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**B**ased on their vertical distribution, fishes are broadly classified as pelagic or demersal. Species those are distributed from the seafloor to a 5 m depth above, are called demersal and those distributed from a depth of 5 m above the seafloor to the sea surface are called pelagic. The term *demersal* originates from the Latin word *demergere*, which means *to sink*. The demersal fish resources include the elasmobranchs, major perches, catfishes, threadfin breams, silverbellies, sciaenids, lizardfishes, pomfrets, bulls eye, flatfishes, goatfish and white fish. This chapter deals with identification of the major demersal teleost fish species.

## Basic morphological differences between pelagic and demersal fish

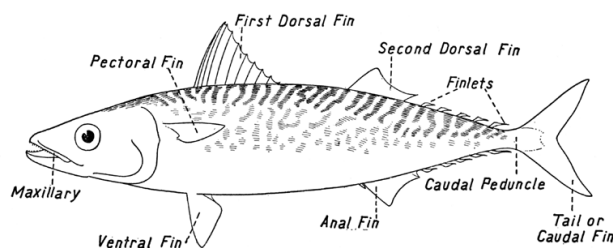
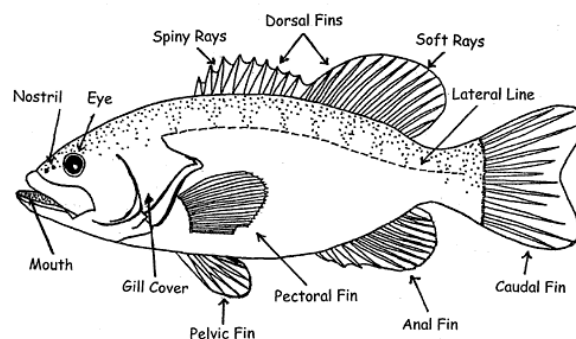


FIG. 5. Example of a fish with finlets.

Drawing from Starks, 1918

**Pelagic**

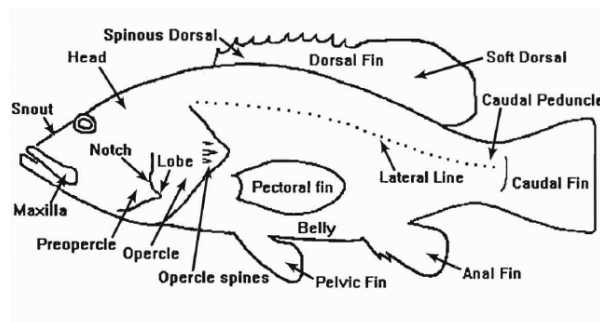


**Demersal**

## MAJOR DEMERSAL FISH GROUPS

### Family: Serranidae – Groupers

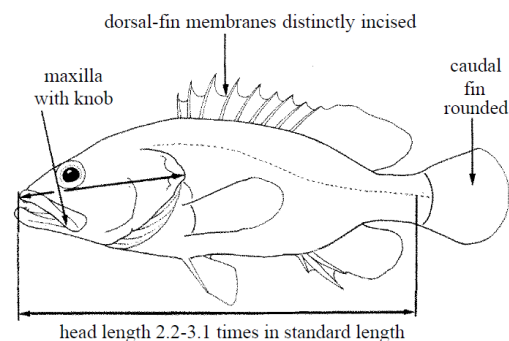
- 3 flat spines on the rear edge of opercle
- single dorsal fin
- body having patterns of spots, stripes, vertical or oblique bars, or maybe plain



### Key to the genera

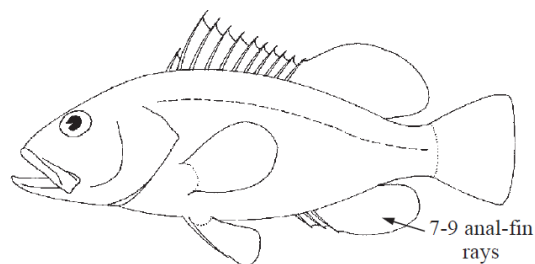
#### 1. *Cephalopholis*

- dorsal fin membranes highly incised between the spines
- IX dorsal fin spines
- rounded or convex caudal fin



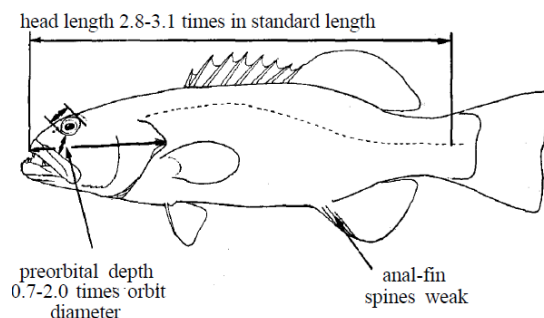
#### 2. *Epinephelus*

- X or XI spines on dorsal fin and 13 to 19 soft rays
- anal-fin rays 7 to 9



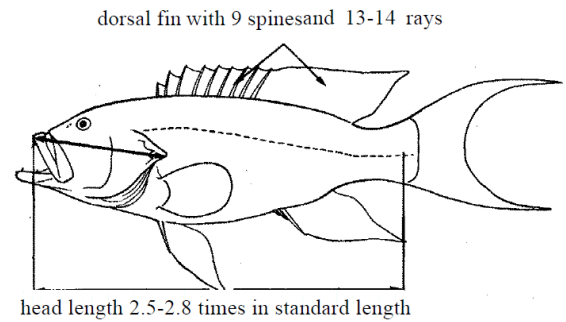
#### 3. *Plectropomus*

- weak anal fin spines
- preorbital depth 0.7 to 2 times orbit diameter
- head length 2.8 to 3.1 times in standard length



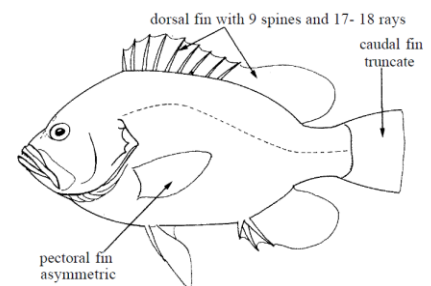
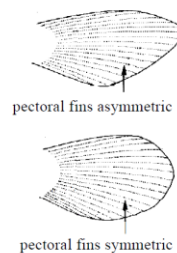
#### 4. *Variola*

- lunate caudal fin (the lobes produced)
- head length 2.5 to 2.8 times in standard length
- IX spines and 13 or 14 rays on dorsal fin



#### 5. *Aethaloperca*

- markedly asymmetric pectoral fins
- IX spines and 17 or 18 rays on dorsal fin
- truncate shaped caudal fin



### Key to the species (adopted and modified from FAO)

#### 1. *Cephalopholis*

- a) *Cephalopholis sonnerati*
  - colour red to brown with broadly distributed whitish blotches
  - head, maxilla and lips with a noticeable purple network
- b) *Cephalopholis sexmaculata*
  - small blue ocelli is present on head, body and fins
  - body with 4 or 5 quadrangular dark brown or black blotches along base of dorsal fin
  - most specimens with dark-edged blue lines radiating from eyes
- c) *Cephalopholis miniata*
  - head, body and fins covered with small blue ocelli
  - dark blotches absent dorsally on body
  - absence of blue lines radiating from eyes

#### 2. *Epinephelus*

- a) *Epinephelus albomarginatus*
  - numerous small dark brown spots present on head, body, dorsal, and caudal fins
  - no spots on ventral parts of head and body
  - conspicuous white edge on the soft dorsal and anal fins

b) *Epinephelus areolatus*

- numerous close-set brownish yellow spots seen on the head, body and fins (the largest near size of pupil)
- distinct white margin on the posterior edge of caudal fin

c) *Epinephelus chlorostigma*

- smaller, more numerous, more closer dark brown spots seen on the head, body and fins (the largest near half size of pupil)
- posterior edge of caudal fin with a distinct white margin

d) *Epinephelus bleekeri*

- numerous reddish yellow spots on the head and body (except on ventral side)
- dorsal fin and upper third portion of caudal fin with spots like those on body and the lower two-thirds of caudal fin without spots/dusky

e) *Epinephelus coioides*

- head, median fins and body with numerous small brownish orange spots
- body with 5 faint, irregular, oblique, dark bars
- first dark bar below anterior dorsal-fin spines, last bar on caudal peduncle
- 2 dark spots on interopercle and another 1 or 2 at junction of interopercles
- midlateral-body scales ctenoid (rough)

f) *Epinephelus malabaricus*

- the dark spots of *E. malabaricus* are smaller, blackish brown (not brownish orange, as on *E. coioides*)
- has irregular white spots on the head and body (no white spots on *E. coioides*)
- 5 irregular, slanted, dark bars (interrupted by pale spots) often visible on body
- midlateral-body scales ctenoid (rough)

g) *Epinephelus tauvina*

- pale orange-red to dark brown, also with small faint white spots and blotches
- 5 faint subvertical dark bars on body
- often has a black blotch (larger than eye) on body at base of last 4 dorsal-fin spines and extending onto lower part of fin
- midlateral body - smooth (without scales) on fish 30-60 cm SL

h) *Epinephelus diacanthus*

- body pale greyish brown, usually with 5 dark vertical bars broader than interspaces, 4 below dorsal fin and fifth (faintest) on peduncle
- fins dusky grey and spots absent

i) *Epinephelus sexfasciatus*

- has 5 dark bars on the body
- greatly enlarged serrae at the angle of the preopercle
- having spots on the median fins

j) *Epinephelus epistictus*

- head, body, and fins brown with faint brownish black dots usually visible on dorsolateral part of body
- dark brown maxillary streak present
- juveniles with dark spots on head and on body dots are arranged in 3 longitudinal rows

k) *Epinephelus latifasciatus*

- presence of 2 black-edged white longitudinal bands
- the upper band from above eye to anterior dorsal-fin rays
- the lower band from below eye to lower caudal-fin rays

l) *Epinephelus fasciatus*

- fins reddish orange, pale yellowish green
- the outer triangular part of interspinous membranes of dorsal fin black

m) *Epinephelus flavocaeruleus*

- fins and jaws bright yellow in colour

n) *Epinephelus lanceolatus*

- the fins with numerous small black spots
- small black spots on the head and dorsal part of the body

o) *Epinephelus longispinis*

- head and body greyish with small, dark reddish brown spots that are round and widely spaced on head and front half of body, but obliquely elongated, closer together and darker posteriorly

