



THE LIVING MARINE RESOURCES OF THE
**WESTERN CENTRAL
PACIFIC**



Volume 2. Cephalopods, crustaceans, holothurians and sharks



FFA
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FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES

THE LIVING MARINE RESOURCES OF THE
WESTERN CENTRAL PACIFIC

VOLUME 2

Cephalopods, crustaceans, holothurians and sharks

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with the support of the

South Pacific Forum Fisheries Agency (FFA)

and the

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SUMMARY

This multivolume field guide covers the species of interest to fisheries of the major marine resource groups exploited in the Western Central Pacific. The area of coverage includes FAO Fishing Area 71 and the southwestern portion of Fishing Area 77 corresponding to the South Pacific Commission mandate area. The marine resource groups included are seaweeds, corals, bivalves, gastropods, cephalopods, stomatopods, shrimps, lobsters, crabs, holothurians, sharks, batoid fishes, chimaeras, bony fishes, estuarine crocodiles, sea turtles, sea snakes, and marine mammals. The introductory chapter outlines the environmental, ecological, and biogeographical factors influencing the marine biota, and the basic components of the fisheries in the Western Central Pacific. Within the field guide, the sections on the resource groups are arranged phylogenetically according to higher taxonomic levels such as class, order, and family. Each resource group is introduced by general remarks on the group, an illustrated section on technical terms and measurements, and a key or guide to orders or families. Each family generally has an account summarizing family diagnostic characters, biological and fisheries information, notes on similar families occurring in the area, a key to species, a checklist of species, and a short list of relevant literature. Families that are less important to fisheries include an abbreviated family account and no detailed species information. Species in the important families are treated in detail (arranged alphabetically by genus and species) and include the species name, frequent synonyms and names of similar species, an illustration, FAO common name(s), diagnostic characters, biology and fisheries information, notes on geographical distribution, and a distribution map. For less important species, abbreviated accounts are used. Generally, this includes the species name, FAO common name(s), an illustration, a distribution map, and notes on biology, fisheries, and distribution. Each volume concludes with its own index of scientific and common names.

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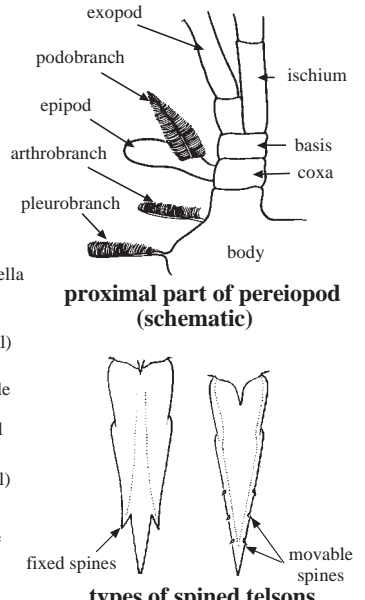
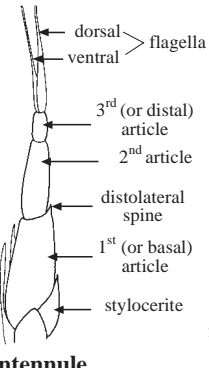
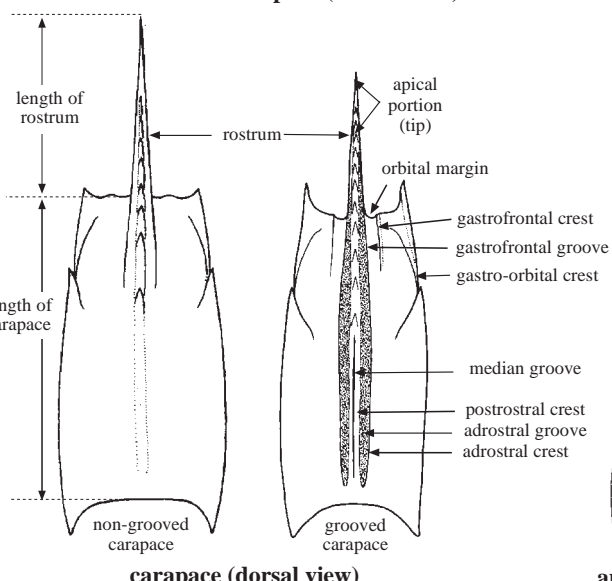
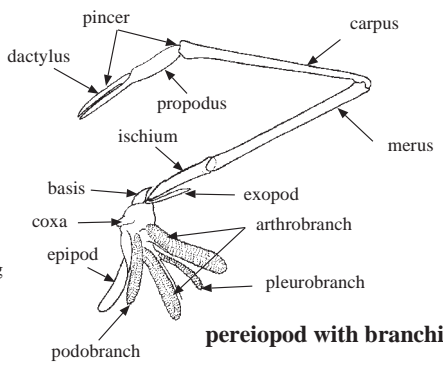
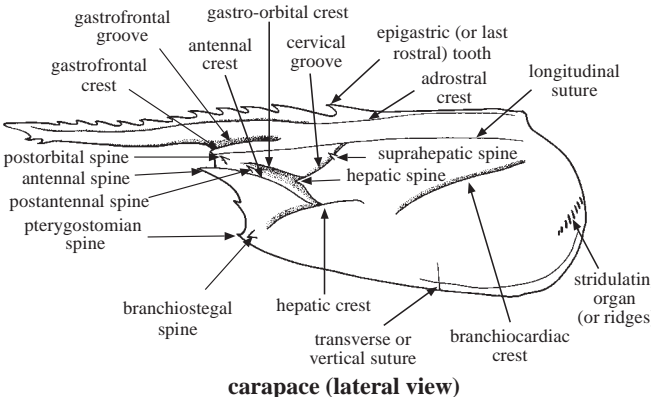
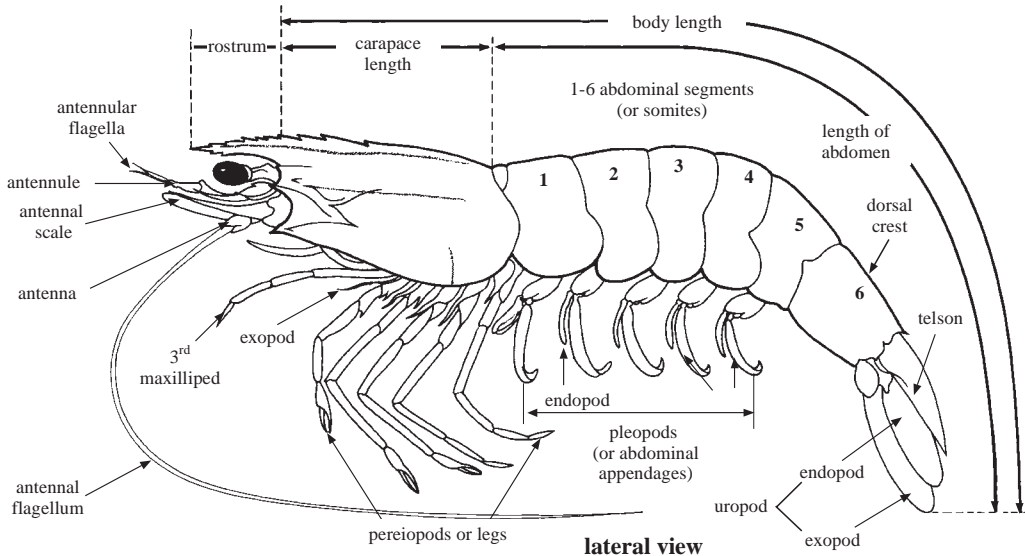
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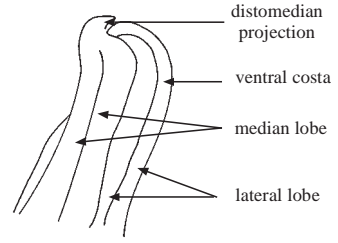
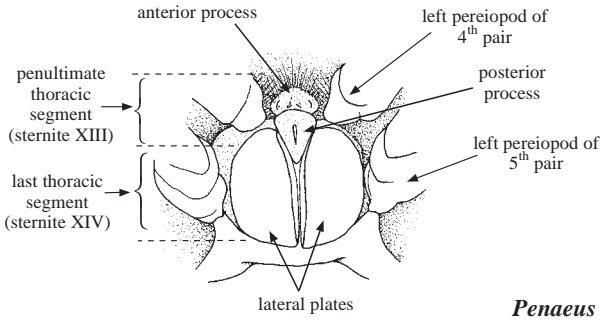
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SHRIMPS AND PRAWNS

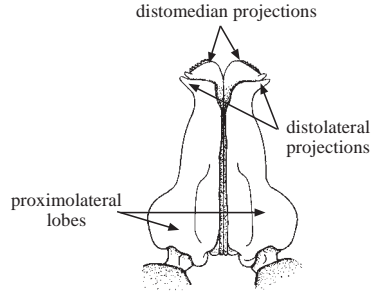
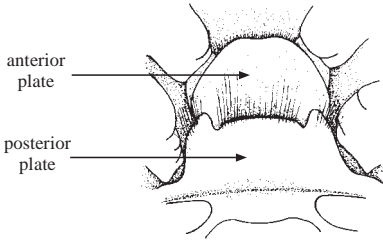
by T.Y. Chan

TECHNICAL TERMS AND MEASUREMENTS

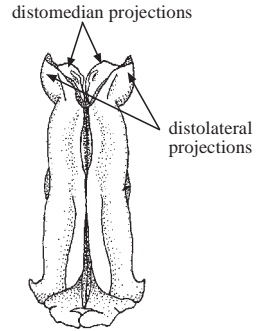
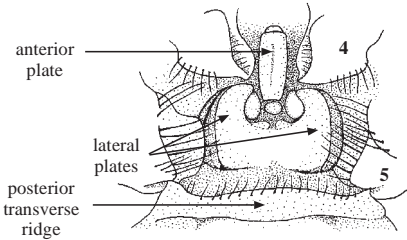




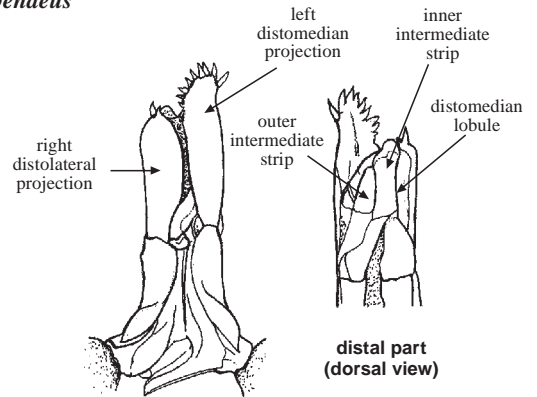
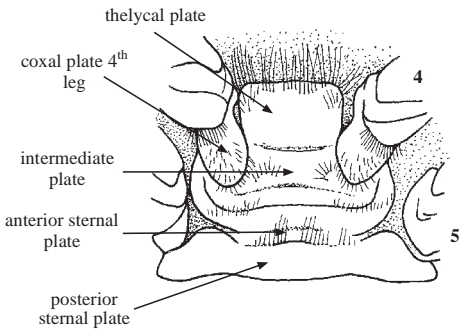
Penaeus



Parapenaeopsis



Metapenaeus



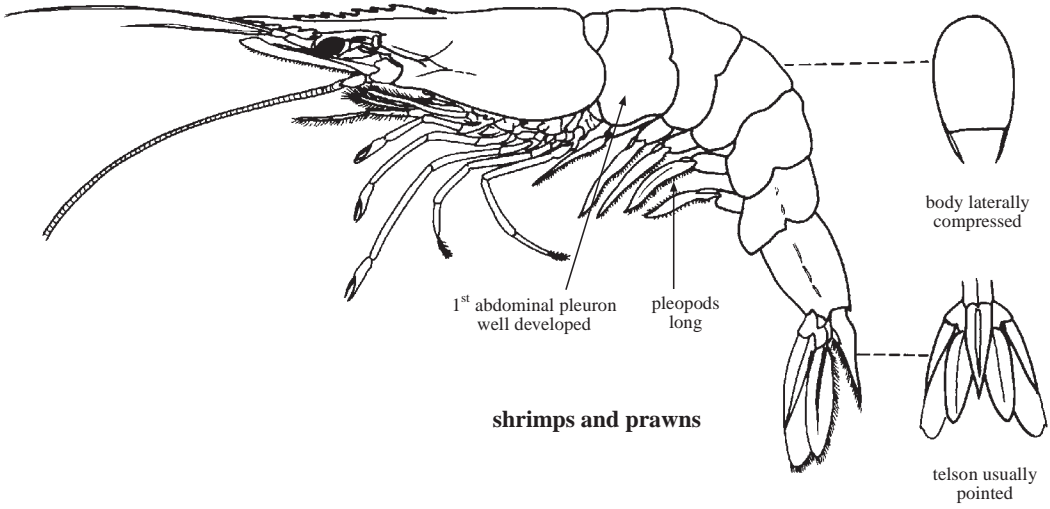
Metapenaeopsis

basic types of thelycum of female penaeid shrimps (ventral view)

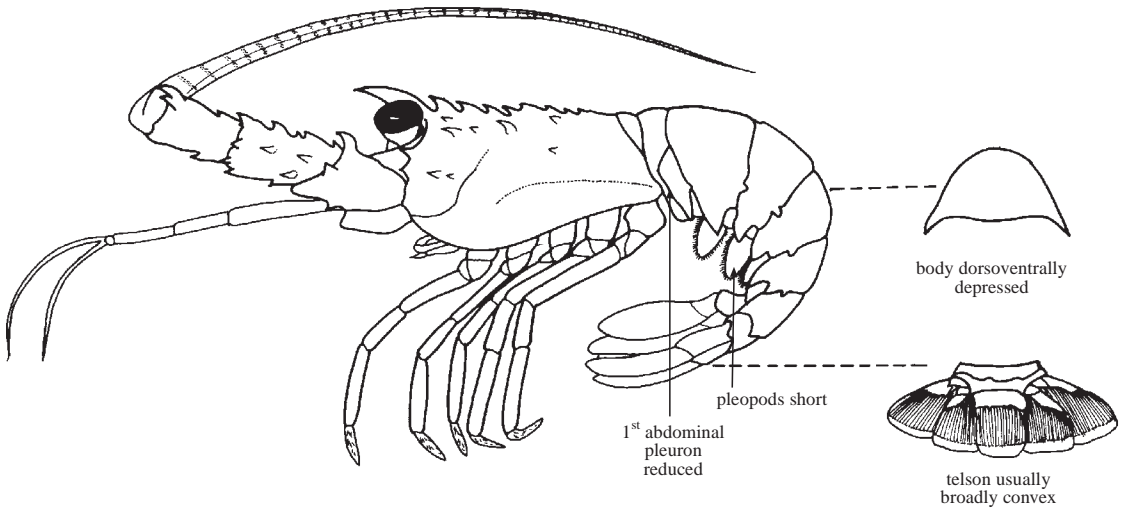
basic types of petasma (joined endopods of first pair of pleopods) of male penaeid shrimps (ventral view - except otherwise stated)

GENERAL REMARKS

Shrimps and prawns constitute a large group of crustaceans with an extended abdomen (or "tail"), varying in size from microscopic to about 35 cm body length (measured dorsally from the posterior orbital margin to the end of the tail, excluding the rostrum and the appendages). Taxonomically, shrimps and prawns belong to the "swimming group" of decapod crustaceans in the suborder Macrura Natantia. They differ from the lobsters (suborder Macrura Reptantia) by having the body generally more laterally compressed, the pleopods (abdominal appendages) well developed, the thoracic sternum (i.e. ventral part of thoracic body segments, between the legs) often narrow and not easy to observe, the first abdominal pleuron (or lateral plate) well developed (about as large as the pleura of following segments, see figure below), and the telson usually tapering distally.



shrimps and prawns



lobsters

(after Chan and Yu, 1993)

conspicuous morphological differences between shrimps and lobsters

The terms "shrimp" and "prawn" have no definite reference to any known taxonomic groups. Although the term "shrimp" is sometimes applied to smaller species, while "prawn" is more often used for larger forms, there is no clear distinction between both terms and their usage is often confused or even reverse in different countries or regions. Therefore, no attempt has been made here to restrict or define their meaning. Certain other crustaceans, such as the "mysid shrimps" (Mysidacea), "mantis shrimps" (Stomatopoda), and "mud shrimps" (Thalassinidea), are taxonomically not true shrimps.

