

## Indian Crustacean Resources: Distribution, Commercial Exploitation, Utilization and Trade

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The crustacean fisheries of India have considerable importance in the economy of the country, earning very valuable foreign exchange. Edible marine crustaceans consisting of prawns, lobsters and crabs form the most important constituents of the commercial fish landings of India. In 2009 the total marine crustacean landings were 493356 tonnes of which 83 per cent was constituted by prawns (penaeid and non-penaeid). This chapter discusses the important commercial species of prawns, lobsters and crabs of Indian coast.

### Shrimps and prawns

Shrimps and prawns constitute a large group of crustaceans varying in size and are widely distributed in marine, brackish, and freshwater regions from the equator to the Polar Regions. Although the majority of the commercial marine species occupy shallow or moderately deep water areas along the continental shelves at depths of less than 100 m, some are found at depths of nearly 5700 m. Many prawns are pelagic but the majority by far is benthic, living on a large variety of bottoms such as rock, mud, peat, and sand, fragments of shells or mixtures of these materials. At present, only slightly less than 300 species of shrimps and prawns are of economic interest worldwide, and out of these, only about 100 comprises the principal share of the annual world catch.

Most of the commercial species of prawns belong to the **superfamily Penaeoidea**, which is divided into families Solenoceridae, Benthescymidae, Aristeidae, Penaeidae and Sicyoniidae. Among them family **Penaeidae** comprises more species of commercial value prawns.

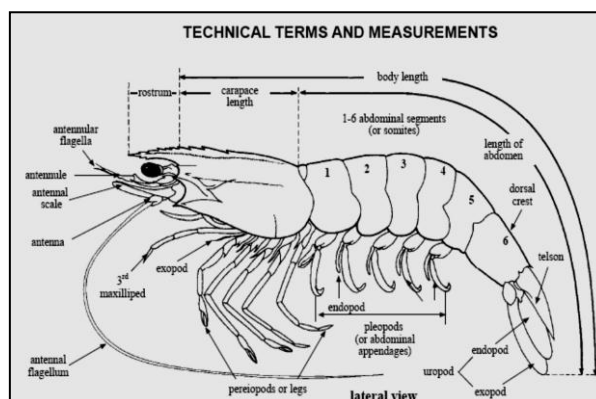
### Superfamily PENAEOIDEA

#### Penaeoid shrimps

#### Pelagic prawns

Some of the important penaeid shrimps that support commercial fisheries along the Indian seas are *Fenneropenaeus indicus* (Indian white prawn), *Penaeus semisulcatus* (Green tiger prawn), *P. monodon* (Giant tiger prawn), *F. merguensis* (Banana prawn), *Marsupenaeus japonicus* (Kuruma shrimp), *F. penicillatus* (Red-tail prawn), *Metapenaeus dobsoni* (flower-tail prawn), *M. monoceros* (Speckled prawn), *M. affinis* (Jinga prawn), *M. kutchensis* (Ginger shrimp), *M. brevicornis* (Yellow prawn), *Parapenaeopsis stylifera* (Kiddi prawn), *P. hardwickii* (Spear prawn), *P. sculptilis* (Rainbow prawn), *P. uncta* (Uncta prawn), *Trachysalambriacurvirostris* (Rough prawn),

*Metapenaeopsisstridulans*(Fiddler shrimp), *Parapenaeuslongipes*(Flaming prawn), *Solenoceracrassicornis*(Coastal mud prawn) and *S. choprai*(Coastal mud prawn).

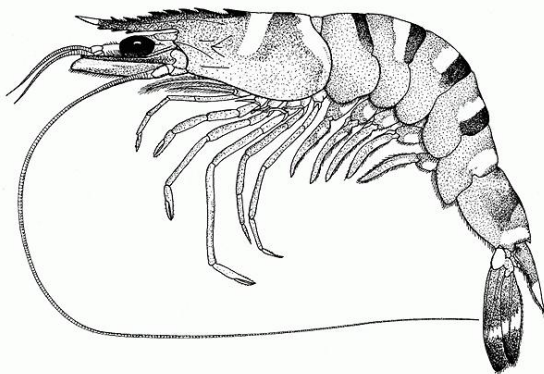


### Deep Sea prawns

Although about 18 species of penaeid and non-penaeid species were observed in the catches only about 8 species constitute the bulk of the catch. The common deep sea prawns are *Heterocarpuswoodmasoni*, *H. gibbosus*, *Plesionikaspinipes*, *P. martia*, (Non-penaeids -fly. Pandalidae), *Metapenaeopsisandamanensis*, *Penaeopsisjerryi* (fly.Penaeidae), *Solenocerahextii*(fly. Solenoceridae) and *Aristeusalcocki*(fly. Aristidae). Details of important species are given in the following pages.

*Penaeusmonodon* (Giant tiger prawn) (Fly. Penaeidae)

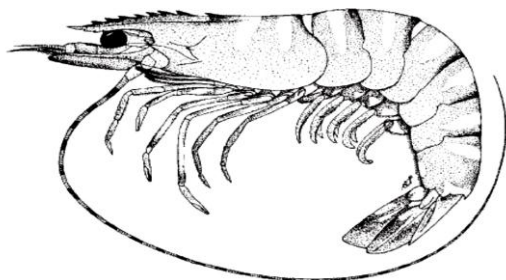
**Rostrum generally armed with 6 to 8 upper teeth (including those on carapace) and 3**



**lower teeth;** postrostral crest well developed and reaching nearly to posterior margin of carapace, with or without a feeble median groove; adrostral crest extending to just before last postrostral tooth; gastrofrontal crest absent; **hepatic crest almost horizontal** and extending far behind antennal crest. **Fifth pereopod without exopod.** Colour: body grayish greenish or dark greenish blue; becoming reddish brown in large adults; carapace covered with mud-yellow transverse

bands, while abdomen bears dark brown and mud-yellow cross bands.

**Distribution and fishery:** Throughout the east and west coasts of India and Andaman Islands; depth upto 150 m (usually less than 30 m).



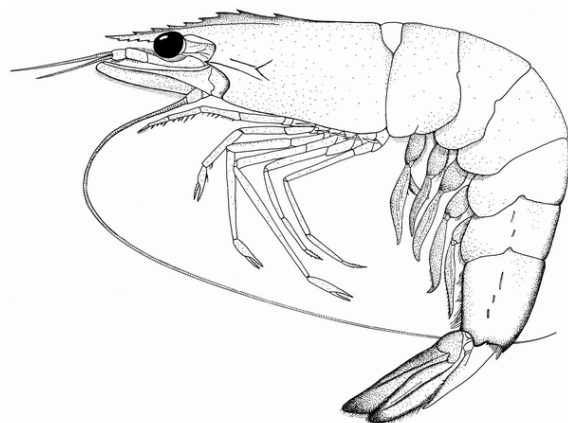
*Penaeussemisulcatus* (Green tiger prawn) (Fly. Penaeidae)

Rostrum generally armed with 6 to 8 upper teeth (including those on carapace) and 3 lower teeth; postrostral crest well developed and reaching nearly to posterior margin of carapace, with a distinct median groove; adrostral crest extending beyond

last postrostral tooth; gastrofrontal crest absent; hepatic crest long and extending behind antennal crest, **straight but distinctly sloping antero- ventrally. Fifth leg with exopod (somewhat hidden beneath carapace).** Colour: body reddish brown to pale brown or dark green, carapace covered with mud-yellow transverse bands while abdomen including tail fan bears grayish brown yellow cross bands.