### 3. *Plectropomus*

#### a) *Plectropomus areolatus*

- body with numerous dark-edged blue spots
- distance between spots subequal to spot diameters

#### b) *Plectropomus leopardus*

- orange-red or red, with numerous small (nostril sized and usually dark-edged) blue spots on head and body (except ventrally) and median fins
- often with a blue ring (dark brown in alcohol) on edge of orbit (sometimes broken into segments)
- an blurry dark band at rear margin of caudal fin, with a white line usually visible along middle of rear edge of the fin

### 4. *Variola*

#### a) *Variola albimarginata*

- rear margin of caudal fin with a black submarginal line and narrow white edge
- dorsal, anal, and pectoral fins without a distinct yellow posterior border
- pelvic fins usually not reaching anus

#### b) *Variola louti*

- caudal, dorsal, anal, and pectoral fins with a broad yellow rear margin
- pelvic fins reach beyond anus

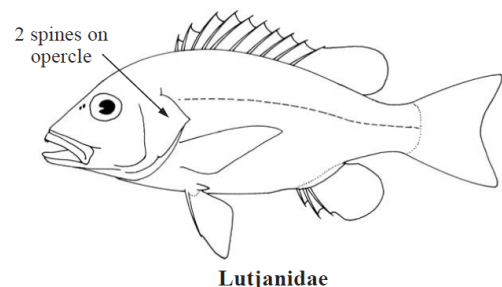
### 5. *Aethaloperca*

#### a) *Aethaloperca rogaa*

- inside of mouth, gill cavity and upper jaw membranes reddish orange
- body dark brown to black

### Family: *Lutjanidae* – Snappers

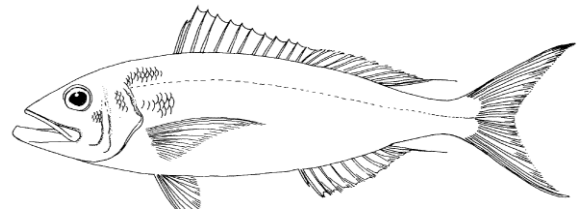
- scales on cheek and opercle but no scales between eye and mouth
- presence of 2 opercular spines
- well-developed canine teeth in jaws
- premaxillae usually moderately protrusible
- pelvic axillary process usually well developed



## Key to the genera

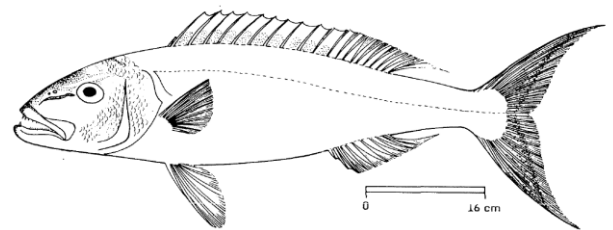
### 1. *Aphareus*

- premaxillae not protrusible
- no caniniform teeth
- caudal fin forked
- edges of preopercle and opercle outlined with black



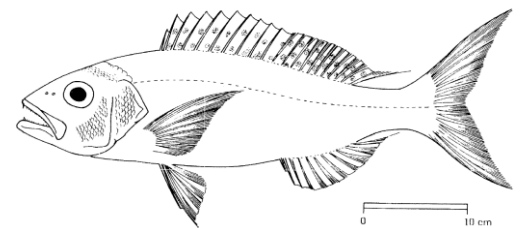
### 2. *Aprion virescens*

- a very distinct horizontal groove in front of eye
- last soft ray of both dorsal and anal fins longer than next to last soft ray
- caudal fin deeply forked, with pointed lobes



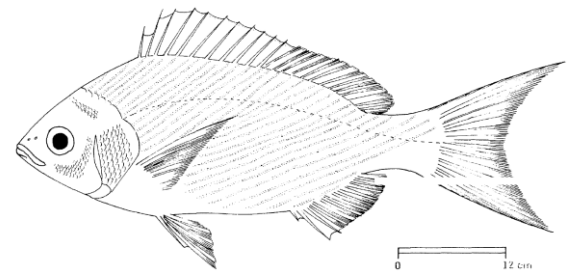
### 3. *Pristipomoides*

- teeth in jaws in bands with an outer row of distinct canines, no groove on snout
- last soft ray of dorsal and anal fins conspicuously longer than preceding rays



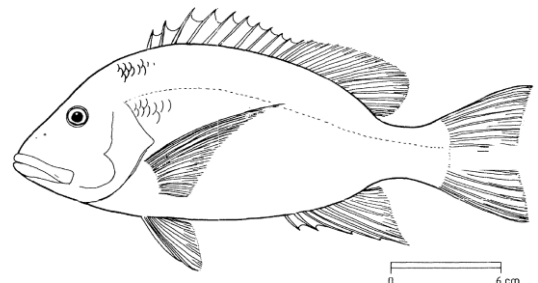
### 4. *Pinjalo*

- upper and lower profiles of head equally rounded
- eye set toward middle of head
- mouth rather small
- no fang-like canines at anterior ends of jaws



### 5. *Lutjanus*

- upper and lower profiles of head not equally rounded, upper profile evenly rounded to and lower profile flattened
- eye closer to upper profile of head than to lower, mouth larger
- some fang-like canines usually present at anterior ends of jaws



## Key to the species (adopted and modified from FAO)

### 1. *Aphareus*

#### a. *Aphareus furcatus*

- body relatively elongate, fusiform and compressed
- gillrakers on lower branch of first gill arch ranges from 16 to 18, and 5 on upper branch

#### b. *Aphareus rutilans*

- body more slender
- gillrakers on lower branch of first gill arch 30 to 34, and 16 to 18 on upper branch
- presence of more deeply forked caudal fin

### 2. *Pristipomoides*

#### a. *Pristipomoides typus*

- absence of golden stripes on snout and cheek
- longitudinal vermiculations (differently shaped) on top of head
- lateral line scales 48 to 52

#### b. *Pristipomoides multidens*

- presence of two golden stripes bordered with blue on snout and cheek
- transverse vermiculations on top of head
- lateral line scales 48 to 52

#### c. *Pristipomoides filamentosus*

- lateral line scales 60 to 65
- small blue spots on top of head

### 3. *Pinjalo*

#### a. *Pinjalo pinjalo*

- dorsal fin with XI spines and 14 or 15 soft rays
- deeply emarginate caudal fin

#### b. *Pinjalo lewisi*

- dorsal fin with XII spines and 13 soft rays
- caudal fin slightly emarginated with black edge

### 4. *Lutjanus*

#### a. *Lutjanus lutjanus*

- preorbital ("suborbital") space (distance between upper jaw and eye) very narrow



- silvery white with a broad yellow stripe on middle of side to caudal-fin base, and fine yellowish lines, corresponding with longitudinal scale rows

b. *Lutjanus bengalensis*

- body with a series of 4 or 5 longitudinal stripes (blue in life, often brownish in preservative) on side
- dorsal-fin spines XI or XII
- preopercular notch developed just above angle

c. *Lutjanus kasmira*

- dorsal-fin spines X
- four blue stripes on side, belly more or less abruptly whitish, frequently with thin grey lines
- preopercular flange naked or with some embedded scales

d. *Lutjanus gibbus*

- profile of head concave in adults
- caudal fin distinctly forked with rounded lobes
- preopercular notch deep and narrow, with a long interopercular knob fitting into it

e. *Lutjanus argentimaculatus*

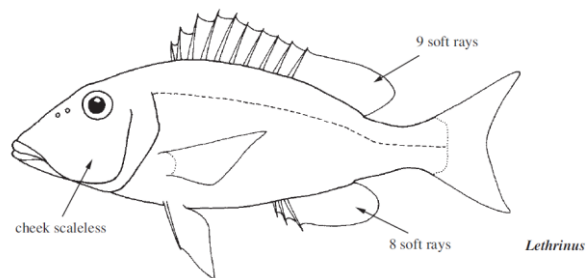
- red snapper with head profile straight or slightly convex
- preopercle unnotched; interopercle with no distinct knob
- scale rows above lateral line running parallel to dorsal body profile anteriorly, but slanting upward posteriorly
- often a silvery patch in the centre of each scale

f. *Lutjanus bohar*

- head profile slightly convex
- prominent notch in front of eye containing the nostrils
- shallow notch and an interopercular knob

