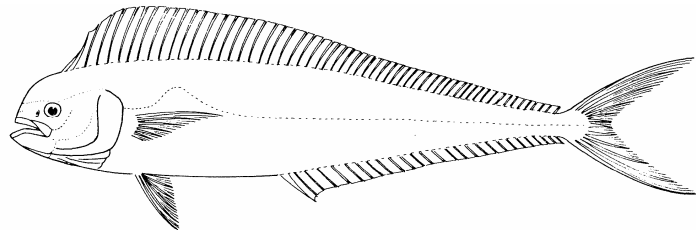


General characters:

- ❖ Body deep and somewhat compressed, with a heavy caudal peduncle.
- ❖ the maxilla exposed, broad, scaled and extending at least to below middle of eye
- ❖ A single, long-based dorsal fin
- ❖ a prominent axillary scale
- ❖ scales large, usually keeled, covering body and head.
- ❖ Colour uniform black, bluish-black or silvery.

Coryphaenidae (Dolphinfishes)

Resource code : 71

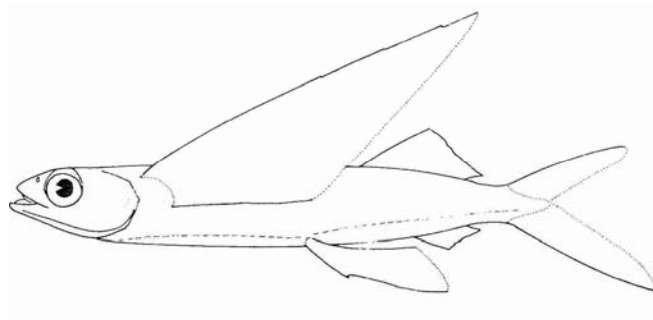


General characters:

- ❖ Elongate compressed fishes.
- ❖ Adult males develop a bony crest on front of head. Lateral line curved upward above pectoral fin.
- ❖ Dorsal and anal fins very long, continuing almost to caudal fin, without sharp spines, or finlets; dorsal fin origin on nape.
- ❖ Colour in life very variable, sides with golden hues and back brilliant metallic greens and blues; many small, black spots on head and body.

Exocoetidae

Resource code : 72



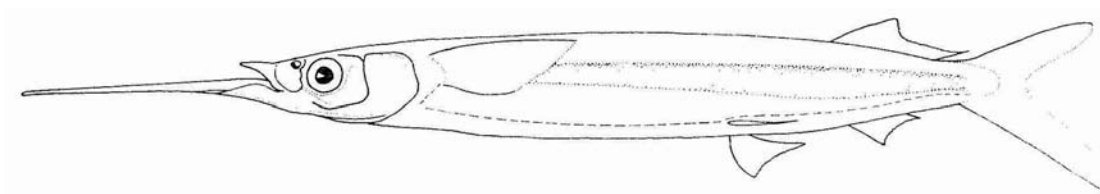
General Characters:

- ❖ Elongate fishes, their bodies broadly cylindrical (round in cross-section), flattened ventrally in some species.
- ❖ Snout blunt, shorter than eye in all Indian Ocean species.
- ❖ No spines in fins; pectoral fins high on sides, strikingly long, always extending beyond dorsal fin origin; pelvic fins abdominal in position, and greatly enlarged in many, caudal fin deeply forked.
- ❖ Lateral line low on body; scales large.
- ❖ Colour dark above, pale below; the dark colours usually iridescent blue or green in life. Pectoral fins in some species with dark spots or pale stripes. Dorsal fin in some species with black pigment.



Hemiramphidae (Halfbeaks)

Resource code : 73

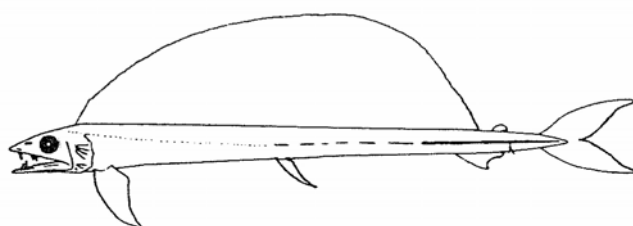


General Characters:

- ❖ Elongate fishes with a prolonged lower jaw (except in *Oxyporhamphus*) and a short triangular upper jaw.
- ❖ Nostrils in a pit anterior to the eyes.
- ❖ No spines in fins; dorsal and anal fins posterior in position; pelvic fins in abdominal position; pectoral fins usually short.
- ❖ Lateral line running down from pectoral fin origin and then backward along ventral margin of body.
- ❖ Colour green or blue on the back and silvery white on the sides and ventrally. Tip of the lower jaw bright red or orange in most species.

Alepisauridae (Lancet fishes)

Resource code : 74

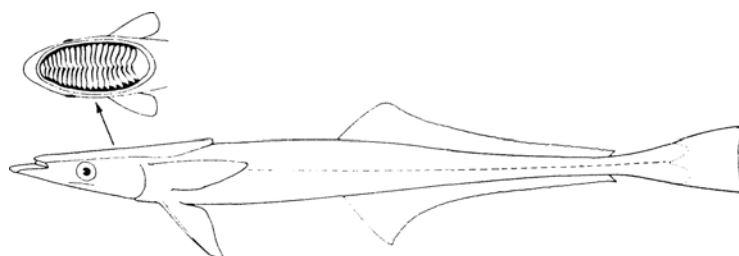


General characters:

- ❖ somewhat similar to elongate gempylids in general appearance, when the sail-like dorsal fin is folded back, but easily distinguished by their jelly-like body, a dorsal adipose fin (instead of a rayed second dorsal fin), and the insertion of the pelvic fins far behind the pectorals.

Echeneidae (sharksuckers, discfishes)

Resource code : 75



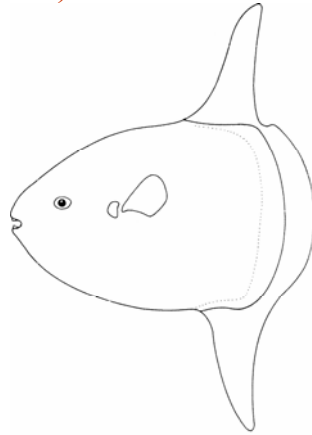
General characters:

- ❖ Perciform fishes with a transversely laminated, oval-shaped cephalic disc,
- ❖ Dorsal and anal fins long, lacking spines.
- ❖ Colour: in life colours subdued, pale brown, greyish to black, sometimes light to whitish or with light and dark horizontal stripes on trunk.



Molidae (Molas, ocean sunfishes)

Resource code : 76

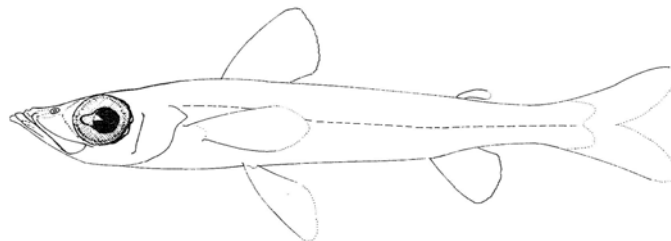


General characters:

- ❖ Body short and deep or oblong, markedly compressed, truncate and without caudal peduncle and normal caudal fin
- ❖ gill openings small, pore-like
- ❖ Dorsal and anal fins of similar shape, generally triangular, dorsal located above anal
- ❖ pectoral fins small, located midside
- ❖ caudal fin reduced to a leathery fold with a scalloped trailing margin, immediately posterior to the bases of dorsal and anal fins.
- ❖ Skin of body leathery and thick

Chlorophthalmidae (Greeneyes)

Resource code : 77



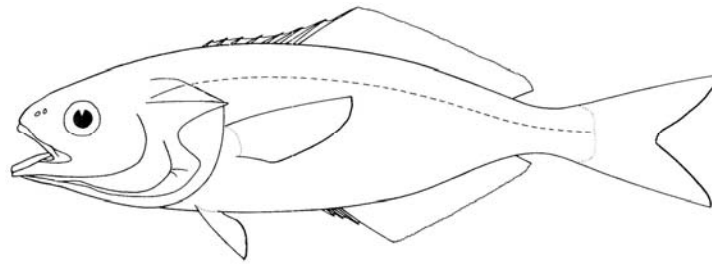
General Characters:

- ❖ Small, moderately slender bottom fishes of the continental shelf and deep sea.
- ❖ Colour yellowish-brown, sometimes with dusky mottlings.
- ❖ Tapetum of eye brilliant iridescent green.



Centrolophidae (Ruffs, barrellfishes and blackfishes)

Resource code : 78

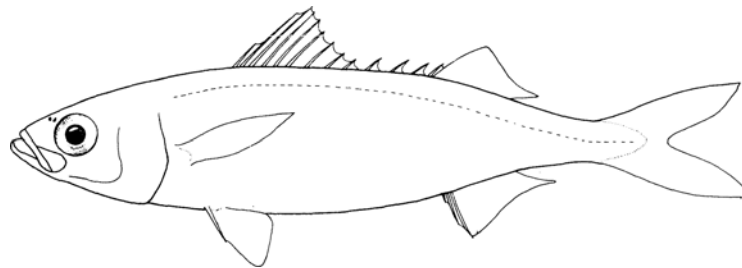


General Characters:

- ❖ Slender to deep, usually somewhat compressed stromateoid fishes.
- ❖ Preopercular margin usually moderately denticulate.
- ❖ A single continuous dorsal fin, its segmented rays preceded by 5 to 9 short, stout spines or 3 to 7 thin weak spines; anal fin with 3 spines, not separated from the segmented rays; pelvic fins attached to the abdomen by a thin membrane and folding into a broad shallow groove.
- ❖ Lateral line, when present, with tubed scales extending onto caudal peduncle.
- ❖ Colour generally dark green to grey, or brownish, with an indistinct vertical, or more usually horizontal, pattern of darker irregular stripes; eyes often golden.

Emmelichthyidae (rovers)

Resource code : 79



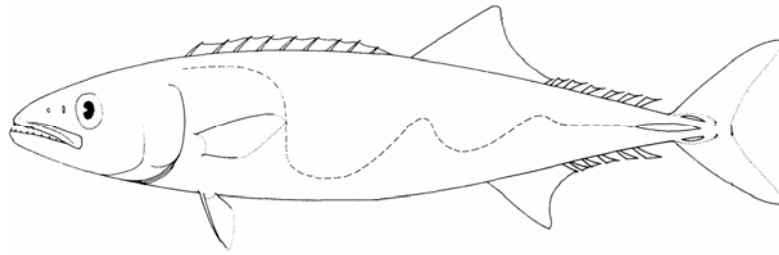
General characters:

- ❖ Body elongate, subcylindrical or oblong and somewhat compressed. Maxilla broadly expanded, scaly, and not covered by the preorbital bone when mouth is closed;
- ❖ upper jaw very protrusile
- ❖ jaws toothless or with a series of minute teeth
- ❖ caudal fin forked



Gempylidae (Snake mackerels)

Resource code : 80

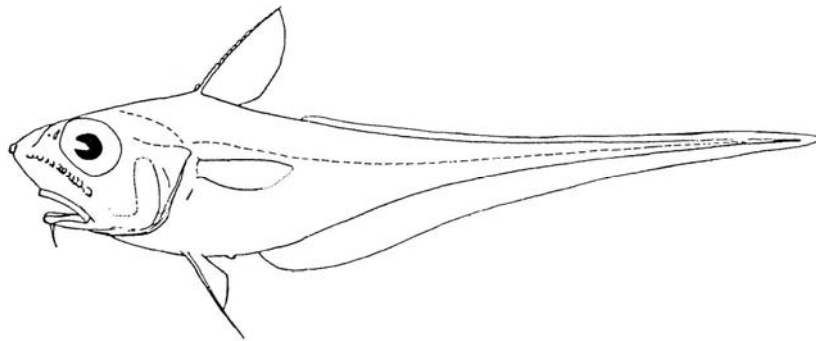


General characters:

- ❖ Body elongate and compressed or somewhat fusiform
- ❖ strong teeth in jaws, those at front of upper jaw often fang-like
- ❖ Two dorsal fins, the second (excluding finlets) shorter than the first

Macrouridae (Grenadiers)

Resource code : 82



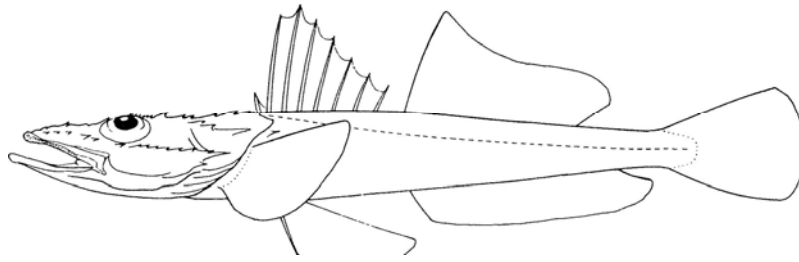
General Characters:

- ❖ Trunk short, moderately compressed; tail greatly elongated, tapering to a point that usually lacks a caudal fin.
- ❖ Head shape compressed, rounded or cylindrical, with a bluntly rounded to sharply pointed snout; mouth terminal to inferior, small to moderate in size; chin barbel usually present.
- ❖ Dorsal fins two except in Macrouroidinae with one; first dorsal with the 2 anteriormost rays spinous except in Trachyrincus and Macrouroidinae; second dorsal and anal fins long, (both fins meet at tip of tail;)
- ❖ Exposed fields of scales often covered with spinules, which are sometimes arranged in ridgelike rows; a stout, terminal, scutelike scale at tip of snout in some species; ridgelike rows of coarse, scutelike scales sometimes present on head.
- ❖ Colour usually grey, brown, or blackish, sometimes with a blue or violet tinge; some silvery along sides.



Platycephalidae (Spiny flatheads)

Resource code : 83

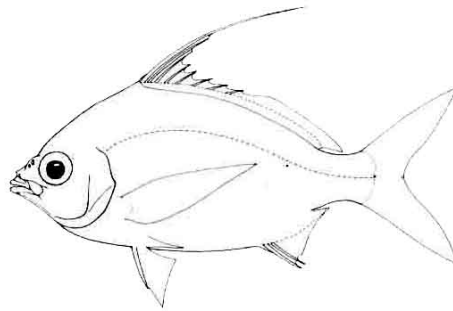


General Characters:

- ❖ Bony ridges of head usually bearing spines or serrations; Lateral line complete.
- ❖ Scales ctenoid, usually embedded on head and breast; anterior pored scales of lateral line often bearing spines, all pored scales with a spine in some species.
- ❖ Colour dark above, pale below; the dark colours with various shades of brown, grey or black; brighter hues of reddish, purplish or greenish in some.

Gerreidae (Silver-biddies)

Resource code : 84



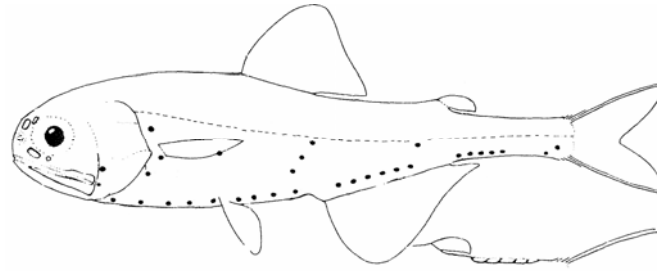
General characters:

- ❖ Small to medium-sized fishes.
- ❖ 2nd dorsal spine, longest, laterally compressed, produced into filament.
- ❖ Small to medium-sized fishes.
- ❖ Mouth strongly protractile, pointing downwards when extended.
- ❖ Colour usually a brilliant silver, occasionally with dusky markings on sides; margin of spinous part of dorsal fin often black.



Myctophidae (Lanternfishes)

Resource code : 85

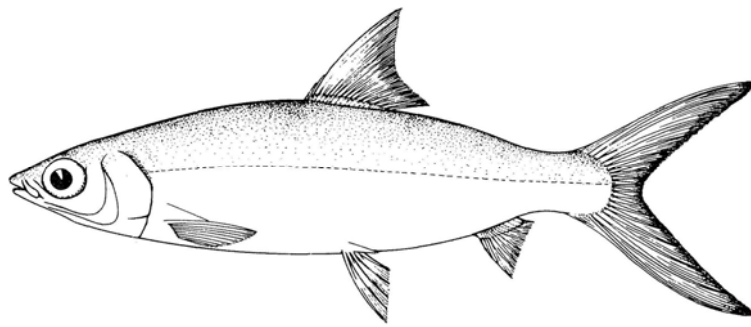


General characters:

- ❖ Head and trunk compressed. Eyes large.
- ❖ jaws extending to or far beyond vertical through posterior margin of eye.
- ❖ Jaws (premaxillaries in upper, and dentaries in lower jaws) with bands of closely-set teeth,
- ❖ Teeth also present on roof of mouth
- ❖ All fins lacking spines; adipose fin present;

Chanidae (Milkfishes)

Resource code : 86



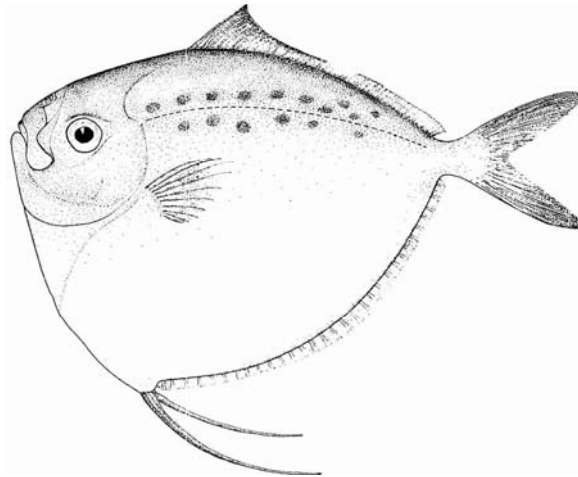
General characters:

- ❖ Body elongate, moderately compressed, with no scutes along belly.
- ❖ Mouth small, without teeth, lower jaw with a small tubercle at tip, fitting into a notch of upper jaw; branchiostegal rays only 4.
- ❖ Dorsal fin at about midpoint of body; anal fin short and far behind dorsal fin base.
- ❖ Scales small, lateral line present.
- ❖ Colour back olive green, flanks silver. Dorsal, anal and caudal fins with dark margins.



Menidae (Moonfishes)

Resource code : 88

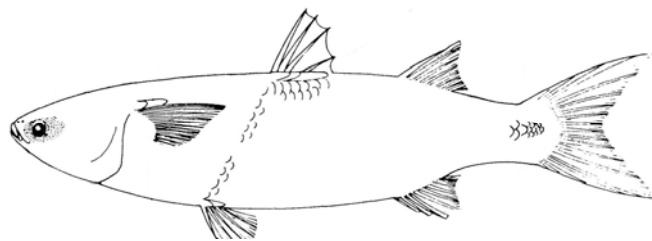


General characters:

- ❖ Body extremely compressed, discoid, its depth contained 1.3 to 1.5 times in length (from tip of snout to base of caudal fin).
- ❖ Upper jaw protrusile.
- ❖ Gillrakers well developed.
- ❖ Pectoral fins shorter than head; caudal fin forked.
- ❖ Lateral line ending below rear end of dorsal fin base; scales minute, deciduous (body apparently scaleless).
- ❖ Colour dark blue dorsally and silvery white! below; several small round black spots on dorsal part of body.

Mugilidae (Mulletts)

Resource code : 89



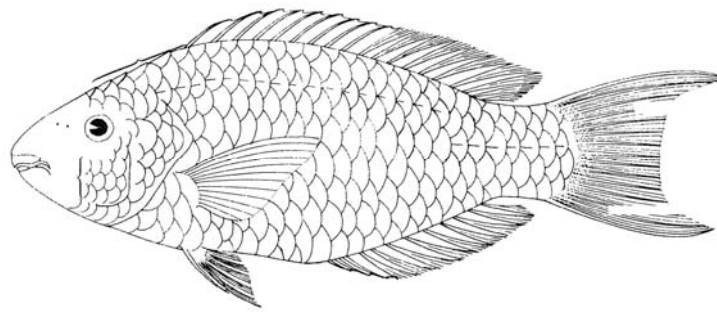
General Characters:

- ❖ Elongate fishes, usually with a broad, flattened head (but head rounded in *Agonostomus* species) blunt snout and cylindrical or a little compressed body.
- ❖ Lateral line absent. Scales large or moderate-sized; modified scales may be present below first dorsal fin and above pectoral and pelvic fins (Axillary scales).
- ❖ Colour in life, blue/green, green or olive on back, silvery on sides and belly, often with 3 to 9 longitudinal streaks on back, sides and belly; fins hyaline and dusky.
- ❖ Eyes often partly covered by fatty tissue (adipose eyelid).



Scaridae (Parrotfishes)

Resource code : 90

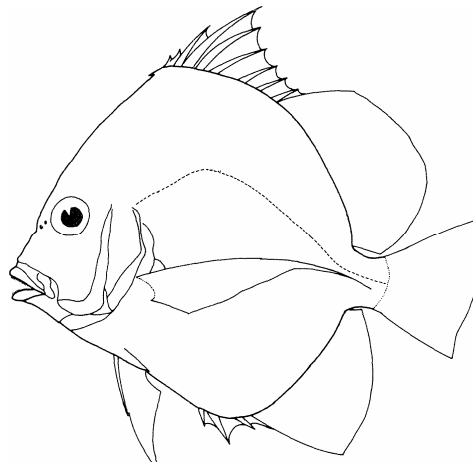


General Characters:

- ❖ Body oblong, moderately compressed.
- ❖ Dorsal fin continuous, with 9 slender, flexible spines rays; pectoral fins with 2 unbranched rays (the first always rudimentary, the second supporting most of the leading margin of the fin), and 11 to 15 branched rays, caudal fin varying from rounded to lunate, with produced caudal lobes.
- ❖ Colour most species are very colourful, and man exhibit striking sexual dichromatism.
- ❖ Most species have 2 distinct adult colour phases

Drepanidae (Sicklefishes)

Resource code : 91



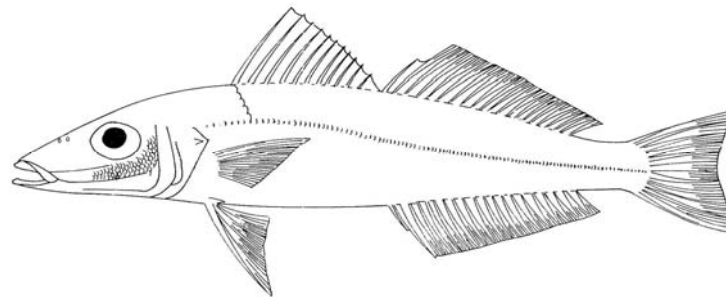
General Characters:

- ❖ Body very deep and strongly compressed; head with a parabolic upper profile; Colour silvery grey above, silvery white below, with dusky spots or grey vertical bars.
- ❖ Mouth terminal and protrusible, forming a downward-pointing tube when protracted.
- ❖ Dorsal fin with 8 to 10 spines (the first small, procumbent, visible only in young), the spinous part separated from the soft part by a deep notch and depressible in a high basal scaly sheath.
- ❖ Colour silvery grey above, silvery white below, with dusky spots or grey vertical bars.



Sillaginidae (Sillagos)

Resource code : 92

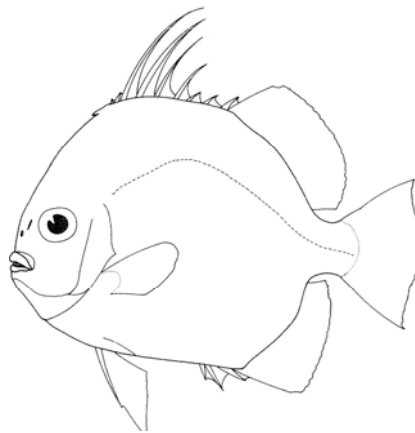


General Characters:

- ❖ Body elongate, slightly compressed, tapering from middle of spinous dorsal fin to head and tail.
- ❖ Opercle with a small, sharp spine; mouth small, terminal.
- ❖ Two separate dorsal fins, the first with 9 to 12 slender spines, its origin above middle of pectoral fins; the second with 1 spine and 16 to 26 rays, its base about twice that of 1st dorsal fin; pelvic fin origin slightly behind origin of pectoral fin; anal fin with two weak spines.
- ❖ Scales small, ctenoid (rough to touch); lateral line slightly arched.
- ❖ Colour silvery grey/green, sometimes with black spots.

Ephippidae (Spadefishes)

Resource code : 93



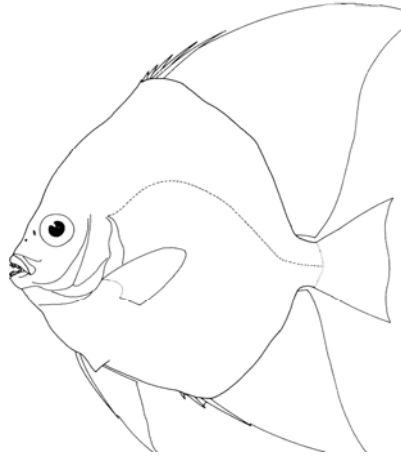
General Characters:

- ❖ Body very deep to almost orbicular, strongly compressed.
- ❖ Head short, its profile either steep or fairly convex; caudal fin distally more or less sigmoid - shaped, with an obtuse median angular process.
- ❖ Lateral line angularly arched. Scales moderate to small.
- ❖ Colour silvery grey to greenish; body with 4 to 10 vertical bands fading with age.