Altogether, there are about 3 047 species of shrimps and prawns known to date, subdivided into 4 major groups, namely Sergestoidea (about 94 species), Penaeoidea (about 376 species), Stenopodidea (at least 60 species), and Caridea (at least 2 517 species). Although the Caridea comprise the majority of species, only some are abundant enough to be of interest to fisheries. Most of the commercial shrimps and prawns belong to the Penaeoidea. At present, only slightly less than 300 species of shrimps and prawns are of economic interest worldwide, and out of these, only about 100 comprise the principal share of the annual world catch. FAO's Yearbook of Fishery Statistics reports in 1995 a worldwide production of all shrimps and prawns of around 3 200 000 t (both from capture fishery and aquaculture). Around 710 000 t of this production originated in the Western Central Pacific.

The exact number of species of shrimps and prawns present in the Western Central Pacific is uncertain. This is especially true for the carideans and stenopodids, most species of which have no economic value and thus only very few studies exist on them. However, recent extensive studies on carideans from the Philippines and adjacent areas have shown that 528 species occur in that region alone. Although caridean shrimps are widely distributed in marine waters, brackish and fresh waters, and are found from high mountain regions to coral reefs and the deep sea, at present only the giant river prawn *Macrobrachium rosenbergii* is of high economic importance in the Western Central Pacific. This is a very large species, sometimes found in marine waters, and extensively fished and cultured in several countries. The other coastal or fresh-water caridean shrimps in the area are either too small or not abundant enough to be fished on a large scale, although a few of them may locally be used as food. It should be noted, however, that the present commercial fishing activities in the area are generally rather simple and mainly limited to shallow waters with depths less than 100 m. Several deep-sea caridean shrimps, mostly belonging to the family Pandalidae, can often be caught in large quantities during exploratory trawling operations and may eventually prove to be of commercial interest with the development of a deep-sea fishery.

The Stenopodidea (with the single family Stenopodidae) generally have no economic importance, although a few of them, as well as some coral reef carideans, are sporadically seen in the aquarium trade and thus have some commercial value.

Most of the commercial species of shrimps and prawns belong to the Penaeoidea. Studies on penaeoids are more comprehensive and at present 4 families including 191 species are known to occur in the Western Central Pacific, with the Penaeidae being the most important family. As species of the Penaeidae are generally of moderate to large size and often occur in large quantities in shallow waters along the continental shelf on trawlable bottoms, they are fished extensively by trawls, seines, set nets, traps, and artisanal gear. Large-scale pond culture of penaeid shrimps is practised in several countries. Species of the penaeoid families Aristeidae and Solenoceridae are mainly deep-water dwellers and largely unexploited. The fact that larger representatives of these 2 families are often caught on the basis of exploratory deep-sea trawling, indicates that they have a high commercial potential with the future development of a deep-sea fishery in the area. In contrast, species of the penaeoid family Sicyoniidae are generally small, nowhere abundant, and do not have any commercial potential.

Sergestoid shrimps are usually small and of no interest to fisheries, except for the genus *Acetes*, 7 species of which are found in the Western Central Pacific. These epipelagic shrimps inhabit shallow coastal estuarine waters and often occur in great abundance. They are extensively fished by push nets, bag nets and seines, and are of considerable economic importance, particularly in the Southeast Asian countries of the area.

Shrimps and prawns in the Western Central Pacific are generally marketed fresh or frozen, sometimes live, except for species of *Acetes* which are usually processed into shrimp paste. They are locally consumed or exported. In the Philippines, Indonesia and Thailand, altogether 94 200 t of shrimps and prawns were exported in 1987.

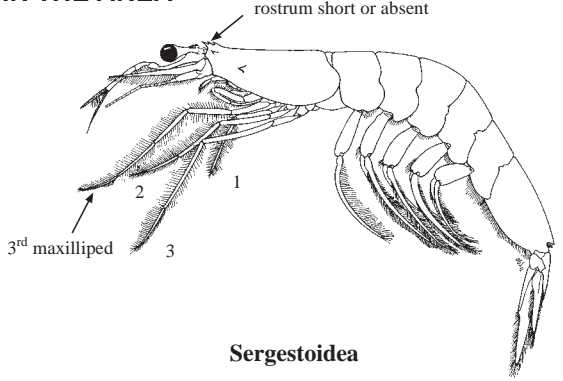
GUIDE TO THE MAJOR GROUPS OF SHRIMPS AND PRAWNS OCCURRING IN THE AREA

SERGESTOIDEA

Page 858

Sergestoid shrimps

Usually small to microscopic, body strongly compressed laterally, shell rather soft; rostrum and last 2 pairs of legs (pereiopods) reduced (absent in Luciferidae); abdomen with posterior part of pleura (lateral plates) covering anterior part of succeeding pleura; males with large copulatory organ (petasma) on first pair of pleopods (abdominal appendages); generally pelagic, with eggs released directly into the water (eggs carried on second pair of legs in Luciferidae).



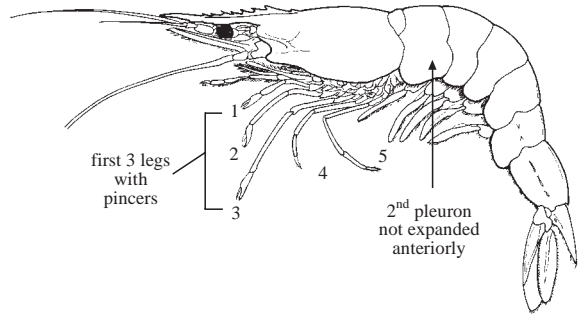
Sergestoidea

PENAEOIDEA

Page 866

Penaoid shrimps

Small to large; all 5 pairs of legs (pereiopods) well developed, with first 3 pairs forming a pincer, none of the pincers particularly large; abdomen with posterior part of pleura (or lateral plates) covering anterior part of succeeding pleura; with large specific copulatory organ on first pair of pleopods (abdominal appendages) in males (petasma), and on posterior thoracic sternites in females (thelycum); eggs released directly into the water, not retained by the females.



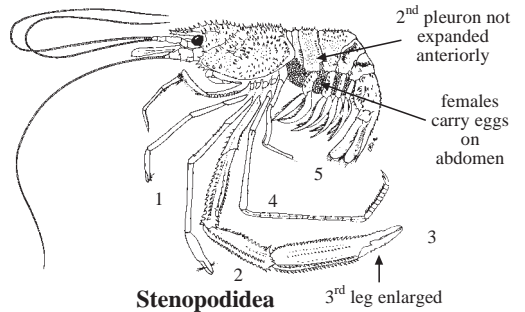
Penaeoidea

STENOPODIDEA

Page 955

Stenopodid shrimps

Usually small; all 5 pairs of legs (pereiopods) well developed, with first 3 pairs forming a pincer, third pair huge and massive; abdomen with posterior part of pleura (lateral plates) covering anterior part of succeeding pleura; males and females without large specific copulatory organ on first pair of pleopods (abdominal appendages) or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



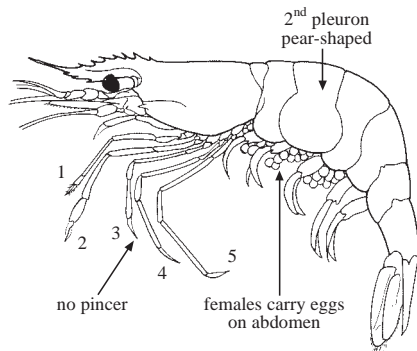
Stenopodidea

CARIDEA

Page 957

Caridean shrimps

Size very small to large; all 5 pairs of legs (pereiopods) well developed, the first 2 pairs with or without pincer, but third pair never bearing a pincer; second abdominal pleuron (lateral plate) greatly expanded, pear-shaped and overlapping posterior part of first pleuron and anterior part of third pleuron; males and females without large specific copulatory organ on first pair of pleopods (abdominal appendages) or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Caridea

LIST OF FAMILIES OCCURRING IN THE AREA

The symbol  is given for those families which are treated further in this contribution.

Infraorder PENAEIDEA

Superfamily SERGESTOIDEA

LUCIFERIDAE

 SERGESTIDAE

Superfamily PENAEOIDEA

 ARISTEIDAE

 SOLENOCERIDAE

 PENAEIDAE

 SICYONIIDAE

Infraorder STENOPODIDEA

 STENOPODIDAE

Infraorder Caridea

Superfamily PASIPHAEOIDEA

PASIPHAEIDAE

Superfamily OPLOPHORIDEA

OPLOPHORIDAE

Superfamily ATYOIDEA

 ATYIDAE

Superfamily BRESILIOIDEA

BRESILIIDAE

Superfamily NEMATOCARCINOIDEA

EUGONATONOTIDAE

NEMATOCARCINIDAE

 RHYNCHOCINETIDAE

Superfamily PSALIDOPODOIDEA

PSALIDOPODIDAE

Superfamily STYLODACTYLOIDEA

STYLODACTYLIDAE


Superfamily CAMPYLONOTIDEA

BATHYPALAEEMONELLIDAE

Superfamily PALAEMONOIDEA

ANCHISTIOIDIDAE

GNATHOPHYLLIDAE

 HYMENOCERIDAE

 PALAEMONIDAE

Superfamily ALPHEOIDEA

ALPHEIDAE

 HIPPOLYTIDAE

OGYRIDIDAE

Superfamily PROCESSOIDEA

PROCESSIDAE

Superfamily PANDALOIDEA

 PANDALIDAE

THALASSOCARIDIDAE

Superfamily CRANGONOIDEA

CRANGONIDAE

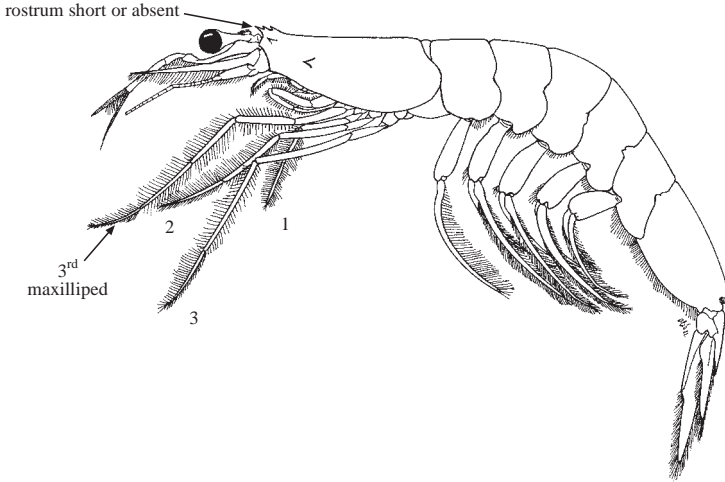
GLYPHOCRANGONIDAE

Infraorder PENAEOIDEA

Superfamily SERGESTOIDEA

Sergestoid shrimps

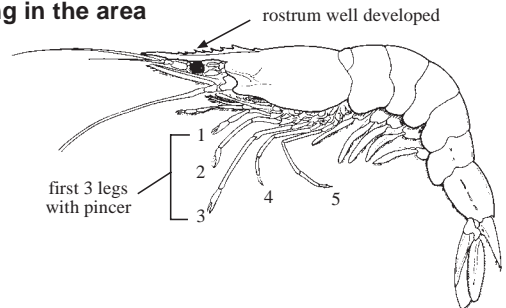
Diagnostic characters: Usually microscopic to small sized, with a body length from 1 to about 5 cm (exceptionally over 8.5 cm). **Body strongly compressed laterally**, shell soft. Carapace with crests and grooves poorly developed, often wanting. **Rostrum very short and small, sometimes absent.** In males, lower antennular flagella with a clasping organ. First leg with or without pincer, second and third legs bearing small pincers; **fourth and fifth legs reduced or absent.** Abdomen with **posterior part of pleura (lateral plates) covering anterior part of succeeding pleura.** **Males with large copulatory organ (petasma)** on first pair of pleopods (abdominal appendages). Generally pelagic; eggs released directly into the water (family Sergestidae), or carried on second pair of legs until hatching (family Luciferidae).



Habitat, biology, and fisheries: Members of this superfamily (including 2 families and 7 genera) mainly inhabit brackish and marine environments (a single species is found in pure fresh water). They can be found from shallow to deep waters (deeper than 2 100 m) and are generally pelagic, although a few (in the genus *Sicyonella*) have adapted to a benthic way of life. At present, 2 families and 4 genera of sergestoid shrimps are known from the Western Central Pacific, but all except the genus *Acetes* are without any economic importance as they are either too small, not abundant enough, or occur in very deep water. Members of the genus *Acetes* mainly occur in estuarine or shallow coastal waters and are seasonally very abundant. These are small shrimps with a body length of adults ranging between 1 and 4 cm. Their bodies are translucent or semi-translucent, with black eyes and several pairs of red pigment spots (chromatophores) on the bases of uropods. In the course of their fishing seasons, they are extensively caught by push nets, bag nets, and seines. They are mainly fished in the Southeast Asian countries of the area and are of significant commercial importance. From 1990 to 1995, the reported annual catch of sergestoid shrimps in the Western Central Pacific ranged from around 38 500 to 45 700 t (FAO Yearbook of Fishery Statistics). Only a small part of the catch is marketed fresh, and the greater fraction is dried, salted or fermented with salt and processed into shrimp paste. As only species of *Acetes* are of commercial interest, a key to species of this genus is given here.

Other major groups of shrimps and prawns occurring in the area

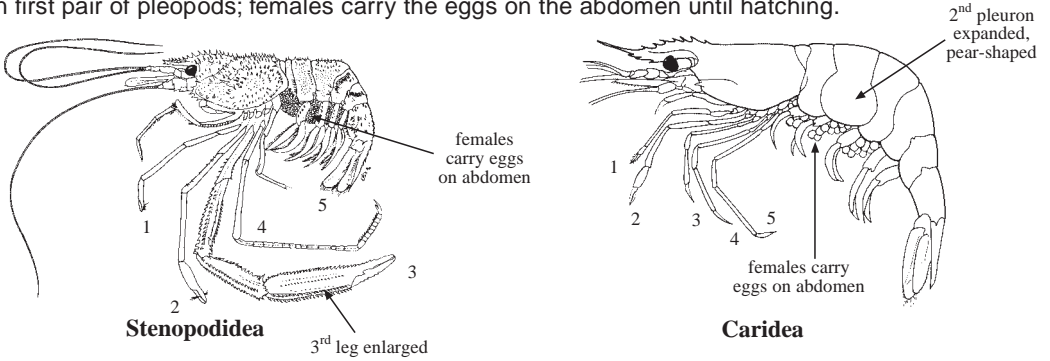
Penaeoidea: all 5 pairs of legs well developed, with first 3 pairs forming a pincer, none of the pincers particularly large; rostrum usually well developed, extending beyond eyes; numerous branchiae (more than 8 on each side).



Penaeoidea

Stenopodidea: all 5 pairs of legs well developed, first 3 pairs forming a pincer, third pair huge and massive; males without large copulatory organ on first pair of pleopods; females carry the eggs on the abdomen until hatching.

Caridea: all 5 pairs of legs well developed, third pair without pincer; abdomen with pleuron of second segment greatly expanded, overlapping those of first and third segments; males without large copulatory organ on first pair of pleopods; females carry the eggs on the abdomen until hatching.



Key to families and genera^{1/} of Sergestoidea occurring in the area

- 1a. Head greatly elongated (Fig. 1); no branchiae; size very small, about 1 cm body length **Luciferidae**
- 1b. Head not particularly elongate; branchiae present; size small, but generally adults with more than 2 cm body length (**Sergestidae**) → 2
- 2a. Fourth and fifth legs entirely lacking, reduced to a pair of protuberances (genital coxae) in males (Fig. 2); first maxillae and first maxillipeds without palp; second maxillae with a single undivided lobe **Acetes**
- 2b. Fourth and fifth legs present, with fifth leg much shorter than fourth (Fig. 3); first maxillae and first maxillipeds with palp; second maxillae with 2 lobes **other genera**

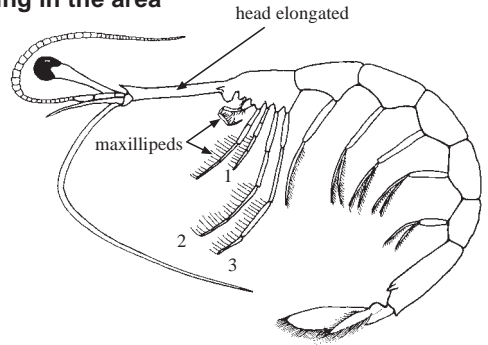


Fig. 1 Luciferidae

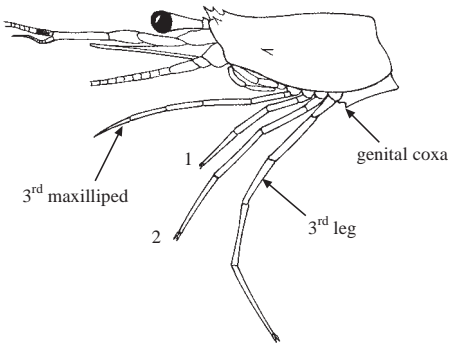


Fig. 2 Acetes

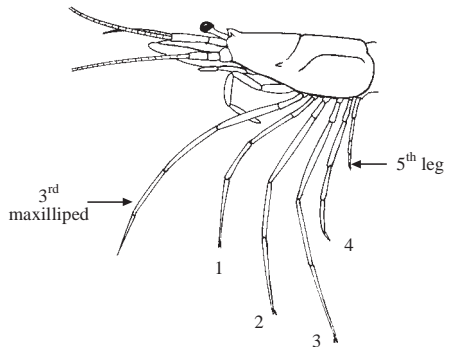


Fig. 3 Sergestes

^{1/} Restricted to the identification of *Acetes*, the only genus of interest to fisheries in the area.