## Family: Lethrinidae- Pigface breams

- dorsal fin continuous, with X spines and 9 or 10 soft rays; anal fin with III spines and 8 to 10 soft rays
- cheek naked in *Lethrinus* and scaly in remaining genera
- preopercular edge typically smooth



## Key to the genera

### 1. *Lethrinus*

- cheek naked
- 9 soft rays in dorsal fin
- 8 soft rays in anal fin

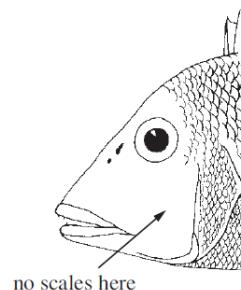
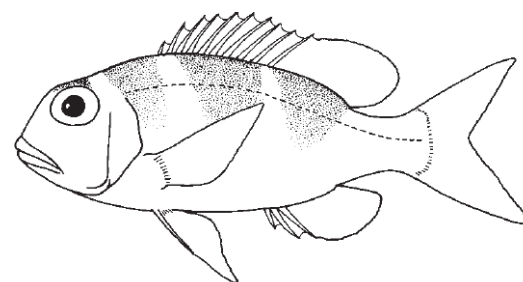


Fig. 1 *Lethrinus*

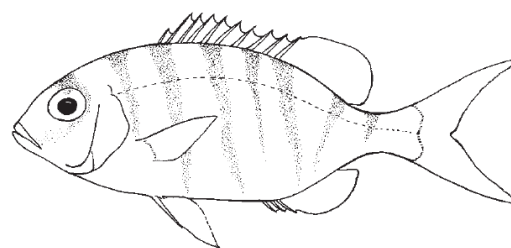
### 2. *Monotaxis grandoculis*

- cheek with 3 to 6 vertical rows of scales
- 10 soft rays in dorsal fin
- usually 9 or 10 soft rays in anal fin
- inner surface of pectoral-fin base densely scaled; sides of jaws with round, flat molars



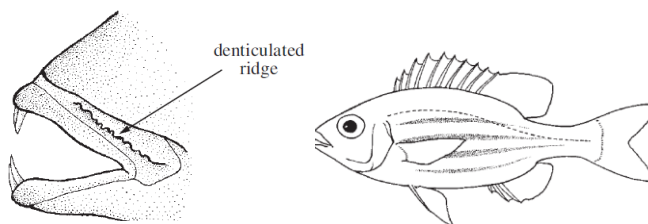
### 3. *Gymnocranius*

- inner surface of pectoral-fin base scaleless
- sides of jaws with canines and villiform teeth
- outer surface of maxilla smooth



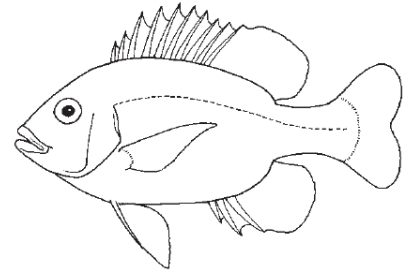
### 4. *Gnathodentex aurolineatus*

- outer surface of maxilla with denticulated ridge
- caudal-fin lobes pointed; anal fin with 8 or 9 soft rays; pectoral fins with 15 rays



## 5. *Wattsia mossambica*

- caudal-fin lobes rounded; anal fin with 10 soft rays; pectoral fins with 14 rays
- outer surface of maxilla with denticulated ridge



### Key to the species (adopted and modified from FAO)

#### 1. *Lethrinus*

##### a. *Lethrinus conchylatus*

- body comparatively slender
- head length almost always distinctly greater than body depth
- prominent scaleless patch above base of pectoral fins (bright red in life)
- lips red

##### b. *Lethrinus microdon*

- snout long
- 3 dark streaks radiating advancing from eye on snout usually visible
- inner surface of pectoral-fin surface never red in life

##### c. *Lethrinus rubrioperculatus*

- wide naked (scaleless) area (red in colour) on upper posterior margin of opercle

##### d. *Lethrinus nebulosus*

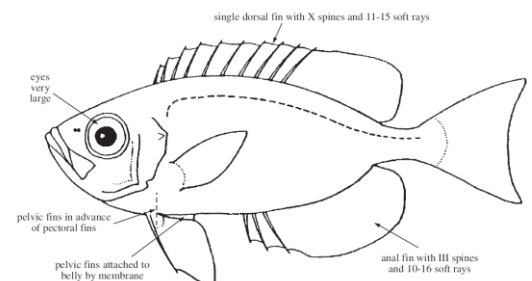
- blue spots and/or streaks radiating forward from eye

##### e. *Lethrinus mahsena*

- head is purplish gray, sometimes with a red blotch on the nape

### Family: Priacanthidae- Bigeyes

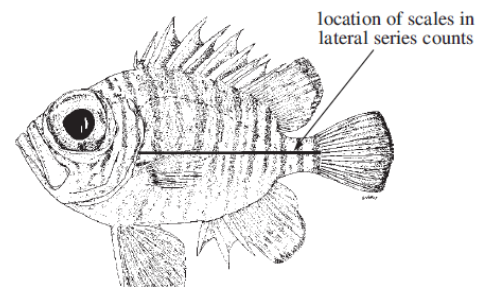
- extremely large eyes (about 1/2 head length) and upturned mouth
- pelvic fins in advance of pectoral fins
- pelvic fins attached to belly by membrane



## Key to the genera

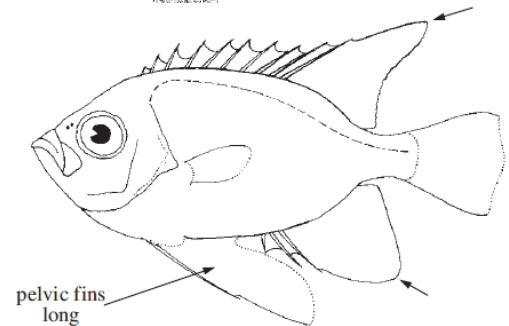
### 1. *Pristigenys*

- body profile very deep and broadly ovate, its depth 1.7 to 1.9 times in standard length
- anal-fin rays 10 or 11; dorsal-fin rays 11 or 12
- scales in lateral series 36 to 51



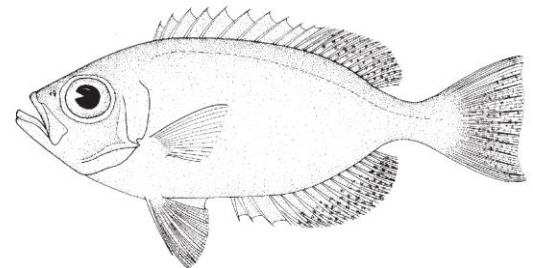
### 2. *Cookeolus japonicas*

- pelvic fins very long except in large adults (30 cm standard length or larger) exceeding head length
- soft dorsal and anal fins long and broadly pointed except in very large specimens



### 3. *Heteropriacanthus cruentatus*

- tip of lower jaw around on level with midline of body when mouth tightly closed
- well-developed spine at angle of preopercle
- caudal, soft dorsal, and anal fins with elliptical dark specks



### 4. *Priacanthus*

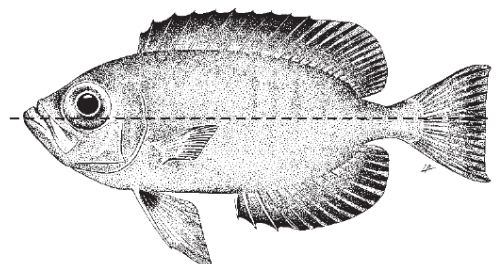
- posterior portion of preopercle having scales
- edge of lower jaw typically above level of midline of body
- fins bare or with larger dusky spots

## Key to the species (adopted and modified from FAO)

### 1. *Priacanthus*

#### a. *Priacanthus hamrur*

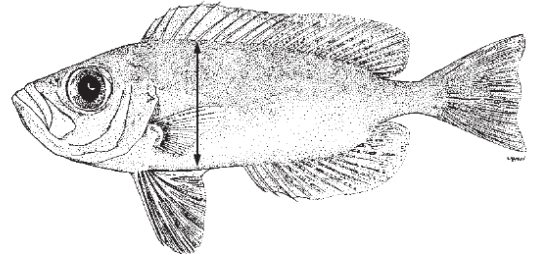
- caudal-fin margin concave, outer rays slightly to much longer than remainder of rays



- anal-fin rays usually 15 or 16
- total gill rakers on first gill arch 24 to 26
- body depth at sixth dorsal-fin spine about 2.6 to 2.8 times in standard length

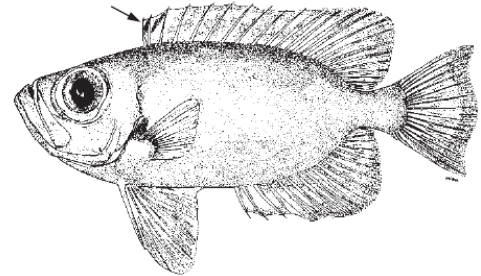
b. *Priacanthus proluxus*

- total gill rakers on first gill arch 29 to 31
- body depth at sixth dorsal-fin spine 3 or more times in standard length