Platacidae (Batfishes)

Resource code : 93

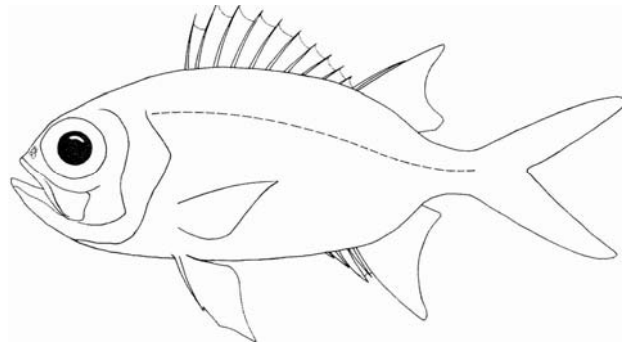


General Characters:

- ❖ Body very deep, rhomboid and strongly compressed, much changing with age.
- ❖ Head much shorter than high, with front profile more or less parabolic; mouth small, horizontal, terminal, scarcely protractile; pectoral fins short, rounded; pelvic fins present, greatly produced, becoming shorter with age.
- ❖ Lateral line arched, about concurrent with back. Scales small, finely ciliated, becoming minute on head and vertical fins.
- ❖ Colour of juveniles: nearly completely black, fringed with orange-red. Subadults and adults: silvery grey with blackish vertical bars, the first through eye, fading with age.

Holocentridae (Squirrelfishes, soldierfishes)

Resource code : 94



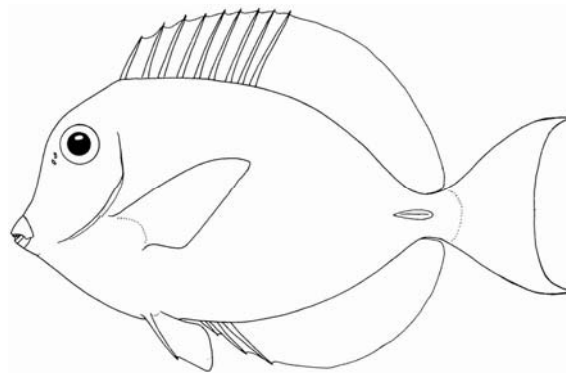
General characters:

- ❖ Body moderately elongate, compressed, the caudal peduncle slender; mucous channels developed on head; edges of membrane bones of head serrated or with spines; eyes large.
- ❖ Mouth terminal or with lower jaw projecting.
- ❖ Lateral line complete.
- ❖ Colour usually red or pink, plain or striped, sometimes with black markings around gill opening or on fins.



Acanthuridae (Surgeonfishes, tangs, unicornfishes)

Resource code : 95

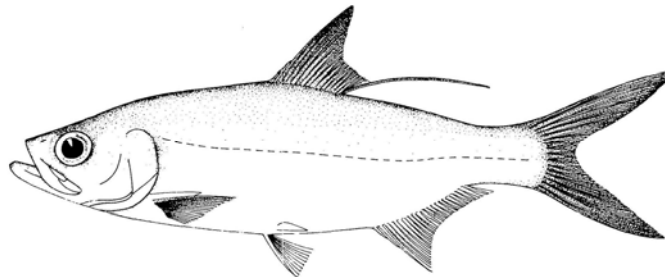


General characters:

- ❖ High-bodied, compressed fishes with a single folding lancet-like spine (Acanthurinae) or one or two bony plates usually bearing sharp keels on side of caudal peduncle.
- ❖ Mouth small, the premaxilla not protractile; teeth in a single row, variable in shape with genus, but never caniniform or molariform.
- ❖ A continuous, unnotched dorsal fin; caudal fin truncate to lunate.
- ❖ Colour often brown or grey, but some species very colourful.

Megalopidae (Tarpons)

Resource code : 96



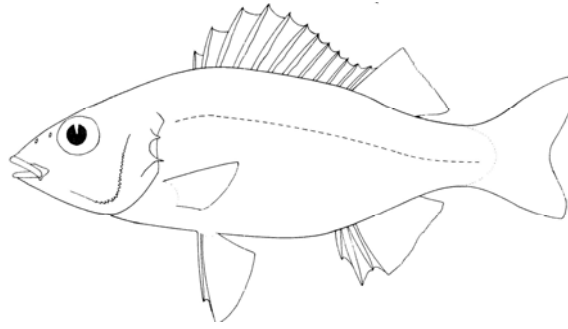
General characters:

- ❖ Body moderately deep; eye large; lower jaw projecting.
- ❖ Fins lacking spines; dorsal fin origin at about midpoint of body, last dorsal fin ray filamentous; anal fin origin a little behind dorsal fin base.
- ❖ Colour back blue/green, flanks silvery.



Teraponidae (Terapon-perches, terapons)

Resource code : 97

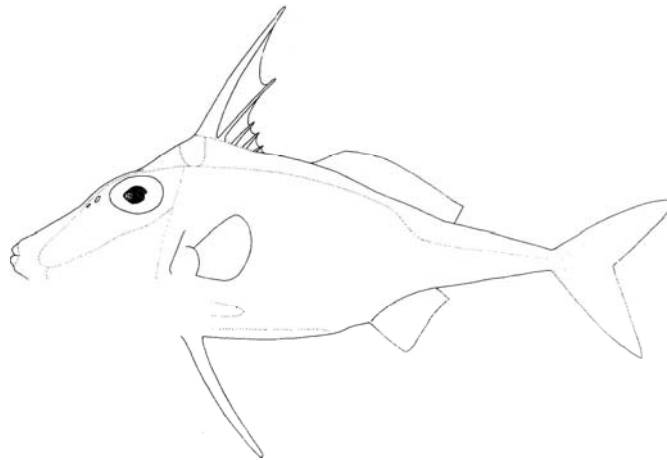


General Characters:

- ❖ Small to medium-sized perch-like fishes with an oblong to oblong-ovate body, moderately compressed.
- ❖ Mouth moderate, protractile, with gape usually oblique; caudal fin usually emarginate (rounded or truncate in some freshwater species).
- ❖ Lateral line single and complete. Scales adherent.
- ❖ Colour of body tan or light grey; most marine species with 3 or more longitudinal body stripes.

Triacanthidae (Tripodfishes, triplespines)

Resource code : 98



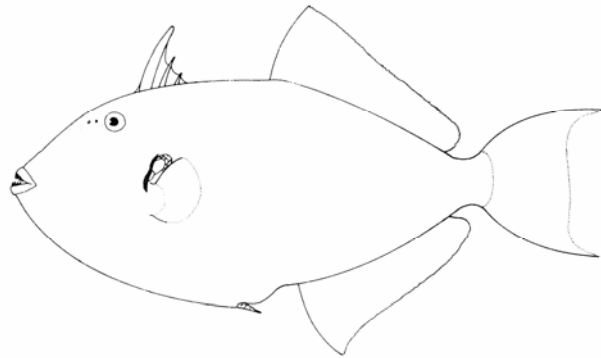
General Characters:

- ❖ Small fishes, up to 30 cm in length, with deep compressed bodies.
- ❖ Dorsal fin spines 6 (usually only 5 visible, the 6th being a rudiment), dorsal fin rays 20 to 26, anal fin rays 13 to 22; caudal fin deeply forked and caudal peduncle distinctly tapered; pelvic fin represented by a large spine which is movably articulated with anterior end of pelvis and capable of being locked erect by a flange on they pelvis; most dorsal, anal and pectoral fin rays branched.
- ❖ Lateral line inconspicuous.
- ❖ Colour generally silvery, with upper half of body dusky, with or without darker blotches.



Balistidae (Triggerfishes)

Resource code : 99

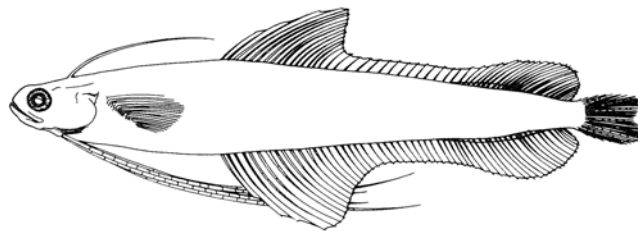


General characters:

- ❖ Moderately compressed bodies encased with very thick, tough skin with large rectilinear scale plates easily discernible as individual units; scales above pectoral fin base usually enlarged and slightly separated, forming a flexible tympanum.
- ❖ Three dorsal fin spines, the second spine more than one-half the length of the first; the first spine capable of being locked in an upright position of erection by the second; most dorsal, anal and pectoral fin rays branched; pelvic fins and spines rudimentary or absent, represented by a series of 4 pairs of enlarged scales encasing the end of pelvis.

Bregmacerotidae (Codlets, codlings)

Resource code : 100



General characters:

- ❖ Body moderately elongate and with a relatively short head.
- ❖ Two dorsal fins, the first a single long ray on top of rear part of head, the second with a long base, middle rays much shorter
- ❖ pelvic fins inserted under rear part of head



2.3.SPECIES-WISE CHARACTERISTICS OF FINFISHES

2.3.1. EELS

Family: Muraenesocidae

Scientific name: *Congresox talabonoides*

Resource code : 04

Common name: Indian pike conger

Local name:



Field identification characters:

- ❖ Outer tooth row on lower jaw leaning outward; teeth of middle row on vomer needle-like and prominent; tip of lower jaw with its large canines fits into notch in underside of snout when mouth is closed.
- ❖ Pectoral fins much smaller.
- ❖ Lateral line pores before level of anus 35 to 40.

2.3.2. CAT FISHES

Family: Ariidae

Scientific name: *Arius caelatus*

Resource code : 05

Common name: Engraved catfish

Local name:



Field identification characters:

- ❖ Head shield rugose and granulated posterior to orbit, especially on the supraoccipital region, tapering to a wide V toward occipital region, and with a preorbital conical protuberance.
- ❖ Palate teeth villiform and densely packed in a small, roughly triangular patch on each side.
- ❖ Tip of the dorsal fin produced occasionally into a black filament.



Scientific name: *Arius tenuispinis*

Resource code : 05

Common name: Thinspine sea catfish

Local name:



Field identification characters:

- ❖ Median longitudinal groove long, narrow, deep, running onto supraoccipital process.
- ❖ Palatine teeth villiform along outer margin, globular along inner margin, in a single elliptical shoe-shaped large patch on each side, placed far back in the buccal cavity.

Scientific name: *Arius thalassinus*

Resource code : 05

Common name: Giant catfish

Local name:



Field identification characters:

- ❖ A prominent preorbital conical protuberance tapering as a wide V posteriorly.
- ❖ Palatine teeth villiform, in 3 patches on each side, forming a triangle, posterior patch longest, patches usually fused (slightly separated in juveniles).



Scientific name: *Osteogeneiosus militaris*

Resource code : 05

Common name: Soldier catfish

Local name:



Field identification characters:

- ❖ Only one pair of stiff, semiosseous maxillary barbels, mental barbels absent.
- ❖ Head shield smooth without granulation or rugose striations.
- ❖ Top of head and back intense dark blue.

2.3.3. CLUPIEDS

Family: *Chirocentridae*

Scientific name: *Chirocentrus dorab*

Resource code : 06

Common name: Dorab wolf-herrings

Local name:



Field identification characters:

- ❖ 2 fanglike canines pointing forward in upper jaw, a series of canine teeth in lower jaw.
- ❖ Upper part of the dorsal fin black, inner face of pectoral fin black at base; some black on anterior part of anal fin.



Scientific name: *Chirocentrus nudus*

Resource code : 06

Common name: whitefin wolf-herrings

Local name:



Field identification characters:

- ❖ 2 fanglike canines pointing forward in upper jaw, a series of canine teeth in lower jaw.
- ❖ Dorsal fin clear, inner face of pectoral fin black at base; no black on anterior part of anal fin.

Family : Clupeidae

Scientific name: *Sardinella longiceps*

Resource code : 07

Common name: Indian oil-sardinella

Local name:



Field identification characters:

- ❖ Belly rounded, with a low keel of scutes.
- ❖ Colour back blue/green, flanks silvery. A black spot on hind edge of gill cover and a golden patch on the body behind it.



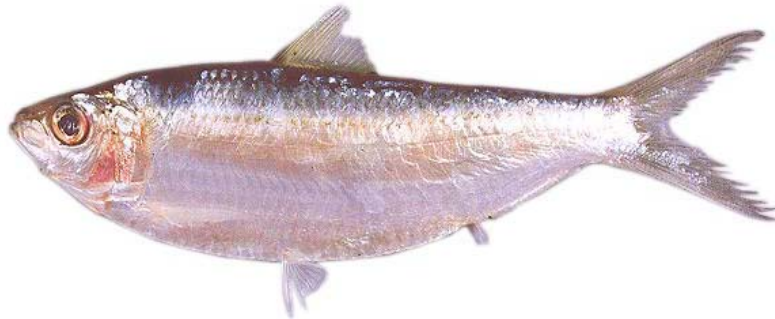
Family : Clupeidae

Scientific name: *Sardinella albella*

Resource code : 08

Common name: White sardinella

Local name:



Field identification characters:

- ❖ Body somewhat compressed but variable, from slender to moderately deep; total number of scutes 29 to 33.
- ❖ Vertical striae on scales not meeting at center, hind part of scales with a few perforations and somewhat produced posteriorly.
- ❖ A dark spot at dorsal fin origin.

Family : Clupeidae

Scientific name: *Sardinella fimbriata*

Resource code : 08

Common name: Fringescale sardinella

Local name:



Field identification characters:

- ❖ Body somewhat compressed but variable; total number of scutes 29 to 33.
- ❖ Vertical striae on scales not meeting at center, hind part of scales with a few perforations and (in Indian Ocean specimens) somewhat produced posteriorly.
- ❖ A dark spot at dorsal fin origin.



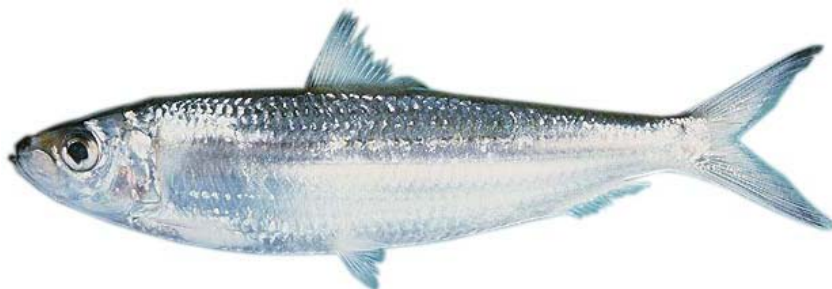
Family : Clupeidae

Scientific name: *Sardinella gibbosa*

Resource code : 08

Common name: Goldstripe sardinella

Local name:



Field identification characters:

- ❖ Total number scutes 32 to 34.
- ❖ Vertical striae on scales not meeting at center, numerous small perforations on hind part of scale.
- ❖ A golden mid-lateral line down flank; dorsal and caudal fin margins dusky; a dark spot at dorsal fin origin.

Family : Clupeidae

Scientific name : *Tenuulosa ilisha*

Resource code : 09

Common name : Hilsa shad

Local name :



Field identification characters:

- ❖ Belly with 30 to 33 scutes. Distinct median notch in upper jaw.
- ❖ Fins hyaline.
- ❖ A dark blotch behind gill opening, followed by a series of small spots along flank in juveniles.
- ❖ Color in life, silver shot with gold and purple.



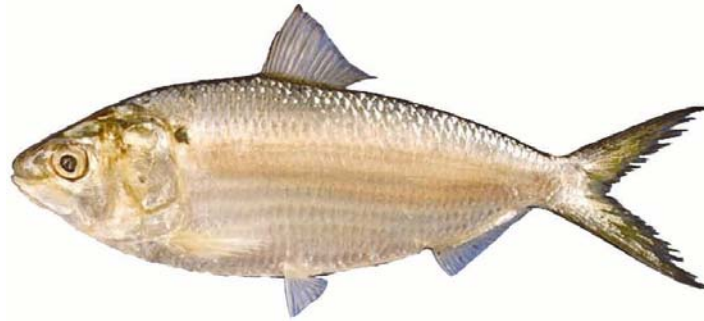
Family : Clupeidae

Scientific name: *Hilsa toli/ tenualosa toli*

Resource code : 10

Common name: Toli shad

Local name:



Field identification characters:

- ❖ Body fusiform, moderately deep and compressed; belly with a distinct sharp keel of scutes.
- ❖ Upper jaw with distinct median notch.
- ❖ Colour blue/green, flanks silvery, at most a diffuse dark blotch behind gill opening but other spots on flanks.

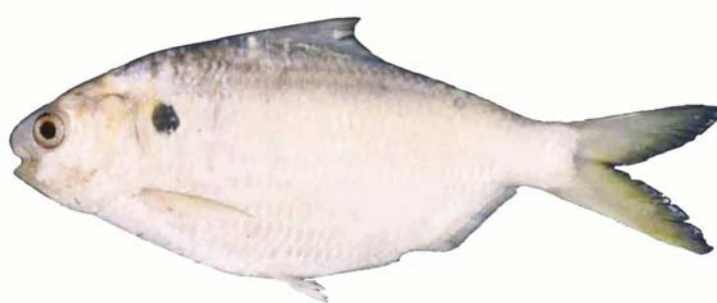
Family: Clupeidae

Scientific name: *Anodontostoma chacunda*

Resource code : 10

Common name: Chacunda gizzard-shad

Local name:



Field identification characters:

- ❖ Body very deep and compressed; belly with a keel of scutes.
- ❖ Mouth inferior, snout rounded and projecting.
- ❖ Back blue/green, flanks bright silver; a large jet black spot behind gill opening.



Family: Engraulidae

Scientific name: *Coilia dussumieri*

Resource code : 12

Common name: Golden anchovy

Local name:



Field identification characters:

- ❖ Body elongate, tapering evenly to the very slender tail.
- ❖ Upper 6 pectoral fin rays filamentous; anal fin very long and joined to caudal fin.
- ❖ 3 series of orange/ gold spots on flanks.

Family: Engraulidae (Anchovies)

Scientific name : *Setipinna taty*

Resource code : 13

Common name : Scaly hairfin anchovy

Local name :



Field identification characters:

- ❖ Belly with keeled scutes from isthmus to anus.
- ❖ Lower gill rakers with the serrae distinctly clumped.
- ❖ Pectoral filament long, reaching to base of 23rd to last anal fin ray.
- ❖ Scales present on dorsal and anal fins.



Scientific name: *Stolephorus commersonii*

Resource code : 14

Common name: Commerson's anchovy

Local name:



Field identification characters:

- ❖ Pelvic fin tips reaching beyond dorsal fin origin; anal fin origin below last dorsal fin rays.
- ❖ Colour light transparent fleshy brown, with a silver stripe down flanks; back with 2 pigmented areas behind head and a double pigment line before dorsal fin origin.

Scientific name : *Thryssa baelama / Thrissina baelama*

Resource code : 15

Common name : Baelama anchovy

Local name :



Field identification characters:

- ❖ Belly rounded before pelvic fins, with 4 to 9 + 7 to 10 = 12 to 18 keeled scutes, the pre-pelvic scutes ending below the pectoral fin base or behind it.
- ❖ Maxilla short, reaching to just beyond front border of pre-operculum, tip pointed.

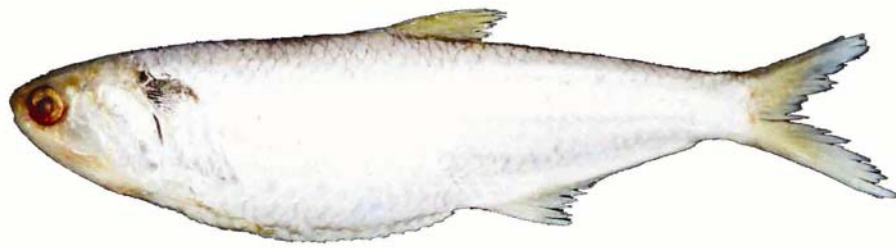


Scientific name: *Thryssa mystax*

Resource code : 16

Common name: Moustached thryssa

Local name:



Field identification characters:

- ❖ Tip of the snout at level of eye centre; maxilla produced, reaching almost to, base of first pectoral fin rays.
- ❖ Colour back blue/ green, flanks silvery; a black venulose area behind gill opening, with a golden area before it.

Scientific name: *Thryssa vitirostris*

Resource code : 16

Common name: Orangemouth thryssa

Local name:



Field identification characters:

- ❖ Tip of the snout at level of eye centre; maxilla produced, reaching beyond base of first pectoral fin rays.
- ❖ Colour back blue/ green, flanks silvery; a black venulose area behind gill opening, golden area absent.

Scientific name: *Opisthopterus tardoore*

Resource code : 17

Common name: Tardoore

Local name:



Field identification characters:

- ❖ Body elongate, strongly compressed; belly rounded anteriorly, with a sharp keel of scutes.
- ❖ Anal fin long.

2.3.4. BOMBAY-DUCK

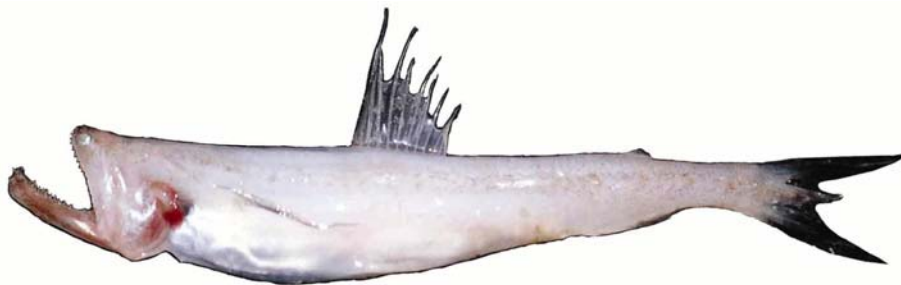
Family: Harpadontidae

Scientific name: *Harpadon nehereus*

Resource code : 18

Common name: Bombay duck

Local name:



Field identification characters:

- ❖ Mouth very wide, armed with slender, recurved and depressible teeth of unequal size.
- ❖ Dorsal fin followed by a conspicuous adipose fin; pelvic fins very long.
- ❖ Lateral line extending onto pointed median lobe of caudal fin.



2.3.5. LIZARDFISHES

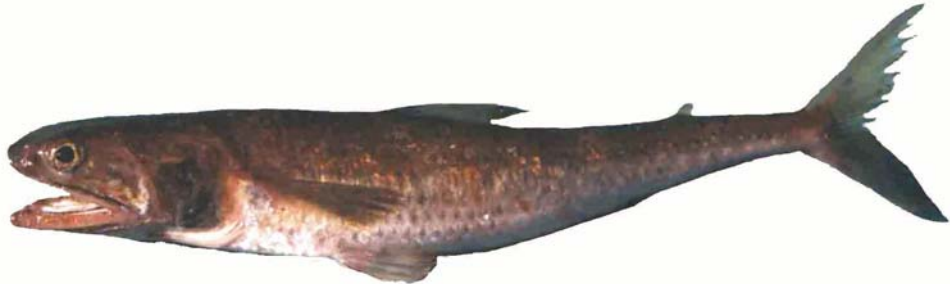
Family: Synodontidae

Scientific name: *Saurida tumbil*

Resource code : 19

Common name: Greater lizardfish

Local name:



Field identification characters:

- ❖ Several rows of teeth visible in both jaws even when mouth is closed.
- ❖ Back and sides brown, belly pale or silvery. 8 to 10 faint bars occasionally visible along lateral line. Distal parts of dorsal, pectoral and particularly caudal fins dusky; otherwise, no markings on fins.

Scientific name: *Saurida undosquamis*

Resource code : 19

Common name: Brushtooth lizardfish

Local name:



Field identification characters:

- ❖ Several rows of teeth visible in both jaws even when mouth is closed.
- ❖ Back and sides brown, belly silvery. 8 to 10 bars often visible along lateral line. Distal parts of dorsal, pectoral and particularly caudal fin dusky. 2nd dorsal fin ray and upper caudal fin ray with a series of about 8 dark spots; fins otherwise without markings.