**Distribution and fishery:** Both east and west coasts of India and Andaman waters; depth upto 130 m.

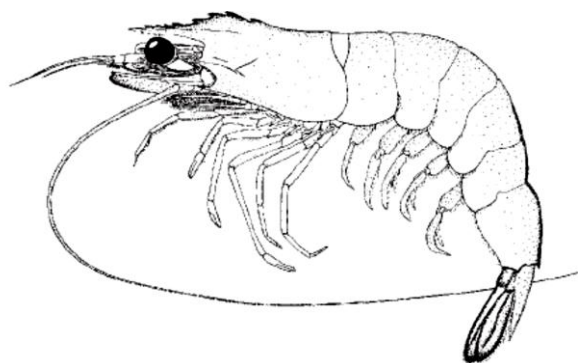
***Fenneropenaeus indicus*** (Indian white prawn) (Fly. Penaeidae)



Carapace rather smooth, lacking gastrofrontal and hepatic crests; adrostral crest extending as far as or just before epigastric tooth; **rostrum slightly curved at tip and sigmoidal-shaped**, usually bearing 7 to 9 upper teeth (including those on carapace) and 3 to 6 lower teeth. **Postrostral crest extending near to posterior margin of carapace.** Colour: Body semi-translucent, Somewhat yellowish white (small specimens) or grayish green and covered with numerous minute dark brown dots.

**Distribution and fishery:** Both east and west coasts of India and Andaman Islands; depth upto 90 m

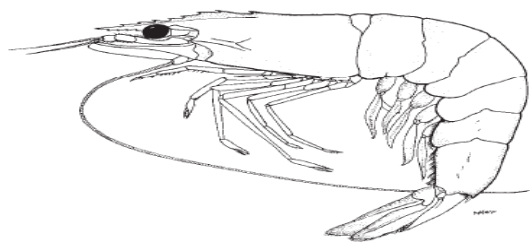
***Fenneropenaeus merguensis*** (Banana prawn) (Fly. Penaeidae)



Carapace rather smooth, lacking gastrofrontal and hepatic crests; adrostral crest extending to, or just before, epigastric tooth; tip of rostrum horizontally straight, and **rostral crest becoming very high and broadly triangular in large specimens (even stronger in females)**, generally bearing 6 to 9 upper teeth (including those on carapace) and mostly 3 to 5 lower teeth; postrostral rest extending near to posterior margin of carapace. In adult males, third maxilliped with distal segment only about half as long as second segment this bears **a tuft of dense**

**short hairs** (slightly shorter than distal segment) at tip. Colour: body semi- translucent, somewhat yellowish to greenish (in very large specimens) and covered with numerous minute dark brown dots; distal part of uropods yellowish green with red margins; young specimens often with many longitudinal black broken lines on abdomen.

**Distribution and fishery:** Both east and west coasts of India; depth upto 150 m



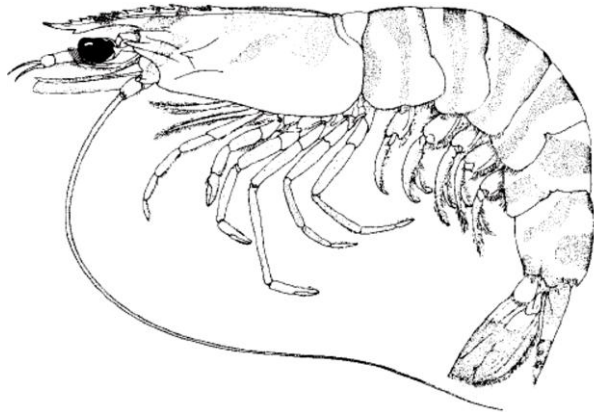
***Fenneropenaeus penicillatus*** (Red tail prawn) (Fly. Penaeidae)

Carapace rather smooth, **lacking gastrofrontal and hepatic crests**; adrostral crest extending just beyond epigastric tooth; **tip of rostrum horizontally straight, and rostral crest generally slightly elevated in**

**young and adult males, to moderately high in large females;** In **adult males**, third maxilliped with distal segment much longer than second segment which bears a **tuft of dense long hairs** (as long as distal segment) at tip. **Colour:** body semi-translucent, slightly greenish and covered with numerous minute dark brown dots; rostral and abdominal dorsal crests reddish brown to dark brown; **antennal flagella reddish brown;** legs translucent and somewhat whitish; pleopods rather reddish; **distal half of uropods yellowish to greenish but always with reddish tips.**

**Distribution and fishery:** Gujarat, Maharashtra, Orissa and West Bengal; depth upto 90 m

***Marsupenaeus japonicus*** (Kuruma prawn) (Fly. Penaeidae)

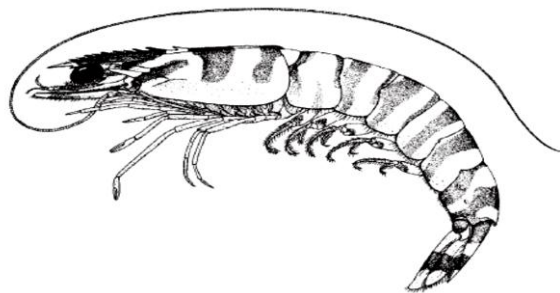


Carapace with grooves and crests very distinct, bearing both gastrofrontal and hepatic crests; **rostrum generally armed with 9 or 10 upper teeth (including those on carapace) and 1 lower tooth,** postrostral crest well developed and with a deep median groove throughout its length; adrostral groove extending near to posterior margin of carapace and almost as wide as postrostral crest; **Telson with 3 pairs of movable lateral spines.** Colour: body pale yellowish and crossed with dark

brown transverse bands; those on carapace generally extending to lower half of carapace, **last abdominal band interrupted.**

**Distribution and fishery:** Gujarat, Tamil Nadu, Maharashtra and West Bengal; depth upto 90 m

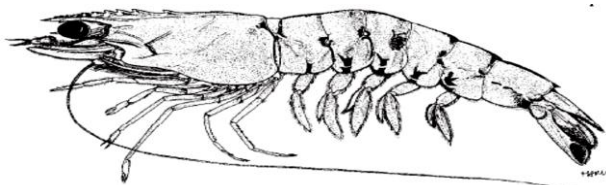
***Melicertus canaliculatus*** (Witch Prawn) (Fly. Penaeidae)



Carapace with grooves and crests very distinct, bearing both gastrofrontal and hepatic crests; rostrum armed with 10 or 11 upper teeth (including those on carapace) and 1 lower tooth; postrostral crest well developed and with a deep median groove throughout its length; adrostral groove extending almost to posterior margin of carapace and slightly wider than postrostral crest; First leg without ischial spine. **Telson without lateral spines.** Colour: body pale yellowish and crossed with dark brown **transverse bands;** those on

carapace note extending over lower half of carapace **while those on last abdominal segment usually continuous to the ventral margin.**

**Distribution and fishery:** Gujarat, Orissa, West Bengal, Maharashtra, Tamil Nadu, Kerala and Andaman and Nicobar Islands; depth upto 50 m.