SERGESTIDAE

Key to sexes of *Acetes*

- 1a. A pair of protuberances (genital coxae; Fig. 2) between third legs and first pleopods; lower antennular flagella with 1 or 2 clasping spines, or modification of these (Fig. 4); petasma (Fig. 5) present on first pleopods **male**
- 1b. No protuberance in genital area; lower antennular flagella without spine; petasma absent **female**

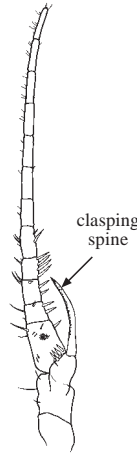


Fig. 4 lower antennular flagellum of a male

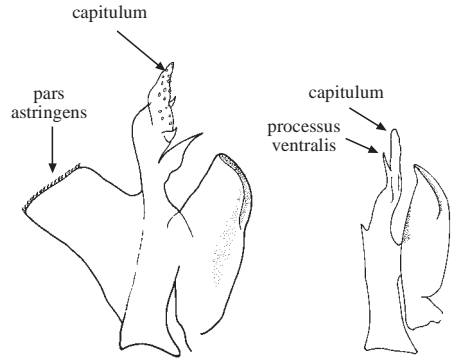


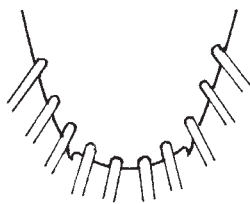
Fig. 5 examples of the petasma

Key to the species of *Acetes* occurring in the area

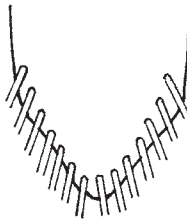
Remark on key characters: see the respective species accounts for illustrations of the petasma and lower antennular flagellum of males, and the basis of third leg of females.

Females

- 1a. Apex of telson rounded or truncated (Fig. 6a) → 2
- 1b. Apex of telson triangular (Fig. 6b) → 3
- 2a. Third thoracic sternite produced posteriorly (Fig. 7b) *Acetes japonicus*
- 2b. Third thoracic sternite not produced posteriorly (Fig. 7a) *Acetes serrulatus*

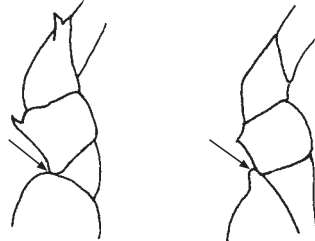


a) rounded or truncated



b) triangular

Fig. 6 apex of telson



a) b)
Fig. 7 base of third leg

- 3a. Procurved tooth present between bases of first pleopods → 4
- 3b. Procurved tooth absent between bases of first pleopods → 6
- 4a. Inner margin of basis of third leg with sharply pointed projection; third and fourth thoracic sternites deeply channeled longitudinally. *Acetes indicus*
- 4b. Inner margin of basis of third leg without sharply pointed projection; third and fourth thoracic sternites not channeled longitudinally. → 5
- 5a. First segment of antennular peduncle at most as long as second and third segments together; distal inner margin of basis of third leg ending in blunt projection . . . *Acetes intermedius*
- 5b. First segment of antennular peduncle longer than second and third segments together; distal inner margin of basis of third leg without projection *Acetes erythraeus*

- 6a. Lower antennular flagellum with 20 segments or less; distal inner margin of basis of third leg ending in projection; pair of small protuberances on anterior part of third thoracic sternite *Acetes sibogae*
- 6b. Lower antennular flagellum with 20 segments or more; distal inner margin of basis of third leg without projection; pair of large protuberances on anterior part of third thoracic sternite *Acetes vulgaris*

Males

- 1a. Anterior margin of genital coxa rounded; petasma without pars astringens (Fig. 5) → 2
- 1b. Anterior margin of genital coxa pointed; petasma with pars astringens (Fig. 5) → 4
- 2a. Procurved tooth present between bases of first pleopods; lower antennular flagellum with 1 clasping spine *Acetes indicus*
- 2b. Procurved tooth absent between bases of first pleopods; lower antennular flagellum with 2 clasping spines → 3
- 3a. Lower antennular flagellum with triangular projection from upper end of first segment of main branch *Acetes serrulatus*
- 3b. First segment of main branch of lower antennular flagellum without triangular projection *Acetes japonicus*
- 4a. Procurved tooth present between bases of first pleopods → 5
- 4b. Procurved tooth absent between bases of first pleopods → 6
- 5a. First segment of antennular peduncle shorter than second and third segments together; capitulum of petasma with 3 to 5 subequally large hooks along outer margin . . . *Acetes intermedius*
- 5b. First segment of antennular peduncle longer than second and third segments together; capitulum of petasma with 1 large hook at outer margin *Acetes erythraeus*
- 6a. Lower antennular flagellum with 12 segments or less; capitulum of petasma with 1 large hook and often additionally 1 small hook along outer margin *Acetes sibogae*
- 6b. Lower antennular flagellum with 17 segments or more; capitulum of petasma with 3 large hooks along outer margin *Acetes vulgaris*

List of genera and commercial species occurring in the area








The symbol  is given when species accounts are included.

LUCIFERIDAE

Genus *Lucifer*

SERGESTIDAE

Genus *Acetes*

-  *Acetes erythraeus* Nobili, 1905
-  *Acetes indicus* H. Milne Edwards, 1830
-  *Acetes intermedius* Omori, 1975
-  *Acetes japonicus* Kishinouye, 1905
-  *Acetes serrulatus* (Krøyer, 1855)
-  *Acetes sibogae* Hansen, 1919
-  *Acetes vulgaris* Hansen, 1919

Genus *Sergestes*

Genus *Sergia*

Genus *Sicyonella*

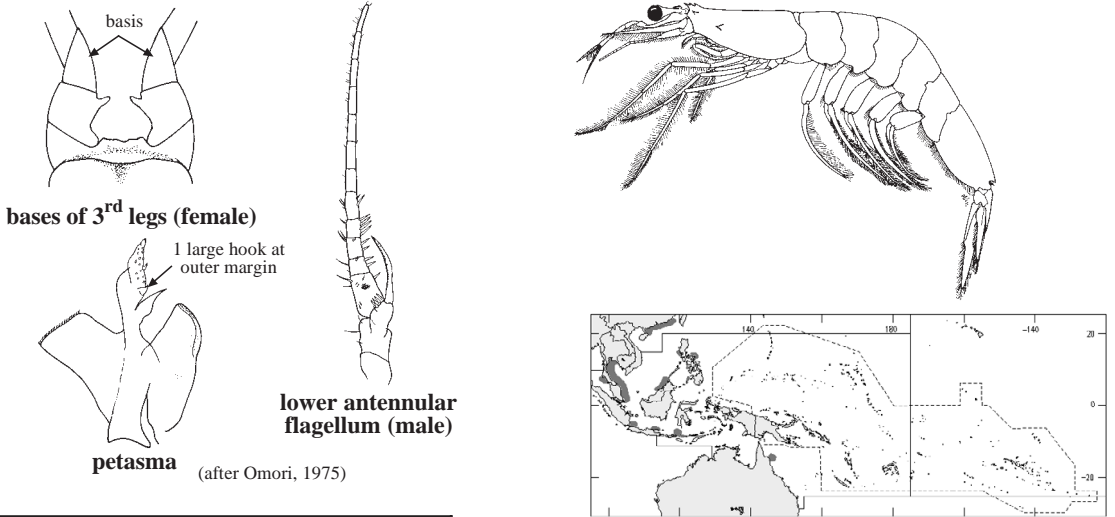
References

- Miquel, J.C. 1984. Shrimps and Prawns. In *FAO species identification sheets for fisheries purposes. Western Indian Ocean (Fishing Area 51)*, edited by W. Fischer and G. Bianchi. Rome, FAO.
- Omori, M. 1975. The systematics, biogeography, and fishery of epipelagic shrimps of the genus *Acetes* (Crustacea, Decapoda, Sergestidae). *Bull. Ocean Res. Inst., Univ. Tokyo*, 7:1-89.
- Pérez Farfante, I. and B.F. Kensley. 1997. Penaeoid and sergestoid shrimps and prawns of the world. Keys and diagnosis for the families and genera. *Mem. Mus. Natn. Hist. Nat.*, 175:1-233.

***Acetes erythraeus* Nobili, 1905**

En - Tsvikihini paste shrimp; **Fr** - Chevrette tsvikihini; **Sp** - Camaroncillo tsvikihini.

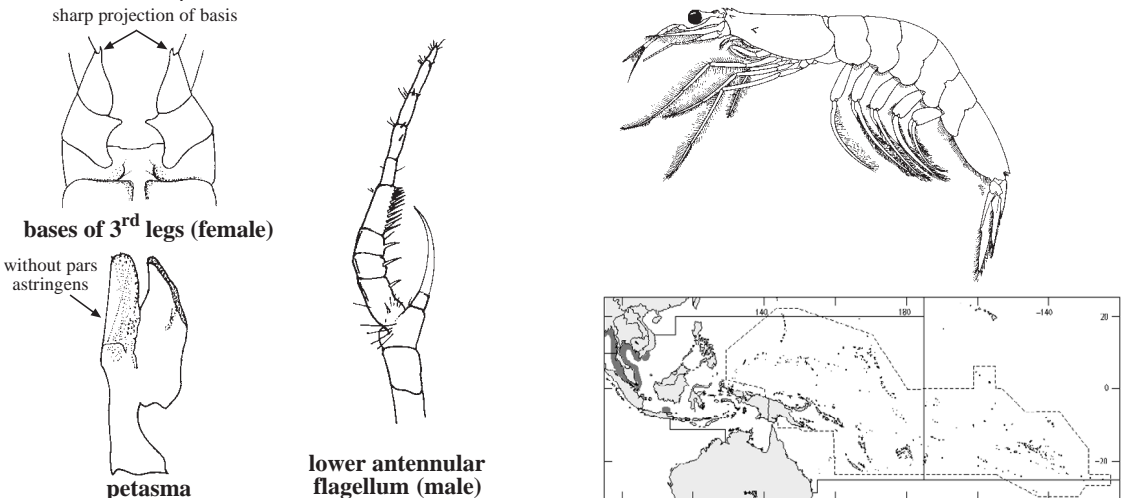
Maximum body length 1.6 to 4.0 in females (rarely 4.8 cm) and 1.6 to 3.2 cm in males. Epipelagic, found over muddy or sandy bottoms, from the surface to a depth of 55 m. Marine or brackish, but usually brackish and fished in the intertidal zone and estuaries with mangroves. Probably the most common species of the genus in the area and of major commercial importance in its range, despite its very small size. Caught with triangular nets, lift nets, scoop nets, push nets, bag nets, set filter nets, and seines, occasionally encountered in penaeid shrimp culture ponds. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Indo-West Pacific from the eastern coast of Africa to southern China and northeastern Australia.



***Acetes indicus* H. Milne Edwards, 1830**

En - Jawla paste shrimp; **Fr** - Chevrette jawla; **Sp** - Camaroncillo javlá.

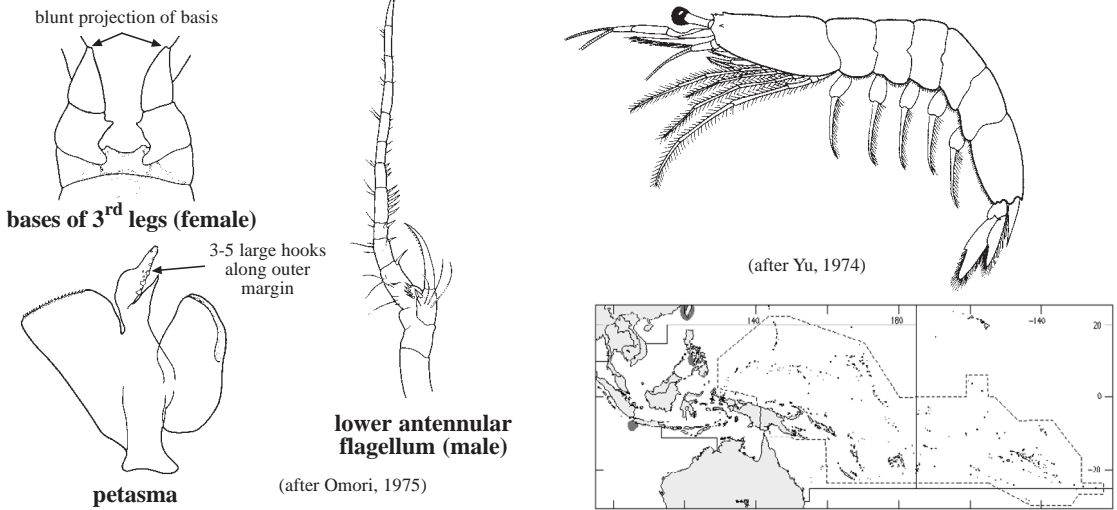
Maximum body length 2.3 to 4.0 cm (females) and 1.5 to 2.5 cm (males). Inhabits shallow, sometimes brackish coastal waters; epipelagic, usually swims in midwater or near the surface. One of the more common species of the genus in the area and of considerable economic importance. Caught with push nets, bag nets and seines, and sometimes by light fishing at night. Taken throughout its range. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Indo-West Pacific from India to Viet Nam and Indonesia.



***Acetes intermedius* Omori, 1975**

En - Taiwan mauxia shrimp; **Fr** - Chevrette mauxia de Formose; **Sp** - Camaroncillo mauxia de Formosa.

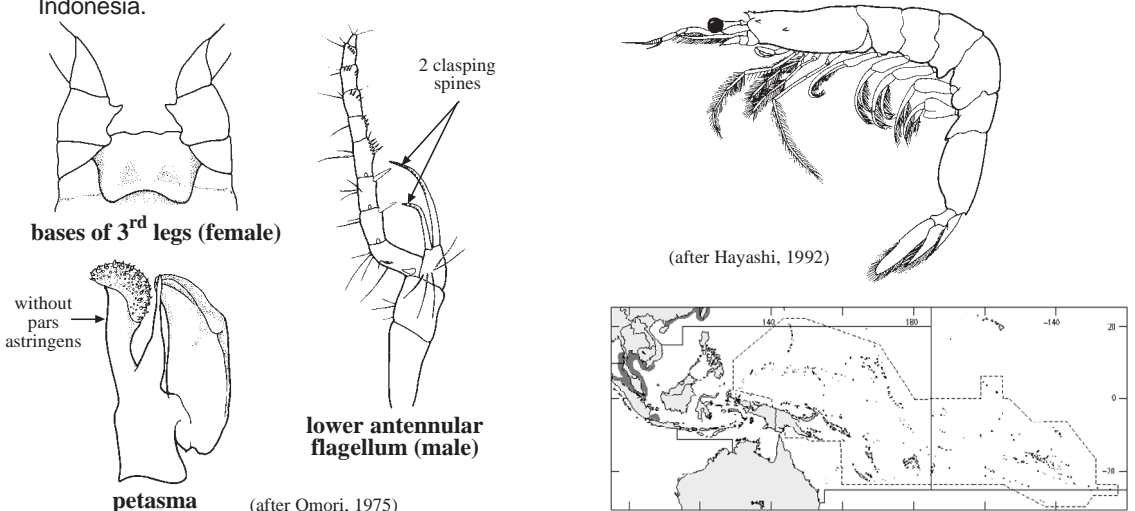
Maximum body length 2.0 to 2.6 cm (females) and 1.7 to 2.4 cm (males). Epipelagic, found mainly at sea. Within the area, reported from commercial catches made in the Philippines and Indonesia, and probably of moderately commercial importance. Caught with midwater trawls, triangular nets, lift nets, and scoop nets, and sometimes by light fishing at night. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Found in the western Pacific, but so far only reported from Taiwan Province of China, Philippines, and the southern coast of Java.