2.3.6. BULL'S EYE (PRIACANTHIDS)

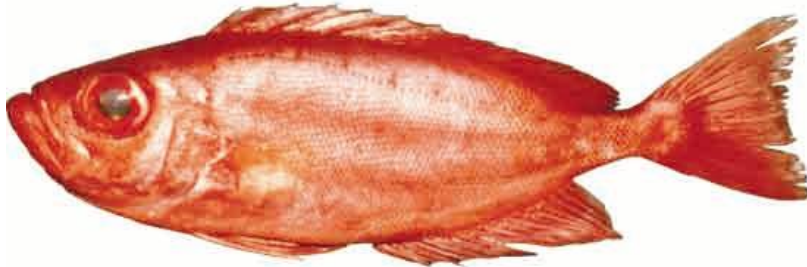
Family: Priacanthidae

Scientific name: *Priacanthus hamrur*

Resource code : 20

Common name: Moontail bullseye

Local name:



Field identification characters:

- ❖ Posterior portion of preopercle above and below spiny.
- ❖ pelvic fins shorter than head.
- ❖ Body crimson red; fins dusky to blackish, being darker near the margin; a black basal spot on the dorsal surface of pelvic fin bases.

2.3.7. THREADFIN BREAMS (NEMIPTERIDS)

Family: Nemipteridae

Scientific name: *Nemipterus japonicus*

Resource code : 21

Common name: Japanese threadfin bream

Local name:



Field identification characters:

- ❖ Dorsal fin continuous without a notch between spinous and soft portions; upper lobe of caudal fin prolonged into a filament.
- ❖ A brownish saddle on top of head, a yellow band along belly; a bright orange red blotch nears origin of lateral line.
- ❖ Caudal fin red, tip of upper lobe and filament bright yellow.

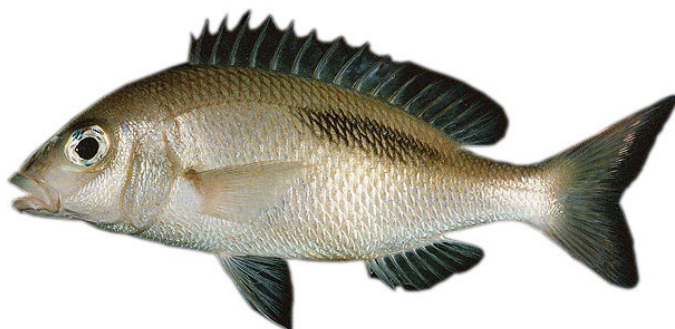


Scientific name : *Scolopsis bimaculatus*

Resource code : 87

Common name : Thumbprint monocle bream

Local name :



Field identification characters:

- ❖ Head scales reaching forward to level of posterior nostrils.
- ❖ Lower limb of preopercle scaly.
- ❖ Antrorse (forward-directed) suborbital spine absent. Pelvic fins long, reaching to between level of anus and origin of anal fin.
- ❖ Axillary scale present. Color: Upper body grey, whitish below.
- ❖ A blue stripe joining eyes.

2.3.8. PERCHES

Family: Serranidae

Scientific name: *Epinephelus diacanthus*

Resource code : 22

Common name: Thornycheek grouper

Local name:



Field identification characters:

- ❖ Preopercle border forming nearly a right angle, with 1 to 3 enlarged serrae at the angle
- ❖ Anterior nostrils tubular, with a large flap posteriorly extending over rear nostril.
- ❖ Body generally buff, with 5 more or less distinct, vertical dark bars; 4 bars below dorsal fin and 5th on caudal peduncle. Ventral part of head and body reddish. Black streak across cheek at the upper edge of maxilla.



Family: Lutjanidae

Scientific name: *Lutjanus argentimaculatus*

Resource code : 23

Common name: Mangrove red snapper

Local name:



Field identification characters:

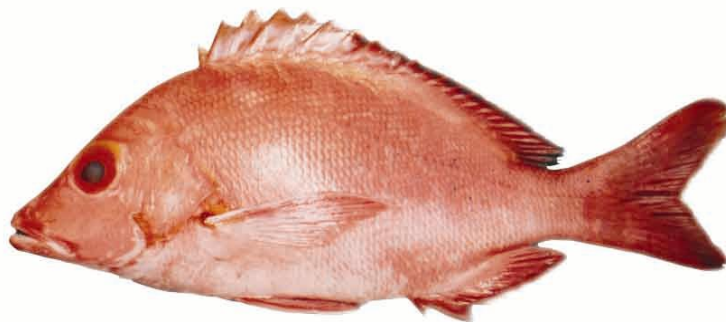
- ❖ Longitudinal rows of scales above lateral line parallel to dorsal profile anteriorly, but appearing to rise obliquely under soft part of dorsal fin or under posterior part of spinous dorsal fin.
- ❖ Scale rows below lateral line horizontal.
- ❖ Colour red brown; somewhat paler on belly; often a silvery patch in the centre of each scale.

Scientific name: *Lutjanus malabaricus*

Resource code : 23

Common name: Malabar blood snapper

Local name:



Field identification characters:

- ❖ Head profile straight or concave; dorsal fin with 11 spines and 14 soft rays, anal fin with 3 spines and 8 or 9 soft rays.
- ❖ Longitudinal rows of scales above lateral line appear to rise obliquely to dorsal profile, those below lateral line horizontal.
- ❖ Colour deep red in adults; juveniles red/ brown above, silvery below, with dark longitudinal stripes on body.



Scientific name: *Lutjanus johni*

Resource code : 23

Common name: John's snapper

Local name:



Juvenile



Adult

Field identification characters:

- ❖ Longitudinal scale rows above lateral line parallel to it, and those below lateral line horizontal.
- ❖ Body silvery green or bronze/ red, with a distinct dark spot on each scale forming a length-wise series of dark streaks.
- ❖ A large black blotch present above lateral line at junction of spinous and soft part of dorsal fin and this often surrounded by a silvery ring in juveniles.

Family: Lethrinidae

Scientific name: *Lethrinus nebulosus*

Resource code : 24

Common name: Spangled emperor

Local name:



Field identification characters:

- ❖ Body depth greater than head length, inner surface of pectoral fin base scaled.
- ❖ Colour olive green above, paler below; usually 2 or 3 blue streaks radiating from eye; each scale on the back with a white to blue centre; usually several yellow longitudinal stripes on sides.



Family: Haemulidae

Scientific name: *Pomadasys maculatum*

Resource code : 25

Common name: Saddle grunt

Local name:



Field identification characters:

- ❖ Two pores and a median pit on chin.
- ❖ Colour silvery grey, head purplish, nape and back with a series of incomplete crossbars; spinous part of dorsal fin with a large black blotch.

Family : Haemulidae

Scientific name : *Pomadasys argenteus*

Resource code : 25

Common name : Silver Grunt

Local name :



Field identification characters:

- ❖ Body oblong and compressed.
- ❖ Head blunt, its upper profile convex; mouth small; maxilla reaching to eye; two pores and a median pit on chin.
- ❖ Dorsal fin with 12 spines and 14 soft rays.
- ❖ Colour body silvery, with dark blotches on dorsal fin and numerous scattered dark brown to blackish spots on body.



Family: Centropomidae

Scientific name: *Lates calcarifer*

Resource code : 26

Common name: Barramundi.

Local name:



Field identification characters:

- ❖ Head pointed, with concave dorsal profile, nostrils close together.
- ❖ Upper jaw reaching to behind the eye, Lower edge of the opercle serrated.
- ❖ A very deep notch almost dividing spiny from soft part of dorsal fin.

2.3.9. GOAT FISHES (UPENIDS)

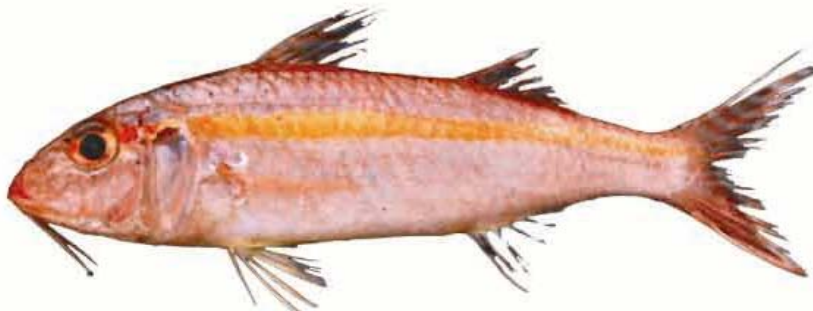
Family: Mullidae

Scientific name: *Upeneus moluccensis*

Resource code : 27

Common name: Goldband goatfish

Local name:



Field identification characters:

- ❖ Chin with 2 slender barbels, which do not reach rear margin of preopercle.
- ❖ A golden yellow stripe about as broad as pupil passing from eye along upper side of body to upper caudal base.
- ❖ Upper lobe of caudal fin with 6 to 7 transverse orangish bands; lower lobe longitudinally streaked with orangish and whitish.

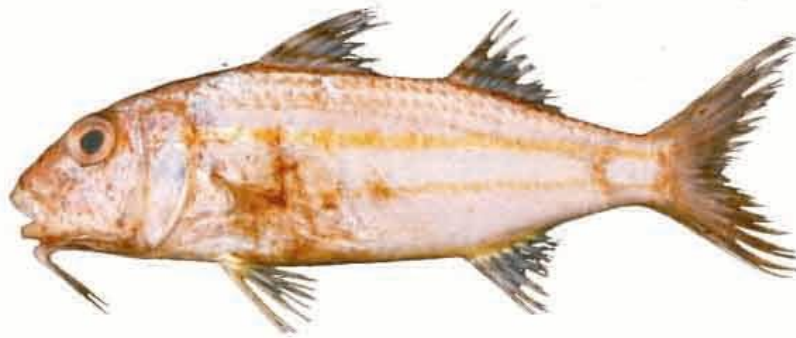


Scientific name: *Upeneus vittatus*

Resource code : 27

Common name: Striped goatfish

Local name:



Field identification characters:

- ❖ Chin with 2 slender barbels, which do not reach rear margin of preopercle.
- ❖ Colour greenish on back, shading to silvery white on sides and pale yellow ventrally, with 4 orange- yellow stripes.
- ❖ Caudal fin crossed by broad dark bands, the upper lobe with 4 to 5 and the lower with 3 to 4, the most distal band broadest and darkest.

2.3.10. THREADFINS (POLYNEMIDS)

Family: Polynemidae

Scientific name: *Eleutheronema tetradactylum*

Resource code : 28

Common name: Fourfinger threadfin

Local name:



Field identification characters:

- ❖ Lips absent, except for lower lip near corner of mouth; eyes large.
- ❖ Lower part of the pectoral fin with 4 filamentous rays of which the upper filament is the longest, reaching to pelvic fin base.
- ❖ Body silvery green above, cream below; dorsal and caudal fins grey, dusky at edges, pelvic and anal fins orange, pectoral filamentous rays white.



Scientific name: *Polynemus heptadactylus*

Resource code : 28

Common name: Sevenfinger threadfin

Local name:



Field identification characters:

- ❖ Upper lip absent lower lip well developed; eyes large.
- ❖ Lower part of the pectoral fin with 7 filamentous rays of which the 3rd, 4th and 5th are the longest, reaching to anal fin origin.
- ❖ Colour back brown, flanks golden; pectoral fins black, as also margins of other fins.

Scientific name: *Polynemus paradiseus*

Resource code : 28

Common name: Paradise threadfin

Local name:



Field identification characters:

- ❖ Eyes small, with adipose tissue.
- ❖ Lower part of the pectoral fin with 7 free filamentous rays, of which 3 upper ones are the longest about twice the length of fish.
- ❖ Body golden with a shade of grey along back; all fins greyish.



Scientific name: *Polynemus plebeius*

Resource code : 28

Common name: striped threadfin

Local name:



Field identification characters:

- ❖ Upper part with all rays unbranched; lower part with 5 free filamentous rays, of which the upper 2 are the longest, reaching to end of pelvic fin.
- ❖ Body golden olive, with narrow dusky stripes; pectoral fins black.

Scientific name: *Polynemus sextarius*

Resource code : 28

Common name: Blackspot threadfin

Local name:



Field identification characters:

- ❖ Lower part of the pectoral fin with 7 free filamentous rays, of which upper 2 are the longest, reaching to tip of pelvic fin.
- ❖ Body golden olive above, silvery below; fins yellowish with black spots; inner side of gill cover pigmented with black; a large black blotch at beginning of lateral line.



2.3.11. CROCKERS (SCIAENIDS)

Family: Sciaenidae

Scientific name: *Dendrophysa russelli*

Resource code : 29

Common name: Goatee croaker

Local name:



Field identification characters:

- ❖ A single barbel on chin; median mental pore at the base of the solid, pointed mental barbel.
- ❖ Back grey, shading to white on belly; a dark brown band on nape; opercle with a deep blue blotch; upper edge of spiny part of dorsal fin dark.

Scientific name: *Johnius belangerii*

Resource code : 29

Common name: Belanger's croaker

Local name:



Field identification characters:

- ❖ Rostral pores 5, marginal pores 5; teeth differentiated into large and small in upper jaw only, lower jaw teeth villiform.
- ❖ Body darkly pigmented, but pigment sometimes irregular and concentrated into short dark bars along back or on dorsal fin; spinous part of dorsal fin black; a dark blotch shows through gill cover.



Scientific name: *Nibea maculata*

Resource code : 29

Common name: Blotched croaker

Local name:



Field identification characters:

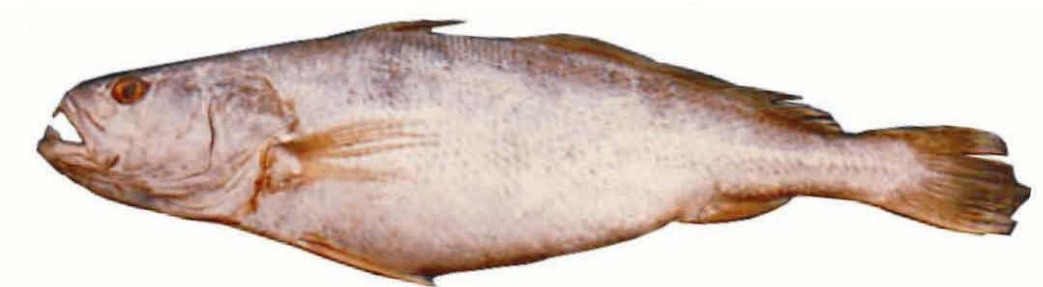
- ❖ Rostral pores 3, marginal pores 5, notching the edge to produce 3 lobes; mental pores 5.
- ❖ A distinctive colour pattern of 5 dark bars extending obliquely from the back to the lower part of flanks, and sixth dark blotch on top of caudal peduncle.
- ❖ First bar broadest, from nape obliquely backwards, lower part of bars narrower and often discontinuous.

Scientific name: *Protonibea diacanthus*

Resource code : 29

Common name: Spotted croaker

Local name:



Field identification characters:

- ❖ A big, nearly horizontal and terminal mouth; teeth differentiated into large and small in both jaws.
- ❖ 5 dark bars along back and many small black spots on top of head, upper half of body and caudal fin; pectoral, pelvic, anal and lower part of caudal fins black. In large fishes the 5 bars and the small spots are absent.



Scientific name: *Otolithoides biauratus*

Resource code : 29

Common name: Bronze croaker

Local name:



Field identification characters:

- ❖ Upper jaw reaching back well beyond eye; teeth strong and spaced in both jaws, sometimes with one upper pair of large canines.
- ❖ Caudal fin acutely pointed.
- ❖ Head and back green/ grey, flanks gold/ orange, paler towards belly, minutely dotted with brown. Pectoral fins brown with a black spot at base.

2.3.12. SILVER BELLIES (LEIOGNATHIDS)

Family: Leiognathidae

Scientific name: *Leiognathus bindus*

Resource code : 30

Common name: Orangefin ponyfish

Local name:



Field identification characters:

- ❖ Body silvery, with dark vermiculations on back.
- ❖ Spinous part of dorsal fin black at half height, above which the membrane between 2nd & 5th spines bears a bright orange blotch.
- ❖ Mouth protrucible in downward direction.

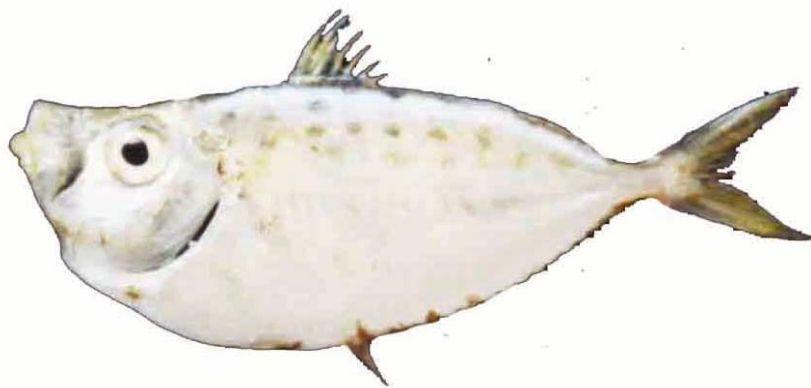


Scientific name: *Secutor insidator*

Resource code : 30

Common name: Pugnose ponyfish

Local name:



Field identification characters:

- ❖ Mouth pointing upward when protracted. Lateral line reaching backward nearly to below end of dorsal fin. Cheek scaleless.
- ❖ Belly silvery; back greenish to brownish, with about 10 broken, dark, vertical bars and spots extending to little below lateral line.

2.3.13. FLATFISHES

Family: Psettodidae

Scientific name: *Psettodes erumei*

Resource code : 31

Common name: Indian spiny turbot

Local name:



Field identification characters:

- ❖ Mouth large with strong teeth. Both the eyes on same side; upper eye lying immediately below dorsal edge.
- ❖ Dorsal fin origin well posterior to eyes.
- ❖ Body usually brown/ grey, sometimes with 4 broad, dark crossbars. Dorsal anal and caudal fin tips black.



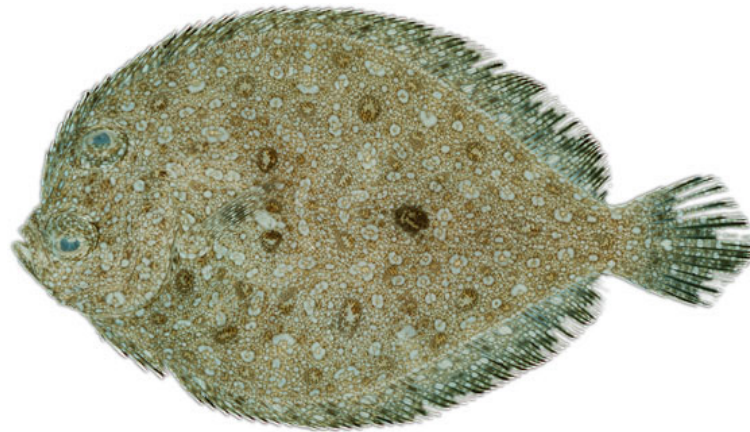
Family: Bothidae (Lefteye flounders)

Scientific name : *Bothus myriaster*

Resource code : 32

Common name : Indo-Pacific oval flounder

Local name :



Field identification characters:

- ❖ Distinguished by cycloid scales on the ocular side, except for upper and lower margins of body, and a shorter lower jaw (2.3 to 2.9 times in head length).
- ❖ Body almost circular in shape in young, becoming ovate with growth.

Family: Bothidae (Large-tooth flounders)

Scientific name : *Pseudorhombus malayanus*

Resource code : 32

Common name : Malaya flounder

Local name :



Field identification characters:

- ❖ Body brownish, a small dark blotch at junction of straight and curved parts of lateral line.
- ❖ Body deep ovoid, its depth 1.8 to 2 times in SL.
- ❖ Maxilla extending to below posterior margin of lower eye.
- ❖ Teeth in upper jaw small and close-set laterally, and enlarged anteriorly.
- ❖ Teeth in lower jaw stronger and more widely spaced than those of upper jaw.
- ❖ Found on the muddy and sandy trawling grounds of the continental shelf.



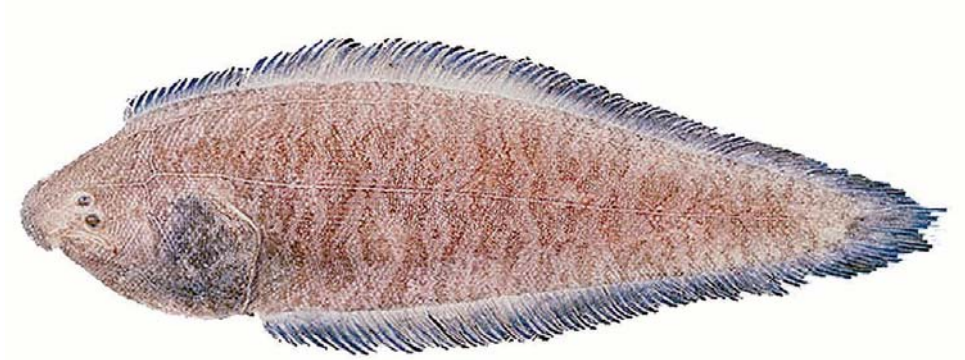
Family: Cynoglossidae

Scientific name: *Cynoglossus macrostomus*

Resource code : 33

Common name: Malabar tonguesole

Local name:



Field identification characters:

- ❖ Eyes on left side of body, with no space between them.
- ❖ Two lateral lines on eyed side but none on blind side.
- ❖ Colour light brown on eyed side with dark brown mottling forming diffuse, irregular crossbands.

Scientific name: *Cynoglossus puncticeps*

Resource code : 33

Common name: Speckled tonguesole

Local name:



Field identification characters:

- ❖ Eyes on left side of body, with a narrow space between them.
- ❖ Two lateral lines on eyed side.
- ❖ Colour yellow/ brown on eyed side with very distinct irregular dark brown patches forming irregular crossbands.



Family: Soleidae

Scientific name: *Euryglossa orientalis*

Resource code : 33

Common name: Oriental sole

Local name:



Field identification characters:

- ❖ Eyes on right side, separated by a scaly space
- ❖ Dorsal and anal fins joined to caudal fin; pectoral fins well developed, that on blind side somewhat shorter than that on eyed side
- ❖ Head scales of blind side modified into cutaneous sensory processes.
- ❖ Colour grey or brown with cloudy indistinct patches on eyed side, tinged yellow on blind side; pectoral fin on eyed side darker.

2.3.14. BIG JAWED JUMPER

Family: Lactariidae

Scientific name: *Lactarius lactarius*

Resource code : 34

Common name: False trevally

Local name:



Field identification characters:

- ❖ Mouth large and oblique, with a prominent lower jaw; one pair of small, sharp canine teeth at front of each jaw.
- ❖ Two dorsal fins of about equal height.
- ❖ Colour silvery grey with a blue iridescence above; silvery white below.
- ❖ A dusky spot on upper part of gill cover.

2.3.15. DRIFT FISHES

Family: Ariommidae (Ariommas)

Scientific name: *Ariomma indica*

Resource code : 35

Common name: Indian ariomma/ driftfish

Local name:



Field identification characters:

- ❖ Body moderately deep, compressed but thick; caudal peduncle, not compressed, almost square in cross-section and with two very low and ill-defined fleshy keels at base of caudal fin.
- ❖ Snout blunt and rounded; eyes large, surrounded by thick adipose tissue. Palate toothless; teeth of lower jaw simple anteriorly, with 3 cusps posteriorly. A branch of the lateral line arches forward over the eye in a bony tract.
- ❖ Colour quite silvery with a bluish tinge on back; may have few darker and variable blotches on sides; inside of opercle black.

Family: Nomeidae

Scientific name: *Cubiceps squamiceps*

Resource code : 36

Common name: Indian driftfish

Local name:



Field identification characters:

- ❖ Body somewhat deep; body depth 29.2- 35.2% standard length.
- ❖ Snout blunt, forehead slightly arched.
- ❖ Mouth small, barely reaching beyond anterior margin of eye.
- ❖ Scales on cheek nearly reaching anterior margin of eye.
- ❖ Silvery white when fresh, becoming brownish with well-defined scale pockets in preservative.



2.3.16. BARRACUDAS

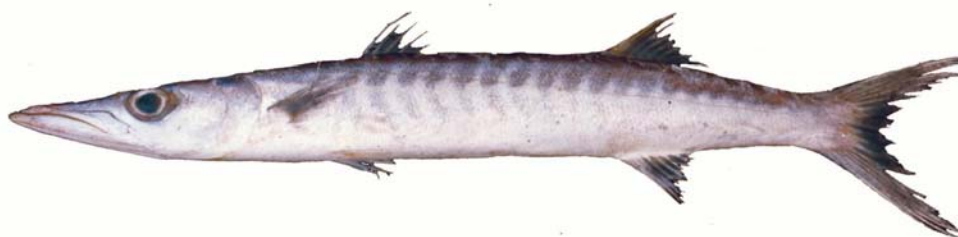
Family: Sphyraenidae

Scientific name: *Sphyraena jello*

Resource code : 37

Common name: Pickhandle barracuda

Local name:



Field identification characters:

- ❖ No gillrakers on 1st arch; upper and lower gill arch platelets rough, but without distinct spines; scales small.
- ❖ Colour blue/ black or brown above, sides silvery, with a dark pattern of serpentine bars reaching a little below lateral line, but no inky spots on hind part of body below lateral line.

Scientific name: *Sphyraena obtusata*

Resource code : 37

Common name: Obtuse barracuda

Local name:



Field identification characters:

- ❖ 2 gillrakers on 1st arch; upper and lower gill arch platelets rough, but without distinct spines.
- ❖ Colour grey/ brown with greenish tinge above, sides silvery white without dark bars or chevrons; 2nd dorsal, anal and caudal fins yellowish.