***Melicertus latisulcatus*** (western king prawn) (Fly. Penaeidae)

Carapace with grooves and crests very distinct, bearing both gastrofrontal and hepatic crests; rostrum generally armed with 10 or 11 upper teeth (including those on

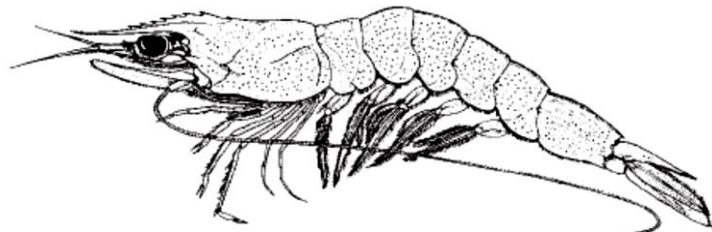
carapace) and 1 lower tooth, lacking distinct accessory crest on the blade; postrostral crest well developed and with a deep median groove throughout its length; adrostral groove extending almost to posterior margin of carapace and distinctly wider than postrostral crest; posterior end of gastrofrontal groove divided into 2. **Telson with 3 pairs of movable lateral spines.**

Colour: body generally yellowish green, becoming slightly reddish in large adults; **abdominal segments each with a short vertical black bar on pleuron; hinges on abdomen often bearing dark brown spots** and posterolateral part of carapace also sometimes with 2 black stripes positioned at a right angle.; uropods bright yellow, with distal half and outer margins of exopods bright blue, other margins reddish.

**Distribution and fishery:** Gujarat, Tamil Nadu, Kerala, Andaman and Nicobar Islands and Lakshadweep; depth upto 90 m.

***Metapenaeusdobsoni*** (Kadal Shrimp) (Fly.Penaeidae)

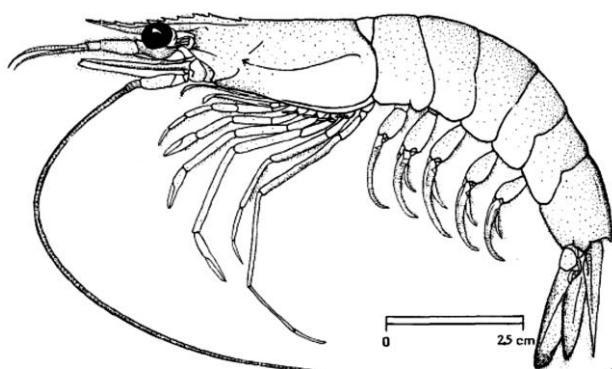
Rostrum long, extending beyond antennular peduncle, slightly sinuous, armed with 7 to 9 dorsal teeth, but toothless on its distal half; postrostral ridge ending near posterior margin of carapace; drostral crest reaching as far as epigastric tooth, adrostral groove a little beyond. **In females, fifth pereopod often reduced to coxa and basis;** thelycum with a long, grooved tongue-like anterior plate



partially ensheathed in a horse-shoe-like process formed by the lateral plates; **impregnated (fertilized) specimens with white conjoined pads on thelycum.** Colour: body pale yellow to brownish with red, brownish or greenish specks; antennae red; middorsal abdominal crest and margin of last segment dark brown to red; pereopods and pleopods white to pinkish; uropods grey-brownish, darker distally with external part of exopods red.

**Distribution and fishery:** South of Goa on the west coast through southeast coast to south of Visakhapatnam on the east coast; depth 1-40 m .

***Metapenaeusaffinis***(Jinga shrimp) (Fly. Penaeidae)

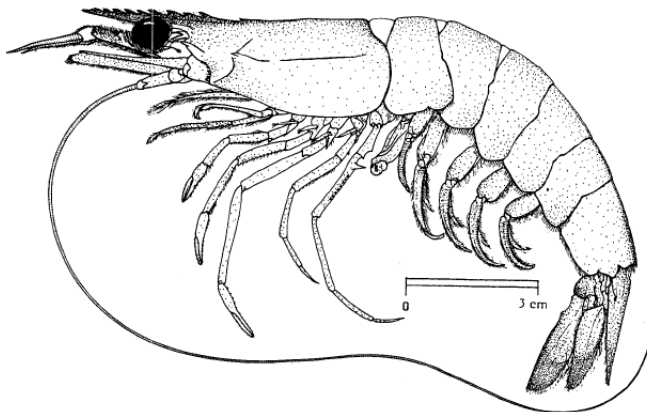


Generally almost entire body pubescent, rarely partly or completely hairless; rostrum armed with 8 to 11 teeth along entire dorsal margin, slightly sinuous and reaching from proximal to distal margin of third antennular article, or exceeding it; adrostral crest ending behind second rostral tooth, and adrostral groove a little behind epigastric tooth; branchiocardiac ridge slightly sinuous and reaching posterior extension of hepatic spine. **In adult males, merus of fifth 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. Colour: body pale green to pale pink, sometimes green-bluish or pink-brownish, with green or red-brown specks.

**Distribution and fishery:** Throughout west and east coasts of India and Andaman waters; major landing from Maharashtra and Kerala; depth 5-90 m.

***Metapenaeus monoceros*** (Speckled shrimp) (Fly. Penaeidae)

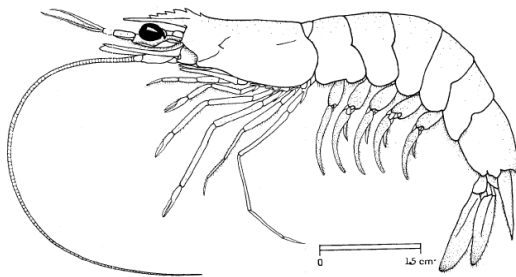


Body covered with stiff, very short tomentum. Rostrum nearly straight, uptitted, reaching nearly to, or a little beyond the tip of antennular peduncle. Dorsal carina on first to sixth abdominal terga, blunt and inconspicuous on first to third, very sharp on 4<sup>th</sup> to 6<sup>th</sup>. Three terminal joints of 5<sup>th</sup> pereopods slender in both sexes, the dactylus rarely reaches much beyond of antennal scale. 5<sup>th</sup> pereopod of adult male with proximal end of merus notched on

outer side, notch deepened anteriorly by large hood-like spine, No exopods on the 5<sup>th</sup> legs. distomedian projections of **petasma ear-shaped**. Colour: body pink, green-greyish or whitish with brown specks; distal part of uropods purple blue.