***Acetes japonicus* Kishinouye, 1905**

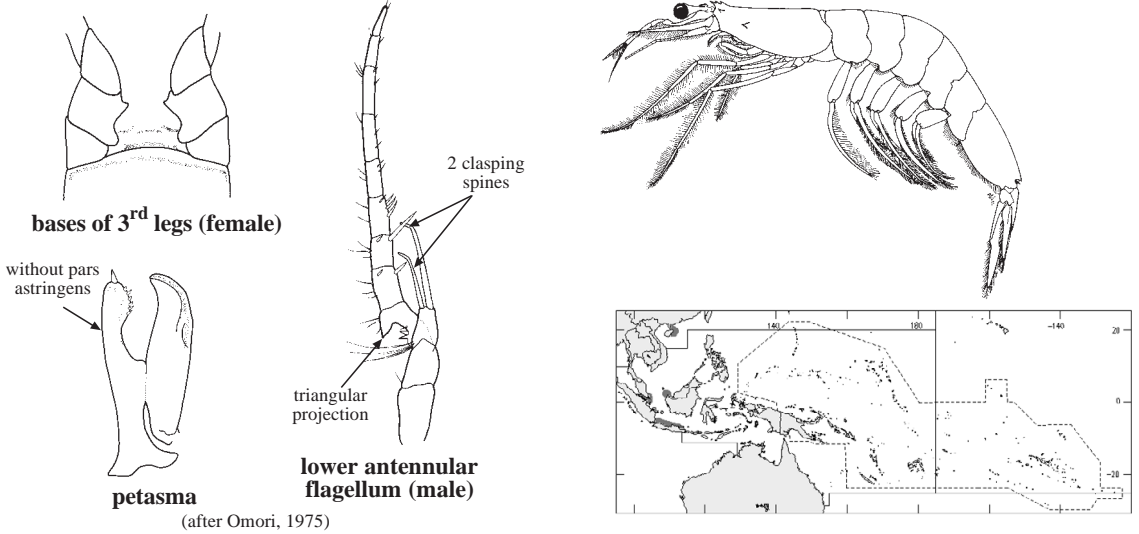
En - Akiami paste shrimp; **Fr** - Chevrette akiami; **Sp** - Camaroncillo akiami.

Maximum body length 1.5 to 3.0 cm (females) and 1.1 to 2.4 cm (males). Epipelagic, inhabits shallow coastal waters over muddy bottoms. One of the more common species of the genus in the area and of considerable economic importance; reported from commercial catches made in Viet Nam, Thailand, and Malaysia. Caught with push nets, bag nets, and seines, and sometimes by light fishing at night. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. In 1995, the reported production from culture ponds of this species in Indonesia amounted to 3 500 t (FAO Aquaculture Production Statistics). Widely distributed in the Indo-West Pacific from the Persian Gulf to Japan and Indonesia.



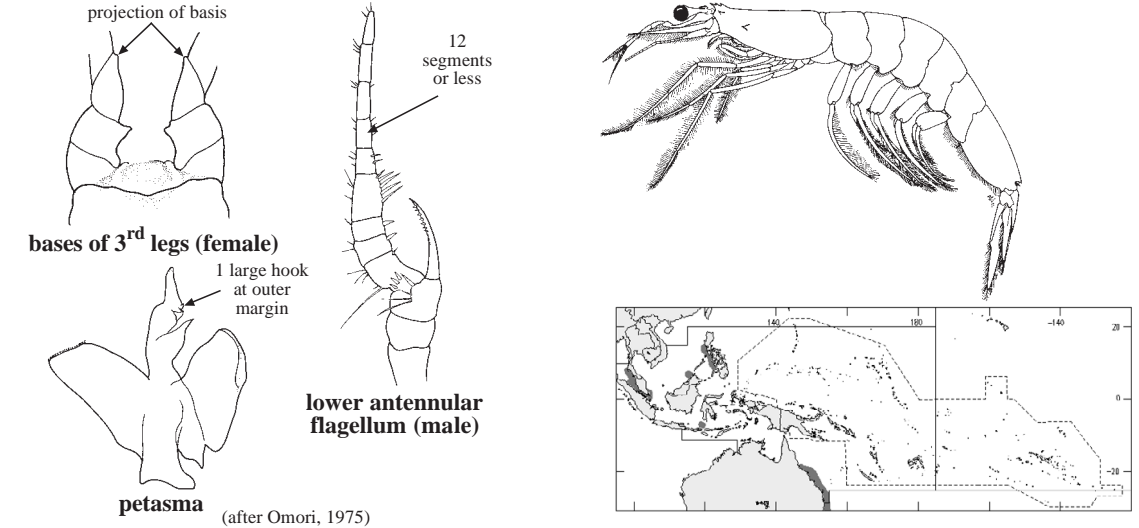
***Acetes serrulatus* (Krøyer, 1855)**

En - Southern mauxia shrimp; **Fr** - Chevrette mauxia méridionale; **Sp** - Camaroncillo mauxia sureño.
 Maximum body length 1.5 to 2.1 cm (females) and 1.2 to 1.7 cm (males). Epipelagic, inhabits shallow coastal water. Probably less common than the other species of the genus. Within the area, reported from commercial catches made in Malaysia and Indonesia, but no further information on its economic status is presently available. Caught by push nets, bag nets, and seines. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Western Pacific and so far known only from southern China, Singapore, Malaysia, and Indonesia.



***Acetes sibogae* Hansen, 1919**

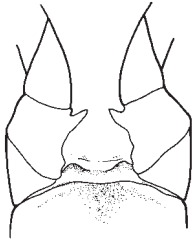
En - Alamang shrimp; **Fr** - Chevrette alamang; **Sp** - Camaroncillo alamang.
 Maximum body length 1.4 to 3.4 cm (females) and 1.3 to 2.5 cm (males). Epipelagic, found over muddy bottoms in estuarine and marine waters to a depth of 55 m. Probably caught throughout its range in the area and of moderate commercial importance. Taken by triangular nets, lift nets and scoop nets. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Indo-West Pacific from India to the Philippines and eastern Australia (the Australian population and certain specimens from India are sometimes considered to be 2 subspecies).



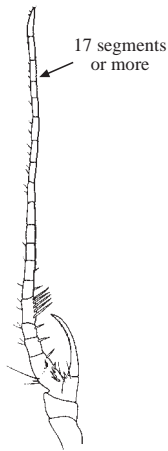
Acetes vulgaris Hansen, 1919

En - Jembret shrimp; **Fr** - Chevrette jembre; **Sp** - Camaroncillo jembre.

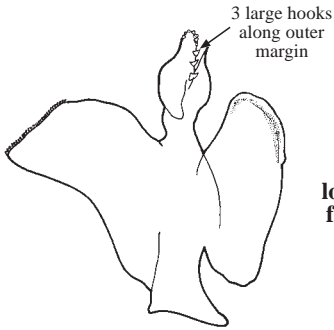
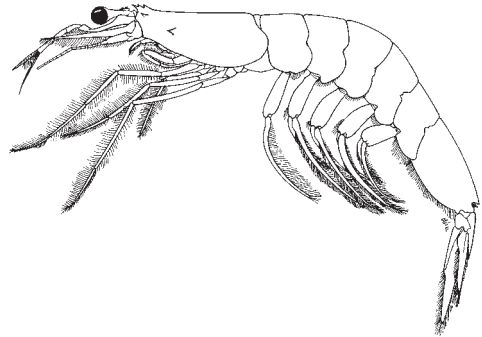
Maximum body length 2.0 to 3.4 cm (females) and 1.7 to 2.6 cm (males). Epipelagic, found over sandy and muddy bottoms in marine waters from depths of 9 to 55 m. One of the more common species of the genus in the area and of considerable economic importance; reported from commercial catches made in Thailand, Singapore, and Indonesia. Caught with push nets, bag nets, scoop nets, and seines, sometimes by light fishing at night. Marketed dried, boiled, salted, fermented with salt, fresh, or processed in other ways; consumed locally, mainly in the form of seasoning such as shrimp paste or shrimp sauce, sometimes exported. Western Pacific from southern China to the Strait of Malacca and Indonesia.



bases of 3rd legs (female)



17 segments or more

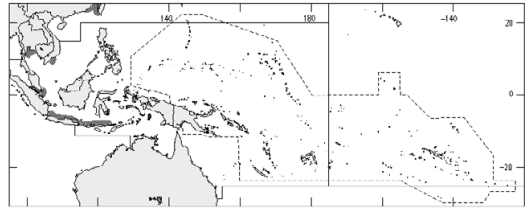


3 large hooks along outer margin

lower antennular flagellum (male)

petasma

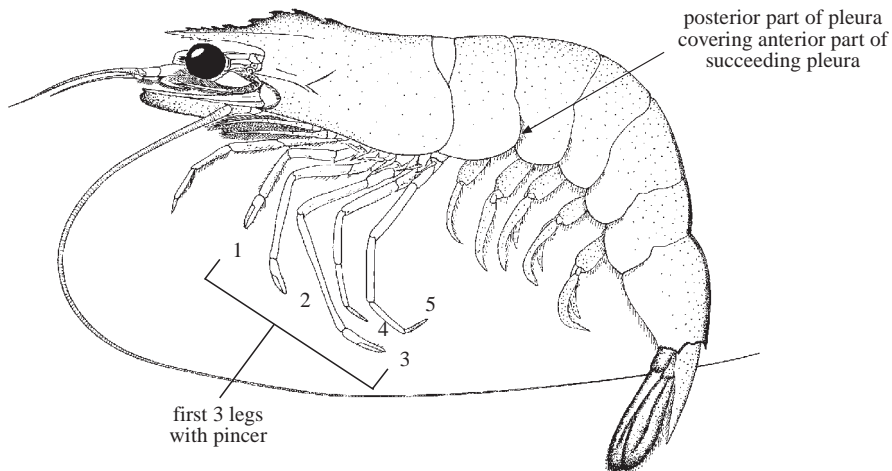
(after Omori, 1975)



Superfamily PENAEOIDEA

Penaeoid shrimps

Diagnostic characters: Small to large sized, with a body length from 2.5 to about 35 cm. All 5 pairs of legs well developed, with **first 3 pairs of legs forming a pincer**, none of the pincers particularly large. Abdomen with **posterior part of pleura (lateral plates) covering anterior part of succeeding pleura**. **With large copulatory organ, on first pair of pleopods in males (petasma), and on posterior thoracic sternites in females (thelycum)**. Eggs are released directly into the water and not retained by the females on the abdomen.

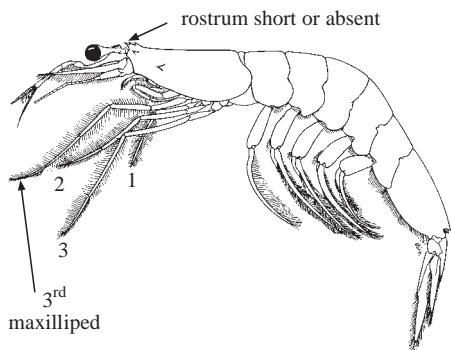


Habitat, biology, and fisheries: Members of this superfamily are all marine, although the juveniles of some species of Penaeidae inhabit brackish water and occasionally are even found in almost fresh water. The 4 families of penaeoids can all be found in the Western Central Pacific, with the family Penaeidae being of great economic importance in capture fisheries and aquaculture. Members of the 2 families Aristeidae and Solenoceridae mainly occur in deep water and are presently not exploited in the area. As some of them can reach a large size and are often taken on the basis of exploratory deep-water trawling, they may eventually prove to be of commercial interest. In contrast, species of the family Sicyoniidae are usually small and nowhere abundant. They are caught incidentally in prawn fisheries but do not have any economic importance.

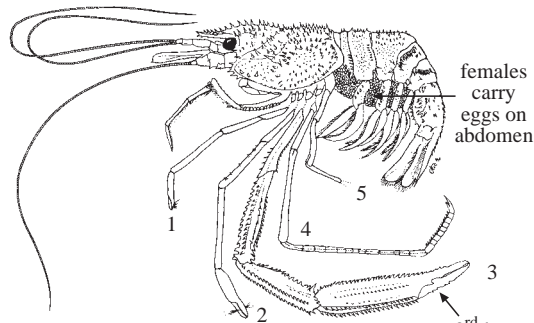
Other major groups of shrimps and prawns occurring in the area

Sergestoidea: usually small sized to microscopic; body strongly compressed laterally; shell rather soft; rostrum as well as last 2 pairs of legs reduced or absent; branchiae few, not more than 8 on each side.

Stenopodidea: third pincer very large and massive; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.

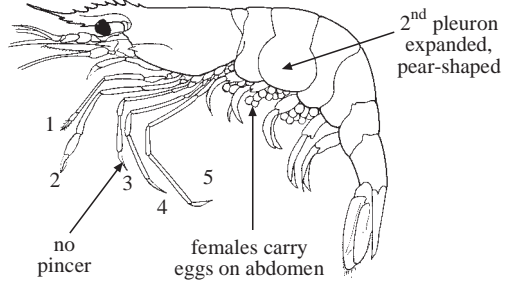


Sergestoidea



Stenopodidea

Caridea: third leg always without pincer; pleuron of second abdominal segment greatly expanded and overlapping those of first and third segments; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Caridea

Key to the families of Penaeoidea occurring in the area

- 1a. Either rostrum very short and armed with 1 or 2 upper teeth only, or upper antennular flagellum very short and attached to the base of distal antennular segment (Fig. 1)
 **Aristeidae** (p. 868)
- 1b. Rostrum always armed with more than 3 upper teeth, and both upper and lower antennular flagella of similar length and attached to the tip of antennular peduncle → 2
- 2a. Pleopods (abdominal appendages) with 1 branch only; abdomen often with many distinct furrows and grooves (Fig. 2) **Sicyoniidae** (p. 952)
- 2b. Pleopods (abdominal appendages) with 2 branches; abdomen without or with very few distinct grooves. → 3

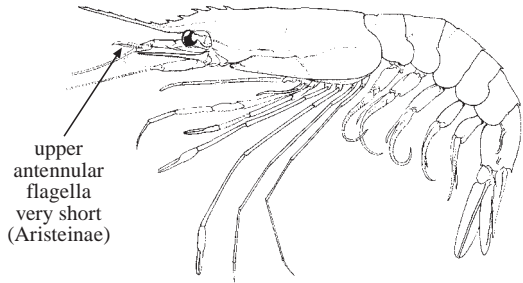


Fig. 1 Aristeidae

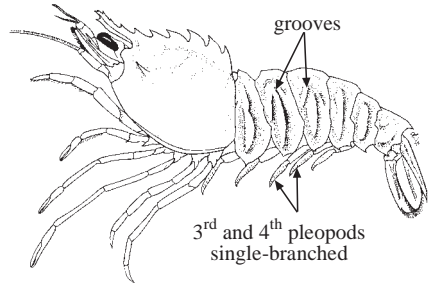


Fig. 2 Sicyoniidae

- 3a. Cervical groove prominent and extending to about dorsal carapace; either postorbital or postantennal spine present (Fig. 3) **Solenoceridae** (p. 875)
- 3b. Distinct part of cervical groove far from dorsal carapace; postorbital and postantennal spine absent (Fig. 4) **Penaeidae** (p. 889)

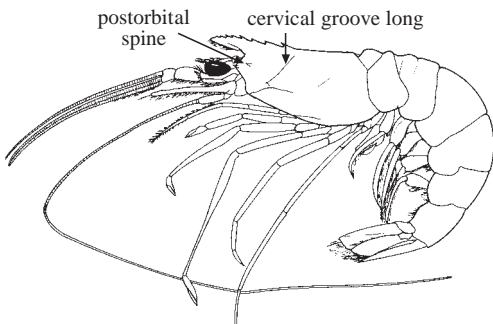


Fig. 3 Solenoceridae

(after Hayashi, 1992)