2.3.17. POMFRETS

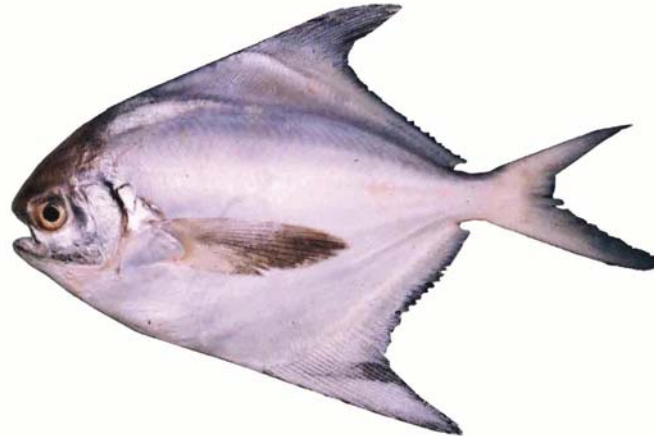
Family: Stromatidae

Scientific name: *Pampus argenteus*

Common name: Silver pomfret

Local name:

Resource code : 38



Field identification characters:

- ❖ Mouth small, curved downward; maxilla immobile covered with skin and united to cheek.
- ❖ 5 to 10 flat blade-like spines preceding the median fins, dorsal and anal fin with posteriorly elevated lobes, no pelvic fins, caudal fin forked.
- ❖ Body silvery white on sides, head slightly brownish, edges of the fins are blackish.

Scientific name: *Pampus chinensis*

Common name: Chinese silver pomfret

Local name:

Resource code : 39



Field identification characters:

- ❖ Mouth small, curved downward; maxilla immobile covered with skin and united to cheek.
- ❖ Dorsal and anal fins subequal in length, originating at level of or behind pectoral fin bases, no spines ahead of fins; pelvic fins absent, caudal fin broad and only slightly forked.
- ❖ Colour grey to brown on the back, silvery white on sides; small black dots cover entire body; fins yellowish to dusky.



Family: Carangidae

Scientific name: *Parastromateus niger*

Resource code : 40

Common name: Black pomfret

Local name:



Field identification characters:

- ❖ Dorsal fin with 4 to 5 short spines (embedded and not apparent in adult).
- ❖ Pelvic fins absent.
- ❖ Straight part of lateral line with 8 to 10 weak scutes, forming a slight keel on caudal peduncle.

2.3.18. CARANGIDS

Family: Carangidae

Scientific name: *Atropus atropus*

Resource code : 41

Common name: Cleftbelly trevally

Local name:



Field identification characters:

- ❖ Belly with a deep median groove, accommodating pelvic fins, anus and anal fin spine.
- ❖ Pelvic fins conspicuously long, tip of appressed fin extending almost to anal fin origin.
- ❖ Membranes of pelvic fins black, with the rays white basally.



Scientific name: *Carangoides chrysophrys*

Resource code : 41

Common name: Largenose trevally

Local name:



Field identification characters:

- ❖ Dorsal profile of snout gently sloped, then abruptly vertical just above mouth cleft.
- ❖ Dorsal fins separate, second dorsal fin falcate but usually shorter than head length.
- ❖ Breast naked ventrally to distinctly behind origin of pectoral fins upto pelvic fins laterally.

Scientific name: *Gnathanodon speciosus*

Resource code : 41

Common name: Golden trevally

Local name:



Field identification characters:

- ❖ Lips noticeably papillose and upper jaw strongly protractile.
- ❖ Upper jaw without teeth.
- ❖ Colour silvery to yellow with 7 to 11 black bands, usually alternating broad and narrow; the first oblique through eye, the second crossing back and opercle.

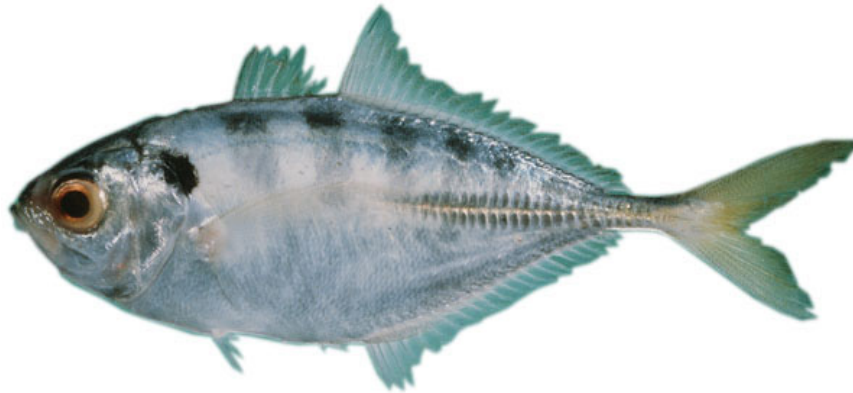


Scientific name: *Caranx para*

Resource code : 41

Common name: Banded scad

Local name:



Field identification characters:

- ❖ Body oval, strongly compressed, with ventral profile distinctly more convex than dorsal; adipose eyelid well developed on posterior half of eye only.
- ❖ Upper jaw anteriorly with 2 irregular rows of short conical teeth posteriorly inner surface of jaw paved with blunt teeth; lower jaw with a single row of short, conical teeth except 2 rows anteriorly.
- ❖ Colour bluish-grey to green above, silvery below; large black spot on upper margin of opercle and adjacent area of shoulder.

Scientific name : *Megalaspis cordyla*

Resource code : 42

Common name : Torpedo scad

Local name :



Field identification characters:

- ❖ Color bluish grey to green dorsally; silvery below; dark fins.
- ❖ Opercle with a large black spots.
- ❖ Anal fin with 2 detached spines.
- ❖ Numerous dorsal and anal finlets are distinct.

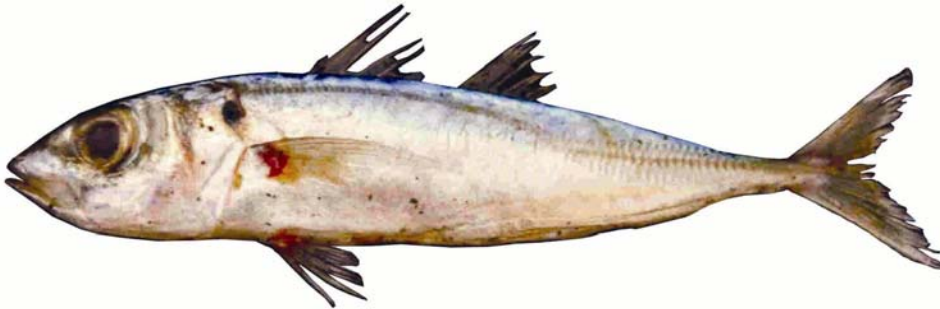


Scientific name: *Decapterus russelli*

Resource code : 43

Common name: Indian scad

Local name:



Field identification characters:

- ❖ Shoulder girdle (cleithrum) margin with 2 small papillae, the lower papilla is larger.
- ❖ Small black blotch on margin of opercle near upper edge.
- ❖ Caudal fin hyaline to dusky brown.

Scientific name: *Alepes djedaba*

Resource code : 43

Common name: Shrimp scad

Local name:



Field identification characters:

- ❖ Adipose eyelid well developed on posterior half of eye only.
- ❖ Colour greyish- green above, silvery to white below.
- ❖ A distinct black blotch on margin of opercle, bordered above by a smaller white spot.



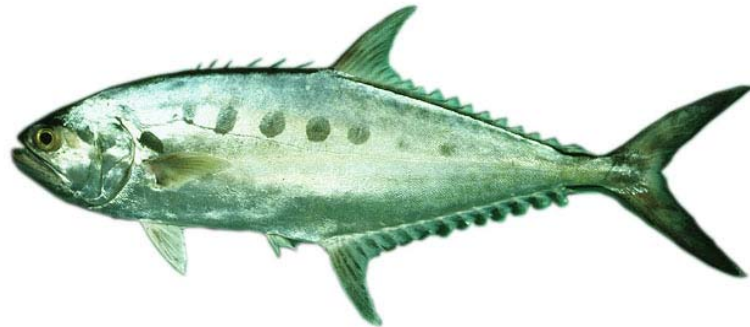
Family : Carangidae

Scientific name : *Scomberoides commersonianus*

Resource code : 44

Common name : Talang queenfish

Local name :



Field identification characters:

- ❖ Body oblong to elliptical, strongly compressed.
- ❖ Anal-fin rays consisting of semidetached finlets.
- ❖ Lateral line only slightly irregular, weakly to moderately convex above pectoral fin, becoming straight posteriorly. No scutes; scales on midbody below lateral line.
- ❖ Colour in life, head and body dusky green to bluish dorsally, grey to silvery below, large individuals often golden, especially ventrally; sides of adults with 5 to 8 large, plumbeous blotches above or touching lateral line, first two may intersect lateral line.
- ❖ Dorsal and anal fins dusky to dark, uniformly pigmented; pectoral fins of adults frequently with a dusky blotch ventrally.

Family : Carangidae

Scientific name : *Scomberoides tala*

Resource code : 44

Common name : Barred queenfish

Local name :



Field identification characters:

- ❖ Body oblong to elliptical, strongly compressed.
- ❖ Posterior soft dorsal- and anal-fin rays consisting of semidetached finlets.
- ❖ Lateral line only slightly irregular, weakly to moderately convex above pectoral fin, becoming straight posteriorly.
- ❖ No scutes.
- ❖ Colour in life, head and body greenish-grey dorsally, grey to silvery below; sides of adults with 4 to 8 vertically elongate plumbeous blotches, most of which intersect lateral line.
- ❖ Dorsal and anal fins dusky to dark and uniformly pigmented; pectoral fin yellow and pelvic fin white in adults.



Family: Carangidae (Jacks and pompanos)

Scientific name : *Elagatis bipinnulata*

Resource code : 45

Common name : Rainbow runner

Local name :



Field identification characters:

- ❖ Color dark olive green or blue above, white below; 2 narrow light blue bands on sides with a yellowish band between them; fins olive or yellowish.
- ❖ Upper jaw ending before the eye. Anal fin base is shorter than that of dorsal fin base.
- ❖ It has a 2-rayed finlet; 2 anal fin spines are detached.
- ❖ Dorsal and anal fins are relatively short; with small two-rayed pinnulae just behind the dorsal and anal fins.
- ❖ Lateral line without scutes.

Family: Carangidae (Jacks and pompanos)

Scientific name : *Seriolina nigrofasciata*

Resource code : 47

Common name : Blackbanded trevally

Local name :



Field identification characters:

- ❖ Color bluish grey to black dorsally, white to dusky below; 5-7 dark oblique bands or blotches on young disappear with age.
- ❖ Posterior spines of dorsal fin minute or embedded in large adults.
- ❖ Grooves of caudal peduncle present dorsally and ventrally.
- ❖ Maxilla reaching below rear margin of the eyes.



Scientific name: *Atule mate*

Resource code : 48

Common name: Yellowtail scad.

Local name:



Field identification characters:

- ❖ Last dorsal and anal rays finlet-like in adults, twice in length of adjacent rays and a little more separated but joined by interradiation membrane.
- ❖ Colour bright olive-green dorsally, yellowish-green laterally and whitish ventrally. Dorsal and caudal fins dusky greenish-yellow; anal fin pale yellow; pectoral and pelvic fins whitish.

Scientific name: *Trachinotus mookalee*

Resource code : 48

Common name: Indian pompano

Local name:



Field identification characters:

- ❖ 2 separate dorsal fins, the first with 6 short spines (the anterior spines often becoming completely embedded in adults), followed by 1 spine and 16 to 18 soft rays.
- ❖ Head and body generally silvery, greenish to bluish-grey dorsally, paler below; anal fin bright to dirty yellow, lobe without a brownish anterior margin.



Family: Rachycentridae

Scientific name: *Rachycentron canadum*

Resource code : 46

Common name: Cobia

Local name:



Field identification characters:

- ❖ Head broad and depressed; first dorsal fin with 7 to 9 short but strong isolated spines, not connected by membrane.
- ❖ Caudal fin lunate, upper lobe longer than lower lobe.
- ❖ Back and sides dark brown, with 2 sharply defined narrow-light bands; belly yellowish.

2.3.19. RIBBON FISHES

Family: Trichiuridae

Scientific name: *Lepturacanthus savala*

Resource code : 49

Common name: Savalai hairtail

Local name:



Field identification characters:

- ❖ Body extremely elongate and strongly compressed, ribbon-like, tapering to a point, mouth very large with a dermal flap at tip of each jaw; 2 to 3 fangs with barbs and 2 small forward directed canine teeth present in upper jaw, eyes small.
- ❖ Lower hind margin of gill cover concave, pelvic and caudal fins absent.
- ❖ Body steely blue, with metallic reflections; tapering part white. Margin of anus pale; usually, margin of dorsal fin membrane white; tip of both jaws black; pectoral girdle pale black.



Scientific name: *Trichiurus lepturus*

Resource code : 49

Common name: Largehead hairtail

Local name:



Field identification characters:

- ❖ Eyes large, lower hind margin of gill cover concave, pelvic and caudal fins absent.
- ❖ Lateral line beginning at the upper margin of gill cover, running oblique to behind tip of pectoral fin, then straight near to ventral profile.
- ❖ Body steel blue, with silvery reflections, pectoral fins semi-transparent, other fins sometimes tinged with pale yellow.

2.3.20. MACKERELS

Scientific name: *Rastrelliger kanagurta*

Resource code : 50

Common name: Indian mackerel

Local name:



Field identification characters:

- ❖ Body moderately deep, gillrakers very long, visible when mouth is opened.
- ❖ Back blue/ green, flanks silver with golden tint; 2 rows of small, dark spots on sides of dorsal fin bases, narrow dark longitudinal bands on upper part of body and black spot on body near lower margin of pectoral fin. Rests of fins are yellowish to dusky.



Family: Scombridae (Mackerels, tunas, bonitos)

Scientific name : *Rastrelliger faughni*

Resource code : 51

Common name : Island mackerel

Local name :



Field identification characters:

- ❖ Head longer than body depth. Maxilla covered by lachrymal bone.
- ❖ Interpelvic process small and single.
- ❖ The belly is yellowish silver; 2 to 6 large spots are at the base of the first dorsal fin; tow faint stripes are at the level of the lateral line in some specimens.

2.3.21. SEERFISHES

Scientific name: *Scomberomorus commerson*

Resource code : 52

Common name: Narrow-barred Spanish mackerel

Local name:



Field identification characters:

- ❖ Body elongate, rather compressed; lateral line abruptly bent downward below end of 2nd dorsal fin.
- ❖ Back iridescent blue/ grey, sides silver with bluish reflections, marked with numerous thin, wavy vertical bands; juveniles are frequently spotted.

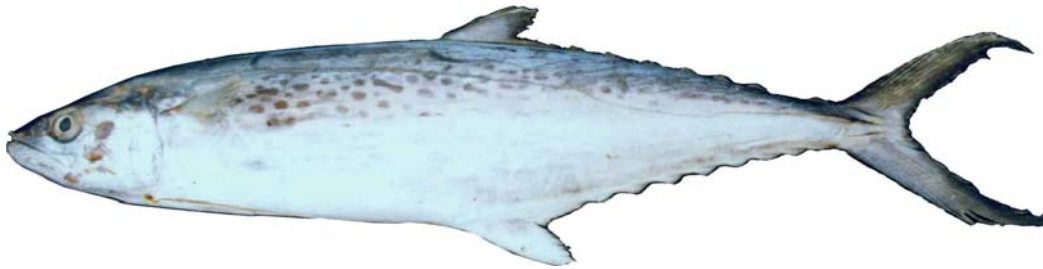


Scientific name: *Scomberomorus guttatus*

Resource code : 53

Common name: Indo-pacific king mackerel

Local name:



Field identification characters:

- ❖ Lateral line, with many fine branches anteriorly almost straight to below middle of 2nd dorsal fin, and gently bent downward to middle of caudal peduncle.
- ❖ Colour blue on back, silvery on sides; about 3 irregular rows of dark round spots along sides of body; spinous dorsal fin dark up to the 8th spine, white posteriorly, with the distal margin black.

Scientific name : *Scomberomorus lineolatus*

Resource code : 54

Common name : Streaked seerfish

Local name :



Field identification characters:

- ❖ A unique pigment pattern of short lines on the sides which distinguishes from all other species of *Scomberomorus*; maxilla with the posterior end greatly expanded.
- ❖ Interpelvic process small and bifid. Lateral line without auxiliary branches anteriorly, running almost straight below second dorsal finlet then slightly bent downward toward keel of caudal peduncle.
- ❖ First dorsal fin black posteriorly.



Scientific name : *Acanthocybium solandri*

Resource code : 55

Common name : Wahoo

Local name :



Field identification characters:

- ❖ Mouth large with strong, triangular, compressed and finely serrate teeth. Snout about as long as the rest of head.
- ❖ Posterior part of maxilla completely concealed under preorbital bone.
- ❖ Gill rakers absent. Interpelvic process small and bifid.
- ❖ Swim bladder present. Body covered with small scales.
- ❖ The back is iridescent bluish green; the sides silvery with 24 to 30 cobalt blue vertical bars which extend to below the lateral line.

2.3.22. NERITIC TUNAS

Scientific name : *Auxis rochei rochei*

Resource code : 56

Common name : Bullet tuna

Local name :



Field identification characters:

- ❖ Back bluish, turning to deep purple or almost black on head.
- ❖ Scaleless area with pattern of 15 or more fairly broad, nearly vertical dark bars. Belly white.
- ❖ Pectoral and pelvic fins purple, their inner sides black. Body robust, elongate and rounded.
- ❖ Pectoral fins short, not reaching vertical line from anterior margin of scaleless area above corselet.
- ❖ A large, single-pointed flap (interpelvic process) between pelvic fins.
- ❖ A strong central keel on each side of caudal-fin base between 2 smaller keels.



Family: Scombridae

Scientific name: *Auxis thazard*

Resource code : 57

Common name: Frigate tuna

Local name:



Field identification characters:

- ❖ Two dorsal fins, the 1st with 10 to 12 spines, separated 2nd fin followed by 8 finlets; pectoral fins short, but reaching past vertical line from anterior margin of scaleless area above corselets; a large single-pointed flap between pelvic fins; anal fin followed by 7 finlets.
- ❖ Back bluish, turning to deep purple or almost black on head; a pattern of 15 or more narrow, oblique to nearly horizontal, dark wavy lines in the scaleless area above the lateral line.

Scientific name: *Ethynnus affinis*

Resource code : 58

Common name: Kawakawa

Local name:



Field identification characters:

- ❖ 1st dorsal fin with 11 to 14 spines; both dorsal fins separated by only a narrow interspace.
- ❖ 2nd dorsal fin much lower than 1st and followed by 8 to 10 finlets; pectoral fins short.
- ❖ 2 flaps (interpelvic process) between pelvic fins; anal fin followed by 6 to 8 finlets.
- ❖ Back dark blue with a complicated striped from middle of 1st dorsal fin upto caudal peduncle; lower sides and belly silvery white
- ❖ Several characteristic dark spots between pelvic and pectoral fins.

Scientific name: *Thunnus tonggol*

Common name: Longtail tuna

Local name:

Resource code : 59



Field identification characters:

- ❖ Two dorsal fins separated only by a narrow interspace, the 2nd higher than the 1st and followed by 9 finlets; pectoral fins short to moderately long.
- ❖ Back blue or black, lower sides and belly silvery white with colourless elongate oval spots arranged in horizontally oriented rows; dorsal, pectoral and pelvic fins blackish, tip of 2nd dorsal and anal fins yellow; anal fin silvery; dorsal and anal finlets yellow with greyish margins; caudal fin blackish, with streaks of yellowish green.

Scientific name : *Sarda orientalis*

Common name : Striped bonito

Local name :

Resource code : 60



Field identification characters:

- ❖ Mouth moderately large.
- ❖ Interpelvic process small and bifid.
- ❖ Back with narrow oblique stripes.



2.3.23. OCEANIC TUNAS

Scientific name: *Thunnus obesus*

Resource code : 61

Common name: Bigeye tuna

Local name:



Field identification characters:

- ❖ Pectoral fins moderately long in large specimens, but very long in small specimens.
- ❖ Back metallic dark blue, lower sides and belly whitish; a lateral iridescent blue band runs along sides; 1st dorsal fin deep yellow, 2nd dorsal and anal fins light yellow, finlets bright yellow edged with black.

Scientific name: *Katsuwonus pelamis*

Resource code : 62

Common name: skipjack tuna

Local name:



Field identification characters:

- ❖ 1st dorsal fin with 14 to 16 spines, the second followed by 7 to 9 finlets.
- ❖ A strong keel on each side of base of caudal fin between 2 smaller keels.
- ❖ Back dark purplish blue, lower sides and belly silvery, with 4 to 6 very conspicuous longitudinal dark bands.



Scientific name: *Thunnus albacares*

Resource code : 63

Common name: Yellowfin tuna

Local name:



Field identification characters:

- ❖ Two dorsal fins separated only by a narrow interspace, the 2nd followed by 8 to 10 finlets; anal fin followed by 7 to 10 finlets.
- ❖ Large specimens have very long 2nd dorsal and anal fins.
- ❖ Pectoral fins moderately long, usually reaching beyond 2nd dorsal fin origin but not beyond its base.
- ❖ Back metallic dark blue changing through yellow to silver on belly; belly frequently crossed by about 20 broken, nearly vertical lines. All fins and finlets bright yellow, finlets with a narrow black border.

Scientific name: *Thunnus alalunga*

Resource code : 64

Common name: Albacore

Local name:



Field identification characters:

- ❖ Anterior spines much higher than posterior spines giving the fin a strongly concave outline.
- ❖ Interpelvic process small and bifid.
- ❖ Body with very small scales. Pectoral fins remarkably long, about 30% of fork length or longer in 50 cm or longer fish.
- ❖ Ventral surface of liver striated and the central lobe is largest.



2.3.24. SAILFISH

Family: Istiophoridae

Scientific name: *Istiophorus platypterus*

Resource code : 65

Common name: Sailfish

Local name:



Field identification characters:

- ❖ Body elongate, much compressed. Upper jaw prolonged into a rather slender spear.
- ❖ Two dorsal fins, first dorsal fin large and sail-like; pelvic fins very long almost reaching to anus.
- ❖ Body dark blue dorsally, silvery white ventrally; first dorsal fin membrane blue-black with many small black spots; other fins brown-black; more or less 20 horizontal bars, each consisting of several pale blue spots on body.

2.3.25. SWORD FISH

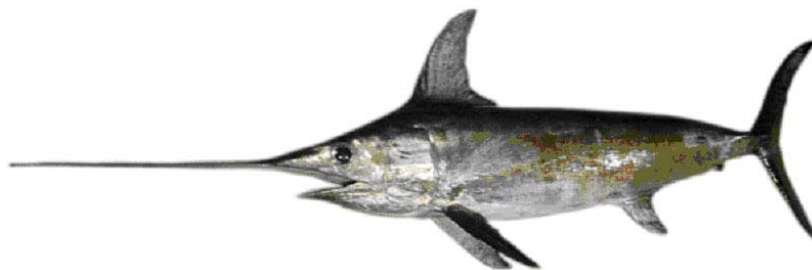
Family: Xiphiidae

Scientific name : *Xiphias gladius*

Resource code : 66

Common name : Swordfish

Local name :



Field identification characters:

- ❖ Blackish-brown fading to light-brown below; 1st dorsal fin with blackish-brown membrane, other fins brown or blackish-brown.
- ❖ A long, flat, sword-like bill and no pelvic fins.



2.3.26. MARLINS

Family: Istiophoridae

Scientific name: *Makaira indica*

Resource code : 67

Common name: Black marlin

Local name:



Field identification characters:

- ❖ Body elongate, not strongly compressed. Upper jaw prolonged into a rather slender spear; nape very steep.
- ❖ Two dorsal fins, the first long and low posteriorly; the second small; height of anterior part of first dorsal fin smaller than body depth.
- ❖ Pectoral fins falcate, rigid, not foldable back against sides of body; pelvic fins shorter than pectorals, consisting of 1 spine and 2 soft rays. Lateral line single.
- ❖ Body dark blue dorsally, silvery white ventrally; first dorsal fin membrane blue-black, usually unspotted; other fins brown-black.

Scientific name : *Makaira mazara*

Resource code : 68

Common name : Indo-Pacific blue marlin

Local name :



Field identification characters:

- ❖ Body elongated and not very compressed; upper jaw produced into a robust but not very long beak.
- ❖ Dark blue above, silvery white below; sometimes with light blue vertical stripes; 1st dorsal fin blackish to dark blue, other fins dark brown with tinges of dark blue in some specimens.
- ❖ Body blue-black dorsally and silvery white ventrally, with about 25 pale, cobalt-colored stripes, each consisting of round dots or narrow bars.
- ❖ Bill long, extremely stout and round in cross section.
- ❖ Caudal peduncle with strong double keels on each side and a shallow notch on both the dorsal and ventral surfaces.