**Distribution and fishery:** All along the west and east coasts of India; depth upto 60 m.

***Metapenaeus brevicornis*** (Yellow shrimp) (Fly. Penaeidae)



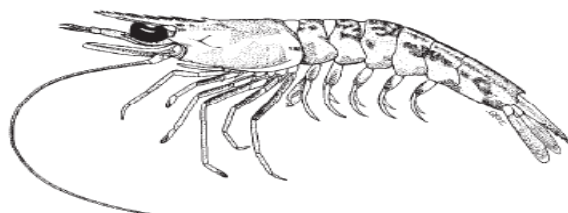
Almost entire body hairless; rostrum armed with 5 to 7 dorsal teeth, toothless on little less than its distal half, reaching from proximal margin of second, to distal margin of third antennular article, **rostral crest high**; postrostral ridge not reaching posterior margin of carapace; adrostral crest and groove reaching as far as second rostral tooth; In adult males, **merus of fifth**

**pereopod with a proximal notch**, followed by a keel-shaped tubercle; each **distomedian projection of petasma with a long and slender apical filament**. Colour: body yellow to white, sometimes greyish, with distinct dark green to bluish-brown specks; pereopods of same colour; pleopods yellowish to pinkish; distal part of uropods brown to rusty red.

**Distribution and fishery:** Northwest and northeast coasts of India & Andaman waters; supports fishery in the "bheries" of West Bengal; depth 4-90 m.

***Metapenaeopsis stridulans*** (Fiddler shrimp) (Fly. Penaeidae)

Body densely pubescent. Rostrum low, usually straight, directed slightly upward, reaching to tip of the antennular peduncle and armed with 7 or 8 dorsal teeth, **the penultimate**



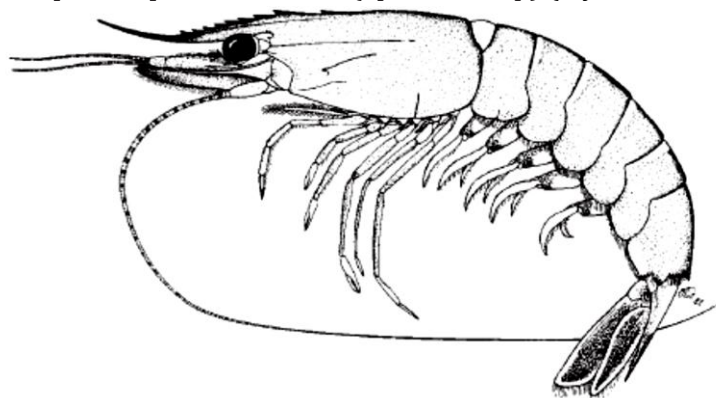
**tooth generally anterior to orbital margin of carapace. Stridulating organ consisting of 5 to 7 very strong ridges on a wide, straight band** at 4/10 of carapace depth.

Middorsal crest on third abdominal segment with a usually broad groove. Petasma asymmetrical, right distoventral projection shorter and bearing a few small apical processes, left distoventral projection with 5 to 12 larger apical processes. Thelycal plate subquadrate with rounded corners and slightly wider than long; intermediate broadly trapezoidal, much wider than long, flat or with a shallow median groove; coxal plates of fourth pereopods smaller than thelycal plate. Colour: white to reddish-brown, with red to dark brown mottling; pereopods pinkish to dark red except on

their proximal parts; uropods red to brown except for their proximal third and often their tips.

**Distribution and fishery:** Maharashtra, Andhra Pradesh, Tamil Nadu and Andamans; depth 90 m.

***Parapenaeopsis hardwickii*** (Spear shrimp) (Fly. Penaeidae)



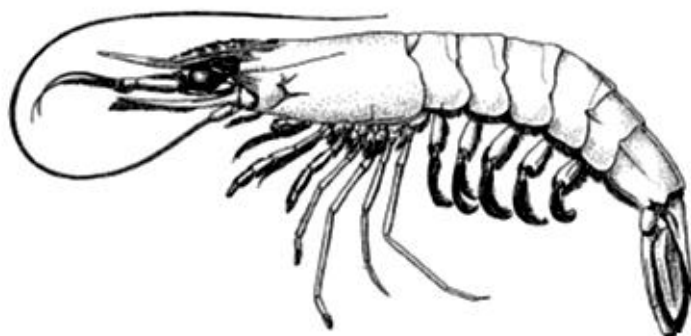
Body naked and smooth, Rostrum armed with 9 to 11 upper teeth; **in females, rostrum very long and of sigmoidal shape**, with distal 1/3 to 1/2 toothless, extending far beyond antennular peduncle; **in adult males, unarmed portion absent and slightly curving downward**, only reaching to middle of second antennular

segment. Longitudinal suture extending to about 3/4 or more carapace length. Petasma of males with distomedian projection bluntly protruded and short, somewhat wing-like, anterior margin often crenulate; distolateral projection short and directed laterally. Telson bearing only 3 to 5 pairs of minute movable lateral spinules. Colour: body greyish to greenish grey, sometimes pink, and densely covered with dark-coloured dots; rostrum black-brown; basal 1/3 of antennal flagella crossed with brown narrow bands; uropods dark reddish brown with yellowish margins.

**Distribution & fishery:** Good fishery exists along northwest coast of India (Veraval and Mumbai) and Orissa and Kakinada on the east coast; depth 5-90 m.

***Parapenaeopsis stylifera*** (Kiddi prawn) (Fly. Penaeidae)

**Rostrum sigmoid-shaped**, strongly upcurved and by far overreaching tip of antennular peduncle (in males somewhat shorter), armed with 7 to 9 dorsal teeth; but **toothless in distal half or more;**



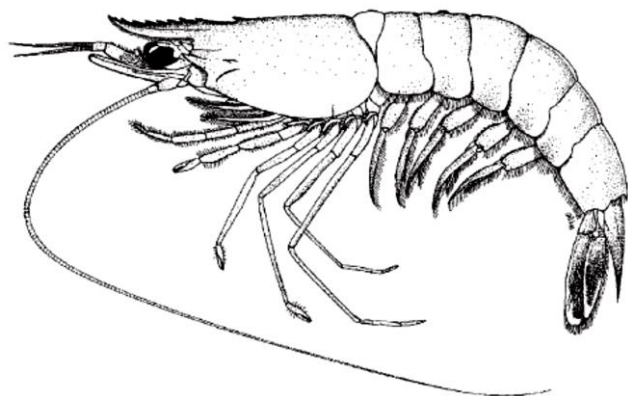
epigastric tooth present; postrostral crest almost reaching posterior margin of carapace; longitudinal suture long, reaching 2/3 of carapace length; **telson armed with 4 pairs of lateral fixed spines;** basis of third pereopod unarmed. In

males, distolateral projections of petasma slender, horn-like and straight, directed antero-laterally and with ventro-external openings; distomedian projections small and curved ventrally. In females, anterior plate: of thelycum square, concave, with a slender stem-like posterior process; posterior plate deeply notched anteromedially. Colour: pale brownish or pinkish white, sometimes greyish; rostrum and abdominal crest darker; pereopods and pleopods yellowish pink to reddish pink; distal part of uropods dark grey, their tips distinctly white.