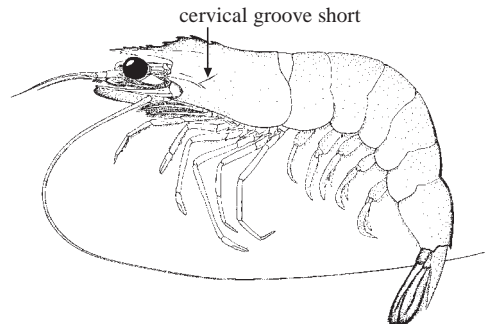
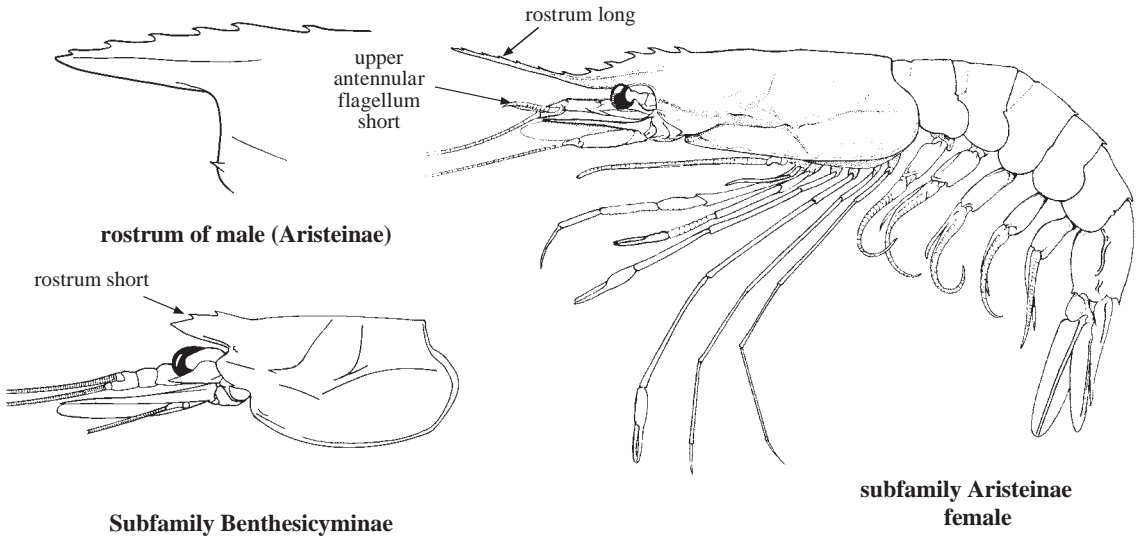


Fig. 4 Penaeidae

ARISTEIDAE

Aristeid shrimps

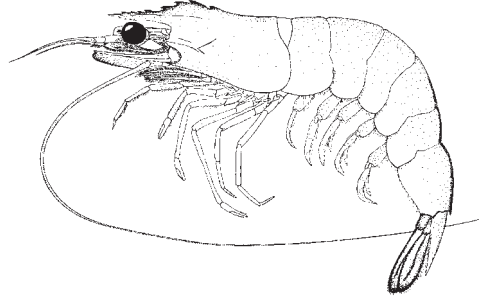
Diagnostic characters: Animals either a) with rostrum very long in females and young males, but becoming rather short in adult males, and **always bearing more than 2 upper teeth (subfamily Aristeinae)**; or b) **rostrum short, not extending beyond eyes and armed with 1 or 2 upper teeth (subfamily Benthescyminae)**. No styliform projection at base of eyestalk, but a tubercle present on its inner border (very small in *Aristaeomorpha*). **In the subfamily Aristeinae, upper antennular flagellum very short and attached to the base of distal antennular segment. Carapace lacks both postorbital and postantennal spines;** cervical groove either long, extending almost to dorsal carapace, or very short. All 5 pairs of legs well developed, **fourth leg bearing 2 well-developed arthrobranches (hidden beneath carapace)**. **In males, endopod of second pair of pleopods (abdominal appendages) with appendix masculina and appendix interna, but without lateral projection.** Third and fourth pleopods divided into 2 branches. Telson with 1 to 4 pairs of movable lateral spines. **Colour: typical coloration of deep-sea crustaceans:** body reddish or scarlet, sometimes pale white and with red cross bands on abdomen.



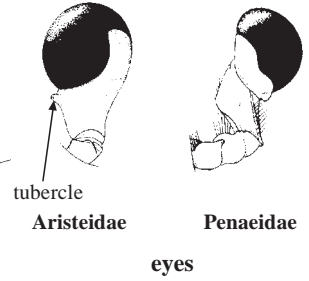
Habitat, biology, and fisheries: All representatives of this family are marine and occur in very deep waters (generally deeper than 300 m), with the members of the subfamily Benthescyminae being exclusively bathypelagic (to depths of at least 5 413 m), whereas those of the Aristeinae are benthic and prefer soft bottom. Aristeid shrimps are generally of large size and can reach a body length of 33 cm. The sexes are easily distinguished by the presence of a large copulatory organ (petasma) on the first pair of pleopods (abdominal appendages) of males, while the females have the posterior thoracic sternites modified into a large sperm receptacle process (thelycum) which holds the spermatophores or sperm sacs (usually whitish or yellowish in colour) after mating. The shape of the petasma and thelycum is often specific and very useful for species identification. The eggs are small and numerous, and are released directly into the water and not retained on the female abdomen. The larvae are planktonic and have the nauplius stage. At present, 11 genera and 29 species of aristeid shrimps are known from the Western Central Pacific, but none of them are fished commercially because there is virtually no deep-sea fishery in the area. Nevertheless, the fact that some species reach a large size and are commonly taken on the basis of exploratory deep-water trawling, suggests they may have future commercial potential once that suitable deep-sea fishing gear is used in the area. In view of the present non-commercial status of the whole family in the area, no identification key to all species is provided here. Instead, a simplified key and species accounts are given for 3 species that have high potential interest.

Similar families occurring in the area

Penaeidae: rostrum always armed with more than 3 upper teeth; both upper and lower antennular flagella of similar length, attached to tip of antennular peduncle; eyestalk without tubercle on inner border; in males, endopod of second pair of pleopods with appendix masculina only; a single well-developed arthrobranch on fourth leg (hidden beneath carapace).



Penaeidae



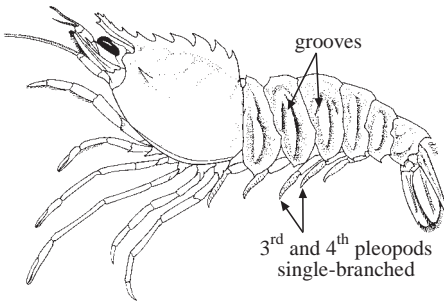
tubercle

Aristeidae

Penaeidae

eyes

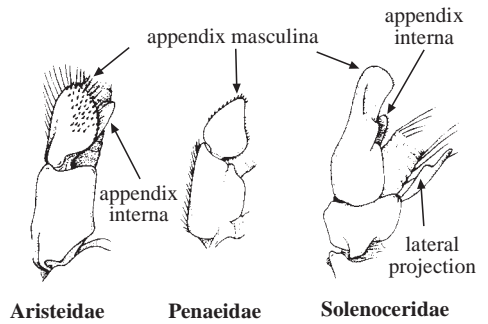
Sicyoniidae: shell generally hard and body "stony" in appearance; abdomen often with deep grooves and numerous tubercles; rostrum always armed with more than 3 upper teeth; both upper and lower antennular flagella of similar length, attached to tip of antennular peduncle; third and fourth pleopods single-branched.



Sicyoniidae

grooves

3rd and 4th pleopods single-branched



Aristeidae

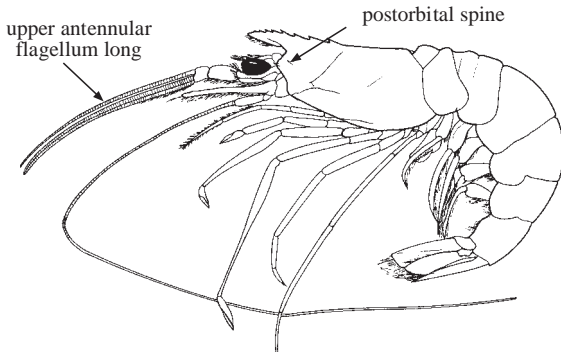
Penaeidae

Solenoceridae

various types of appendices masculinae on endopods of 2nd pair of pleopods

Solenoceridae: either postorbital or postantennal spine present on carapace; rostrum always armed with more than 3 upper teeth; both upper and lower antennular flagella long, of similar length and attached to tip of antennular peduncle; telson usually armed with fixed lateral spines; in males, endopod of second pair of pleopods with appendix masculina, appendix interna, and lateral projection.

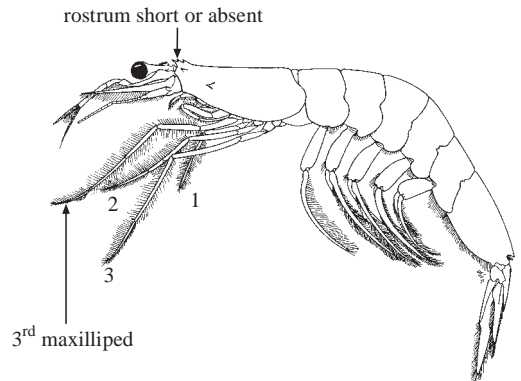
Sergestidae: generally small sized; rostrum very short; body strongly compressed laterally, shell soft; last 2 pairs of legs reduced or absent.



Solenoceridae

upper antennular flagellum long

postorbital spine



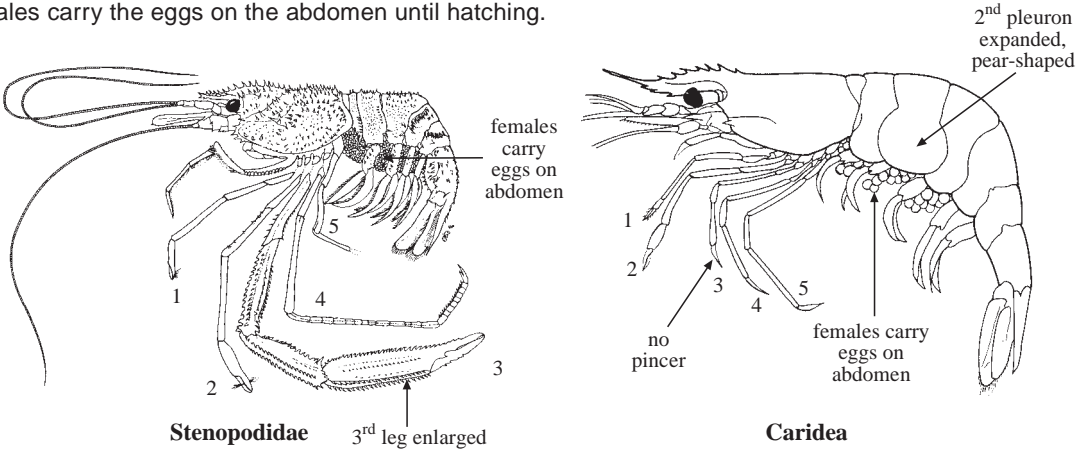
Sergestidae

rostrum short or absent

3rd maxilliped

Stenopodidae: third pincer very large and massive; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.

Shrimps of the infraorder Caridea: third leg without pincer; second abdominal pleuron (lateral plate) greatly expanded, overlapping posterior part of first pleuron as well as anterior part of third pleuron; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Key to species with commercial potential in the area

- 1a. Rostrum armed with more than 5 upper teeth; hepatic spine present (Fig. 1) (*Aristaeomorpha*) *Aristaeomorpha foliacea*
- 1b. Rostrum armed with 3 upper teeth only; hepatic spine absent (Fig. 2) → 2

- 2a. Crests on carapace without sharp edges (*Aristeus*) *Aristeus virilis*
- 2b. Crests on carapace very prominent and sharply edged (*Plesiopenaeus*). *Plesiopenaeus edwardsianus*

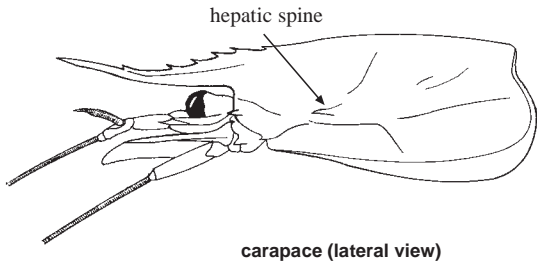


Fig. 1 *Aristaeomorpha*

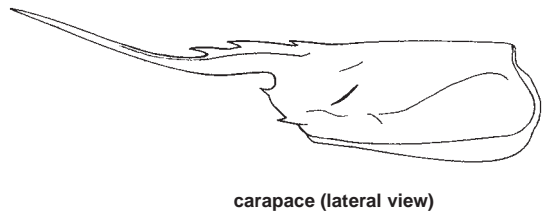



Fig. 2 *Aristeus*


List of species occurring in the area

The symbol  is given when species accounts are included.

 *Aristaeomorpha foliacea* (Risso, 1827)

Aristeus mabahissae Ramadan, 1938

Aristeus semidentatus Bate, 1881

 *Aristeus virilis* (Bate, 1881)

Benthonectes filipes Smith, 1885

Betheogennema pasithea (De Man, 1907)

Bethesicymus altus Bate, 1881

Bethesicymus bartletti Smith, 1882

Bethesicymus investigatoris Alcock and Anderson, 1889

Bethesicymus iridescens Bate, 1881

Bethesicymus tirmiziae Crosnier, 1978

Bethesicymus urinator Burkenroad, 1936

Gennadas bouvieri Kemp, 1909

Gennadas capensis Calman, 1925

Gennadas gilchristi Calman, 1925

Gennadas incertus (Balss, 1927)

Gennadas kempii Stebbing, 1914

Gennadas propinquus Rathbun, 1906

Gennadas scutatus Bouvier, 1906


Hemipenaeus carpenteri Wood-Mason, 1891

Hemipenaeus spinidoralis Bate, 1881

Hepomadus tener Smith, 1884

Parahepomadus vaubani Crosnier, 1978

Plesiopenaeus armatus (Bate, 1881)

 *Plesiopenaeus edwardsianus* (Johnson, 1867)

Pseudaristeus crassipes (Wood-Mason, 1891)

Pseudaristeus gracilis (Bate, 1888)

Pseudaristeus kathleenae Pérez Farfante, 1987

Pseudaristeus sibogae (De Man, 1911)

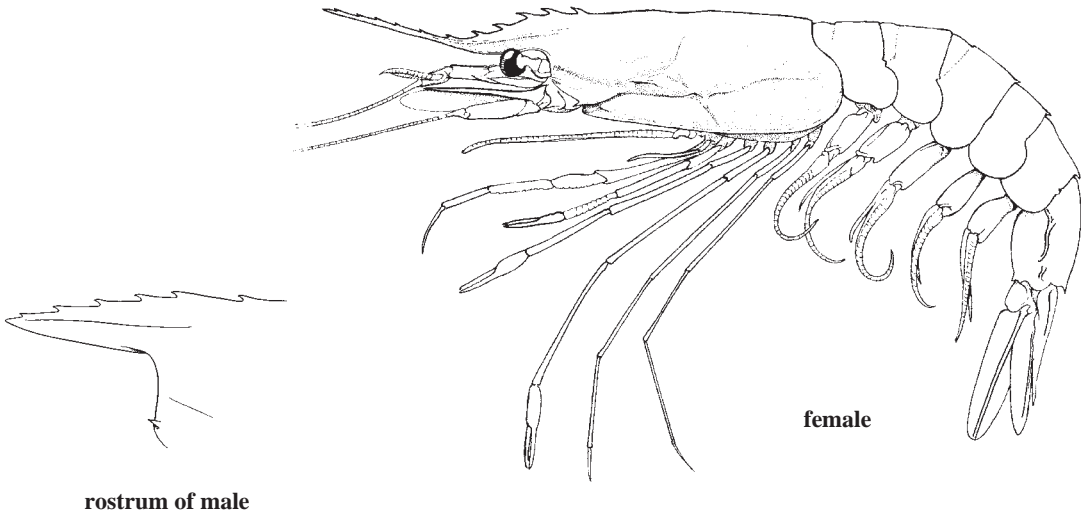
References

- Crosnier, A. 1978. Crustacés Décapodes Péneides Aristeidae (Bethesicyminae, Aristeinae, Solenocerinae). *Faune de Madagascar*, 46:1-197.
- Crosnier, A. 1989. Bethesicytidae, Aristeidae, Solenoceridae (Crustacea Penaeoidea). In *Résultats des Campagnes MUSORSTOM*, Vol. 5, edited by J. Forest. *Mém. Mus. natn. Hist. nat.*, (A), 144:37-67.

Aristaeomorpha foliacea (Risso, 1827)

Frequent synonyms / misidentifications: *Aristaeomorpha rostridentata* (Risso, 1827) / None.

FAO names: En - Giant red shrimp; Fr - Gambon rouge; Sp - Gamba española.