Scientific name : *Tetrapturus audax*

Resource code : 69

Common name : Striped marlin

Local name :



Field identification characters:

- ❖ Body elongated and compressed; upper jaw produced into a robust and medium sized beak; two dorsal fins, the height of the first greater than the greatest depth, short anteriorly, taller in the middle, then becoming shorter posteriorly; pectoral fins falcate and flexible; back dark blue; belly silvery; membrane of first dorsal fin blue black without dark spots; flanks with about 20 bluish stripes.
- ❖ Blue-black above and silvery white below, with about 15 rows of cobalt-colored stripes; 1st dorsal fin dark blue; other fins dark brown, sometimes with a tinge of dark blue; anal fin bases with a tinge of silvery white.

2.3.27. OTHER PELAGIC FISHES

Family: Bramidae (Pomfrets)

Scientific name : *Taractichthys longipinnis*

Resource code : 70

Common name : Bigscale pomfret

Local name :



Field identification characters:

- ❖ Grey or silvery in color, with coppery reflections.
- ❖ Generally oceanic and presumably epipelagic.



Family: Coryphaenidae (Dolphinfishes)

Scientific name : *Coryphaena hippurus*

Resource code : 71

Common name : Common dolphinfish

Local name :



Field identification characters:

- ❖ Tooth patch on tongue small and oval; single dorsal fin extending from above eye almost to caudal fin with 58-66 rays; a concave anal fin extending from anus almost to caudal fin; pectoral fin more than half of head length.
- ❖ The color is striking with golden hues on the sides, metallic blues and greens on the back and sides, with white and yellow on the underparts.
- ❖ Small specimens have pronounced vertical bars on the sides of the body.

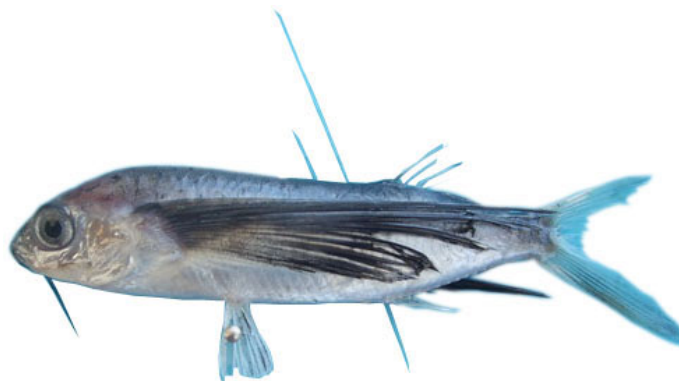
Family: Exocoetidae

Scientific name : *Exocoetus monocirrhus*

Resource code : 72

Common name : Barbel flyingfish

Local name :



Field identification characters:

- ❖ Body dark iridescent blue above, silvery white below; pectorals and caudal fin greyish or brownish, other fins unpigmented.



Family: Hemiramphidae

Scientific name: *Hemiramphus dispar*

Resource code : 73

Common name: Viviparus halfbeak

Local name:



Field identification characters:

- ❖ An elongate fish with a greatly prolonged, beak-like lower jaw; upper jaw short, triangular and scaleless.
- ❖ Pectoral fins short, not reaching past nasal pit when folded forward.
- ❖ Colour bluish above, silvery white below, beak dark.

Family: Alepisauridae (Lancetfishes)

Scientific name : *Alepisaurus ferox*

Resource code : 74

Common name : Longnose lancetfish

Local name :



Field identification characters:

- ❖ Mouth large with two erect fangs on palatines.
- ❖ Dorsal fin very high, about three rays beginning with third or fourth much exerted; adipose moderate in size, over posterior part of anal insertion.
- ❖ Generally pale, iridescent, darker dorsally; lateral adipose keel dark; all fins dark brown or black; peritoneum black



Family: Echeneidae (Remoras)

Scientific name : *Echeneis naucrates*

Resource code : 75

Common name : Live sharksucker

Local name :



Field identification characters:

- ❖ With a dark mid-lateral stripe bordered by narrow white stripes above and below.
- ❖ Body depth contained in 8-14 times in SL; caudal fin in adults almost truncate with the upper and lower lobes longer than the middle rays; first dorsal fin replaced by a transversal, laminated, oval cephalic disc with 16-18 laminae

Family: Molidae (Molas or Ocean Sunfishes)

Scientific name : *Mola mola*

Resource code : 76

Common name : Ocean sunfish

Local name :



Field identification characters:

- ❖ The scaleless body is covered with extremely thick, elastic skin.
- ❖ The caudal fin is replaced by a rudder-like structure called 'clavus'.
- ❖ Dorsal and anal fins very high with short base; in swimming, these fins are flapped synchronously from side to side and can propel the fish at surprisingly good speed.
- ❖ Pectorals small and rounded, directed upward.
- ❖ Mouth very small; teeth fused to form a parrot-like beak.
- ❖ Gills 4, a slit behind the last; gill openings reduced to a small hole at the base of the pectoral fins.
- ❖ Gas bladder absent in adults.



2.3.28. DEEPSEA FISHES

Family : Chlorophthalmidae

Scientific name : *Chlorophthalmus agassizi*

Resource code : 77

Common name : Shortnose greeneye

Local name :



Field identification characters:

- ❖ Snout shorter than eye diameter, contained more than 1.3 times in eye; eye very large, less than 2 times in head teeth.
- ❖ Origin of dorsal fin much closer to tip of snout than to adipose fin.
- ❖ Eyes green.
- ❖ Colour brownish or yellowish, covered with large dark blotches, especially the dorsal half; a dark mid-stripe along upper flanks.

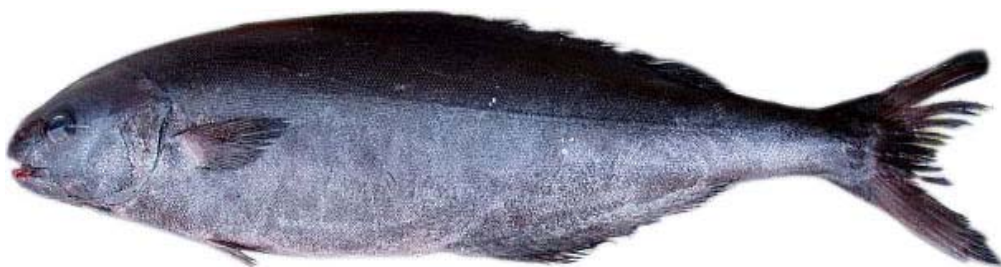
Family: Centrolophidae (Medusafishes)

Scientific name : *Centrolophus niger*

Resource code : 78

Common name : Blackfish

Local name :



Field identification characters:

- ❖ Dark brown to black, occasionally almost bluish; median and pelvic fins darker than body; young with 2-4 vertical bars.
- ❖ Snout is slightly longer than the eye diameter.



Family: Emmelichthyidae (Rovers)

Scientific name : *Emmelichthys nitidus nitidus*

Resource code : 79

Common name : Redbait

Local name :



Field identification characters:

- ❖ Reddish, darker (bluish grey) dorsally, silvery white below.

Family: Gempylidae (Snake mackerels)

Scientific name : *Neopinnula orientalis*

Resource code : 80

Common name : Sackfish

Local name :



Field identification characters:

- ❖ There are two lateral lines on the sides, both originating from above the upper angle of the gill opening.
- ❖ Overall color is greenish brown to dark brown.
- ❖ The buccal and branchial cavities are usually black.



Family : Macrouridae

Scientific name : *Physiculus capensis*

Resource code : 82

Common name : Physiculus capensis

Local name :



Field identification characters:

- ❖ Dorsal fins connected by a shallow membrane; caudal fin rounded.
- ❖ Snout short; body elongate; tail base slender.
- ❖ 1st dorsal fin : short base; 2nd dorsal fin : low, long base.
- ❖ Chin with barbell.
- ❖ pelvic: 6-7 rays, 2nd extremely long.

2.3.29. MISCELLANEOUS FISHES

Family : Platycephalidae

Scientific name : *Grammoplites suppositus*

Resource code : 83

Common name : Spotfin flathead

Local name :



Field identification characters:

- ❖ Body elongate with head strongly depressed.
- ❖ Top of head with strong spines and bony ridges.
- ❖ Pored lateral line scales 51 to 55, usually 53.
- ❖ Scale rows slanting downward and backward above lateral line about the same as the number of pored lateral line scales.
- ❖ Colour brownish above, whitish below, fins more or less dusky; first dorsal fin with a large black blotch posteriorly; upper pectoral rays, upper caudal rays and second dorsal rays with dark spots.



Family: Gerreidae

Scientific name: *Gerres filamentosus*

Resource code : 84

Common name: Whipfin silver-biddy

Local name:



Field identification characters:

- ❖ Second dorsal spine laterally compressed, produced into a filament, whose tip extends past level of first anal spine.
- ❖ Colour silvery, with 7 to 10 columns of ovoid spots on upper portion of sides, in the form bars in small specimens.

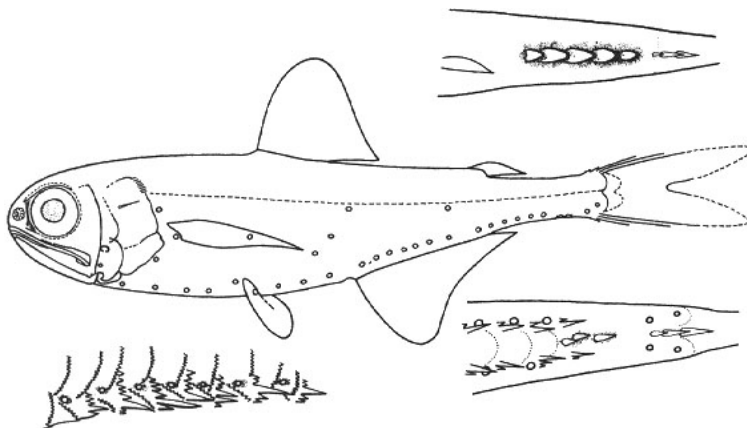
Family: Myctophidae (Lanternfishes)

Scientific name : *Myctophum spinosum*

Resource code : 85

Common name : Spiny Lanternfish

Local name :



Field identification characters:

- ❖ Anal organs 13-15; males with 6 luminous scales in the supracaudal gland, and females with 1-4 smaller scales in the infracaudal gland; ctenoid scales on the anal fin base with 1-2 posteriorly-directed spines, and posterolateral organ is well in advance of origin of adipose fin base, which separate *M. spinosum* from other species of the genus.



Family : Chanidae

Scientific name : *Chanos chanos*

Resource code : 86

Common name : Milkfish

Local name :



Field identification characters:

- ❖ Body elongate, moderately compressed, with no scutes along belly.
- ❖ Mouth small, without teeth, lower jaw with a small tubercle at tip, fitting into a notch of upper jaw; branchiostegal rays only 4.
- ❖ Dorsal fin at about midpoint of body; anal fin short and far behind dorsal fin base.
- ❖ Scales small, lateral line present.
- ❖ Colour back olive green, flanks silver. Dorsal, anal and caudal fins with dark margins.

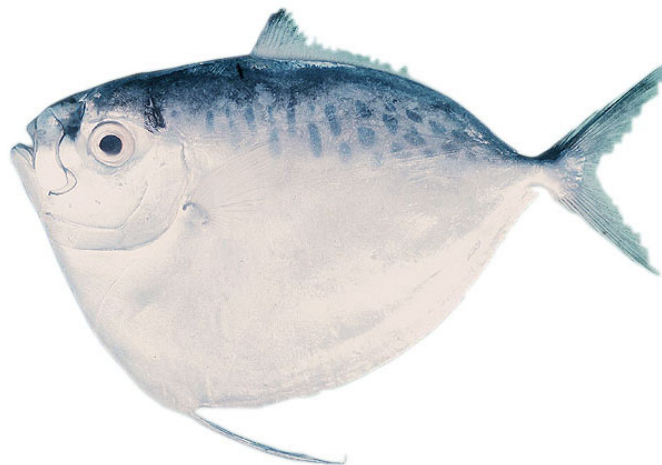
Family :

Scientific name : *Mene maculata*

Resource code : 88

Common name : Moonfish

Local name :



Field identification characters:

- ❖ Dorsal spines disappear with age; dark blue above, silvery white below; 2-3 rows of dark spots above and below lateral line.



Family : Mugilidae

Scientific name : *Liza carinata*
Common name : Keeled Mullet
Local name :

Resource code : 89



Field identification characters:

- ❖ Body moderately robust, head wide, higher than broad, dorsally flattened; a distinct keel or ridge present in front of first dorsal fin.
- ❖ Adipose tissue extending over almost all the iris; lips thin.
- ❖ First dorsal fin origin nearer to snout tip than to caudal fin base; second dorsal fin origin at vertical through end of anterior quarter of anal fin base; pectoral axillary scale absent or rudimentary.
- ❖ Colour greenish grey dorsally, silvery on sides and belly; golden around the eye; end of maxilla black. Dorsal, caudal and pectoral fins with fine black spots on their basal halves.

Family : Mugilidae

Scientific name : *Liza subviridis*
Common name : Greenback Mullet
Local name :

Resource code : 89



Field identification characters:

- ❖ Body robust, head wide, dorsally flattened.
- ❖ Fatty (adipose) tissue covering iris.
- ❖ First dorsal fin nearer to caudal fin base than to snout tip or midway between them; second dorsal fin origin on vertical between anterior third and half of anal fin base.
- ❖ Colour dark greenish above, white below; caudal fin edged with black.



Family: Mugilidae

Scientific name: *Mugil cephalus*

Resource code : 89

Common name: Flathead mullet

Local name:



Field identification characters:

- ❖ Head much flattened dorsally.
- ❖ Colour olive-green on back, silvery on sides, shading to white below; 6 to 7 indistinct brown bands down flanks, a dark purple blotch at base of pectoral fin.

Family : Mugilidae

Scientific name : *Valamugil seheli*

Resource code : 89

Common name : Blue-spot mullet

Local name :



Field identification characters:

- ❖ Body moderately robust; head wide, dorsally flattened; preorbital bone wide.
- ❖ First dorsal fin origin nearer to snout tip than to caudal fin base or equidistant; second dorsal fin origin on vertical from anal fin origin; pectoral axillary scale long; 9 rows of scales on side of caudal peduncle.
- ❖ Colour greenish-brown on back, silvery below; upper rows of scales with dusky spots forming indistinct bands along body; second dorsal and caudal fins pale blue; pelvic, anal and first dorsal fins white, pectoral fin dull yellow with a blue axillary spot; upper lobe of caudal fin with a dark blue tip.

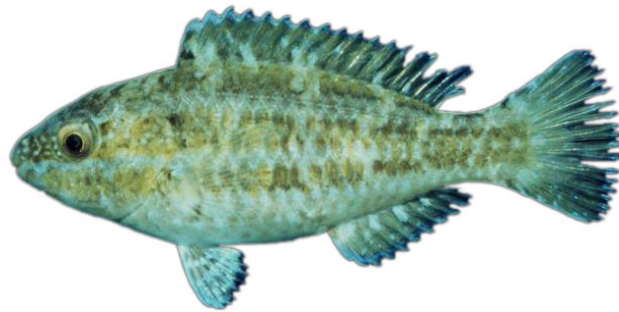
Family : Scaridae

Scientific name : *Scarus ghobban*

Resource code : 90

Common name : Yellow scale parrotfish

Local name :



Field identification characters:

- ❖ Dorsal rays IX, 10; anal rays III, 9; pectoral rays 15, 13 (rarely 14) branched; median predorsal scales usually 6, their size decreasing anteriorly; 3 rows of scales on cheek, upper 2 rows with 5-7 (usually 6) scales, lower row 2-3 (usually 2) scales; forehead without hump in adults; tail fin slightly emarginate in small initial phase fish to strongly concave in terminal males.
- ❖ Initial phase overall yellowish to yellowish green with five irregular scale blue to whitish bars on side; terminal males blue greenish on back with salmon-pink scale edges, lower side largely salmon pink with green scale margins; a pair of blue bands on chin. Juveniles pale with yellowish hue, either striped (3 dark stripes along body) or barred (5 narrow blue-white spotted bars); vertical fins orange-yellow.

Family : Drepanidae

Scientific name : *Drepane punctata*

Resource code : 91

Common name : Spotted Sickfish

Local name :



Field identification characters:

- ❖ Head and body deep, strongly compressed.
- ❖ Mouth protrusible; Dorsal fin with 8 or 9 spines and 19 to 22 soft rays; the 4th dorsal spine the longest; anal fin with 3 spines and 17 to 19 soft rays; pectoral fins long and pointed, reaching to base of caudal fin.
- ❖ Colour generally silvery with a greenish tinge on upper half of body and a large orange spot just above base of pectoral fin; 4 to 11 vertical bars of small black spots on upper half of body; margins of dorsal, anal, caudal and pelvic fins greyish black.



Family : Sillaginidae (Smelt-whittings)

Scientific name : *Sillago sihama*

Resource code : 92

Common name : Silver sillago

Local name :



Field identification characters:

- ❖ Swim bladder with two anterior and two posterior extensions.
- ❖ The anterior extensions extend forward and diverge to terminate on each side of the basioccipital above the auditory capsule.
- ❖ Two lateral extensions commence anteriorly, each sending a blind tubule anterolaterally and then extending along the abdominal wall below the investing peritoneum to just posterior of the duct-like process.
- ❖ Two posterior tapering extensions of the swim bladder project into the caudal region, one usually longer than the other.
- ❖ The species has a low lateral line with about 70 scales.

Family : Ephippidae

Scientific name : *Ephippus orbis*

Resource code : 93

Common name : Spadefish

Local name :



Field identification characters:

- ❖ Body deep, nearly circular, strongly compressed.
- ❖ Eye diameter not shorter than distance from mouth to eye margin; mouth small, terminal, not protrusible; First dorsal fin with 1 forward-pointing spine, the 4th dorsal spine longest; pectoral fins short and rounded; anal fin with 3 spines and 15 or 16 soft rays.
- ❖ Scales small.
- ❖ Colour 4 or 5 vertical black bars on body from dorsal fins almost to belly.

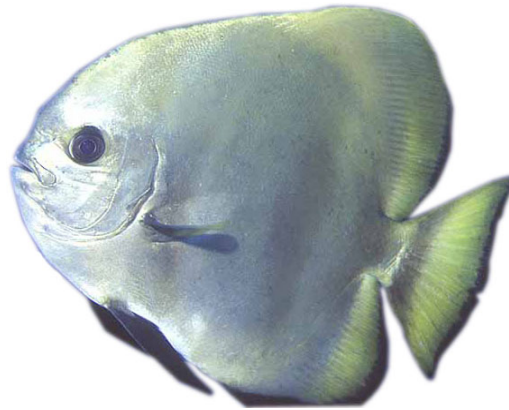
Family : Platacidae

Scientific name : *Platax orbicularis*

Common name : Orbicular batfish

Local name :

Resource code : 93



Field identification characters:

- ❖ Body deep, rhomboid, strongly compressed.
- ❖ Forehead profile somewhat angular.
- ❖ Dorsal fin with 5 concealed spines and 36 or 37 soft rays; pectoral fins short and rounded; pelvic fins produced.
- ❖ Lateral line arched.
- ❖ Colour adults silvery grey with blackish vertical bars fading with age.

Scientific name : *Sargocentron caudimaculatum*

Common name : Silverspot squirrelfish

Local name :

Resource code : 94



Field identification characters:

- ❖ Head and body red, edges of scales silver; silvery white spot anterodorsally on caudal peduncle; spinous part of dorsal fin mottled light red, the outer part of the membranes bright red.
- ❖ 4-5 oblique rows of scales on cheek.
- ❖ Maxilla extending posteriorly from front of pupil to the center of eye; premaxillary groove reaching about front edge of orbit; anterior end of nasal bone with 2 short diverging spines; upper edge of first suborbital bone not serrated.

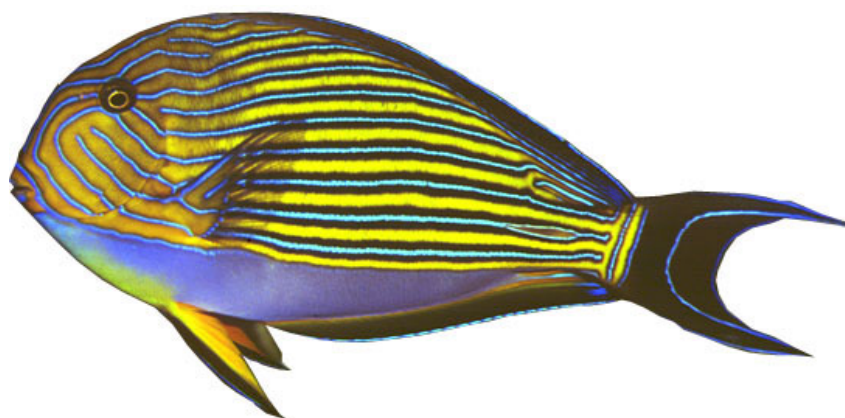


Scientific name : *Acanthurus lineatus*

Resource code : 95

Common name : Lined surgeonfish

Local name :



Field identification characters:

- ❖ Upper 3/4 of body with alternating black-edged blue and yellow bands; lower 1/4 of body gray.
- ❖ Erectile spine on each side of caudal peduncle is sharp, strong, forward-pointing, and venomous.
- ❖ Upper part of head with yellow, oblique stripes. Pectoral fins pale with dusky rays; pelvic fins light yellowish brown with black outer margin; vertical markings in caudal fin.

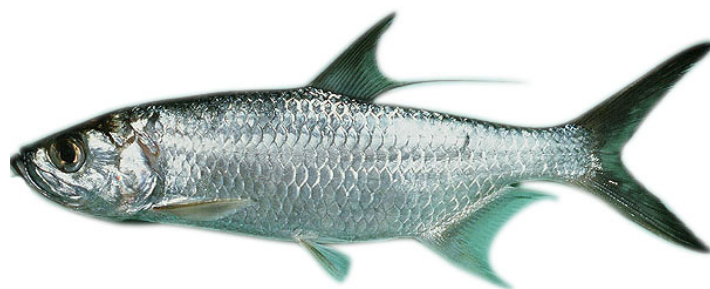
Family : Megalopidae

Scientific name : *Megalops cyprinoides*

Resource code : 96

Common name : Indo-Pacific Tarpon

Local name :



Field identification characters:

- ❖ Body moderately deep; eye large; lower jaw projecting.
- ❖ Fins lacking spines; dorsal fin origin at about midpoint of body, last dorsal fin ray filamentous; anal fin origin a little behind dorsal fin base.
- ❖ Colour back blue/green, flanks silvery.



Family: Teraponidae

Scientific name: *Terapon jarbua*

Common name: Jarbua terapon

Local name:

Resource code : 97



Field identification characters:

- ❖ Lower opercular spine very long and strong, extending distinctly beyond edge of opercular lobe, the spinous part of the fin strongly arched and deeply notched.
- ❖ Body silvery-greyish or tan dorsally and silvery white ventrally; 3 to 4 dark brown or black, downwardly curved longitudinal stripes on body. Spinous part of dorsal fin with a blackish band on upper portions of fin membranes between 3rd to 6th spines.
- ❖ Soft part of dorsal fin with membranes between first 3 rays tipped with black and membranes between 5th to 7th rays entirely black; caudal fin with median rays pigmented; both caudal lobes with dark tips and a transverse band.

Scientific name: *Terapon theraps*

Common name: Largescaled terapon

Local name:

Resource code : 97



Field identification characters:

- ❖ Body dusky dorsally, silvery-white ventrally; 4 dark brown horizontal stripes on body; juveniles also have 6 to 7 vertical bars. Spinous part of dorsal fin with a blackish band on upper portions of fin membranes between 3rd to 7th spines.
- ❖ Each caudal lobe with 1 transverse stripe, upper lobe with black tip.



Family : Triacanthidae

Scientific name: *Triacanthus biaculeatus*

Resource code : 98

Common name: Short-nosed tripodfish

Local name:



Field identification characters:

- ❖ Spiny dorsal-fin membrane very dark between first and third spines, and usually equally dark between third and fifth spines.
- ❖ Outline of head from base of first dorsal-fin spine to above eye an even slightly convex curve or almost a straight line.