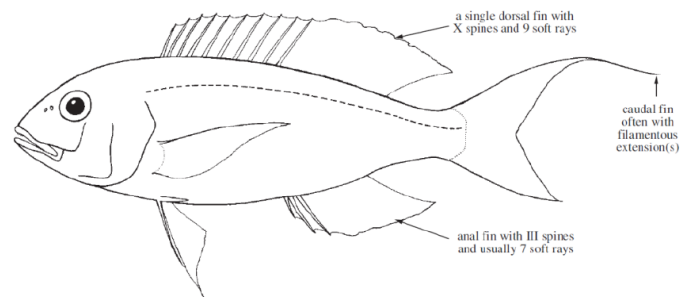
c. *Priacanthus sagittarius*

- first 2 spinous dorsal-fin membrane with black blotch
- length of second dorsal-fin spine about twice in length of tenth spine
- scales in lateral series 67 to 74
- total gill rakers on first gill arch 23 or fewer
- pectoral fins not bright yellow



### Family: Nemipteridae- Threadfin breams

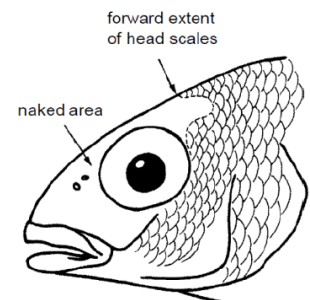
- a single continuous dorsal fin, with X spines and 9 soft rays
- anal fin with III spines and 7 (except *Nemipterus virgatus* with 8) soft rays
- caudal fin often with filamentous extension(s)



### Key to the genera

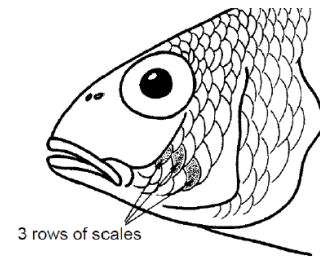
#### 1. *Scaevius*

- scales present on top of head but not reaching to the level of eyes
- temporal parts of head scaleless



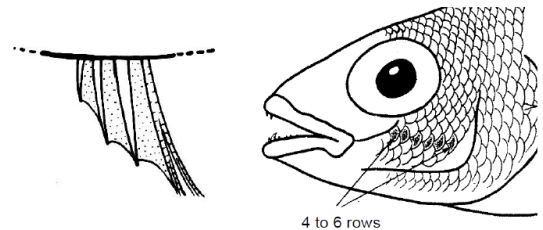
## 2. *Nemipterus*

- presence of 3 transverse rows of scales on preopercle



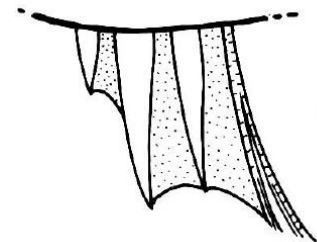
## 3. *Pentapodus*

- suborbital spine frail or absent
- presence of 4-6 transverse scale rows on preopercle
- second anal spine shorter in length and less stout than third



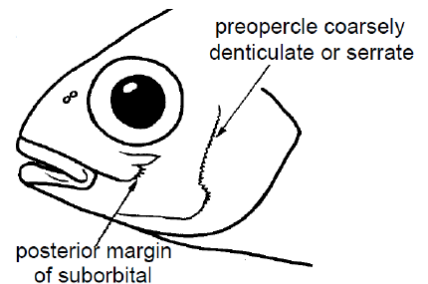
## 4. *Parascolopsis*

- absence of canine teeth in jaws
- second anal spine generally longer and more robust than third spine



## 5. *Scolopsis*

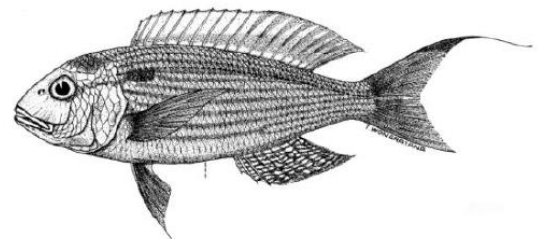
- suborbital scaleless, with a large backwardly facing spine and a series of minor serrations on its posterior margin
- posterior margin of preopercle serrated
- absence of canine teeth



## Key to the species (adopted and modified from FAO)

### a. *Nemipterus japonicus*

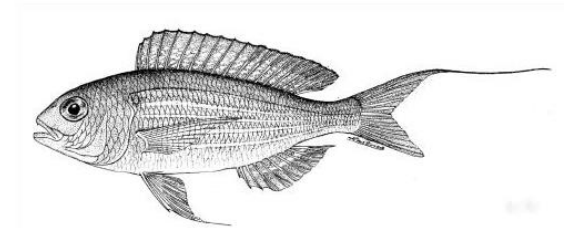
- pectoral fins reaching to or just past the level of origin of anal fin
- upper part of caudal fin with moderately long filament, almost equal to head length



- pelvic fins moderately long, reaching to or just beyond anus
- caudal filament yellowish
- gill rakers count 14 to 17

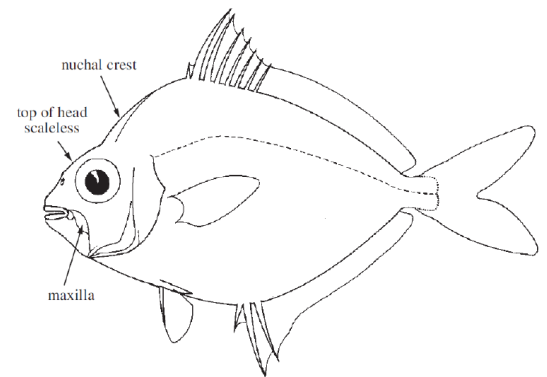
**b. *Nemipterus randalli***

- Pectoral and pelvic fins very long, reaching to or just past the origin of anal fin
- caudal fin forked and having the upper lobe into moderately long reddish filament
- gill rakers 12 to 15



**Family: Leiognathidae- Slipmouths**

- body moderately to distinctly compressed laterally
- maxilla covered under the preorbital
- a well-built nuchal crest or spine
- mouth highly protrusible
- a single dorsal fin with VIII spines
- top of head scale less



**Key to the genera**

**a. *Leiognathus***

- absence of caniniform teeth
- mouth straight, pointing forward or downward when protracted



**b. *Secutor***

- oblique mouth
- pointing upward once protracted



**c. *Gazza***

- presence of caniniform teeth
- mouth pointing forward once protracted



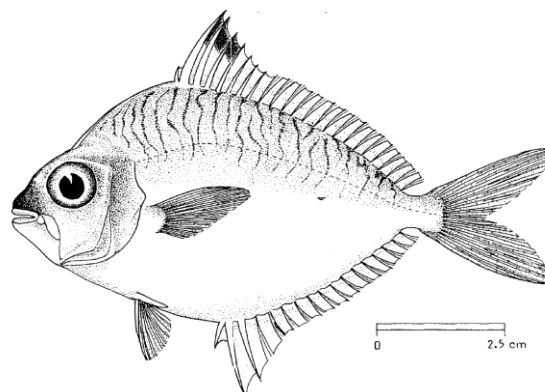


## Key to the species (adopted and modified from FAO)

### ***Eubleekeria splendens*** (*Leiognathus splendens*)

#### Splendid ponyfish

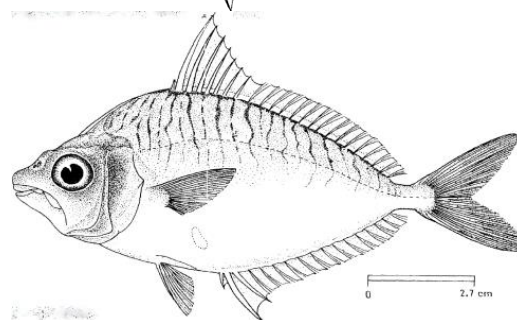
Short snout (shorter than eye diameter) besides blunt; mouth pointing slightly downward once protracted; head scaleless, but presence of prominent scales on breast; grey wavy vertical lines above lateral line in adults, spinous part of dorsal fin usually has a black spot.



### ***Karalla dussumieri*** (*Leiognathus dussumieri*)

#### Dussumier's ponyfish

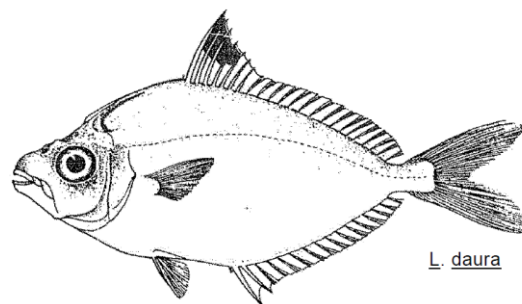
Pointed snout, slightly extended than eye diameter; mouth pointing downward once protracted. Head scaleless, but presence of conspicuous scales on breast. Body extra slender and certainly not a black blotch on dorsal fin.



### ***Karalla daura*** (*Leiognathus daura*)

#### Goldstripe ponyfish

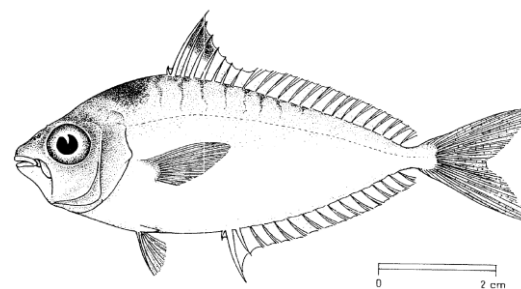
Body more often oval, dorsal and ventral profiles more or less consistently curved; a broad yellow band along lateral line; not any wavy vertical lines above lateral line; dark black blotch on spinous portion of dorsal fin.