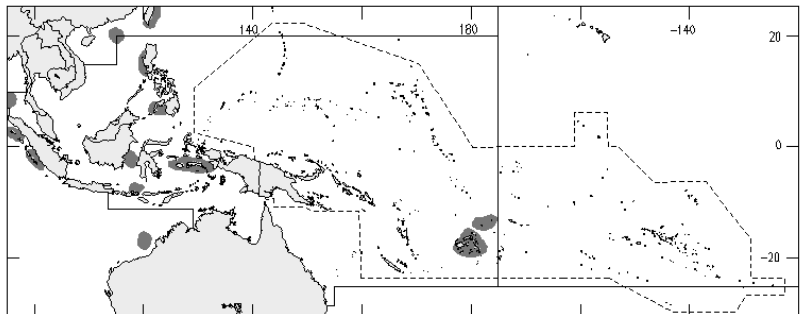


Diagnostic characters: A large shrimp. **Rostrum with 6 to 12 upper teeth (including 2 teeth on carapace)**; very long in females and extending far beyond antennal scale, but short in males and not exceeding tip of antennular peduncle. **Carapace with antennal, hepatic, and branchiostegal spines. Upper antennal flagella very short. Third to sixth abdominal segments each bearing a strong posteromedian spine.** Telson with 4 pairs of small movable lateral spines. **Colour:** body uniformly vermilion; eyes black.

Size: Maximum body length 22.5 cm in females (carapace length 5.9 cm) and 17 cm in males (carapace length 4.5 cm); commonly between 12 and 16 cm.

Habitat, biology, and fisheries: Found from depths of 61 to 1 300 m, but more often between 300 and 750 m; prefers mud bottoms. Moves to midwater at night. One of the common larger shrimps caught during deep-water exploratory trawling operations, often encountered in large quantities. Not yet fished commercially in the area, but with high potential for deep-sea fisheries.

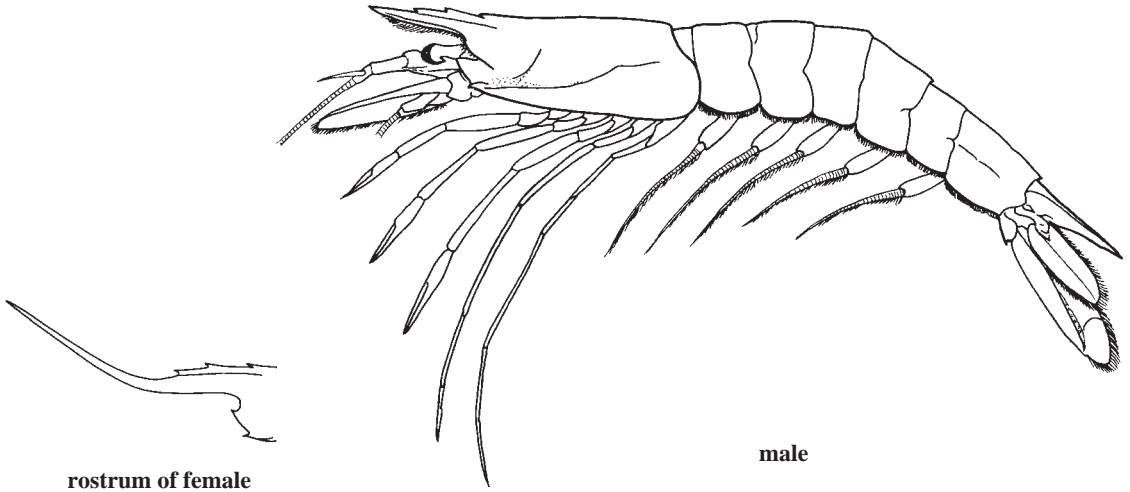
Distribution: Cosmopolitan, reported to be widely distributed in the Western Atlantic, Mediterranean, and Indo-West Pacific.



Aristeus virilis (Bate, 1881)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Stout red shrimp; Fr - Gambon gaillard; Sp - Gambón colorado.



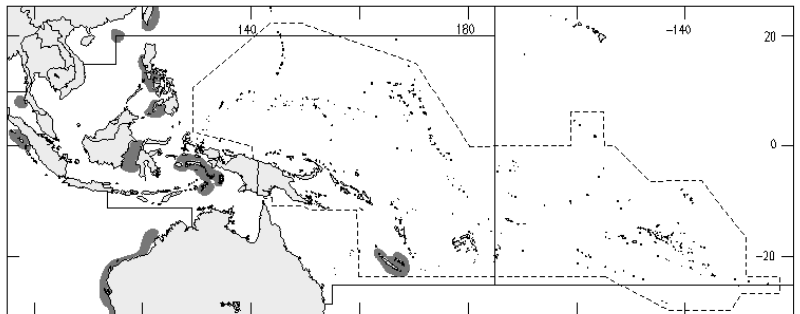
(after Lee and Yu, 1977)

Diagnostic characters: A large shrimp; **body covered with pubescence. Rostrum armed with 3 upper teeth only (including 1 tooth on carapace);** very long in females and extending far beyond antennal scale, but short in males and not exceeding tip of antennal scale. Carapace with antennal and branchiostegal spines but **lacking hepatic spine. Crests on carapace without sharp edges. Upper antennal flagella very short. Legs with photophores; first to third legs armed with a movable spine on merus. Fourth to sixth abdominal segments each bearing a strong posteromedian spine.** Telson with 4 pairs of small movable lateral spines. **Colour:** **body pale white, with red bands on posterior margin of abdominal segments;** eyes black; tip of rostrum, antennal scale, distal half of uropods, antennular and antennal flagella reddish; upper and lateral carapace, as well as legs and pleopods somewhat reddish; photophores on legs purple-red; some young individuals with body rather uniformly reddish.

Size: Maximum body length about 22.2 cm in females (carapace length 6.1 cm) and 14.6 cm in males (carapace length 4.6 cm); commonly between 9 and 12 cm.

Habitat, biology, and fisheries: Found on sand and mud bottom, at depths from 188 to 936 m, usually between 350 and 700 m, apparently not migrating into midwater at night. Not yet fished commercially in the area. However, the size of this species and the fact that it is commonly taken during experimental trawling operations in the Philippines, Indonesia, and New Caledonia suggest it has high potential with the development of a deep-sea fishery in these countries.

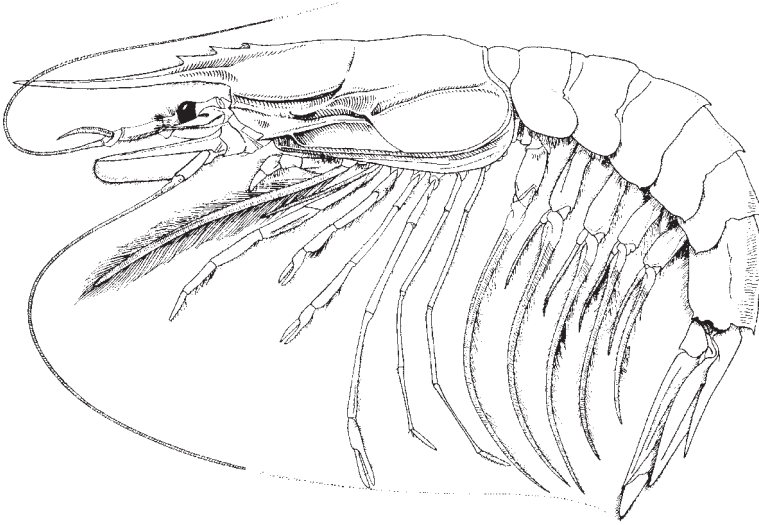
Distribution: Indo-West Pacific from eastern coast of Africa to India, western Australia, the Philippines, Japan, Indonesia, New Caledonia, and Vanuatu.



Plesiopenaeus edwardsianus (Johnson, 1867)

Frequent synonyms / misidentifications: *Aristaeopsis edwardsiana* (Johnson, 1867) / None.

FAO names: En - Scarlet shrimp; Fr - Gambon écarlat; Sp - Gamba carabinero.

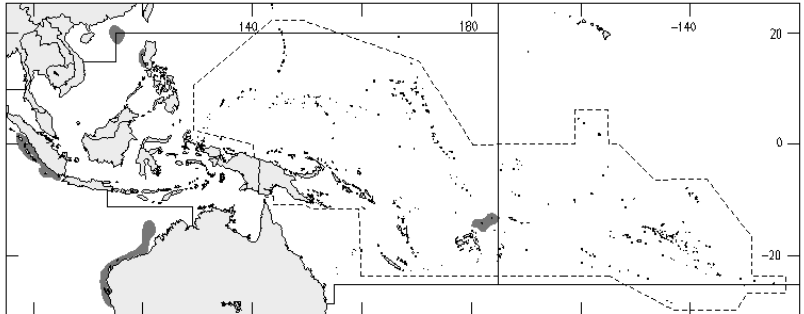


Diagnostic characters: Size very large. **Rostrum armed with 3 upper teeth only (including 1 tooth on carapace)**; very long in females, reaching far beyond antennal scale, but short in males and not exceeding tip of antennal scale. Carapace with antennal and branchiostegal spines but **lacking hepatic spine**. **Crests on carapace very sharp and prominent**. **Upper antennal flagella very short**. **Exopod of second maxilliped about 2 times as large as endopod**. **Legs without exopods**. **Third to sixth abdominal segments each bearing a sharp posteromedian spine**. Telson with 4 pairs of small movable lateral spines. **Colour:** uniformly scarlet; eyes black.

Size: Maximum body length 33.4 cm in females (carapace length 10.4 cm) and 19.3 cm in males (carapace length 6.3 cm); commonly between 15 and 19.5 cm.

Habitat, biology, and fisheries: Found on sandy or muddy bottom, at depths of 200 to 1 850 m, usually between 400 and 900 m. A very large species, often trawled at depths of more than 500 m. With very high potential for deep-sea fisheries in the area, although so far only encountered during exploratory trawling operations off the Philippines, Willis and Fortuna islands.

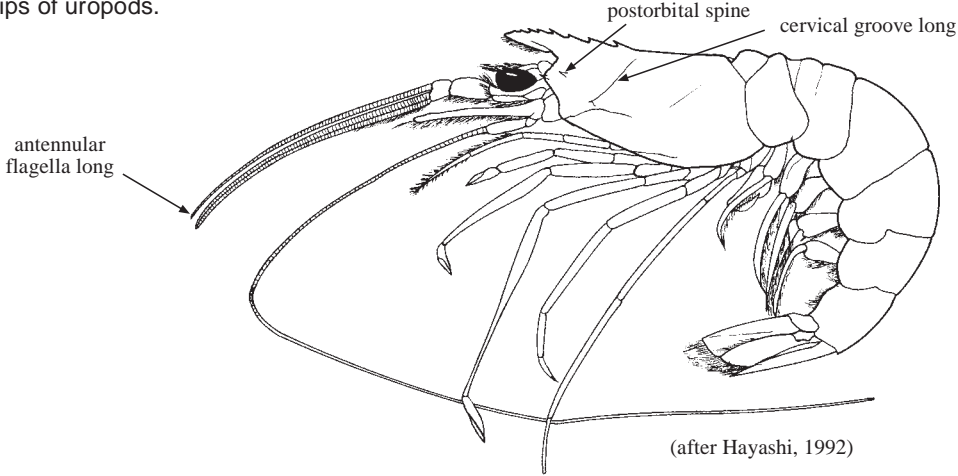
Distribution: Cosmopolitan, widely distributed in the Atlantic and the Indo-West Pacific.



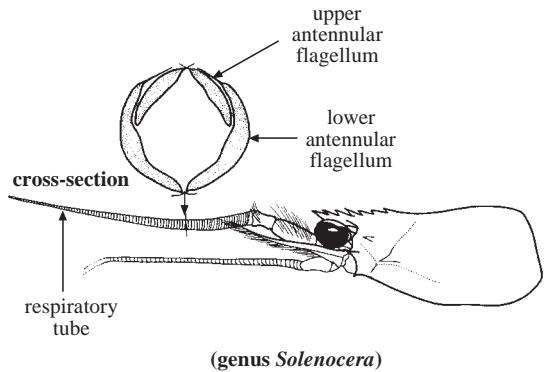
SOLENO CERIDAE

Solenocerid shrimps

Diagnostic characters: Rostrum well developed (extending at least to middle of eye), always bearing more than 3 upper teeth (including those on carapace); **no styliform projection at base of eyestalk, but a tubercle present on its inner border. Both upper and lower antennular flagella long (additionally strongly compressed laterally and tube-like in *Solenocera*), of the same length, and attached to tip of antennular peduncle. Carapace either with postorbital or postantennal spine; cervical groove long, extending to about dorsal carapace. All 5 pairs of legs well developed, fourth leg bearing 2 well-developed arthrobranches (hidden beneath carapace). In males, endopod of second pair of pleopods (abdominal appendages) with appendix masculina, appendix interna, and lateral projection. Third and fourth pleopods divided into 2 branches. Telson generally armed with at least 1 pair of fixed lateral spines. **Colour: generally pink to red;** sometimes with pale markings on antennular flagella and tips of uropods.**



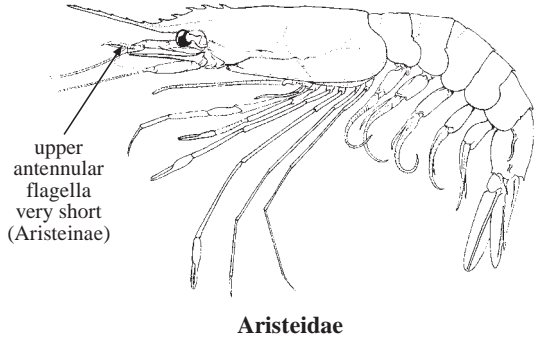
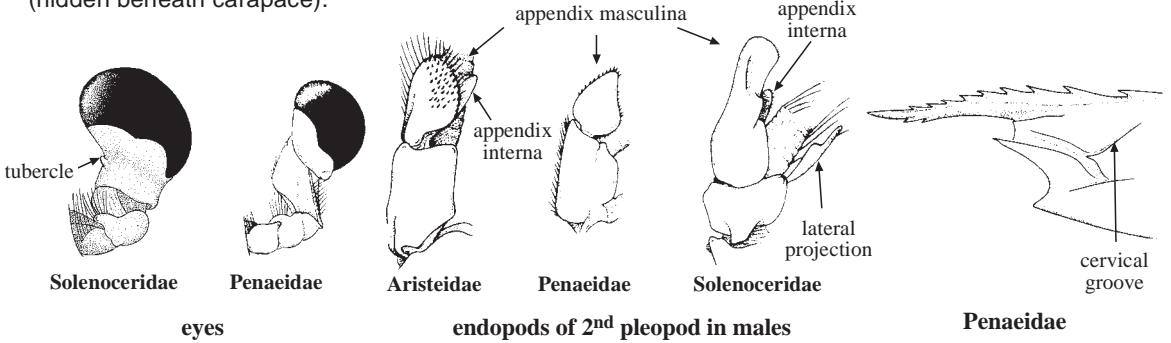
Habitat, biology, and fisheries: Found in deeper marine waters offshore from depths of 2 to over 5 700 m (usually deeper than 20 m). Generally benthic animals with preference for soft bottoms. Species of the genus *Solenocera* often burrow in mud during the daytime, with only the tube-like antennular flagella sticking out for respiration. Their size range from 2.5 to 21.5 cm body length but most species are of moderate size. The sexes are easily distinguished by the presence of a large copulatory organ (petasma) on the first pair of pleopods (abdominal appendages) of males, while the females have the posterior thoracic sternites modified into a large sperm receptacle process (thelycum) which holds the spermatophores or sperm sacs (usually whitish or yellowish in colour) after mating. The shape of the petasma and thelycum is often specific and very useful for species identification. The eggs are small and numerous, and are released directly into the water and not retained on the female abdomen. The larvae are planktonic and have the nauplius stage. In the Western Central Pacific, about 8 genera and 36 species of solenocerid shrimps have been recorded. Since they are generally found in deeper waters, at present only a few of them are taken as bycatch in commercial trawl fisheries. Nevertheless, results of many exploratory deep-water trawling operations have shown that several species are abundant and have fishery potential. Nevertheless, no key to all species of Solenoceridae occurring in the area is given here as most of them are not yet commercially caught and the taxonomic status of some species is still unclear. Species accounts and a key are included below for 2 genera and 11 species which are either more commonly found in commercial catches or that can be easily confused with those commercial species.



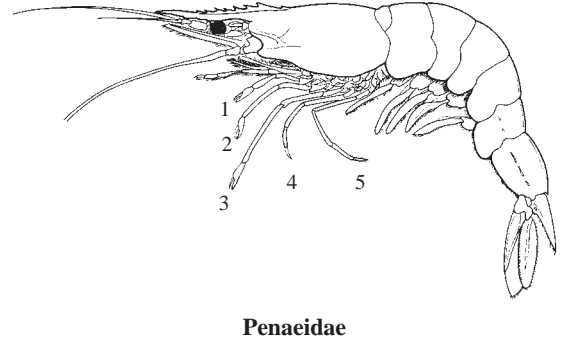
Similar families occurring in the area

Aristeidae: either rostrum very short and armed with 1 or 2 upper teeth only, or upper antennular flagellum very short and not attached to tip of antennular peduncle; no postorbital or postantennal spine present on carapace; telson armed only with movable lateral spines; in males, endopod of second pair of pleopods with appendix masculina, appendix interna, but without lateral projection.