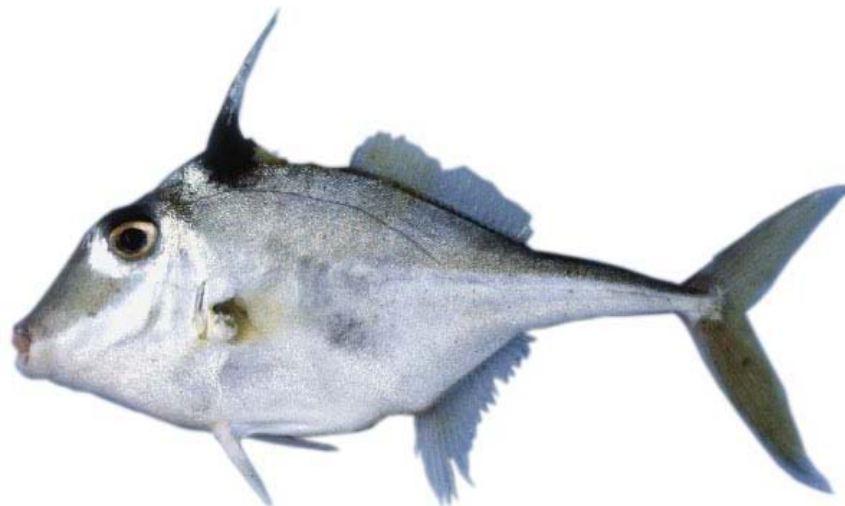
Family : Triacanthidae

Scientific name: *Triacanthus nieuhofii*

Resource code : 98

Common name: Silver tripodfish

Local name:



Field identification characters:

- ❖ Spiny dorsal-fin membrane very dark between first and second spines, slightly to much less darker between second and third spines, and pale between third and fifth spines.
- ❖ Outline of head between base of first dorsal-fin spine and eyes somewhat convex in front of spine and then straight or slightly concave over eye.



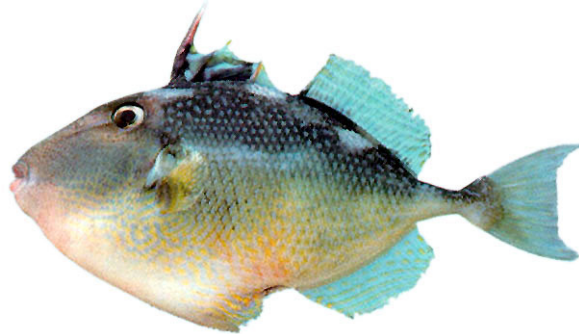
Family: Balistidae (Triggerfishes)

Scientific name: *Abalistes stellatus*

Resource code : 99

Common name :

Local name :



Field identification characters:

- ❖ Body grey brown to olivaceous dorsally with very small pale spots, becoming whitish ventrally with brownish yellow spots; 3 large oval white spots along the back and a small one dorsally on caudal peduncle; a broad white streak often on side of body posterior to upper end of gill opening.

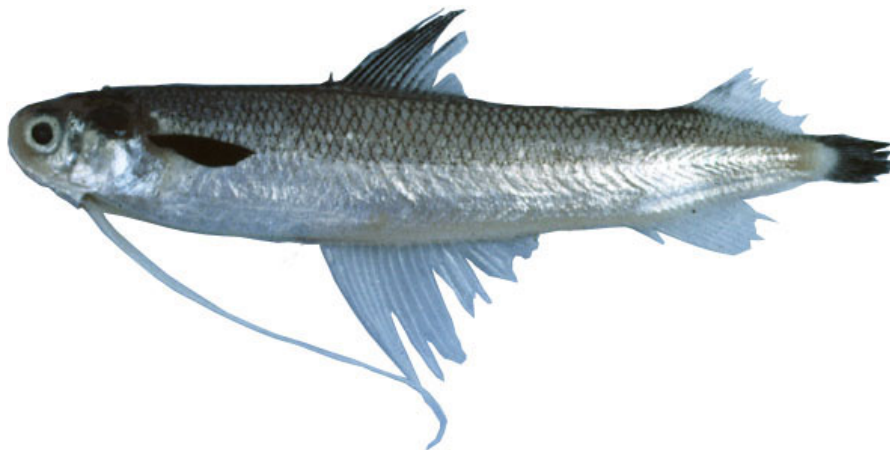
Family: Bregmacerotidae (Codlets)

Scientific name: *Bregmaceros mccllelandi*

Resource code : 100

Common name : Spotted codlet

Local name :



Field identification characters:

- ❖ Body is elongate, brownish and with speckling above and silvery below.
- ❖ The cheek and lower head also silver.
- ❖ Single occipital ray long and delicate, extending to near the middle of the second dorsal fin.
- ❖ Pelvic fins are jugular.

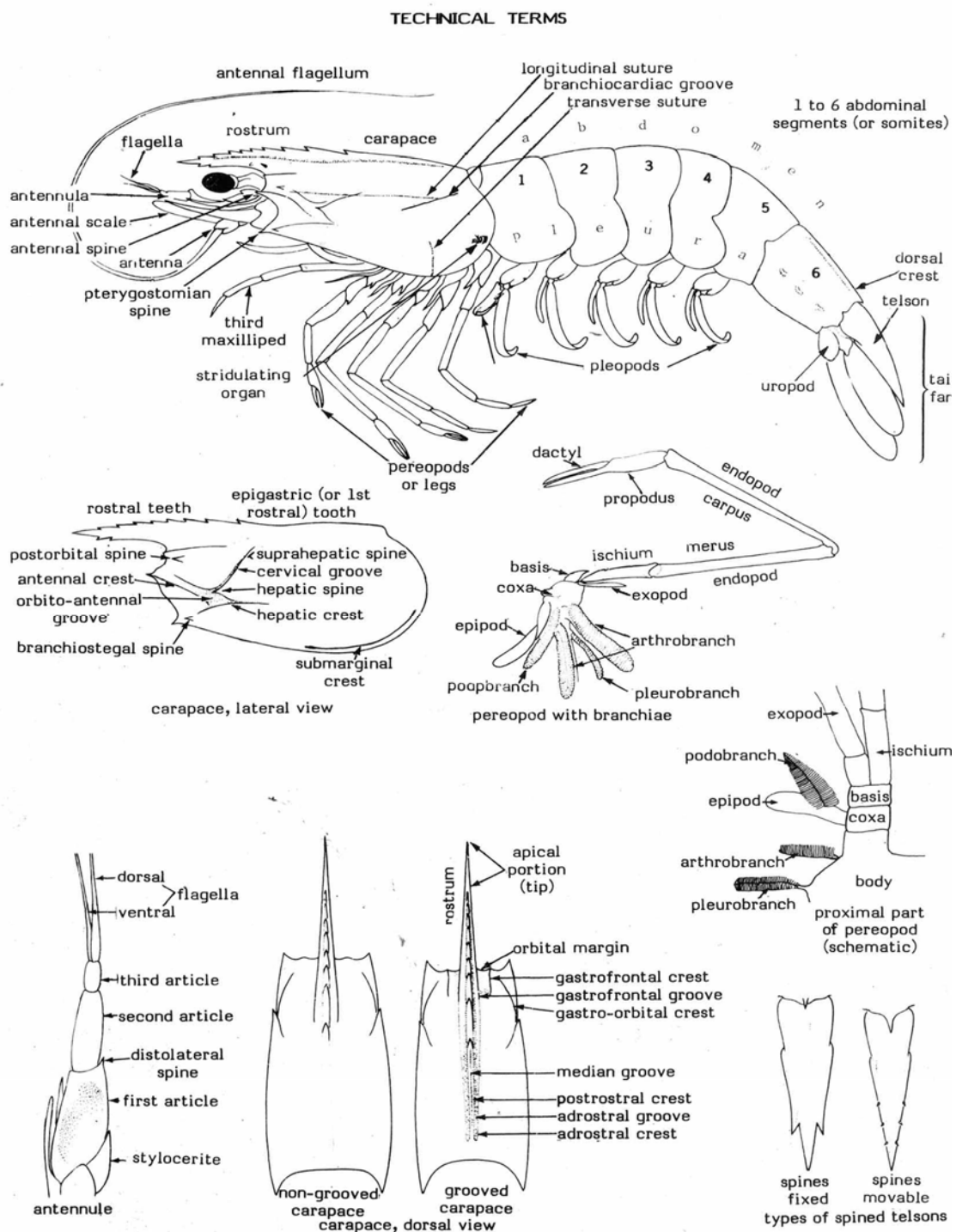


3. CRUSTACEANS

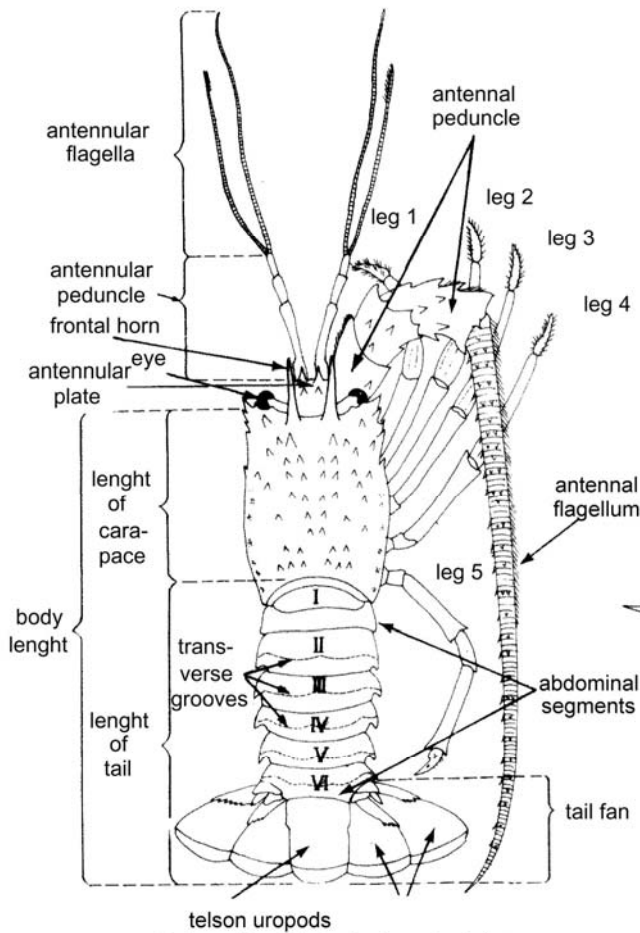




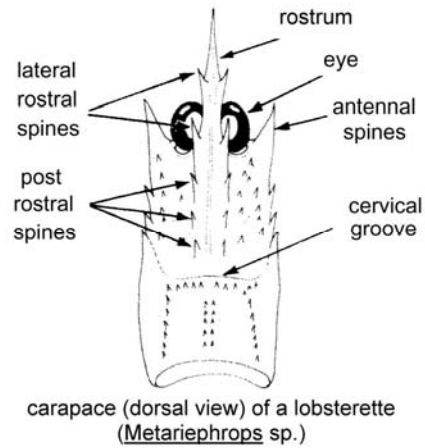
3.1 . MORPHOMETRIC CHARACTERS OF CRUSTACEANS



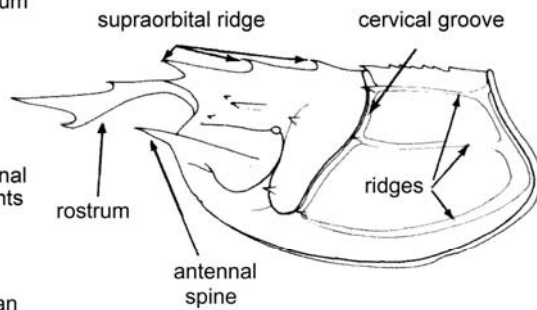
3.1.1. MORPHOMETRIC CHARACTERS OF SHRIMP



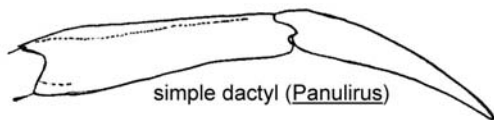
general shape (dorsal view) of a spiny lobster (*Panulirus* sp.) (no rostrum, no pincers)



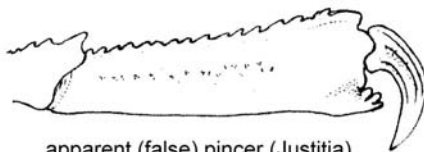
carapace (dorsal view) of a lobsterette (*Metariephrops* sp.)



carapace (lateral view) of a lobsterette (*Metanephrops* sp.)



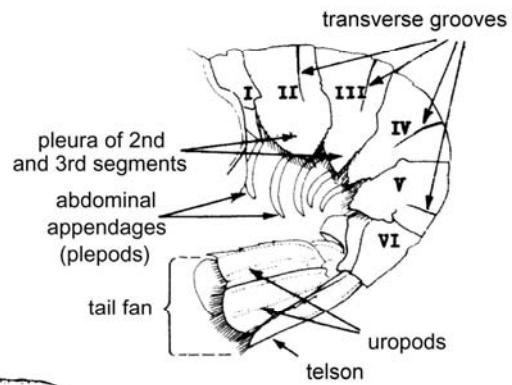
simple dactyl (*Panulirus*)



apparent (false) pincer (*Justitia*)



true pincer (*Acanthacaris*)



tail (abdomen) in lateral view segments numbered I to VI

Types of terminal segments of legs in first pair

3.1.2. MORPHOMETRIC CHARACTERS OF LOBSTERS



3.2. FAMILY-WISE KEY CHARACTERS OF CRUSTACEANS

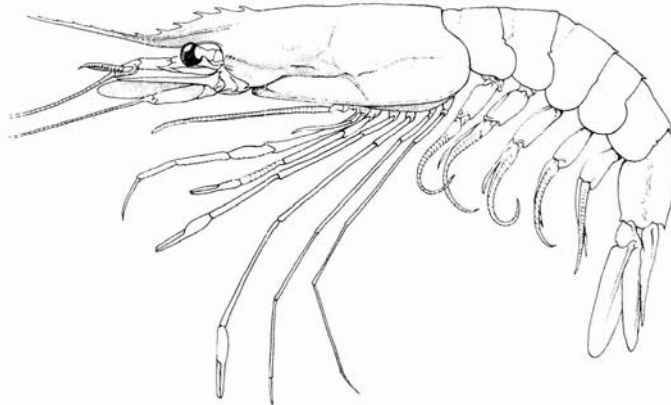
3.2.1. SHRIMPS

DISTINCT CHARACTERISTICS OF PENAIDS AND NON-PENAIDS

Penaeids	Non-penaeids
<p>▲ The pleura of 2nd abdominal segments does not overlap the pleura of 1st segment.</p> <p>▲ First 3 pair of legs chelate.</p> <p>▲ External genitalia (Reproductive organs) present. Fertilization external</p> <p>▲ External maxillipedes 7 jointed.</p> <p>e.g., <i>Penaeus monodon</i>, <i>Metapenaeus dobsoni</i></p>	<p>▲ The pleura of 2nd abdominal segment overlap the pleura of 1st segment.</p> <p>▲ First 2 pair of legs chelate.</p> <p>▲ External genitalia (Reproductive organs) absent. Fertilization external</p> <p>▲ External maxillipedes 4-5 jointed.</p> <p>e.g., <i>Acetes indicus</i>, <i>Macrobrachium rosenbergii</i></p>

Aristeidae (Aristeid shrimps)

Resource code : 101

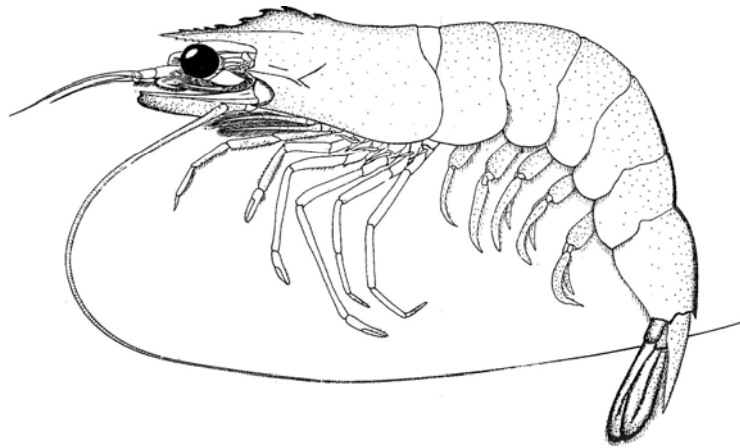


General characters:

- ❖ Rostrum usually very long in females and young males but becoming rather short in adult males (subfamily Aristeinae) or, rostrum short, not exceeding the eye (subfamily Benthescyminae); no styliform projection at base of eyestalk, but a tubercle present on its mesial (inner) border (very small in Aristaemomorpha).
- ❖ Carapace without postorbital spine; cervical groove either long, extending almost to dorsal midline of carapace, or very short; last 2 pairs of pereopods well developed; endopods of second pair of pleopods in males bearing appendix masculina and appendix interna, but no lateral projection; third and fourth pairs of pleopods biramous; telson armed with 1 to 4 movable spines on each side.
- ❖ Two well developed arthrobranchs on penultimate thoracic segment (hidden beneath the carapace).

Penaeidae (Penaeid shrimps)

Resource code : 102,103,104,106,109

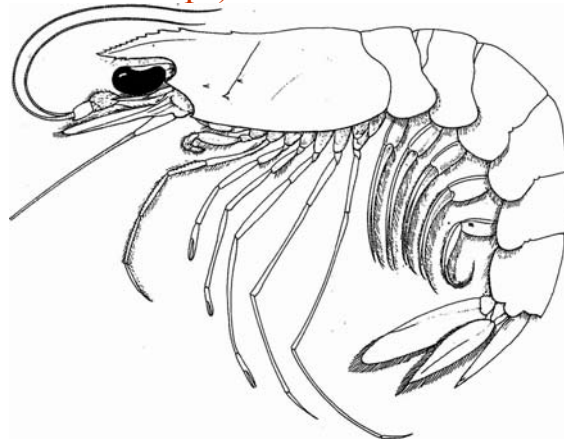


General characters:

- ❖ Shrimps with a well developed and toothed rostrum which generally extends to or beyond distal edge of eye; no styliform projection on base of eyestalk and no tubercle on its mesial (inner) border.
- ❖ Carapace without postorbital spine and with short cervical groove ending well below dorsal midline (extending at most for 2/3 of distance between hepatic spine and middorsal line).
- ❖ Last 2 pairs of pereopods well developed; third and fourth pairs of pleopods biramous; endopods of second air of leopods in males bearing appendix masculina only (lacking appendix interna and lateral, projection).
- ❖ Telson sharply pointed, with or without fixed or movable spines on sides.
- ❖ One single well developed arthrobranch on penultimate thoracic segment (hidden beneath the carapace), 1 rudimentary arthrobranch occasionally present.

Solenoceridae (Solenocerid shrimps)

Resource code : 105



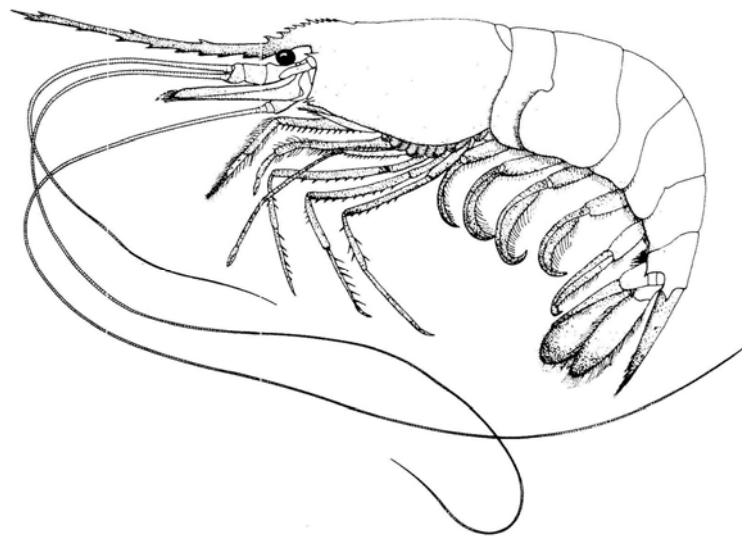
General characters:

- ❖ Shrimps with a well developed and toothed rostrum which extends at least to centre of eye diameter; no styliform projection at base of eyestalk, but a tubercle present on its mesial (inner) border.
- ❖ Carapace with postorbital spine and long cervical groove which end at, or close to, dorsal midline. Last 2 pairs of pereopods well developed; endopods of second pair of pleopods in males bearing appendix masculina appendix interna and lateral projection; third and fourth pairs of pleopods biramous.
- ❖ Telson tridentate in most species (with a fixed spine on each side of tip).
- ❖ Two well developed arthrobranches on the penultimate thoracic segment (hidden beneath the carapace).



Hippolytidae (Cock shrimps)

Resource code : 107

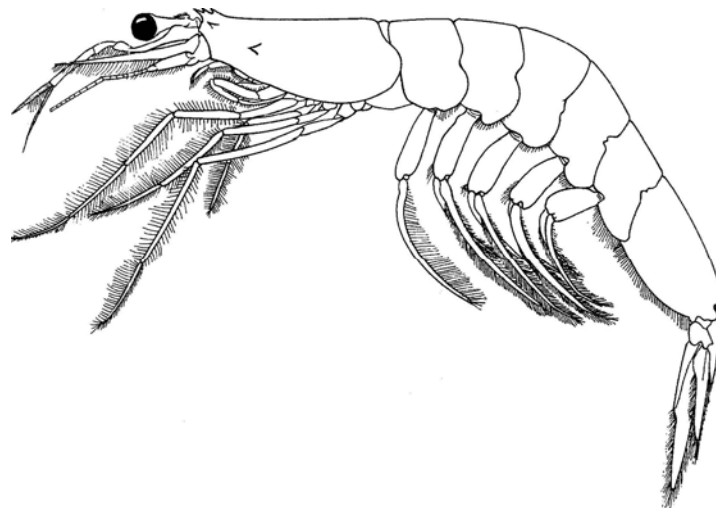


General Characters:

- ❖ The pleura of the second abdominal segment overlap those of the first and third segments, and the third pair of pereopods lack pincers.
- ❖ Rostrum generally longer than eyes and usually with several dorsal and ventral teeth; eyes free, not covered by carapace; first pair of pereopods ending in clearly distinct pincers and broader than second pair, but not considerably enlarged; carpus of second pair divided into several articles.

Sergestidae (Sergestid shrimps)

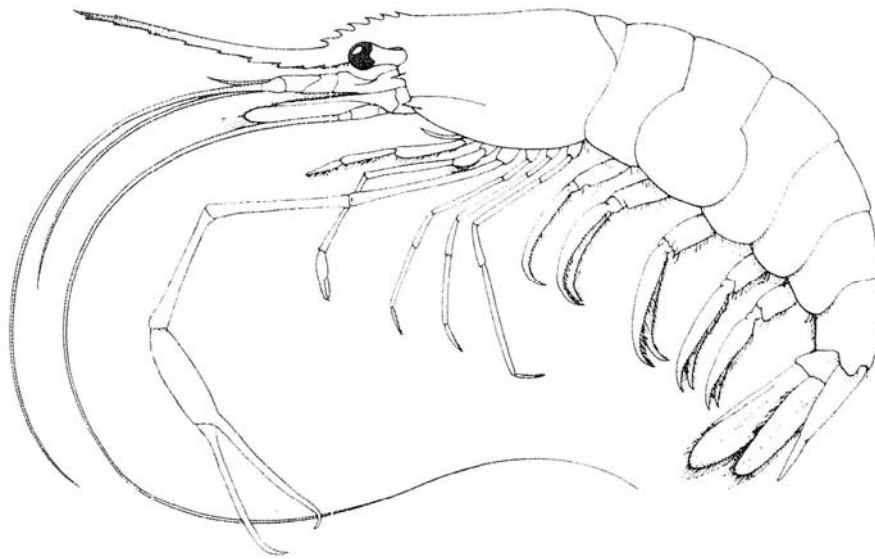
Resource code : 107



General characters:

- ❖ Small-sized shrimps; carapace with poorly developed crests and grooves, often wanting; rostrum shorter than the eye-stalk, generally small and sometimes even absent; branchiae few (not more than 8 on each side) or absent; pleura of first abdominal segment covering that of second somite; in males, lower antennular flagella with a clasping organ; first pair of pereopods with or without pincers; second and third pairs of pereopods with small pincers; fourth and fifth pairs of pereopods shorter than anterior legs (fifth pair strikingly shorter) or absent; in males, petasma present on first pleopods.



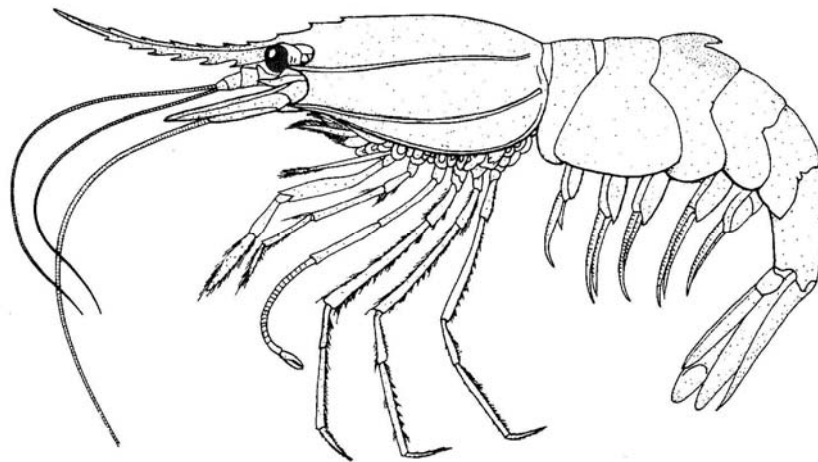
Palaemonidae (Palaemonid shrimps)**Resource code : 107****General Characters:**

- ❖ Small to moderate-sized shrimps.
- ❖ Carapace cylindrical with a prominent laterally compressed rostrum carrying dorsal and ventral teeth.
- ❖ Anterior margin of carapace with an antennal and a branchiostegal spine, the latter sometimes replaced by a hepatic spine; rarely neither branchiostegal nor hepatic spines present.
- ❖ Pleura of second abdominal segment wide and covering both those of first and third somites.
- ❖ Telson elongate, with 2 pairs of dorsal spines and 2 or 3 pairs of posterior spines.
- ❖ First and second pairs of pereopods with pincers.
- ❖ First pair of pereopods shorter and more slender than second; pincers well developed, normal.
- ❖ Second pair of pereopods more robust than first, often very long and strong in adult males; pincers normal, carpus and merus not subdivided.
- ❖ Last 3 pereopods simple without pincers.
- ❖ Exopods on none of the legs.
- ❖ Males without petasma, females without thelycum.
- ❖ Males with an appendix masculine and an appendix interna on the endopods of second pleopods.
- ❖ All species in the juvenile stage and many also as adults are translucent, often with dark lines or spots chromatophores).
- ❖ Large specimens sometimes more opaque and darker coloured.