### ***Nuchequula blochii*** (*Leiognathus blochii*)

#### Two blotch ponyfish

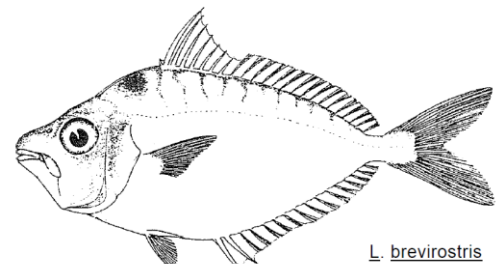
Pointed snout; unequal vertical lines extending down to about lateral line; a brown blotch on nape; tip of snout, head and ventral half of body with fine black dots; underside of pectoral fin base have black dots. The dorsal fin membrane from about half its height to tips of second to fifth spines black.





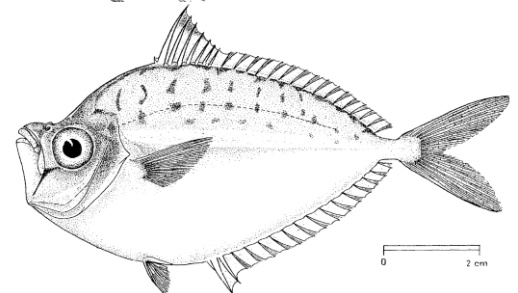
***Leiognathus brevirostris*** (Shortnose ponyfish)

Nape with a dark blotch; grey dots on spinous dorsal fin membrane; a noticeable diffuse golden yellow patch on abdomen about middle between origin of ventrals and anal. Breast scaleless.



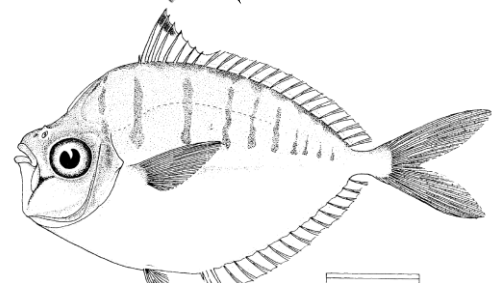
***Secutor insidiator*** (Pugnose ponyfish)

Head intensely curved in above eye; pointed snout; mouth pointing upward once protracted. Lateral line reaching backward nearly to below end of dorsal fin. Cheek scaleless.



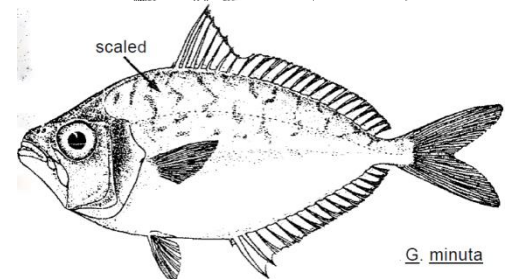
***Secutor ruconius*** (Deep pugnose ponyfish)

Deeper body; lateral line extending to below about middle of soft portion of dorsal fin; presence of scales on cheek.



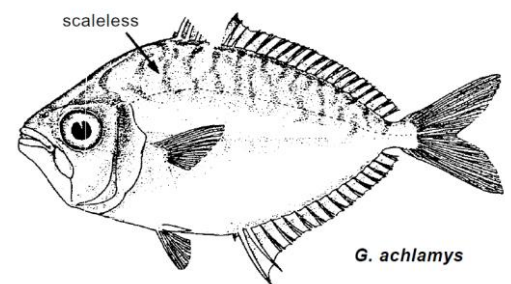
***Gazza minuta*** (Toothpony)

Mouth pointing forward once protracted, presence of distinct caniniform teeth in both jaws. Head scaleless, nonetheless scales casing all of body except for breast ahead of a line from base of pectoral fin to origin of anal fin.



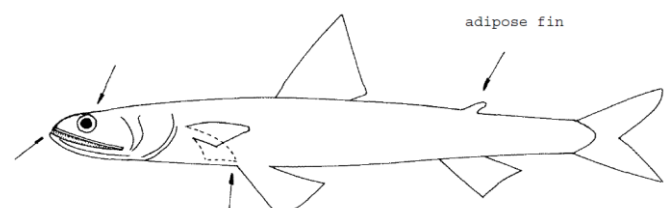
***Gazza achlamys*** (Naked toothpony)

Deeper body; absence of scales anterior to a line from origin of soft dorsal to behind pectoral fin bases and then to origin of anal fin.



**Family: Synodontidae- Lizardfishes**

- body elongate, usually cylindrical and with adipose fin
- head usually lizard-like



- terminal large mouth with rows of numerous small and pointed teeth visible even after mouth is closed
- teeth also on palate and tongue, those on palate in 1 or 2 bands

### Key to the genera

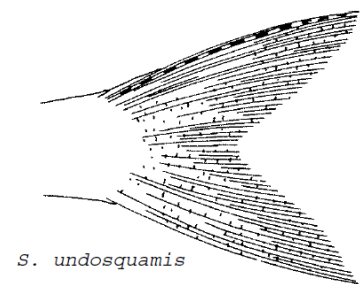
#### 1. *Saurida*

- 9 pelvic fin rays, inner barely longer than outer
- palatine teeth in 2 pairs of bands

### Key to the species (adopted and modified from FAO)

#### a. *Saurida undosquamis*

- body elongate, cylindrical, with lizard-like head and adipose fin
- 2 rows of teeth on anterior part of outer palatine tooth bands
- pectoral fins moderately long, reaching to level of pelvic fin base
- pelvic fin rays almost equal in length
- 4 to 7 dark dots on upper edge of caudal fin

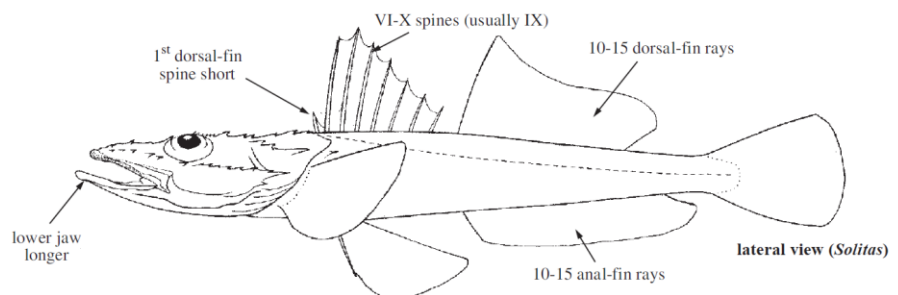


#### b. *Saurida tumbil*

- 3 or more rows of teeth on anterior part of outer palatine tooth bands
- pectoral fins just reaching to level of pelvic fin base
- pelvic fin rays almost equal in length
- no dark dots on upper edge of caudal fin

### Family: Platycephalidae- Flat heads

- elongate fishes with head moderately to strongly depressed
- lower jaw longer than upper
- bony ridges of head typically have spines or serrations
- two dorsal fins, well



separated

- spinous dorsal with 8 to 10 spines (usually 9), the first spine short and scarcely connected to the second

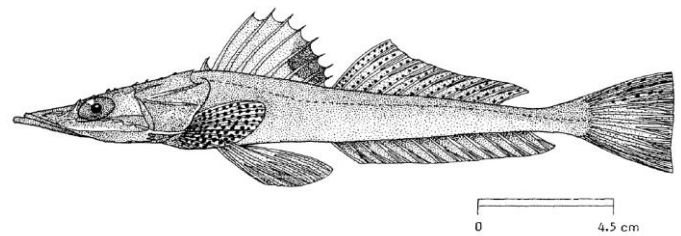
**Key to the species (adopted and modified from FAO, Murty, V. Sriramachandra and Manikyam, Y. 2007)**

**1. *Grammoplites***

- all lateral-line scales bearing a backward directed stout spine
- all ridges on head bear spines
- preopercle with three spines, the upper one is the longest
- all pored scales in the lateral line with one spine each, the spine size increasing towards the posterior end of lateral line giving the appearance of a ridge that is more prominent on the posterior side
- lateral line scales cycloid with one downwardly directed exterior opening

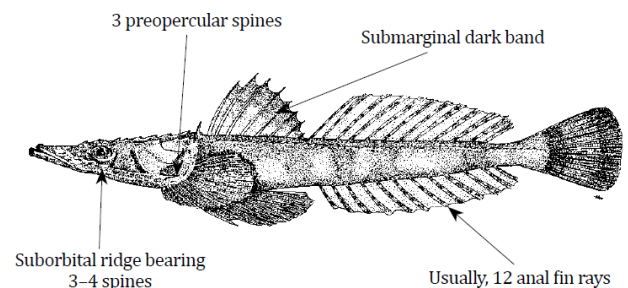
**a. *Grammoplites suppositus***

- first dorsal fin with a large black blotch posteriorly
- upper pectoral rays, upper caudal rays and second dorsal rays with dark spots
- anal fin usually with 13 rays
- preopercular spines usually 3; the lower two small, the upper long, reaching beyond margin of opercular membrane