**Distribution & Fishery:** All along the Indian coast (good fishery in Kerala, Veraval, Karwar and Mumbai); depth 20-90 m.

***Trachysalambriacurvirostris*** (Rough prawn) (Fly. Penaeidae)

Entire body hairy, with grooves and crests on carapace obscure. **Rostrum slightly upcurved at tip**, armed with 6 to 8 upper teeth (including those on carapace). Longitudinal suture on carapace short. First 3 pairs of legs bearing epipods, first leg additionally armed with a distinct ischial spine, fifth leg not exceeding tip of antennal scale. **Abdomen with a small median tubercle on second segment, last 4 segments with a low dorsal crest, distinctly incised posteriorly. Petasma of males T-shaped**, distolateral projections broadly wing-like and directed laterally, distomedian projections small. Telson

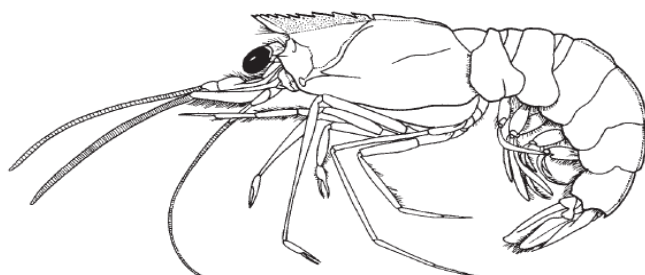


generally armed with 3 or 4 pairs of small movable lateral spines. Colour: body greyish pink to greyish blue, sometimes whitish on sides; antennal flagella reddish; pleopods reddish with white markings on sides; uropods almost entirely reddish, with margins whitish to yellowish.

**Distribution and fishery:** Gulf of Mannar, Chennai, Visakhapatnam, Kakinada and Kerala; depth 10-150 m.

***Solenocerachoprai***(Ridge back Shrimp) (Fly: Sloneoceridae)

Rostrum short, extending to about 2/3 of eyes; upper border with 8 to 10 teeth (including 4 teeth on carapace); lower border moderately convex. **Postrostral crest markedly elevated and plate-like**, slightly interrupted by a small notch above cervical groove. Carapace with orbital, postorbital, antennal and hepatic spines, but without pterygostomial spines. **Telson with a pair of lateral spines.** Colour: body and legs reddish; antennae banded with dark red and white; uropods dark red,

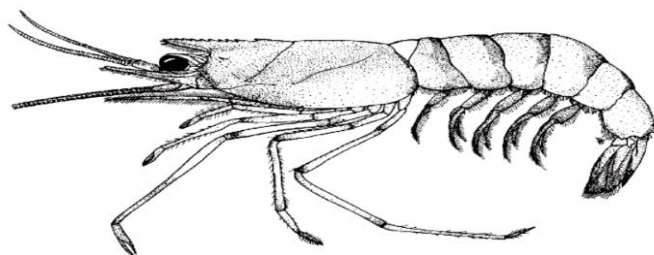


except for some white areas.

except for some white areas.

**Distribution and fishery:** West coast and southeast coast of India, major landing in Gujarat, Maharashtra, Karnataka, Kerala and Tamil Nadu; depth 40-300 m.

***Solenoceracrassicornis***(Coastal mud shrimp)(Fly:Sloneoceridae)



**Rostrum short and nearly straight, about as long as eyes;** upper border armed with 4 to 7 (mostly 5) teeth; lower border unarmed and somewhat convex. Carapace with 3 postrostral teeth and 1 epigastric tooth, and orbital, postorbital, antennal and hepatic spines, but without pterygostomial

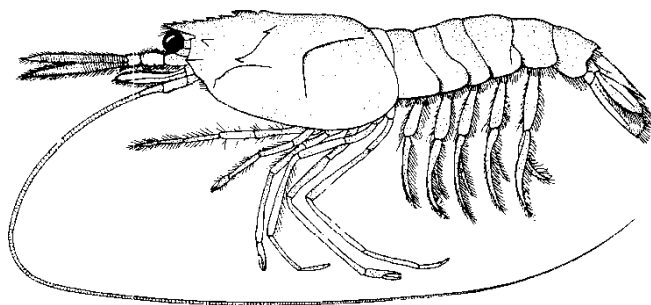
spines; **postrostral crest low and rounded. Telson unarmed, without lateral spines.** Colour: body pink to pinkish orange; posterior border of each abdominal segment covered with a red cross band; eyes dark brown; antennular flagella and distal part of tail fan reddish.

**Distribution and fishery:** Northwest and northeast coast of India and Andaman waters, major landing in Gujarat, Maharashtra and Andhra Pradesh; depth 20-85 m.



***Solenocerahextii***(Deep-sea mudshrimp) (Fly:Sloneoceridae)

Rostrum short, reaching to about distal margin of eye, armed with 6 to 8 dorsal teeth, its



ventral margin nearly straight; **postrostral crest elevated and laminose**, reaching posterior margin of carapace and **interrupted by a notch just in front of cervical groove**, cervical groove deep, reaching to, or almost, to dorsal midline; Postorbital and suprahepatic spines present;branchiostegal and

pterygostomial spines absent; hepatic crest curved ventrally on its anterior part, with a sharp bending near its anterior end; **branchiocardiac crest very distinct and L-shaped**, telson with a pair of fixed distal lateral spines (trifurcate); fifth pereopod with a coxal spine. Colour: bright pink.

**Distribution and fishery:** West coast and Bay of Bengal, minor fishery in Kerala and Tamil Nadu; depth 120 - 500m.

**Products & export**

Shrimps contribute the major share (by value) in the export market and exported to several countries and the major markets for the shrimp are given below.