Pandalidae (Pandalid shrimps)

Resource code : 110,111,112



General Characters:

- ❖ The pleura of second abdominal segment overlap those of first and third segments, and the third pair of pereopods lacks pincers. Rostrum longer than eyes, armed with dorsal and ventral teeth.
- ❖ First pair of pereopods ending in microscopically small pincers or pincers entirely lacking, legs slender, less heavy than any other pair.
- ❖ Carpus of second pair of pereopods divided into several, usually very many, articles.

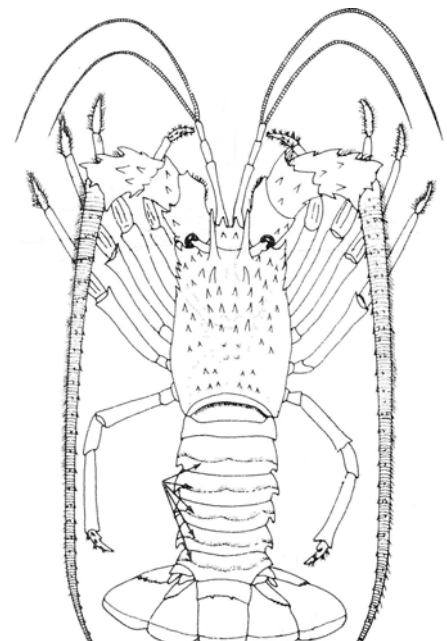
3.2.2. LOBSTERS

Palinuridae (Spiny lobsters)

Resource code : 113

General Characters:

- ❖ Moderate- to large-sized crustaceans.
- ❖ Carapace (or "head") rounded in section (subcylindrical), without a distinct median rostrum, ornamented with spines and granules of various sizes, each eye protected by a strong, spiny frontal projection of the carapace (frontal horns).
- ❖ Antennae long and whip-like, antennules slender, each consisting of a segmented peduncle and 2 long or short flagella. Tail powerful, with a well developed fan; abdominal segments either smooth or with one or more transverse grooves.
- ❖ Legs without true pincers or chelae (except the fifth pair of legs of the female, which ends in a very small pincer), the first pair usually not greatly enlarged (except in males of *Justitia*). Colour most species are brightly coloured and patterned with bands or spots, others uniform.

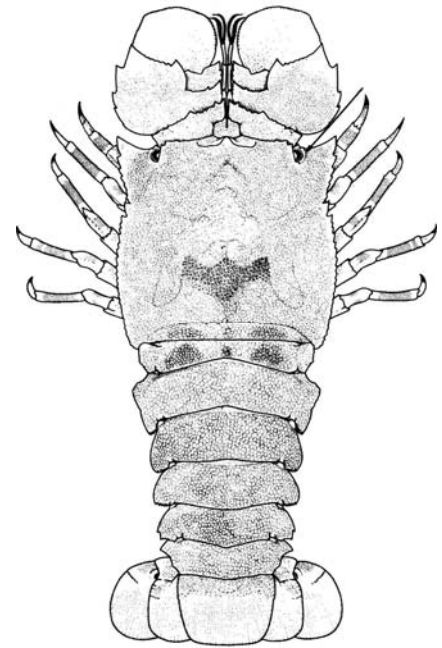


Scyllaridae (Slipper lobsters)

Resource code : 114

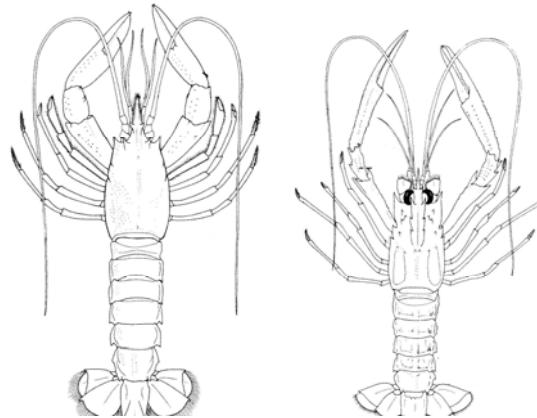
General characters:

- ❖ Small to large crustaceans (total length between 2 and 40 cm).
- ❖ Body more distinctly flattened than in any other group of lobsters.
- ❖ Carapace usually granular, sometimes with teeth, spines and ridges; eyes movable but recessed into anterior margin of carapace.
- ❖ Antennae short and broad, plate-like, lacking flagella; antennules short and slender, with 2 short flagella. Tail broad and powerful, with a well developed tail fan.
- ❖ All legs without pincers (except the fifth leg of the female which in most species ends in a small pincer); all legs of about same size.



Nephropidae (True lobsters and lobsterettes)

Resource code : 115



General Characters:

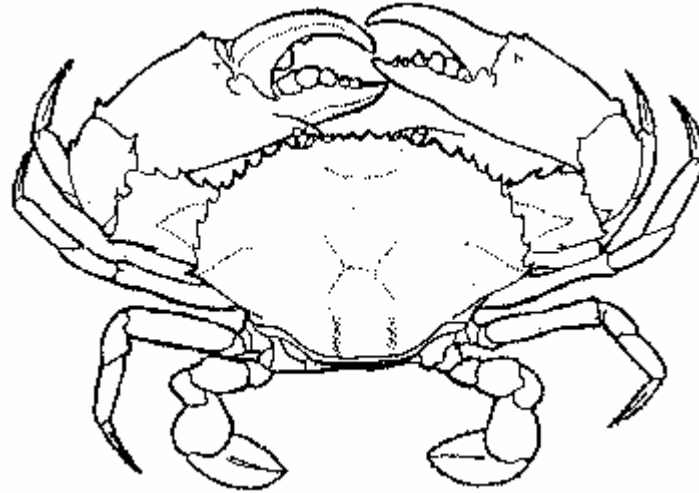
- ❖ Moderate- to large-sized crustaceans.
- ❖ Carapace (or "head") cylindrical, with a well developed, median rostrum and variously ornamented with spines or nodules, occasionally smooth; eyes movable, usually well developed and with black pigment, but small and lacking pigment, or even absent, in some deep-water forms.
- ❖ Antennae long and whip-like, antennules slender, ending in 2 long flagella.
- ❖ Tail powerful, with a well developed fan, abdominal segments smooth, or with one or more transverse grooves, or spiny, or granulate.
- ❖ First 3 pairs of walking legs ending in true pincers, the first pair, and especially its pincers, usually enlarged.
- ❖ Colour variable, depending on the species; some drab, others marked with pink or red. Deep-sea forms are whitish or pinkish.



3.2.3. CRABS

Portunidae (swimming crabs)

Resource code : 116



General Characters:

- ❖ 1 spine near posterior margin and 2 spines near anterior margin of chelate legs.
- ❖ Transverse ridge running between last lateral teeth, last carapace tooth greatly expanded.
- ❖ Body deep brown with numerous creamish spots all over the carapace, chelate and swimming legs; walking legs bluish to dusky.



3.3. SPECIES-WISE CHARACTERISTICS OF CRUSTACEANS

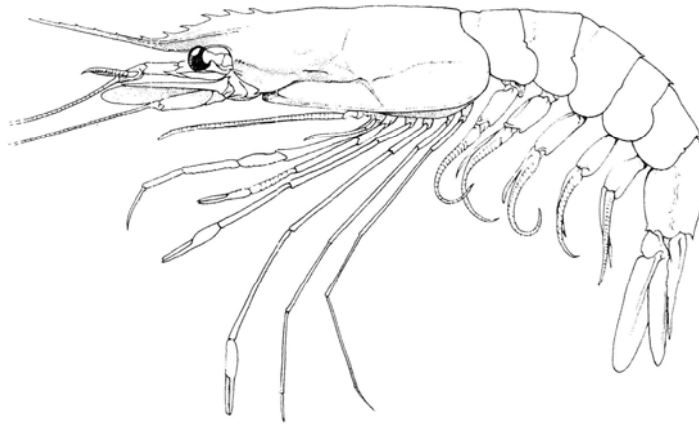
3.3.1. SHRIMPS (Littoral)

Scientific name: *Aristaeomorpha woodmasoni*

Resource code : 101

Common name : Indian red shrimp

Local name :



Field identification characters:

- ❖ Rostrum armed with 4 or more dorsal teeth.
- ❖ Three or more dorsal rostral teeth; upper antennular flagella very short and flattened almost throughout their length.

Family: Penaeidae

Scientific name: *Metapenaeus affinis*

Resource code : 102

Common name: Jinga shrimp

Local name:



Field identification characters:

- ❖ In adult males, merus of 5th pereopod with a proximal notch, followed by a twisted, keeled tubercle; distomedian projections of petasma crescent-shaped, leaning on distolateral projections and concealing them partly or completely.
- ❖ In females, anterior plate of thelycum deeply grooved longitudinally and considerably wider posteriorly; posterior transverse ridge with 2 anterolateral rounded projections partly covering lateral plates
- ❖ Body pale greenish to pale pinkish, sometimes green-bluish or pink-brownish, with green or red-brown specks, uropod's tip usually whitish to yellowish.



Family:Penaeidae (Penaeid shrimps)

Scientific name : *Metapenaeus brevicornis*

Resource code : 102

Common name : Yellow shrimp

Local name :



Field identification characters:

- Rostrum armed with 5-7 dorsal teeth, toothless on little less than its distal half.
- Body yellow to white, with distinct dark green to bluish-brown specks.
- Tip of uropods brown to rusty red.

Scientific name : *Metapenaeus dobsoni*

Resource code : 102

Common name : Kadal shrimp

Local name :



Field identification characters:

- Rostrum long, extending beyond antennular peduncle.
- Distal part of rostrum darker, antennae red, body pale yellow to brownish with red, brownish or greenish specks.



Family: Penaeidae (Penaeid shrimps)

Scientific name : *Metapenaeus lysianassa*

Resource code : 102

Common name : Bird shrimp

Local name :



Field identification characters:

- ❖ Rostrum very short, reaching as far as middle of first antennular article and armed with 6 to 7 teeth along entire dorsal margin.
- ❖ Pereopods and pleopods pale yellow with grey specks.

Scientific name: *Metapenaeus monoceros*

Resource code : 102

Common name: Speckled shrimp

Local name:



Field identification characters:

- ❖ In adult males, merus of 5th pereopod with a proximal notch, followed by a twisted, keeled tubercle; distomedian projections of petasma crescent-shaped, leaning on distolateral projections and concealing them partly or completely.
- ❖ In females, anterior plate of thelycum deeply grooved longitudinally and considerably wider posteriorly; posterior transverse ridge with 2 anterolateral rounded projections partly covering lateral plates.



Scientific name : *Parapenaeopsis hardwickii*

Resource code : 103

Common name : Spear shrimp

Local name :



Field identification characters:

- ❖ Antennular flagella banded.
- ❖ Rostrum sigmoid with 8-10 dorsal teeth, toothless on distal part.
- ❖ Uropods and telson grey or pink, each with a dark grey median longitudinal stripe.

Scientific name : *Parapenaeopsis sculptilis*

Resource code : 103

Common name : Rainbow shrimp

Local name :



Field identification characters:

- ❖ Carapace dark brown dorsally, except for a white band about its middle.
- ❖ Body pale with wide, dark brown almost black transverse bands.

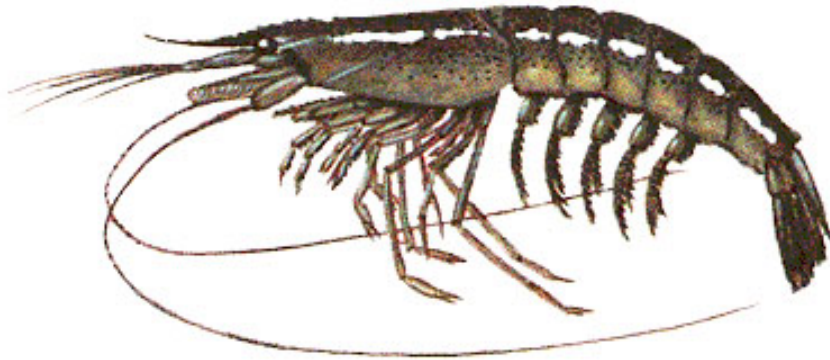


Scientific name : *Parapenaeopsis styliifera*

Resource code : 103

Common name : Kiddi shrimp

Local name :



Field identification characters:

- ❖ Rostrum sigmoid shaped, strongly upcurved and by far overreaching tip of antennular peduncle.
- ❖ Distal part of uropods dark grey, their tips distinctly white.

Scientific name : *Penaeus indicus*

Resource code : 104

Common name : Indian white shrimp

Local name :



Field identification characters:

- ❖ Rostrum slender and long, with 7-9 teeth on dorsal and 4-6 teeth on ventral margin.
- ❖ Body pale pink to yellowish, distal parts of uropods green to red, fringe of setae usually red.



Scientific name: *Penaeus monodon*

Resource code : 104

Common name: Giant tiger prawn

Local name:



Field identification characters:

- ❖ Petasma with distomedian projections slightly overhanging distal margin of costae; ventral costae generally unarmed, sometimes minutely serrate at tip; outer surface of lateral lobes generally unarmed; inner surface of lateral lobes armed with spinules.
- ❖ Thelycum with lateral plates, their median margin sometimes forming tumid lips; anterior process concave, rounded distally; posterior process subtriangular, partly inserted between thelycal plates.
- ❖ Body green-grey to brown, sometimes reddish to bluish; abdomen with dark brown to dark grey and pale yellow dorsal transverse bands; antennae uniform pink-brown; uropods brown, green-grey or bluish, with a pale yellow to pink median transverse band.

Scientific name: *Penaeus semisulcatus*

Resource code : 104

Common name: Green tiger prawn

Local name:



Field identification characters:

- ❖ Body pale brown, sometimes greenish; carapace often with 2 yellow-cream dorsal transverse bands; abdomen with brown-grey and pale yellow dorsal transverse bands; antennae banded white and brown.

Scientific name: *Solenocera crassicornis*

Resource code : 105

Common name:

Local name:



Field identification characters:

- ❖ Post-orbital spine is present.
- ❖ Cervical groove deep, reaching or almost reaching from the hepatic region to the middorsal line of the carapace.
- ❖ Dorsal and ventral antennular flagella lamellate.
- ❖ Lateral ramus of uropod generally lacking distolateral spine.
- ❖ Postrostral crest low and rounded.

Scientific name : *Parapenaeus longipes*

Resource code : 106

Common name : Flamingo shrimp

Local name :



Field identification characters:

- ❖ Branchiostegal spine absent.
- ❖ No trace of hepatic crest.
- ❖ Longitudinal and transverse sutures present.
- ❖ Fifth pereopod exceeding antennal scale by length of dactyl.
- ❖ Petasma with distolateral lobes spout-like and as long as distomedian ones.
- ❖ In females, anterior plate of thelycum semicircular, articulating to intermediate plate and with a median groove which continues on intermediate plate.
- ❖ The latter is broad, quadrate and continuous to posterior sternal plate.



Scientific name : *Trachypenaeus curvirostris*

Resource code : 106

Common name : Cocktail shrimp

Local name :



Field identification characters:

- ❖ Body is rough and pubescent.
- ❖ Rostrum, with 6 - 10 dorsal teeth, varies in shape and length with size and sex.
- ❖ Juveniles and adult males have rather short and horizontal rostrums; adult females have them stout and curved markedly upwards at apex portion.
- ❖ Carapace, with 2 post-rostral teeth and short longitudinal and vertical sutures, is thick and rough. It bears orbital, antennal and hepatic spines, but the shallow hepatic groove is not apparent.
- ❖ Dorsal carina is present from 2nd to 6th abdominal somites.
- ❖ Telson, with deep and broad median groove, has 3 pairs of small movable lateral spines.

Family: Sergestidae (Sergestid shrimps)

Scientific name : *Acetes indicus*

Resource code : 107

Common name : Sergestid shrimp

Local name :



Field identification characters:

- Rostrum shorter than the eye-stalk.
- Body translucent with several pairs of red pigment spots on the bases and endopods of uropods.



Family: Hippolytidae

Scientific name: *Exhippolysmata ensirostris*

Resource code : 107

Common name: Hunter shrimp

Local name:



Field identification characters:

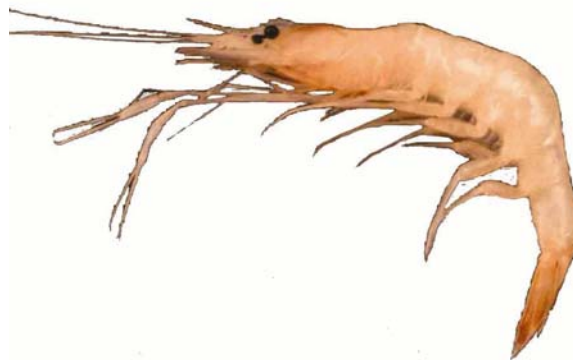
- ❖ Rostrum long, longer than carapace, its dorsal margin with an elevated basal crest of 7 to 12 teeth, which are placed close together, rest of the dorsal margin with 3 to 4 widely spaced teeth; ventral margin with 7 to 16 more or less equally spaced teeth.
- ❖ 2nd pair of pereopods with small pincers, carpus long and subdivided in to more than 7 articles.
- ❖ Colour whitish or pinkish with the appendages red often dark red; rostrum and flagella also red.

Scientific name: *Nematopalemon tenuipes*

Resource code : 107

Common name: Spider prawn

Local name:



Field identification characters:

- ❖ Rostrum long and slender, with an elevated basal crest of 4 to 7 teeth over the eye; most of distal part of dorsal margin toothless save for a small subdistal tooth; ventral margin with 2 to 6 teeth.
- ❖ Colour whitish translucent with distal part of rostrum dark reddish brown; some reddish brown colour on antennae, antennules and distal margins of uropods and telson; also a reddish brown spot on bases of uropods.



3.3.2. SHRIMPS (DEEP SEA)

Family: Palaemonidae

Scientific name: *Aristeus alcocki*

Resource code : 108

Common name: Arabian red shrimp

Local name:



Field identification characters:

- ❖ One or 2 dorsal rostral teeth; upper antennular flagella very long and filiform almost throughout their length.
- ❖ Three or more dorsal rostral teeth; upper antennular flagella very short and flattened almost throughout their length.
- ❖ Cervical groove distinct only in its basal part.

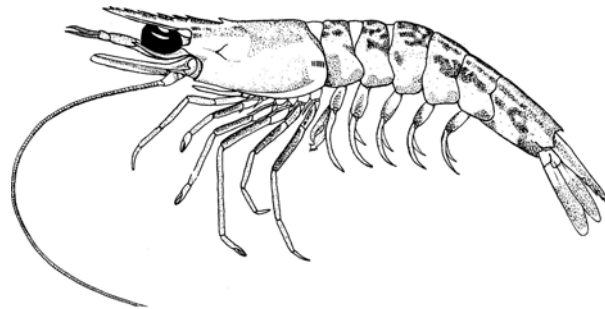
Family : Penaeidae

Scientific name : *Metapenaeopsis stridulans*

Resource code : 109

Common name : Fiddler shrimp

Local name :



Field identification characters:

- ❖ Rostrum low, usually straight, directed forward or slightly upward, reaching to, or almost to, tip of antennular peduncle and armed with 7 or 8 dorsal teeth.
- ❖ Petasma (in males) asymmetrical, right distoventral projection shorter and bearing a few small apical processes.
- ❖ In females, thelycal plate subquadrate with rounded corners and slightly wider than long; coxal plates of fourth pereopods smaller than thelycal plate.
- ❖ Colour white to reddish-brown, with red to dark brown mottlings; pereopods pinkish to dark red except on their proximal parts; uropods red to brown except for their proximal third and often their tips.



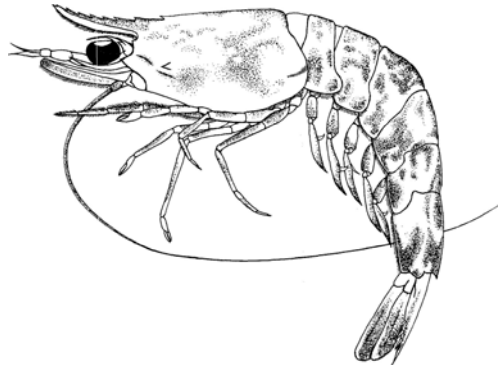
Family : Penaeidae

Scientific name : *Metapenaeopsis toloensis*

Resource code : 109

Common name : Tolo velvet shrimp

Local name :



Field identification characters:

- ❖ Rostrum upcurved or straight (if so, tip upcurved), reaching end of second antennular segment or little beyond and armed with 8 or 9 dorsal teeth.
- ❖ Petasma (in males) asymmetrical, right distoventral projection shorter and bearing a few small apical processes.
- ❖ In females, thelycal plate subquadrate with rounded corners and about as long as wide; coxal plates of fourth pereopods about as large as thelycal plate.
- ❖ Colour yellowish-brownish with irregular dark red to dark brown mottlings; pereopods pinkish to red-brown; uropods dark red to brown except for their proximal parts.

Family: Pandalidae

Scientific name : *Heterocarpus woodmasoni*

Resource code : 110

Common name :

Local name :



Field identification characters:

- ❖ Carpus of second pair of pereopods subdivided into more than 3 segments.
- ❖ Maximum total length usually more than 10 cm.
- ❖ Eyes well developed, the dark cornea much wider than the eyestalk.
- ❖ Second pair of pereopods unequal, with at least 7 articles in the carpus; maximum total length more than 10 cm.
- ❖ Carapace with 1 or more longitudinal crests on sides.

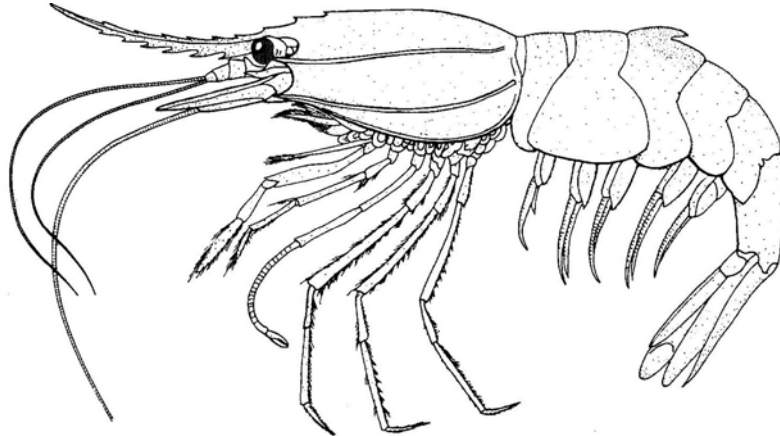


Scientific name : *Parapandalus spinipes*

Resource code : 111

Common name : Oriental narwal shrimp

Local name :



Field identification characters:

- ❖ Carpus of second pair of pereopods subdivided into more than 3 segments.
- ❖ Maximum total length usually more than 10 cm.
- ❖ Eyes well developed, the dark cornea much wider than the eyestalk.
- ❖ Epipods absent from all pereopods.
- ❖ Carapace smooth, without conspicuous crests.

Scientific name : *Plesionika ensis*

Resource code : 112

Common name :

Local name :



Field identification characters:

- ❖ Carapace without conspicuous longitudinal carina.
- ❖ Epipods present on atleast first 2 pairs.
- ❖ Third maxilliped with exopod.
- ❖ Posterior border amd 3rd abdominal tergum acutely produced into a sharp tooth that overlap the next tergum.