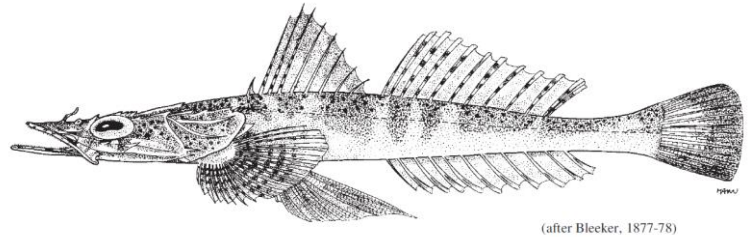
**b. *Grammoplites scaber***

- upper preopercular spine not reaching margin of opercular membrane
- upper half of first dorsal black
- pectoral and caudal fins rounded
- usually 12 anal fin rays
- upper preopercular spine not reaching margin of opercular membrane



## 2. *Cociella punctata*

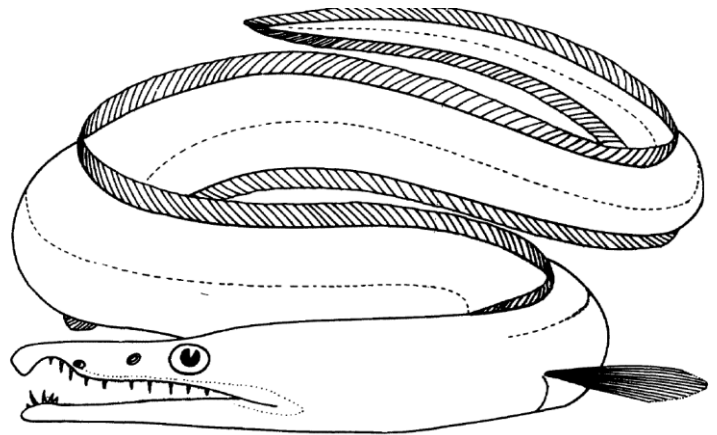
- suborbital ridge bearing 2 spines under eye, usually well developed
- upper preopercular spine shorter, reaching about half-way to opercular margin
- iris lappet simple or slightly bilobed
- interopercular flap present
- numerous small dark spots on back reaching to below lateral line, more widely scattered posteriorly
- soft dorsal fin with dark spots on rays



(after Bleeker, 1877-78)

## Family: Muraenesocidae- Pike-congers

- eel-like fishes, cylindrical shaped body in front and compressed towards tail
- large mouth with upper jaw extending well behind eye
- **fangs on vomer** and at front of lower jaw tongue not free from base of mouth
- gill openings large, distinct and placed low on body
- **pectoral fins present**
- dorsal and anal fins long, continuous with caudal fin
- pelvic fins absent
- anus well behind pectoral fin and rather before center of body
- no scales



### **SIMILAR FAMILIES OCCURRING IN THE AREA**

**Muraenidae:** lack pectoral fins.

**Dysommidae:** anus below the pectoral fin (well behind in the family Muraenesocidae).

All other eel families: lack large canine teeth on vomer.

## Key to Genera

### ***Muraenesox***

- ✓ Distinct bulge at bases of canine teeth on middle part of vomer

### ***Congresox***

- ✓ Canine teeth on vomer conical, or if flattened, then not bulging at bases

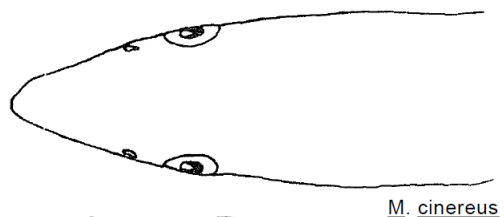
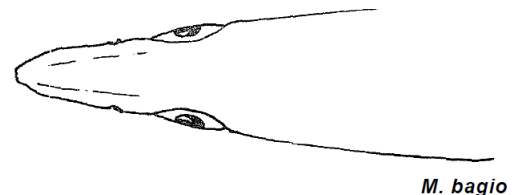
## Key to the species (adopted and modified from FAO)

### ***Muraenesox bagio* and *Muraenesox cinereus* (common characters)**

- ✓ outer tooth row in lower jaw pointing straight upward
- ✓ body greyish
- ✓ middle canines on vomer with distinct basal lobes (blade-shaped, not needlelike)

#### **a. *Muraenesox bagio***

- 35 to 38 pores in lateral line from head to above anus
- dorsal fin rays (47 to 59) before level of anus
- posterior nostril only a little closer to eye than to anterior nostril
- the interorbital width is about 10 or 11 times in head length
- head and body greyish

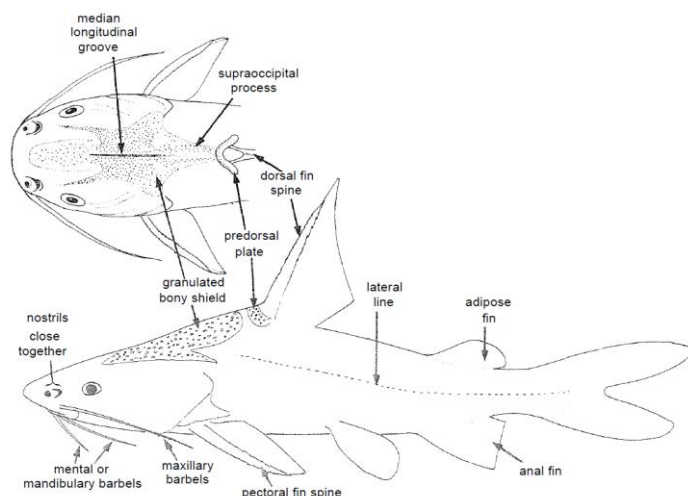


#### **b. *Muraenesox cinereus***

- 39 to 47 pores in lateral line from head to above anus
- more dorsal fin rays (66 to 78) before level of anus
- posterior nostril much nearer to eye than to anterior nostril
- a shorter, broader snout, so that the interorbital width is about 8 times in head length
- body dark to grey/black

## Family: Ariidae- Sea catfishes

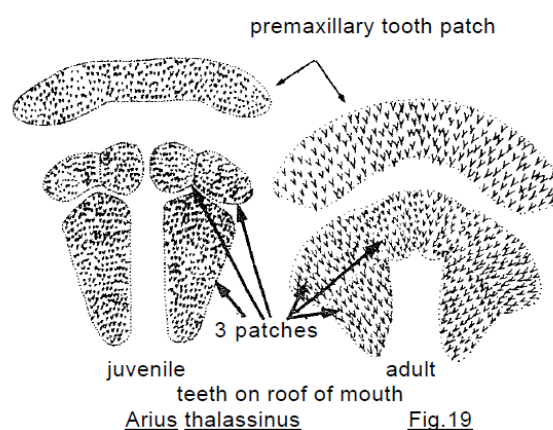
- snout and head rounded to depressed, mouth terminal to inferior
- gill membranes attached with each other and close to isthmus
- fine and villiform teeth (in curved bands) is present in jaws, nostrils close together
- 1 to 3 pairs of barbels
- head covered with a bony shield
- first dorsal fin short having a long and rough spine



## Key to the species (adopted and modified from FAO)

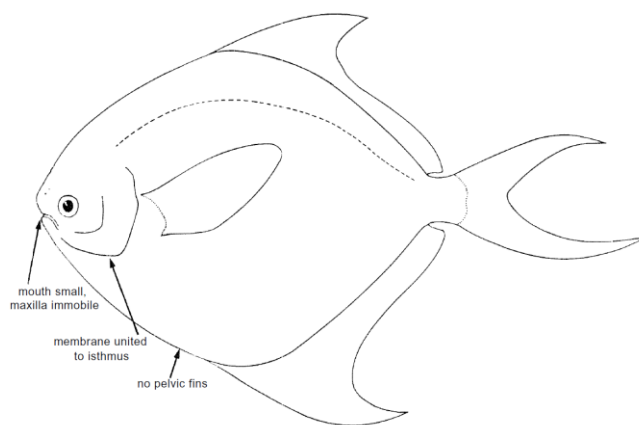
### 1. *Netuma thalassina*

- a prominent preorbital conical protuberance tapering as a wide V posteriorly
- palate teeth (on roof of mouth) villiform, in 3 patches on each side, forming a triangle, posterior patch longest
- patches usually fused (may be slightly separated in juveniles)



## Family: Stromateidae- Butterfishes, silver pomfrets

- body very deep and compressed with no keels or scutes
- immobile maxilla is covered with skin and unified to cheek
- gill membranes broadly united to the isthmus
- no pelvic fins
- caudal fin usually forked, in some species



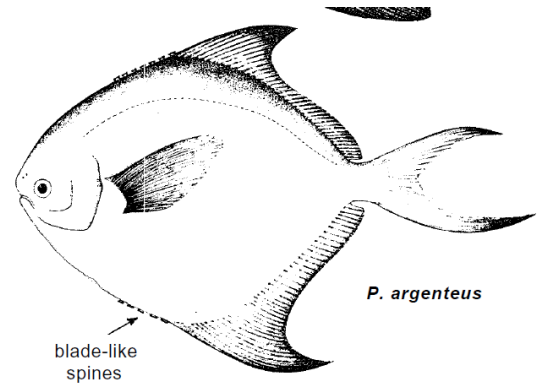


with very extended lobes

### Key to the species (adopted and modified from FAO)

#### a. *Pampus argenteus*

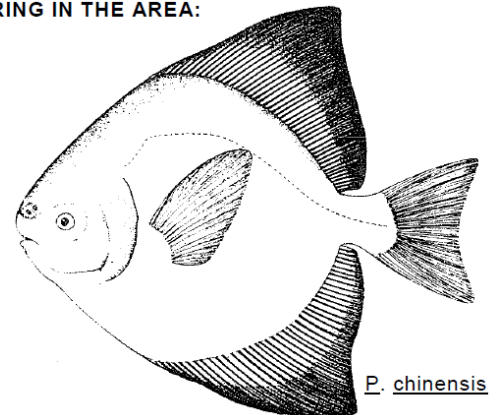
- dorsal and anal fins preceded by 5 to 10 very low blade-like spines
- caudal fin stiff and forked
- the lower lobe longer than the upper anterior rays of median fins, especially the anal fin, and ventral lobe of caudal fin often greatly produced, decidedly falcate