- Japan
- USA
- Belgium
- UK
- UAE
- France
- Netherlands
- Germany
- Italy
- Canada

**Products**

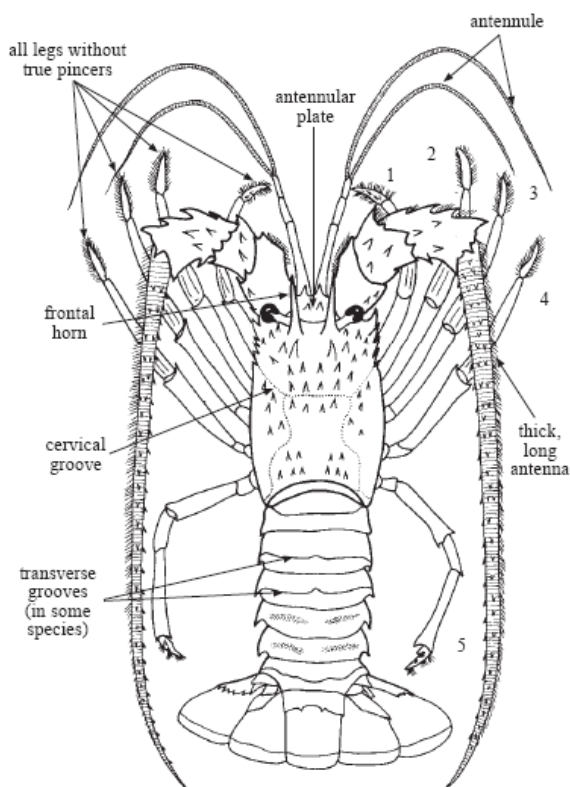
- Frozen shrimp and Cultured shrimp
- Block frozen shrimp
- IQF shrimp
- AFD shrimp
- Chilled shrimp/prawn
- Chilled shrimp (scampi)
- Chilled shrimp (tiger)
- Chilled shrimp n(brown)
- Prawn curry
- AFD shrimp powder and Block frozen

**Lobsters**

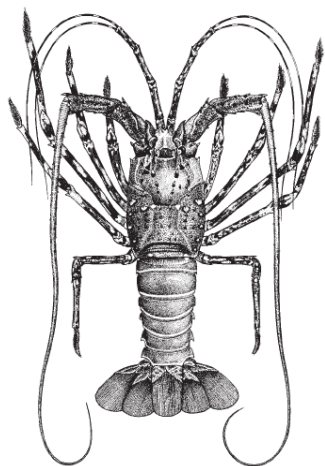
- Order : Decapoda
- Suborder : MacruraReptantia

Infraorder : Palinuridea  
 Superfamily : Palinuroidea  
 Family : Palinuridae Family : Scyllaridae  
 Genus : *Panulirus* Genus : *Thenus*

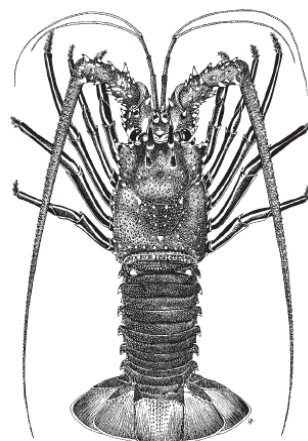
Lobsters are one of the highly priced crustaceans in India and are in great demand as a delicacy in the internal market and as a foreign exchange earner in export market. Fishing of lobsters from Indian seas by traditional fishermen is known since 1950s. The fishery, which has remained as a subsistence fishery until 1957, flourished into a commercial fishery due to the importance of this resource as a potential foreign exchange earner. Twenty five species of lobsters have been so far reported from Indian coast of which only few are commercially important belonging to two families Palinuridae (3 genera- *Panulirus*, *Puerulus* and *Linuparus*) and Scyllaridae (*Thenus*). They are *Panulirus homarus* (Scalloped spiny lobster), *P. polyphagus* (Mud spiny lobster), *P. ornatus* (Ornate spiny lobster), *P. versicolor* (Painted spiny lobster), *P. longipes* (Long legged lobster), *P. penicillatus* (Pronghorn spiny lobster), *Linuparus somniosus* (Arabian spear lobster), deep sea lobster *Puerulus sewelli* (Arabian whip lobster) and *Thenus unimaculatus* (Flathead lobster) (figures are given in the following pages).



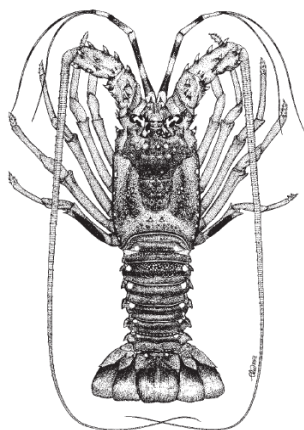
Dorsal view (*Panulirus*)



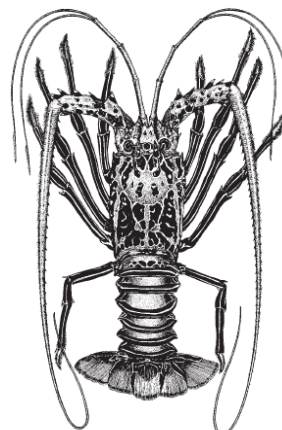
*Panulirus polyphagus*



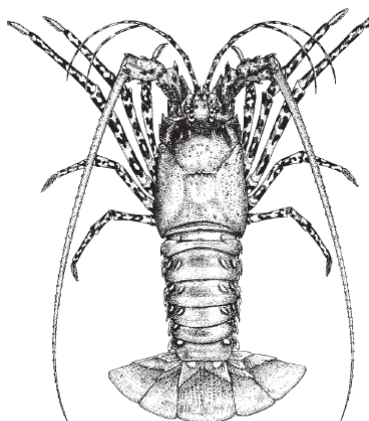
*Panulirus penicillatus*



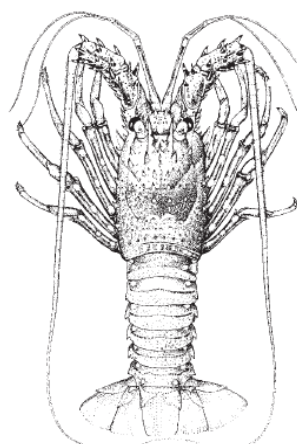
*Panulirus homarus*



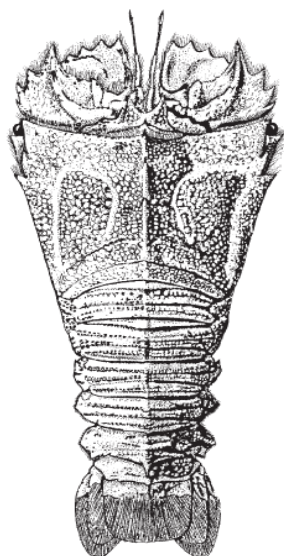
*Panulirus versicolor*



*Panulirus ornatus*



*Panulirus longipes*



***Thenus unimaculatus***

***Panulirus homarus*** (Scalloped spiny lobster)

Body greenish to brownish. Anterior carapace and region between eyestalks with bright orange and blue markings. Antennular flagella alternated with brown and white bands. Abdomen covered with tiny white spots. Antennular plate at bases of antennae bearing 2 pairs of well-separated principal spines and some spinules. Abdominal segments with a slightly crenate transverse groove sometimes interrupted at the middle.