3.3.3. LOBSTERS

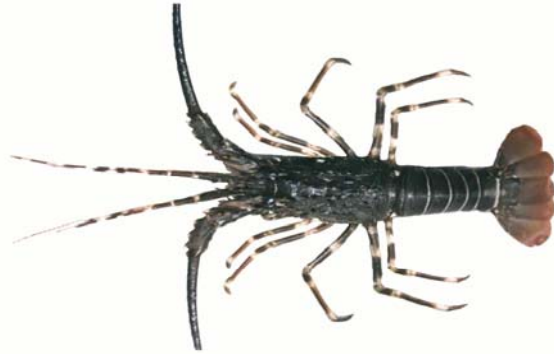
Family: Palinuridae

Scientific name: *Panulirus polyphagus*

Common name: Mud spiny lobster

Local name:

Resource code : 113



Field identification characters:

- ❖ Broad antennular plate bearing a single pair of principal spines; antennules very long, about 1 ½ times the total body length; abdominal segments without transverse grooves. Legs 1 to 4 without pincers.
- ❖ Colour dull greenish, abdominal segments each with a distinct transverse band of white across posterior margin. Antennules broad-banded; legs irregularly blotched creamy white.

Family: Scyllaridae

Scientific name: *Thenus orientalis*

Common name: Flathead locust lobster

Local name:

Resource code : 114



Field identification characters:

- ❖ Carapace flat, widest in front, distinctly narrowing posteriorly; lateral margins straight, with only 2 teeth, one at end, the other in the anterior fourth, posterior ¾ without teeth.
- ❖ Anterior tooth forming part of the orbit, which is situated at the anterolateral angle of carapace. Fifth segment with a sharp spiniform tooth in the middle of posterior margin.
- ❖ Colour pale yellowish brown with the granules of a darker brown. Tips of the teeth whitish. Tail fan with a yellow tinge



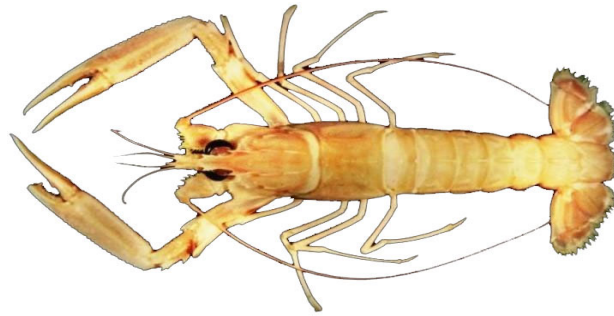
Family : Nephropidae

Scientific name : *Metanephrops andamanicus*

Resource code : 115

Common name : Andaman lobster

Local name :



Field identification characters:

- ❖ A small to medium-sized lobster.
- ❖ Body cylindrical; carapace spiny, but not uniformly so, with a well developed median rostrum armed with lateral and ventral teeth only, and supra-orbital ridges extending behind eyes, the spaces between these ridges with a median ridge; longitudinal ridges present behind the cervical groove.
- ❖ Eyes well developed and pigmented; antennae long and whiplike; antennal scales present.
- ❖ Tail powerful, with a well developed fan and abdominal segments with a sculpturation of longitudinal and transverse grooves.
- ❖ First 3 pairs of legs ending in true pincers, the first pair very long and rather slender, square in cross section, with rows of spines along ridges.
- ❖ Colour pinkish; pincers banded with pink.

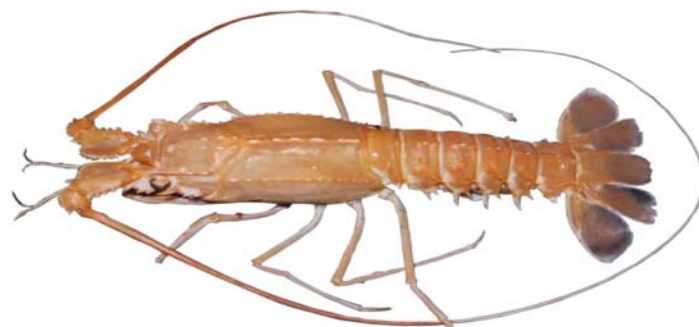
Family : Palinuridae

Scientific name : *Puerulus sewelli*

Resource code : 115

Common name : Deep-sea yellow lobster

Local name :



Field identification characters:

- ❖ Carapace angular, with a median and 2 lateral tuberculate longitudinal ridges behind the transverse cervical groove, and 3 pairs of ridges in front; median post cervical ridge with 8 small teeth; frontal horns compressed and sharply pointed, with a single, small, sharp tooth on basal part of anterior margin; surface of carapace covered with scattered granules, and larger tubercles or teeth on the ridges.
- ❖ Antennules slightly over reaching antennal peduncle, with 2 short flagella; basal part of antennal peduncle with a large, rounded, ciliated lobe on inner margin. Tail powerful.

3.3.4. CRABS

Family: Portunidae

Scientific name: *Charybdis cruciata*

Resource code : 116

Common name: Christian crab

Local name:



Field identification characters:

- ❖ Carapace broad and flat; 5 to 9 teeth on anterolateral margin, no spine on dactyls.
- ❖ Distal 2 segments of last pair of legs more flattened than in anterior legs, dactyl of last pair of legs usually oval.
- ❖ Body purplish brown with a large yellow cross; chelipeds purple, spotted with yellow dots.

Scientific name : *Neptunus pelagicus*

Resource code : 117

Common name : Blue swimming crab

Local name :



Field identification characters:

- ❖ Carapace rough to granulose with regions discernible; front with 4 acutely triangular teeth; 9 teeth on each anterolateral margin.
- ❖ The most external tooth is 2 to 4 times larger than the precedent.
- ❖ Chelae elongate (more in males than in females) with conical tooth at the base of fingers; 3 spines on the inner margin of the merus.
- ❖ Legs laterally flattened to varying degrees, last 2 segments of last pair paddle-like. Males coloured with blue markings, females dull green.



Scientific name: *Portunus Pelagicus*

Resource code : 118

Common name: blue swimming crab

Local name:



Field identification characters:

- ❖ 1 spine near posterior margin and 2 spines near anterior margin of chelate legs.
- ❖ Transverse ridge running between last lateral teeth, last carapace tooth greatly expanded.
- ❖ Body deep brown with numerous creamish spots all over the carapace, chelate and swimming legs; walking legs bluish to dusky.

Scientific name: *Portunus sanguinolentus*

Resource code : 118

Common name: Three spot swimming crab

Local name:



Field identification characters:

- ❖ Carapace bears 9 sharply acuminate teeth on antero-lateral borders equal in size.
- ❖ Anterior spines absent on chelate legs.
- ❖ Carapace reddish brown spots surrounded by a bluish white rim.

Scientific name: *Scylla serrata*

Common name: Mud crab

Local name:

Resource code : 119



Field identification characters:

- ❖ Carapace bears 9 sharply acuminate teeth on antero-lateral borders equal in size.
- ❖ Colour uniformly dark greenish grey.

3.3.5. SQUILLA

Scientific name : *Oratosquilla nepa*

Common name :

Local name :

Resource code : 120



Field identification characters:

- ❖ Mandibular palp absent; submedian, intermediate, and lateral carinae of anterior 3 abdominal somites unarmed ' (2 epipods present; dactylus of claw with 7-8 teeth
 - ❖ Anterior bifurcation of median carina of carapace opening posterior to dorsal pit; cornea small (corneal index 600 or more in adults), set transversely on stalk
 - ❖ Lateral process of fifth thoracic somite composed of 2 slender, sharp spines directed laterally; lateral carinae of anterior 5 abdominal somites bicarinate
 - ❖ Cornea expanded, very large, width about one-third carapace length; dactylus of claw with 10-18 teeth (rostral plate without median carina
- ❖ Median carina of carapace entire, with well-formed anterior bifurcation (dactylus of claw with 6 teeth
 - ❖ Anterior branches of bifurcation of median carina of carapace present, well formed.



4.MOLLUSCANS





4.1. SPECIES-WISE CHARECTERS OF MOLLUSCAS

4.1.1. MOLLUSCAN SHELLS

Family: veneridae

Scientific name: *Meretrix meretrix*

Resource code : 121

Common name: Venus shell

Local name:



Field identification characters:

- ❖ Large, triangularly ovate, thick with polished and glossy surface.
- ❖ Colour straw yellow with dark brown band on left edge of shell.

Scientific name: *Catylsia opima*

Resource code : 121

Common name: Venus shell

Local name:



Field identification characters:

- ❖ Small, tick, solid and flattened shell with glossy surface.
- ❖ Colour pale yellowish brown or straw coloured, mottled and rayed with purplish grey markings.

Scientific name: *Paphia textile*

Common name: Venus shell

Local name:

Resource code : 121



Field identification characters:

- ❖ Shell greatly elongated, thick and heavy with smooth and glossy surface.
- ❖ Colour pale yellowish white marked with purplish grey inverted “V” markings.

Family : Mytilidae

Scientific name : *Perna viridis*

Common name : Green mussel

Local name :

Resource code : 121



Field identification characters:

- ❖ Shell strongly decussately striated, inner surface pearly with iridescence.
- ❖ Front end angularly pointed, posterior margin broadly rounded.
- ❖ Colour deep greenish black.



Family : Trochidae (Top shells)

Scientific name : *Trochus radiatus*

Resource code : 122

Common name : Banded trochus

Local name :



Field identification characters:

- ❖ Surface sculptured by spiral rows of tubercles.
- ❖ Yellowish white ground colour with broad trans-spiral reddish/ crimson bands which usually get broken up into irregular spots on basal portion of the body whorl.

4.1.2. CEPHALOPODS

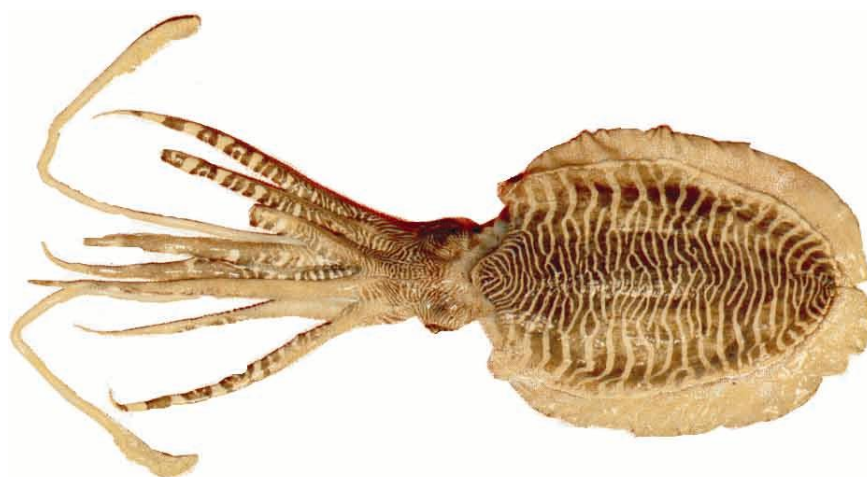
Family: Sepiidae

Scientific name: *Sepia pharaonis*

Resource code : 123

Common name: Pharaoh cuttlefish

Local name:



Field identification characters:

- ❖ Mantle broad; fins wide nearly as long as broad, tentacular clubs moderately long.
- ❖ A vivid transverse tiger-stripe pattern (especially in males) on dorsal mantle and head, a narrow light, interrupted line along bases of fins.



Scientific name: *Sepiella inermis*

Resource code : 123

Common name: Spineless cuttlefish

Local name:



Field identification characters:

- ❖ Cuttlebone (shell or sepion) internal chalky (calcareous), porous, finely laminate, mantle broad robust, sac-like slightly flattened dorsoventrally, fins narrow.
- ❖ Body greyish brown, with a series of reddish patches along bases of fins.

Family: Octopodidae

Scientific name: *Octopus vulgaris*

Resource code : 124

Common name: Octopus

Local name:



Field identification characters:

- ❖ 8 circumoral arms, no tentacles, fins subterminal (on sides of mantle) widely separated or absent.
- ❖ Shell reduced, vestigial, cartilaginous or absent, suckers without chitinous rings.
- ❖ Eyes with primary and secondary lids.



Family: Loliginidae

Scientific name: *Loligo duvaucelli*

Resource code : 125

Common name: Indian squid

Local name:



Field identification characters:

- ❖ 10 Circumoral arms, the 4th pair, the tentacles, contractile but not retractile into pockets, median suckers 1 to 5 times larger than marginal suckers with 14 to 17 sharp teeth on ring.
- ❖ Fin length slightly more than 50% mantle length.
- ❖ Eyes without lids covered with transparent membrane.

Family:

Scientific name : *Sepioteuthis lessoniana*

Resource code : 126

Common name :

Local name :



Field identification characters:

- ❖ Arm sucker rings with pointed teeth around entire margin.
- ❖ Tentacular clubs expanded, with suckers in four series.
- ❖ Posterior mantle not elongated into tail-like structure.
- ❖ Extend nearly full length of mantle (>85% of ML) except in very young squid.
- ❖ Photophores absent.





Appendix-I

Groups / Sub-groups of species identified for marine landings data collection

Group Code	Resource Code	Group	Sub-group	Genus / Species	ISSCAAP CODE
01		ELASMOBRANCHS			38
	01		Sharks	Alopias; Chiloscylidium; Eulamia (= Lamna); Galeocerdo; Ginglymostoma (= Scyllium); Myrmillo (=Mustelus); Rhinodon (=Rhiniodon); Rhizoprionodon (=Hypoprion); Scoliodon (=Carcharias, Carcharhinus); Sphyrna (=Zygaena, Eusphyra blochii); Stegostoma	38
	02		Skates	Pristis; Raja; Rhina; Rhinobatus; Rhynchobatus	38
	03		Rays	Aetobatus; Aetomylaeus (=Myliobatis); Amphotistius (=Dasyatis, Trygon); Gymnura (=Pteroplatea); Himantura (=Trygon); Mobula (=Dicerobatis); Narcine; Narke; Pastinachus; Rhinoptera; Urogymnus	38
02	04	EELS	Eels	Anguilla	22
				Gymnothorax (=Muraena); Thyrsioidea	33
				Congresox; Muraenesox	34
03	05	CATFISHES	Catfishes	Arius (=Tachysurus, Netuma); Batrachocephalus; Osteogeneiosus; Plotosus	33
04		CLUPEIDS			24,35
	06		Wolf Herrings	Chirocentrus spp.	35
	07		Oil sardine	Sardinella longiceps	35
	08		Other Sardines	Other Sardinella spp.; Amblygaster sirm (=sardinella sirm); Sardinella albella; Sardinella fimbriata; Sardinella gibbosa	35
	09		Hilsa Shad	Hilsa ilisha	24
	10		Other Shads	Other Hilsa spp. (Tenuulosa, Macrura)	24
	11		Anchovies		35
	12		Colia		35
	13		Setipinna	Setipinna taty	35
	14		Stolephorus (=Anchoviella)		35
	15		Thrissina	Thrissina baelama	35
	16		Thryssa (=Thrissocles, Engraulis)		35
	17		Other Clupeids	Dorosoma; Ilisha (=Euplatygaster); Nematalosa (=Chaetossus); Opisthopterus; Pellona; Raconda	24
				Elops	33
			Dussumieria; Escualosa (=Kowala); Herklotsichthys (=Harengula); Spratelloides	35	
05	18	BOMBAY DUCK	Bombay duck	Harpadon nehereus	33
06	19	LIZARDFISHES	Lizardfishes	Saurida; Synodus; Trachinocephalus	33

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07	20	BULLS EYE (Priacanthids)	Bulls eye (Priacanthids)	Priacanthus	33
08	21	THREADFIN BREAMS (Nemipterids)	Threadfin breams (Nemipterids)	Nemipterus (=Synagris)	33
09		PERCHES			33
	22		Groupers - Epinephelus spp. (Kalava)	Cephalopholis (=Emeacentrus); Epinephelus (Serranus); Plectropomus; Variola	33
	23		Snappers - Lutjanus spp.	Aprion; Apsilus; Lutjanus (Lutianus)	33
	24		Pig-face Breams	Gymnocranius; Lethrinus	33
	25		Silver grunt (Karkara)	Pomadasy	33
	26		Other Perches	Lates (Perchlet)	25
				Ambassis (=Perchlet); Argyrops (Silver breams); Cheilinus (Wrasses); Chromis (Damsel fish); Fusiliers (Caesio, Pristipomoides); Mylio (=Acanthopagrus) (Silver breams); Pempheris (Sweepers); Pentaprion (Mojarras); Plectorhynchus (=Gaterin) (Sweet lips); Psammoperca (=Digrama) (Perchlet); Rhabdosargus (Silver breams); Scatophagus (Butter fish); Siganus (Spine foot)	33
				Lobotes (Tripletails); Peristedion (Sea robins)	34
				Kurtis (Humpheads)	not found
10	27	GOATFISHES	Goatfishes	Mulloidichthys; Parupeneus; Upeneus	33
11	28	THREADFINS	Threadfins	Eleutheronema; Filimanus; Polynemus, Polydactylus	33
12	29	CROAKERS	Croakers	Johnieops; Johnius; Nibea; Protonibea; Otolithoides; Dendrophysa; Kathala; Otolithes; Pennahia	33
13	30	SILVERBELLIES (PONY FISHES)	Silverbellies (Pony fishes)	Gazza; Leiognathus; Secutor	33
14		FLATFISHES			31,37
	31		Halibut	Psettodes erumei	31
	32		Flounders	Bothus; Chascanopsetta; Poecilopsetta; Pseudorhombus	31
	33		Soles	Cynoglossus; Eurglossa (=Brachirus); Heteromycteris; Solea; Synaptura; Zebrias	31
15	34	BIG JAWED JUMPER	Big jawed jumper	Lactarius lactarius	37
16		DRIFT FISHES			34,37
	35		Indian drift fish	Ariomma (=Psenes) indica	34
	36		Other drift fishes	Cubiceps	37
17	37	BARRACUDAS	Barracudas	Sphyraena spp.	37
18		POMFRETS			37
	38		Silver Pomfret	Pampus argenteus (=Stromateus argenteus)	37
	39		Chinese Pomfret	Pampus chinensis (=Stromateus sinensis)	37
	40		Black Pomfret	Formio niger (=Parastromateus niger)	37

Handbook for Field Identification of Fish Species Occurring in the Indian Seas

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19		CARANGIDS			37
	41		Trevallies - Caranx	Alectis; Atropus; Carangoides; Caranx; Gnathanodon	37
	42		Horse Mackerel	Megalaspis cordyla	37
	43		Scads - Decapterids	Alepes; Decapterus; Selar; Selaroides	37
	44		Leather-Jackets (Queen fishes)	Scomberoides (=Chorinemus)	37
	45		Rainbow runner	Elagatis bipinnulata	37
	46		King fish (=Elacate)	Rachycentron canadum	37
	47		Seriola	Seriolina nigrofasciata	37
	48		Other Carangids	Atule; Naucrates; Trachinotus; Uraspis helvola	37
20	49	RIBBONFISHES	Ribbonfishes	Eupleurogrammus; Lepturacanthus; Trichiurus	34
21		MACKERELS			37
	50		Indian Mackerel	Rastrelliger kanagurta	37
	51		Other mackerels	Other Rastrelliger spp.	37
22		SEERFISHES			36
	52		Narrow-Barred Spanish Mackerel	Scomberomorus commerson (=Cybium commerson)	36
	53		Indo-Pacific Spanish Mackerel	Scomberomorus guttatus	36
	54		Streaked Spanish Mackerel	Scomberomorus lineolatus	36
	55		Wahoo	Acanthocybium solandri	36
23		NERITIC TUNAS			36
	56		Bullet Tuna	Auxis rochei	36
	57		Frigate Tuna	Auxis thazard	36
	58		Little Tuna (Kawa Kawa)	Euthynnus affinis	36
	59		Longtail Tuna	Thunnus tonggol	36
	60		Other neritic tunas	Sarda orientalis	36
24		OCEANIC TUNAS			36
	61		Bigeye tuna	Thunnus obesus	36
	62		Skipjack Tuna	Katsuwonus pelamis	36
	63		Yellowfin Tuna	Thunnus albacares	36
	64		Other oceanic tunas	Thunnus alabunga	36
25	65	Sail fish	Sail fish	Istiophorus platypterus	36
26	66	Sword fish	Sword fish	Xiphias gladius	36
27		Marlins			36
	67		Black marlin	Makaira indica	36
	68		Blue marlin	Makaira mazara	36
	69		Striped marlin	Tetrapturus audax	36
28		OTHER PELAGIC FISHES			33,37
	70		Deepsea pomfrets (Bramidae)	Taractichthys	37
	71		Dolphin fishes	Coryphaena	37
	72		Flying fishes	Cypselurus; Exocoetus; Hirundichthys	37
	73		Full beaks & Half beaks	Ablennes; Hemirhamphus; Hyporhamphus; Rhynchorhamphus; Tylosurus (=Strongylura, Belone)	37
	74		Lancet fish	Alepisaurus	33
	75		Sucker fish	Echeneis; Phtheichthys	37
	76		Sun fish	Masturus; Mola	37

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29		DEEP SEA FISHES			32,34,38
	77		Green eye	Chlorophthalmus; Paraulopus	34
	78		Black ruff (Medusa fish)	Centrolophus niger	34
	79		Red baits	Emmelichthys	34
	80		Sack fish	Neopinnula (=Epinnula) orientalis	34
	81		Deepsea sharks	Apristurus; Centrophorus; Centroscyrnus; Chaenogaleus; Echinorhinus; Eridacnis; Halaelurus; Lago; Neoharriota; Rhinochimaera; Scyliorhinus (Cat shark); Triakis	38
	82		Other deepsea fishes	Paralepis; Bathyclupea spp.; Bathygadus furvescens	32, 34
30		MISC. FISHES			32,33,34
	83		Flat heads	Grammoplites	33
				Thysanophrys (=Platycephalus)	33
	84		Gerrids	Gerres (Mojarras)	33
	85		Lantern fish	Diaphus; Lampanyctodes; Myctophum; Neoscopelus	34
	86		Milk fish	Chanos	25
	87		Monocle breams	Scolopsis	33
	88		Moon fish	Mene maculata	33
	89		Mulletts	Liza; Mugil; Valamugil	33
	90		Parrot fish	Scarus (=Callyodon)	33
	91		Sickle fish	Drepane	33
	92		Sillagos (Whitings)	Sillago	33
	93		Spade fishes	Ephippus; Platax	33
	94		Squirrel fishes	Sargocentron (=Holocentrus)	33
	95		Surgeon fish	Acanthurus	33
	96		Tarpon	Megalops	33
	97		Terapon	Terapon	33
	98		Triacanthids	Triacanthus	33
	99		Trigger fish (Balistids)	Abalistes; Hemibalistes; Odonus; Sufflamen	33
100		Unicorn cod (Bregmaceros)	Bregmaceros	32	
31		SHRIMPS (Littoral)			45
	101		Penaeid - Aristaeomorpha spp.		45
	102		Penaeid - Metapenaeus spp.		45
	103		Penaeid - Parapenaeopsis spp.		45
	104		Penaeid - Penaeus spp.		45
	105		Penaeid - Solenocera spp.		45
	106		Other penaeid shrimps(littoral)	Parapenaeus; Trachypenaeus	45
	107		Non-penaeid shrimps (littoral)	Acetes indicus, Exhippolysmata ensirostris, Nematopalaemon tenuipes	45
32		Shrimps (Deepsea)			45
	108		Penaeid - Aristeus spp.		45
	109		Penaeid - Metapenaeopsis spp.		45



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	110		Non-penaeid - Heterocarpus spp.		45
	111		Non-penaeid - Parapandalus spp.		45
	112		Non-penaeid - Plesionika spp.		45
33		LOBSTERS (Littoral)			43
	113		Panulirus spp. (Rock lobsters)	Panulirus homarus; Panulirus penicillatus	43
	114		Other lobsters (Littoral)	Thenus orientalis	43
34	115	LOBSTERS (Deepsea)	Deepsea lobsters	Metanephrops andamanicus; Puerulus sewelli; Munida scobina	43
35		OTH. CRUSTACEANS			
	116		Crabs - Charybdis spp.	Charybdis (Gonihellenus) smithii; Charybdis edwardsi	42
	117		Crabs - Neptunus spp.		42
	118		Crabs - Portunus spp.		42
	119		Other crabs	Myra; Scylla	42
	120		Stomatopods - Oratosquilla	Oratosquilla nepa (Mantis Shrimp)	42
36		BIVALVES & GASTROPODS			
	121		Bivalves	Villorita	51
				Crassostrea	53
				Perna	54
				Donax; Katelysia; Meretrix; Paphia	56
				Pinctada	81
	122		Gastropods	Conus; Cypraea; Murex; Nautilus; Strombus; Trochus; Turbo; Xancus	52
37		CEPHALOPODS			57
	123		Cuttle Fish	Sepia	57
	124		Octopus	Octopus	57
	125		Squids	Loligo	57
	126		Squid (Oceanic)	Sepioteuthis; Symplectoteuthis	57
38		OTH. INVERTIBRATES			77
	127		Jelly fish		77
39	128	MARINE TURTLES	Marine turtles	Caretta; Chelonia; Dermochelys; Lepidochelys	72
40		MARINE MAMMALS			61,62,64
	129		Dolphins and Porpoise	Delphinus; Grampus; Neophocaena; Sousa; Stenella; Tursiops	62
	130		Seacow	Dugong	64
	131		Baleen whale	Balaena	61
	132		Toothed whale	Kogia; Physeter; Ziphius	62