#### b. *Pampus chinensis*

- no spines preceding median fins
- fins never deeply falcate but the finrays gradually and uniformly diminishing in length posteriorly
- usually a smaller fish

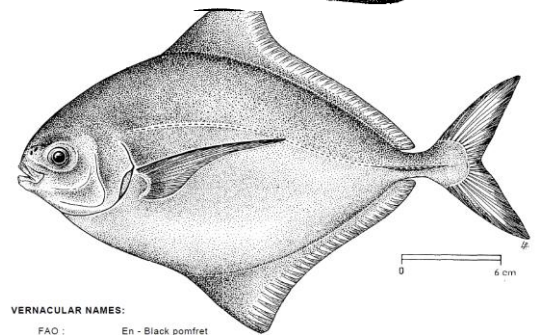
IRRING IN THE AREA:



### Family: Carangidae- Jacks and scads

#### *Parastromateus niger*

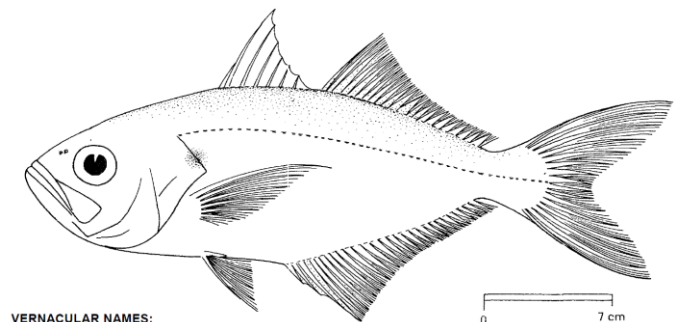
- straight part of lateral line with 8 to 19 weak scutes, forming a slight keel on caudal peduncle
- pelvic fins absent in specimens larger than about 10 cm fork length



### Family: Lactariidae- False trevallies

#### a. *Lactarius lactarius*

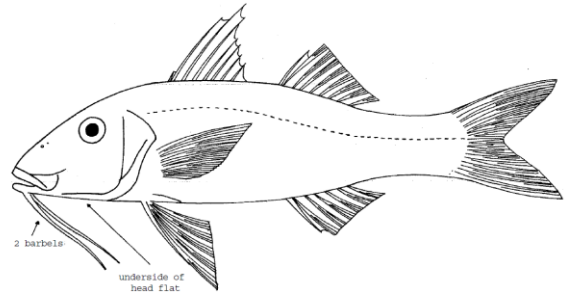
- mouth large and oblique, with a prominent lower jaw
- one pair of small, sharp canine teeth at front of each jaw



- dusky spot on upper part of gill cover

### Family: Mullidae- Goatfishes

- two long unbranched barbels on chin
- 2 dorsal fins, the 1st with 7 to 8 spines, the 2nd with 1 spine and 8 soft rays
- anal fin having 1 spine and 6 rays
- caudal fin is deeply forked having 13 branched rays
- body usually bears coloured markings such as longitudinal bands or stripes in yellow, orange, red



### Key to Genera

#### 1. *Upeneus*

- teeth on vomer and palatines (can be seen only after removing lower jaw)
- stripes on both dorsal fins, but never on anal fin
- no opercular spine

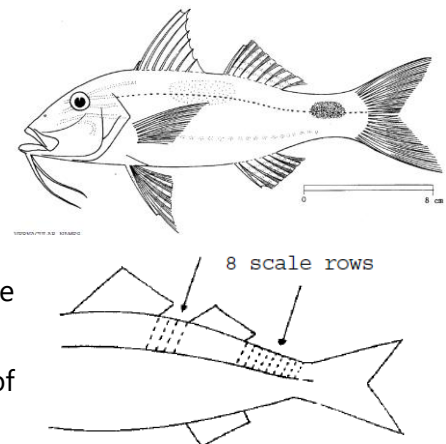
#### 2. *Parupeneus*

- one row of large, blunt teeth in each jaw
- 2 to 3 vertical rows of scales along the space between dorsal fins
- 8 to 9 vertical rows of scales along upper part of caudal peduncle
- stripes always present on 2nd dorsal and anal fins, but never on 1<sup>st</sup> dorsal fin

### Key to the species (adopted and modified from FAO)

#### a. *Parupeneus indicus*

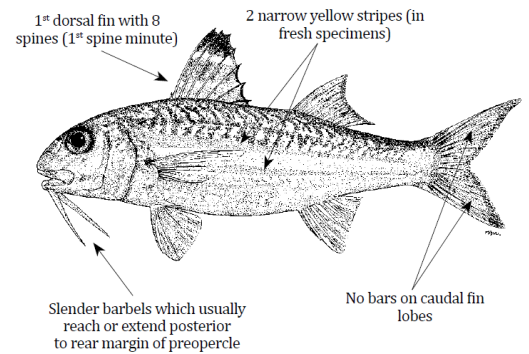
- head with 3 to 5 violet or blue lines from snout to operculum
- combination of a yellow blotch on sides and a dark blotch on midline of caudal peduncle
- 3 vertical rows of scales along the space between dorsal fins
- 8 vertical rows of scales along upper part of caudal peduncle





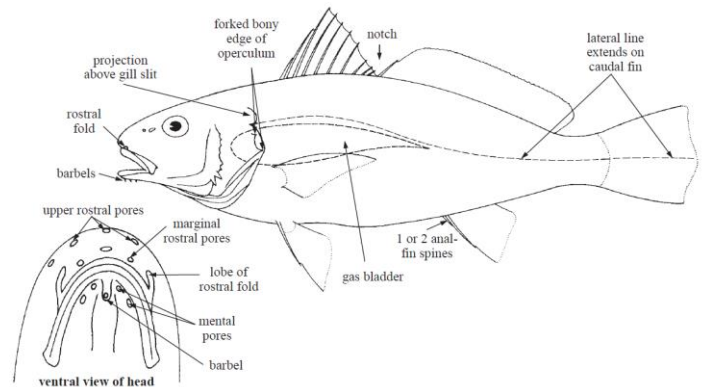
**b. *Upeneus sulphureus***

- silvery white on side; tip of 1<sup>st</sup> dorsal fin black
- upper caudal fin lobe grey



**Family: Sciaenidae- Croakers**

- sensory pores present at tip of snout
- tip of lower jaw (chin) with 2 to 6 mental pores, some with barbels
- dorsal fin is long and continuous having a deep notch between spinous and soft portions
- anal fin with 2 spines
- caudal fin never forked, usually pointed in juveniles, becoming emarginate, truncate, rounded to rhomboidal, or S-shaped in adults
- a single continuous lateral line extending to hind margin of caudal fin

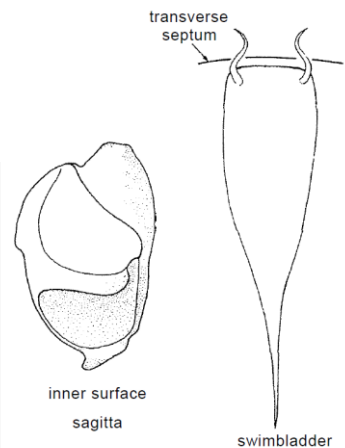
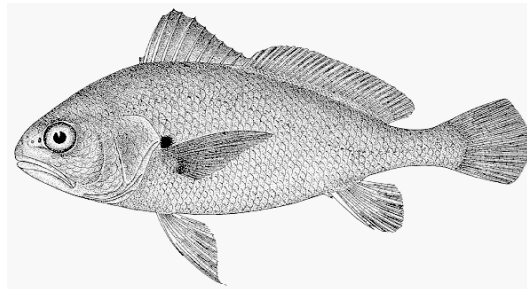


**Identification note**

Correct identification of genera of this family is possible only by the examination of swimbladder and the otoliths.

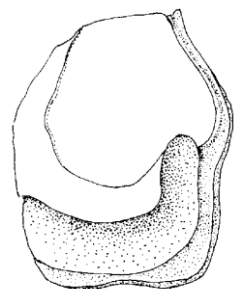
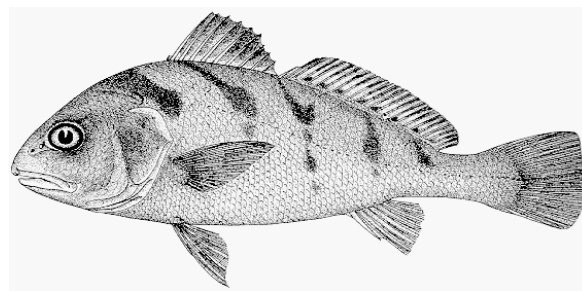
***Kathala axillaris* (Kathala croaker)**

Carrot-shaped swimbladder; black blotch on pectoral fin axil; caudal fin rhomboid; gillraker count 20 to 23 and a dissimilar form of swimbladder.