Penaeidae: no postorbital or postantennal spine present on carapace; cervical groove short, with distinct part always far from dorsal carapace; eyestalk without tubercle on inner border; in males, endopod of second pair of pleopods with appendix masculina only; a single well-developed arthrobranch on fourth leg (hidden beneath carapace).



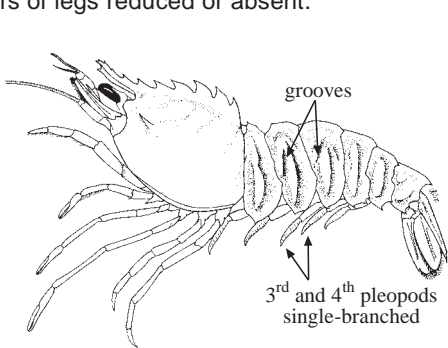
Aristeidae



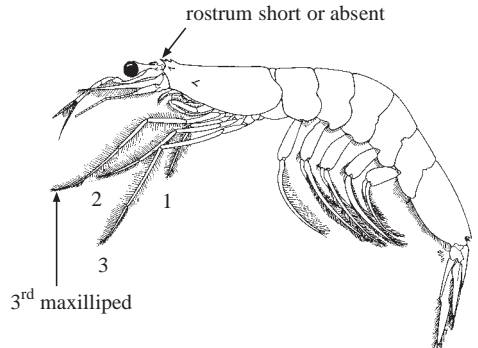
Penaeidae

Sicyoniidae: shell generally hard and body "stony" in appearance; abdomen often with deep grooves and numerous tubercles; no postorbital or postantennal spine present on carapace, cervical groove generally indistinct or absent; third and fourth pleopods single-branched.

Sergestidae: generally small sized; rostrum very short; body strongly compressed laterally, shell soft; last 2 pairs of legs reduced or absent.



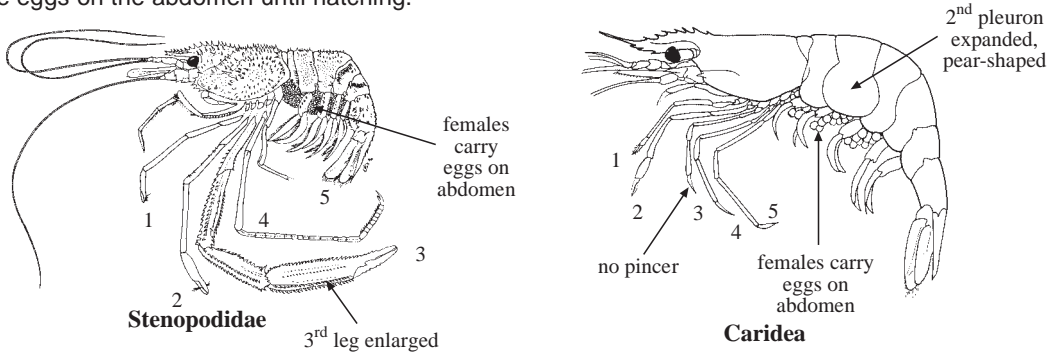
Sicyoniidae



Sergestidae

Stenopodidae: third pincer very large and massive; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.

Shrimps of the infraorder Caridea: third leg without pincer; second abdominal pleuron (lateral plate) greatly expanded, overlapping posterior part of first pleuron and anterior part of third pleuron; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Key to species of interest to fisheries occurring in the area

- 1a. Antennular flagella subcylindrical and thread-like (Fig. 1a); rostrum strongly convex (Fig. 2a); exopod of uropod armed with a distolateral spine (*Haliporoides*) . . . *Haliporoides sibogae*
- 1b. Antennular flagella flattened and tube-like (Fig. 1b); rostrum nearly horizontal (Fig. 2b); exopod of uropod without distolateral spine (*Solenocera*) → 2

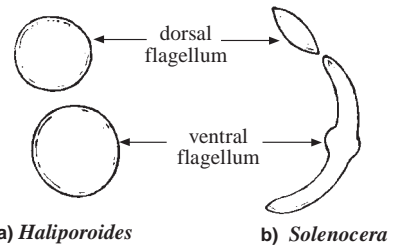


Fig. 1 cross-section of antennular flagella

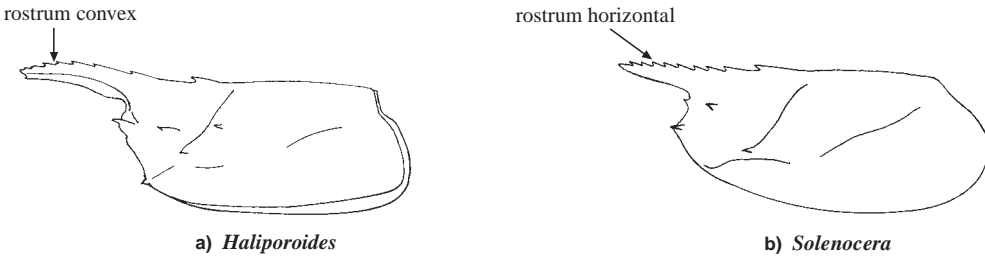


Fig. 2 carapace (lateral view)

- 2a. Telson without lateral spine (Fig. 3a) *Solenocera crassicornis*
- 2b. Telson armed with lateral spines (Fig. 3b) → 3
- 3a. Postrostral crest elevated → 4
- 3b. Postrostral crest weak and low → 10

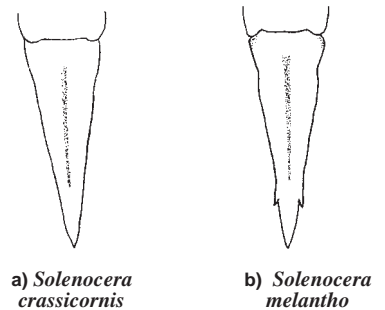


Fig. 3 telson (dorsal view)

- 4a. Postrostral crest very high and plate-like (Figs 4 and 5) → 5
- 4b. Postrostral crest distinct but not plate-like (Figs 6 and 7) → 6
- 5a. Rostrum extending to 2/3 of eye; postrostral crest behind cervical notch with anterior part distinctly higher than posterior part (Fig. 4) *Solenocera choprai*
- 5b. Rostrum extending to 1/2 of eye; postrostral crest behind cervical notch with posterior part distinctly higher than anterior part (Fig. 5) *Solenocera alticarinata*

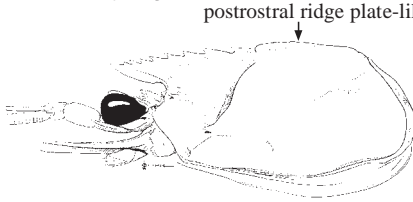


Fig. 4 *Solenocera choprai*
(from Crosnier, 1978)

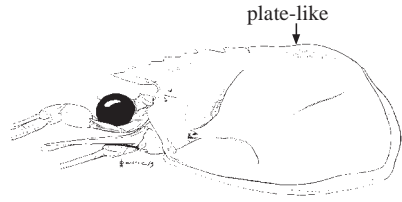


Fig. 5 *Solenocera alticarinata*
(from Crosnier, 1978)

- 6a. Postrostral crest well separated from postrostral teeth by a distinct notch above cervical groove (Fig. 6) *Solenocera koelbeli*
- 6b. No distinct notch present between postrostral teeth and postrostral crest (Fig. 7) → 7

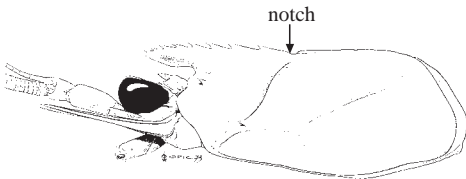


Fig. 6 *Solenocera koelbeli*
(from Crosnier, 1978)

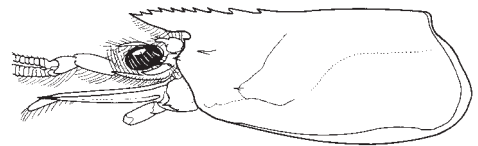
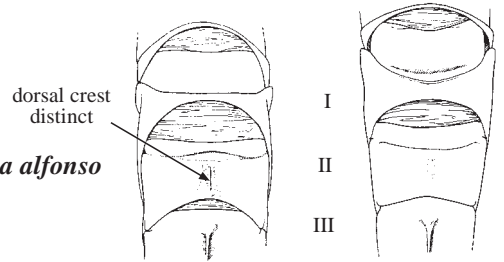


Fig. 7 *Solenocera australiana*
(after Pérez Farfante and Grey, 1980)

- 7a. Posterior part of hepatic groove and anterior part of brachiocardiac groove both very distinct and strongly curving downward; postrostral crest behind cervical groove sometimes with an upper tooth; median part of first abdominal segment very narrow and dorsal crest of second abdominal segment distinct (Fig. 8a) *Solenocera alfonso*
- 7b. Never both posterior part of hepatic groove and anterior part of brachiocardiac groove distinct and curving downward together; postrostral crest behind cervical groove without any teeth; median part of first abdominal segment moderately wide and dorsal crest of second abdominal segment indistinct (Fig. 8b) → 8



a) *Solenocera alfonso* b) *Solenocera melantho*
Fig. 8 abdomen (dorsal view)
(from Crosnier, 1989)

- 8a. Rostrum with lower border nearly convex (Fig. 9a); male petasma with distal margin armed with many well-defined long spinules (Fig. 10a); female thelycum with posterior thoracic ridge almost straight (Fig. 11a) *Solenocera australiana*
- 8b. Rostrum with lower border razor-shaped, very straight or slightly concave (Figs 9b, c); male petasma with spinules on distal margin short and not very well defined; female thelycum with posterior thoracic ridge strongly bilobed (Fig. 11b, c) → 9



a) *Solenocera australiana*



b) *Solenocera melantho* (from Crosnier, 1989)



c) *Solenocera halli*

Fig. 9 rostrum (lateral view)

- 9a.** Anterior end of hepatic crest very strongly convex (Fig. 12a); male petasma with dorsolateral lobule bearing 0 to 13 terminal spinules (Fig. 10a); female thelycum bearing 2 or 3 pairs of protuberances in the middle, with submedian pair larger than lateral ones (Fig. 11b) *Solenocera melantho*
- 9b.** Anterior end of hepatic crest only slightly convex or nearly straight (Fig. 12b); male petasma with dorsolateral lobule bearing 18 to 40 terminal spinules (Fig. 10c); female thelycum always bearing 2 pairs of protuberances in the middle, with submedian pair smaller than lateral pair (Fig. 11c) . . . *Solenocera halli*

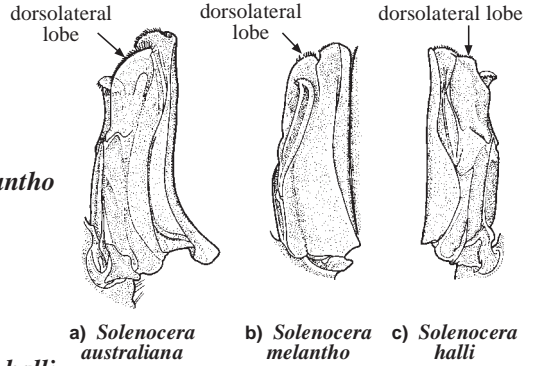


Fig. 10 petasma
(after Pérez Farfante and Grey, 1980)

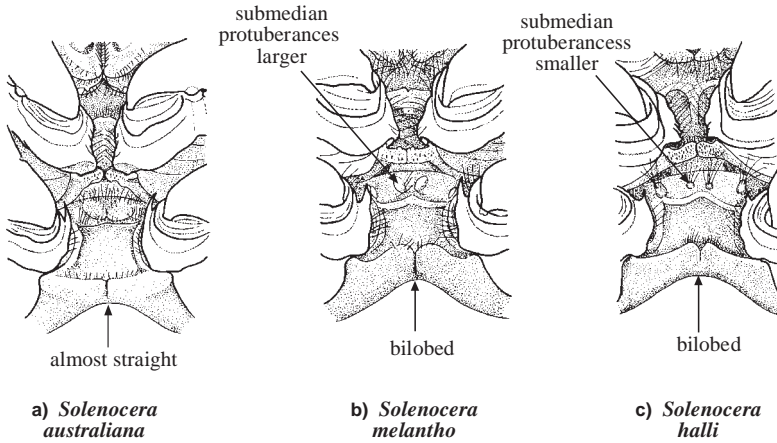


Fig. 11 thelycum
(after Pérez Farfante and Grey, 1980)

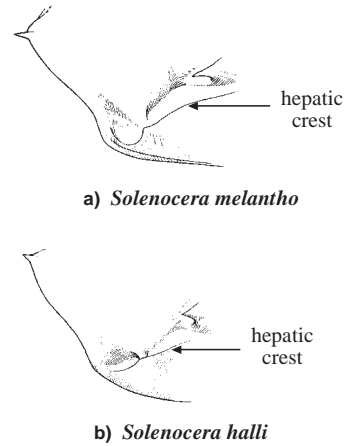


Fig. 12 anterolateral corner of carapace
(from Crosnier, 1989)

- 10a.** Rostrum with 6 or 7 large and well-separated upper teeth (Fig. 13); antennular flagella 0.8 to 1.2 times as long as carapace and generally composed of less than 60 articles *Solenocera pectinulata*
- 10b.** Rostrum generally with 8 or 9 densely packed small upper teeth (Fig. 14); antennular flagella 1.3 to 1.9 times as long as carapace and composed of more than 60 articles *Solenocera pectinata*

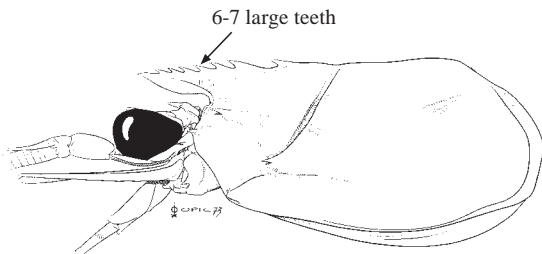


Fig. 13 Solenocera pectinulata
(from Crosnier, 1978)

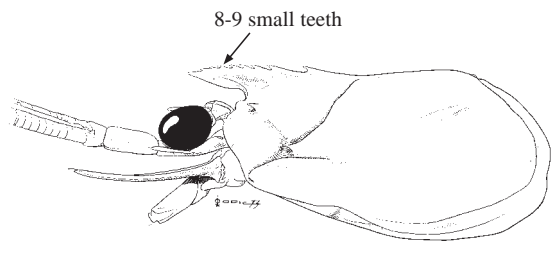



Fig. 14 Solenocera pectinata
(from Crosnier, 1978)

List of species occurring in the area

The symbol  is given when species accounts are included.