***Panulirus polyphagus*** (Mud spiny lobster)

Body dull green. Antennular peduncle alternated with yellowish white and pale green bands, flagella banded with yellowish white and dark brown. Legs light brown with yellowish white blotches. Abdomen with tiny pale dots; a yellowish white band with brown margins near posterior border of each segment, abdomen naked and smooth, without transverse grooves or sunken pubescent areas.

***Panulirus ornatus*** (Ornate spiny lobster)

Body greenish with carapace slightly bluish. Frontal horns intricately banded with yellowish white and brown markings. Antennules and legs conspicuously ringed with pale yellow and black. Abdomen naked and smooth, without transverse grooves or sunken pubescent areas.

***Panulirus versicolor*** (Painted spiny lobster)

Body of adults generally blue and green; more greenish in large individuals. Carapace, including frontal horns, with a mosaic pattern of green, white and blue. Antenna with inner surface pink and outer surface blue; inner surface of antennular peduncle white, outer surface blue; flagella whitish. Legs blue, distinctly striped with white lines. Abdomen greenish, having white lines with blue margins along posterior margin of each segment.

***Panulirus longipes*** (Long legged lobster)

Body dark brown to indigo and covered with numerous white spots and markings. Inner surfaces of antennae and antennular plate brown to purple and with stridulating pad bright blue; antennules dark brown and alternated with conspicuous white bands. Legs covered with prominent white spots connected by orange lines, or only striped with white or pale lines. Abdomen covered with numerous small to medium-sized white spots.

***Panuliruspenicillatus***(Pronghorn spiny lobster)

Body dark blue and brown; males usually darker than females. Antennular peduncle striped with white lines, flagella uniformly brownish; membranous areas at outer base of antenna light blue. Legs conspicuously striped with white lines. Abdomen with tiny pale dots. Abdominal segments with a transverse groove, not continuous with pleural groove; anterior margins of pleura spinous.

***Thenusunimaculatus***(Flat head Lobster)

Body markedly depressed, carapace trapezoid, narrowing posteriorly; anterior part of lateral margin with only 2 teeth, posterior 3/4 without teeth. Eyes small and subspherical; orbits situated at anterolateral angles of carapace. Antennae broad, flattened and plate-like. All legs without pincers and similar in size. Body brownish with reddish brown granules, ventral surface somewhat yellowish white.

**Products and Export**

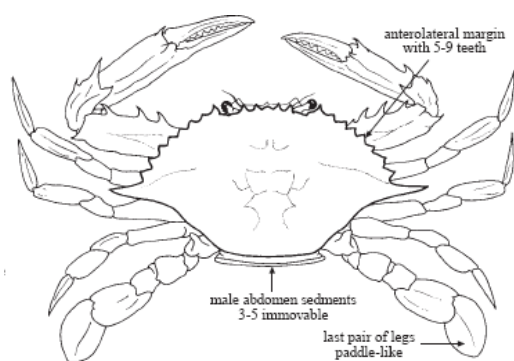
Lobsters are exported in live condition as well as different products, and the following list gives the details of exported products.

Frozen Lobster  
Frozen rock lobster tail  
Frozen sand/slipper tail  
Frozen whole cooked lobster  
Frozen lobster meat  
Frozen rock lobster whole  
Frozen sand lobster whole  
IQF sand/rock lobster  
Frozen head-on lobster  
Frozen lobster whole round  
Lobster head-on (IQF)  
IQF whole cooked lobster  
IQF lobster round  
IQF rock lobster tail  
IQF head on deep sea lobster  
Slipper lobster meat  
Slipper lobster whole  
IQF raw/rock lobster whole

## Crabs

Most of the edible crabs caught from marine and brackish water environments belong to the family Portunidae. In the Indian Ocean, the crab fauna of Portunidae family is included under sub families, Podophthalmidae (Borradaile), Catoptrinae (Sakai), Portuninae (Rafinesque), Caphyrinae (Alcock), Carcininae (Macleay) and Polybiinae (Ortmann). Most of the edible crabs caught from marine and brackishwater environments belong to the sub family Portuninae. In the seas around India, five genera of Portuninae have been reported by various authors. They are *Scylla*, *Portunus*, *Charybdis*, *Lupocyclus* and *Thalamita*. Among them the first three genera contribute to the commercial crab fishery. Commercially important species are *Scylla* spp. (Mud crabs), *Portunus pelagicus* (blue swimmer crab), *P. sanguinolentus* (three spotted crab), *Charybdis feriatus* (crucifix crab), *C. lucifera* (Yellowish brown crab), *C. natator* (line crab) and *Podophthalmus vigil* (long eye-stalk crab; sub fly., Podophthalmidae).

### Portunidae



Carapace hexagonal, transversely ovate to transversely hexagonal, sometimes circular; dorsal surface relatively flat to gently convex, usually ridged or granulose; front broad, margin usually multidentate; usually 5 to 9 teeth on each anterolateral margin, posterolateral margins usually distinctly converging. Endopodite of second maxillipeds with strongly developed lobe on inner margin. Legs laterally flattened to varying degrees, last 2 segments of last pair paddle-like. Male abdominal segments 3 to 5

completely fused, immovable.

#### ***Portunus pelagicus*** (Linnaeus, 1758) (Flower crab).

Carapace rough to granulose, front with 4 acutely triangular teeth; 9 teeth on each anterolateral margin, the last tooth 2 to 4 times larger than preceding teeth. Chelae elongate in males; larger chela with conical tooth at base of fingers. Colour: males with blue markings, females dull green/greenish brown.

#### ***Portunus sanguinolentus*** (Herbst, 1783) (Three-spot swimming crab).

Carapace finely granulose, regions just discernible; 9 teeth on each anterolateral margin, the last tooth 2 to 3 times larger than preceding teeth. Chelae elongated in males; larger chela with conical tooth at base of fingers; pollex ridged. Colour: olive to dark green, with 3 prominent maroon to red spots on posterior 1/3 of carapace.

#### ***Charybdis feriatus*** (Linnaeus, 1758) (Crucifix crab)

Carapace ovate; 5 distinct teeth on each anterolateral margin. Colour: distinctive pattern of longitudinal stripes of maroon and white, usually with distinct white cross on median part of gastric region; legs and pincers with numerous scattered white spots.

#### ***Charybdis natator*** (Herbst, 1789) (Ridged swimming crab)

Carapace with densely covered with very short pubescence which is absent on several distinct transverse granulated ridges in anterior half. Colour: orangish red overall, with ridges on carapace and legs dark reddish brown.