***Nibea maculata* (Blotched croaker)**

Tadpole shaped impression on sagitta (large earstone); a typical colour pattern of 5 dark bars extending obliquely from the back to the lower part of flanks and a sixth dark blotch on top of caudal peduncle.



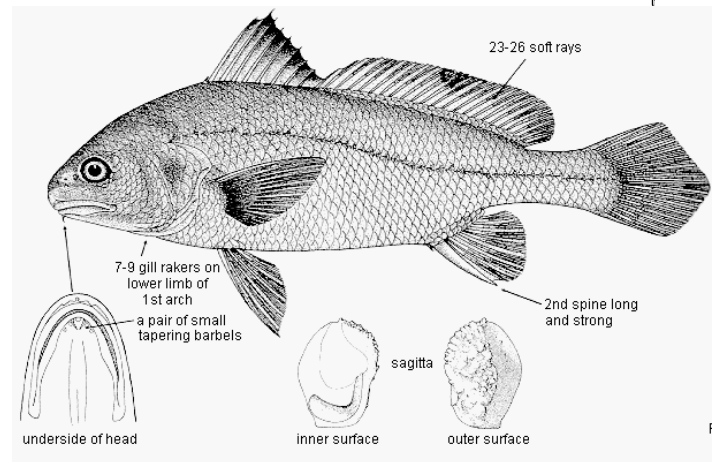
***Nibea soldado*** (Soldier croaker)

Carrot-shaped swim bladder, sharply constricted posteriorly to its tube-shaped end, with about 18 to 22 pairs of appendages; soft dorsal fin rays 28 to 31; no barbels on chin.



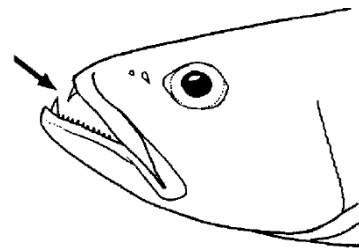
***Nibea albida*** (Two-bearded croaker)

A pair of small tapering barbels on chin; 23 to 26 dorsal soft rays; spinous portion of dorsal fin black.

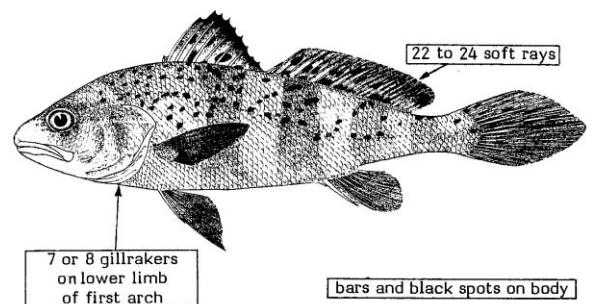
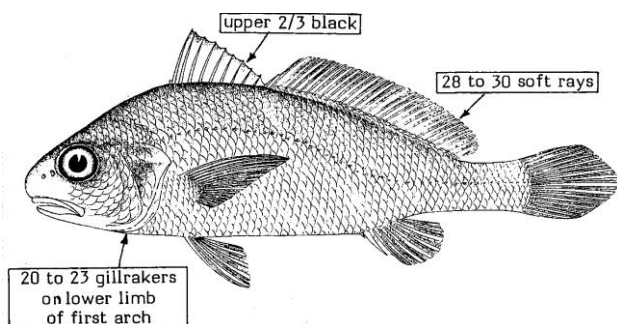


***Otolithes cuevieri*** (Lesser tigertooth croaker)

The body depth  $3 \frac{1}{4}$  to  $4 \frac{1}{2}$  times in standard length. 1 or 2 pairs of robust canines in upper jaw and 1 pair at tip of lower jaw; gillrakers on lower limb of first arch 12 to 17; Carrot-shaped swimbladder, with about 28 pairs of arborescent appendages.



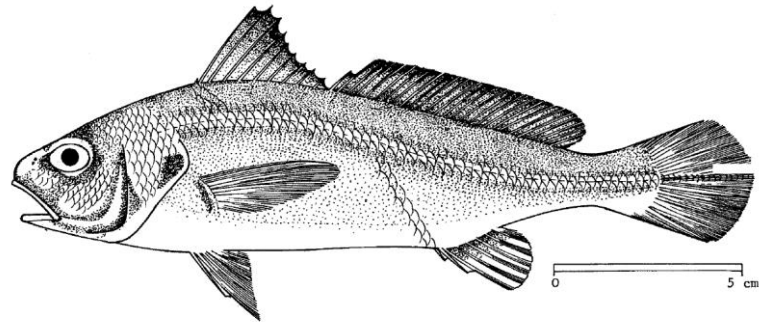
***Johnius glaucus*** (Pale spotfin croaker)



***Protonibea diacanthus* (Spotted croaker)**

***Johnius carutta* (Karut croaker)**

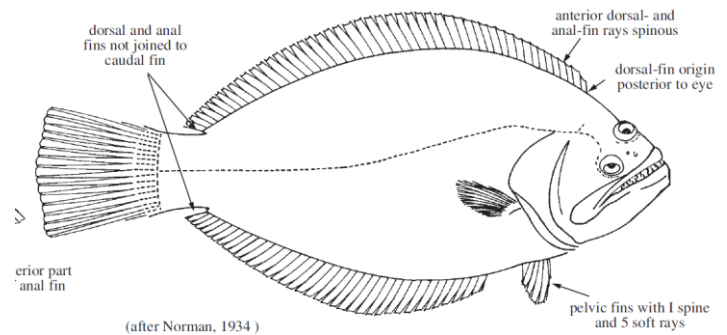
Rounded snout; Dorsal fin with 9 to 10 spines, trailed by a deep notch, second part of the fin with 1 spine and 25 to 28 soft rays; Teeth distinguished into large and small in upper jaw only.



**Family: Psettodidae- Spiny turbot**

**a. *Psettodes erumei***

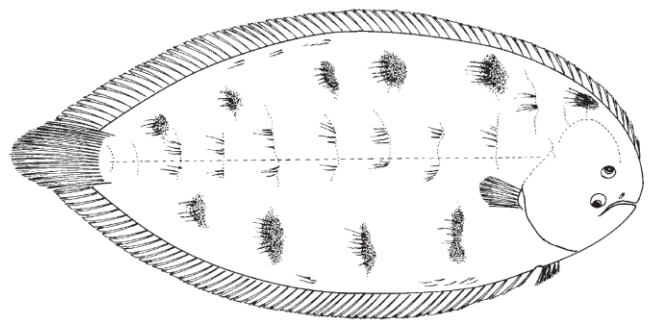
- body is oval-shaped and flat but fairly thick
- both eyes on right or left side of head; upper eye present on dorsal surface of head
- supramaxillary bone well developed
- mouth large, extending well beyond posterior margin of lower eye; lower jaw projecting
- teeth with large canines, several with barbed tips
- preopercular margin easily visible, not hidden by skin or scales
- dorsal-fin origin well posterior to upper eye
- anterior rays of dorsal and anal fins spinous
- pelvic fins having 1 spine and 5 soft rays



**Family: Soleidae- Soles**

**a. *Brachirus orientalis***

- body oval shaped, both curves equally arched
- scales intensely ctenoid on eyed side, weakly ctenoid on blind side with some cycloid scales also
- eyed side with 3 longitudinal series of black circular blotches parallel



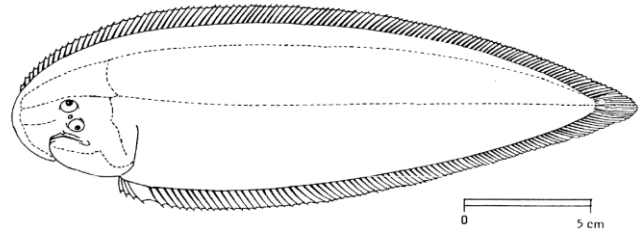
to regions of filamentous scales

- blind side uniformly light yellow, without dusty blotches

### Family: Cynoglossidae- Tonguesoles

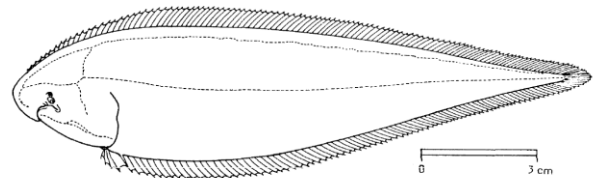
#### a. *Cynoglossus bilineatus*

- snout rounded
- body flat and elongate, with dorsal and anal fins joined to caudal fin
- eyes on left side of body, with a small scaly space between them
- two lateral lines on eyed side and 2 on blind side.
- scales ctenoid (rough to touch) on eyed side but cycloid (smooth) on blind side



#### b. *Cynoglossus macrostomus*

- snout short and obtusely pointed
- body flat and elongate, with dorsal and anal fins joined to caudal fin
- eyes on left side of body, with no space between them
- two lateral lines on eyed side but none on blind side
- scales ctenoid (rough to touch) on both sides of body



### References

- Fischer W. & Bianchi G. (eds), 1984 FAO species identification sheets for fishery purposes. Western Indian Ocean (Fishing Area 51). Rome, Food and Agriculture Organization of the United Nations, vols. 1-6.
- Murty, V Sriramachandra and Manikyam, Y., 2007 Taxonomic revision of the flatheads (Platycephalidae : Pisces) of India. Records of the Zoological Survey of India Occasional Papers (259). Zoological Survey of India, Kolkata. ISBN 81-8171-134-3.