#### ***Podophthalmus vigil*** (Fabricius, 1798)

Carapace distinctly broader than long; anterior margin much broader than posterior margin, with posterolateral margins converging strongly towards narrow posterior carapace margin; orbits very broad. Eyes very long, reaching to or extending beyond edge of carapace. Colour: carapace green; chelipeds and parts of legs violet to maroon in adults.

### ***Scylla* spp.**

The taxonomy of the genus *Scylla* has been terribly confused and is still difficult. Recent research in Australia (Keenan et al., 1998) has clearly shown, using morphological, DNA, and allozyme data, that there are 4 species of *Scylla*.

### ***Scylla serrata***(Forsskål, 1775) (Giant mud crab)

Carapace smooth, with strong transverse ridges; H-shaped gastric groove deep; relatively broad frontal lobes, all more or less in line with each other; broad anterolateral teeth, projecting obliquely outwards, colour green to greenish black; legs may be marbled. Well-developed spines present on outer surface of chelipedal carpus and anterior and posterior dorsal parts of palm.

### ***Scylla tranquebarica***(Fabricius, 1798) (Purple mud crab)

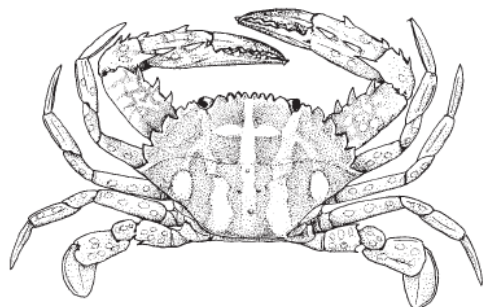
Colour varies from brown to almost black in coloration, and has very well-developed spines on the outer surfaces of the chelipedal carpus and the palm (as seen in *S. serrata*). It differs from *S. serrata*, however, by having the frontal teeth more acutely triangular, the median pair projecting slightly forwards of the lateral pair, and the anterolateral teeth gently curving anteriorly, giving the carapace a less transverse appearance.

### ***Scylla olivacea***(Herbst, 1796) (Orange mud crab)

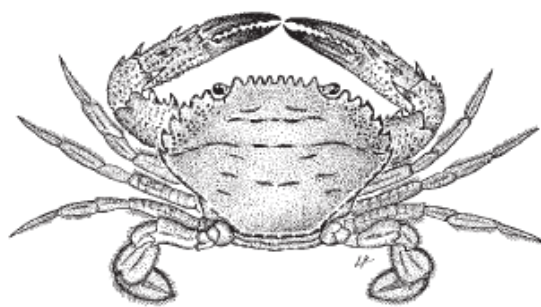
Carapace brownish to brownish green in colour (sometimes orangish), palm orange to yellow. It has a smoother, more evenly convex carapace with very low transverse ridges, a shallow H-shaped gastric groove, the median pair of the frontal lobes more rounded and projecting slightly forwards of the lateral ones, the anterolateral teeth gently curving anteriorly, giving the carapace a less transverse appearance. It also has very low spines on both the outer surface of the chelipedal carpus and the dorsal surface of palm.

### ***Scylla paramamosain***Estampador, 1949 (Green mud crab)

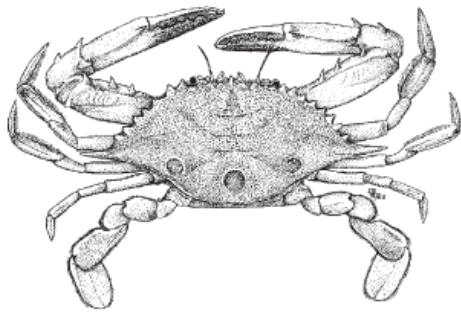
Carapace usually green to light green, palm green to greenish blue with lower surface and base of fingers usually pale yellow to yellowish orange. Frontal margin usually with sharp teeth, palm usually with distinct, sharp spines.



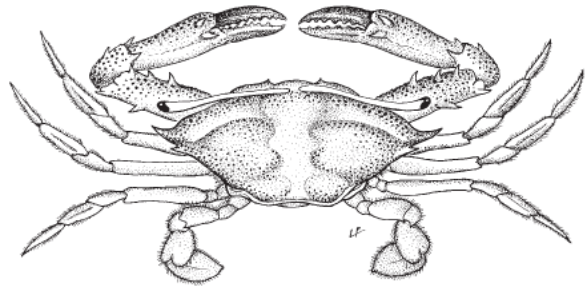
***Charybdis feriatus***(Linnaeus, 1758)



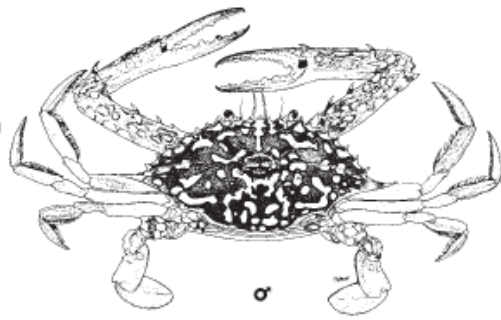
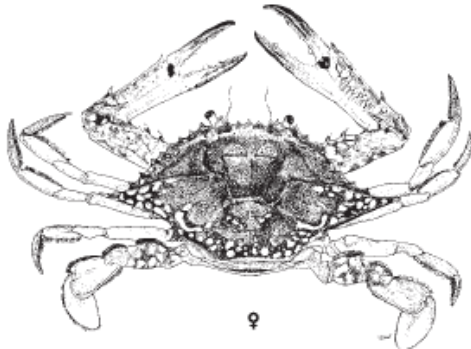
***Charybdis natator***(Herbst, 1789)



*Portunus sanguinolentus* (Herbst, 1783)



*Podophthalmus vigil* (Fabricius, 1798)



*Portunus pelagicus* (Linnaeus, 1758)



*Scylla serrata* (Forsskål, 1777)



*Scylla tranquebarica* (Fabricius, 1798)



*Scylla olivacea* (Herbst, 1796)



*Scylla paramamosain* Estampador, 1949



## **Products and Export**

Among crabs, only *Scylla* spp. is exported in live condition and the following list gives the details of other exported products.

### **Products**

Frozen crab meat  
Frozen stuffed crab  
Frozen mud crab  
Frozen cut swimming crab  
Frozen dressed crab  
IQF whole crab  
Frozen whole crab  
Frozen soft shell crab  
Frozen pasteurised crab  
Frozen crab cutlets  
Frozen crab claws  
Frozen cut crab with claws  
Frozen cut crab  
Frozen swimming cut crab without claw  
Frozen pasteurised crab meat  
Frozen crab meat with shell/crab chunks  
Frozen crab stick  
IQF cut crab (Red/green)  
IQF cut crab (3 spot)  
Crab(3 spot crab)  
IQF blue swimming cut crab  
Frozen blue swimming cut crab  
IQF blue swimming crab (whole)

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