- Cryptopenaeus clevai* Crosnier, 1985
Cryptopenaeus crosnieri Pérez Farfante and Kensley, 1985
Gordonella kensleyi Crosnier, 1988
Gordonella paravillosa Crosnier, 1988
Hadropenaeus lucasii (Bate, 1881)
Haliporoides cristatus Kensley, Tranter, and Griffin, 1987
 *Haliporoides sibogae* (De Man, 1907)
Haliporus curvirostris Bate, 1881
Haliporus taprobanensis Alcock and Anderson, 1899
Hymenopenaeus equalis (Bate, 1881)
Hymenopenaeus halli Bruce, 1966
Hymenopenaeus laevis (Bate, 1881)
Hymenopenaeus neptunus (Bate, 1881)
Hymenopenaeus propinquus (De Man, 1907)
Mesopenaeus brucei Crosnier, 1986
Mesopenaeus mariae Pérez Farfante and Ivanov, 1982
 *Solenocera alfonso* Pérez Farfante, 1981
 *Solenocera alticarinata* Kubo, 1949
Solenocera annectens (Wood-Mason, 1891)
 *Solenocera australiana* Pérez Farfante and Grey, 1980
Solenocera barunajaya Crosnier, 1994
Solenocera bedokensis Hall, 1962
 *Solenocera choprai* Nataraj, 1945
Solenocera comata Stebbing, 1915
 *Solenocera crassicornis* (H. Milne Edwards, 1837)
Solenocera faxoni De Man, 1907
 *Solenocera halli* Starobogatov, 1972
 *Solenocera koelbeli* De Man, 1911
 *Solenocera melantho* De Man, 1907
Solenocera moosai Crosnier, 1985
 *Solenocera pectinata* (Bate, 1888)
 *Solenocera pectinulata* Kubo, 1949
? *Solenocera phuongi* Starobogatov, 1972
Solenocera rathbunae Ramadan, 1938
Solenocera spinajugo Hall, 1961
Solenocera waltirensis George and Muthu, 1970

References

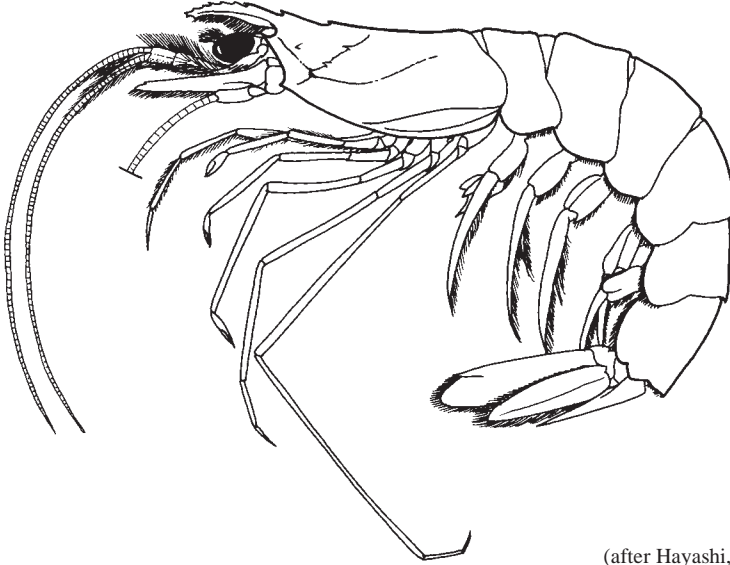
- Crosnier, A. 1978. Crustacés Décapodes Pénéides Aristaeidae (Benthescyminae, Aristeinae, Solenocerinae). *Faune de Madagascar*, 46:1-197.
- Crosnier, A. 1985. Penaeoid shrimps (Benthescymidae, Aristeidae, Solenoceridae, Sicyoniidae) collected in Indonesia during the Corindon II and IV expeditions. *Mar. Res. Indonesia*, 24:19-47.
- Crosnier, A. 1989. Benthescymidae, Aristeidae, Solenoceridae (Crustacea Penaeoidea). In Résultats des Campagnes MUSORSTOM, Vol. 5, edited by J. Forest. *Mém. Mus. natn. Hist. nat.*, (A), 144:37-67.
- Crosnier, A. 1994. Crustacea Decapoda: Penaeoidea récoltés lors de la campagne KARUBAR en Indonésie. In Résultats des Campagnes MUSORSTOM, Vol. 12, edited by A. Crosnier. *Mém. Mus. natn. Hist. nat.*, (A), 161: 351-365.

Haliporoides sibogae (De Man, 1907)

JAQ

Frequent synonyms / misidentifications: *Haliporoides sibogae australiensis* Kensley, Tranter, and Griffin, 1987; *H. sibogae madagascariensis* Crosnier, 1987; *Hymenopenaeus sibogae* (De Man, 1907) / None.

FAO names: En - Jack-knife shrimp; Fr - Salicoque canif; Sp - Camarón cortapluma.



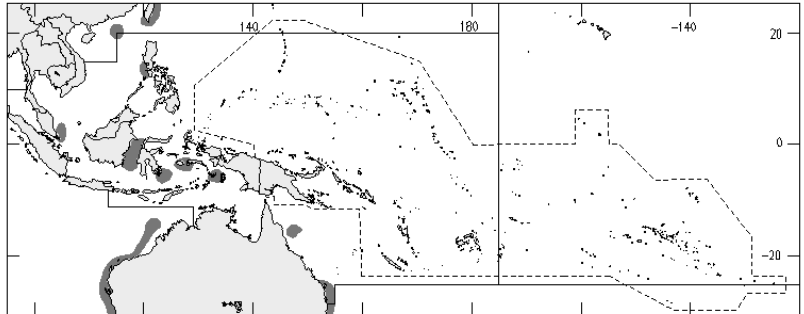
(after Hayashi, 1992)

Diagnostic characters: Body somewhat hairy. **Both upper and lower antennular flagella very long, thread-like. Rostrum strongly convex and short, extending just beyond eyes;** upper border armed with 4 to 7 teeth; lower border concave, armed with 1 to 3 teeth. **Carapace with 1 postrostral and 1 epigastric tooth, as well as antennal, postantennal, branchiostegal, hepatic, and suprahepatic spines. Cervical groove distinct, extending to dorsal carapace.** Legs progressively longer posteriorly. Telson with a pair of fixed lateral spines. **Colour:** body orange to pink; **antennal flagella whitish;** eyes dark brown; **uropods reddish with white tips.**

Size: Maximum body length 16.5 cm in males (carapace length 3.3 cm) and 20 cm in females (carapace length 4.9 cm), commonly between 7 and 10 cm.

Habitat, biology, and fisheries: Deep sea from depths of 100 to 1 463 m, usually between 300 and 600 m, on soft bottom. Taken in large quantities on the basis of experimental deep-water trawling in the Philippines and Indonesia. Generally considered as a species with high potential for commercial deep-sea fisheries. In the area, so far only fished on a small scale off the northeastern coast of Australia (about 50 t in the annual period of 1989/1990). Marketed mainly frozen, consumed locally, sometimes exported.

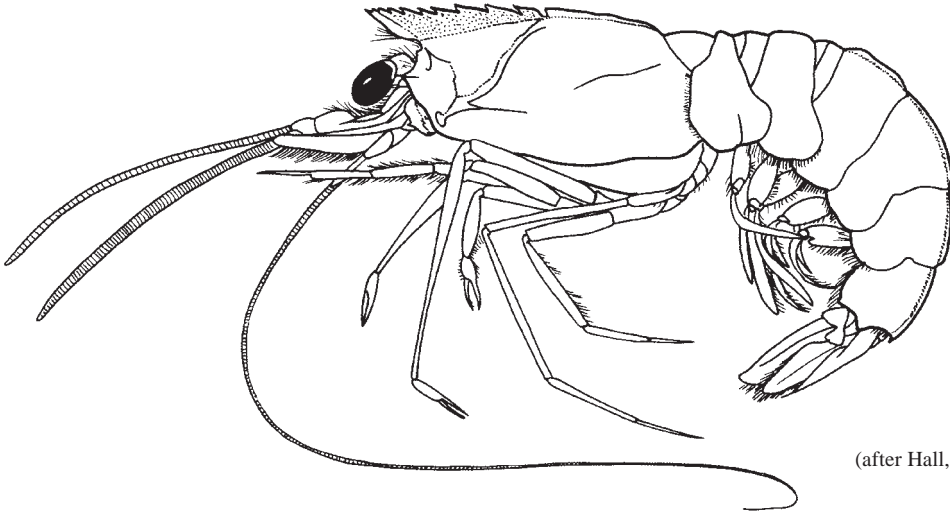
Distribution: Widely distributed in the Indo-West Pacific from Madagascar to Japan, Australia, and New Zealand (populations from Madagascar and eastern Australia are sometimes considered as 2 different subspecies).



Solenocera choprai Nataraj, 1945

Frequent synonyms / misidentifications: None / *Solenocera alticarinata* Kubo, 1949.

FAO names: En - Ridgeback shrimp; Fr - Salicoque balafrée; Sp - Camarón costurón.



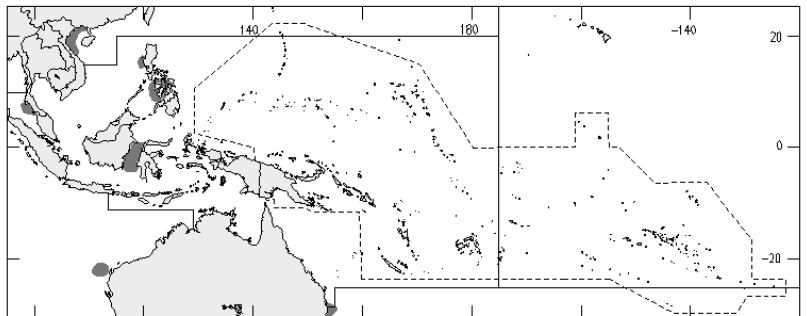
(after Hall, 1962)

Diagnostic characters: 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; height of posterior part progressively decreasing posteriorly.** Carapace with orbital, postorbital, antennal and hepatic spines, but without pterygostomial spines. Antennular flagella moderately long and tube-like. **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.

Size: Maximum body length 13 cm (females) and 9.5 cm (males).

Habitat, biology, and fisheries: Found on soft bottoms at depths between 50 and 175 m. Probably burrows in mud during the daytime, with only the tube-like antennular flagella sticking out for respiration. A bycatch of trawling operations in slightly deeper waters. Nowhere abundant, but of some commercial value because of its moderately large size. In the Philippines, this shrimp is occasionally marked together with other *Solenocera* species. Marketed mainly fresh for local consumption. Often confused with *Solenocera alticarinata*, which has a more northeastern distribution (from Japan to the Philippines), but they are both sometimes considered as a single species.

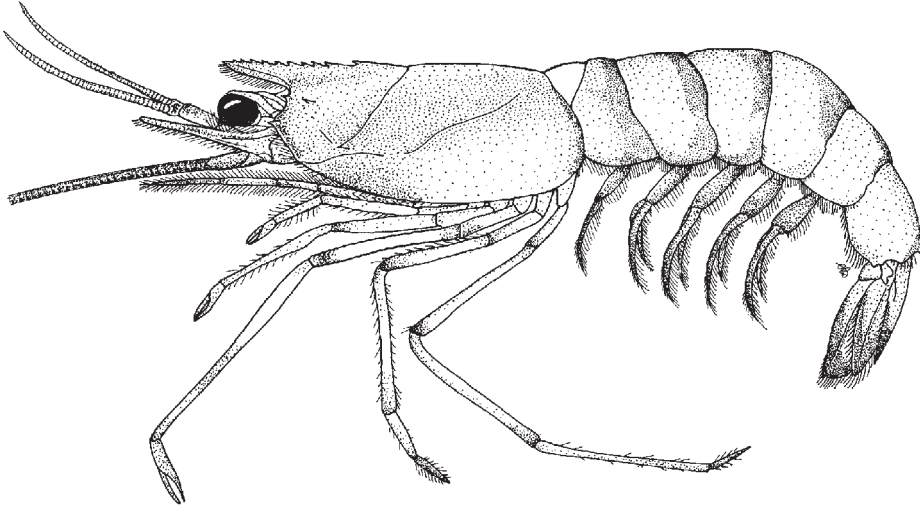
Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Philippines and Australia.



Solenocera crassicornis (H. Milne Edwards, 1837)

Frequent synonyms / misidentifications: *Solenocera indicus* Nataraj, 1945; *S. kubo* Hall, 1956; *S. sinensis* Yu, 1937; *S. subnuda* Kubo, 1949 / None.

FAO names: **En** - Coastal mud shrimp; **Fr** - Salicoque des vases côtières; **Sp** - Camarón fanguero de orilla.

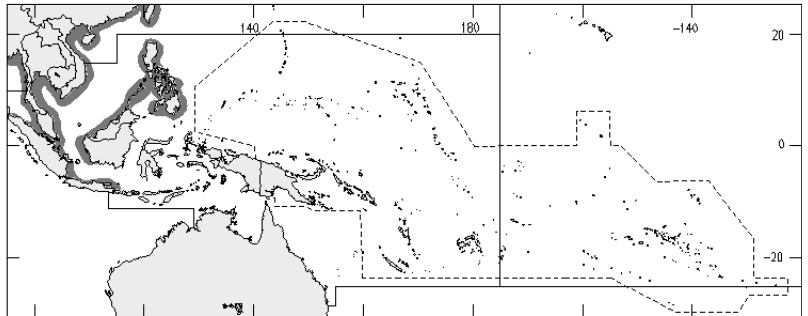


Diagnostic characters: Rostrum short and nearly straight, about as long as eyes; upper border armed with 4 to 7 (mostly 5) teeth; lower border unarmed and somewhat convex. Carapace with 3 postrostral teeth and 1 epigastric tooth, and orbital, postorbital, antennal and hepatic spines, but without pterygostomian spines; postrostral crest low and rounded. Antennular flagella moderately long and tube-like. 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.

Size: Maximum body length 9 cm (males) and 14 cm (females), commonly between 6 and 8 cm.

Habitat, biology, and fisheries: Inhabits muddy bottoms close to shore, at depths from 20 to 85 m. Probably burrows in mud during the daytime, with only the tube-like antennular flagella sticking out for respiration. Mainly forms a bycatch of trawlers. In the area, this shrimp seems to be more common around Thailand and is of minor commercial importance.

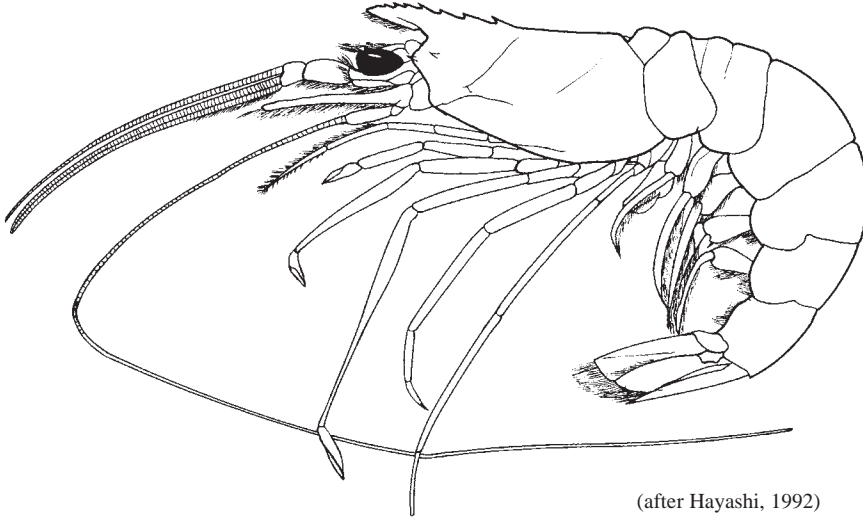
Distribution: Widely distributed in the Indo-West Pacific from the Persian Gulf to Japan and Indonesia.



Solenocera melantho De Man, 1907

Frequent synonyms / misidentifications: *Solenocera prominentis* Kubo, 1949 / *Solenocera alfonso* Pérez Farfante, 1981; *S. australiana* Pérez Farfante and Grey, 1980; *S. halli* Starobogatov, 1972; *S. koelbeli* De Man, 1911.

FAO names: En - Razor mud shrimp.



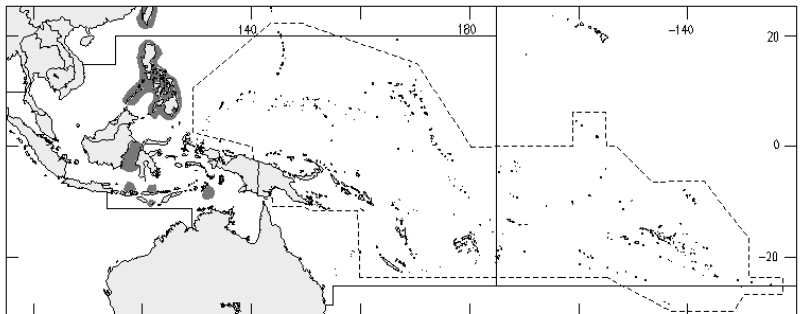
(after Hayashi, 1992)

Diagnostic characters: Rostrum short, not extending beyond eyes; upper border with 6 to 10 teeth (including 3 teeth on carapace); lower border straight or slightly concave, razor-shaped. Postrostral crest distinct but not very high and plate-like, without a distinct notch above cervical groove. Carapace with orbital, postorbital, antennal and hepatic spines, but without pterygostomial spines. Anterior end of hepatic crest strongly concave and curving upward. Antennular flagella moderately long and tube-like. Telson with a pair of lateral spines. **Colour:** body pink to red and somewhat semi-transparent; some irregular red markings on abdomen; eyes black-brown; antennular flagella reddish with a white (or pale yellowish) band at midlength; distal part of uropods slightly yellowish.

Size: Maximum body length 15 cm, commonly between 7 and 12 cm.

Habitat, biology, and fisheries: Inhabits the upper slopes of continental shelves at depths from 78 to 400 m, on sandy mud bottom. Mainly forms a bycatch of trawling operations in slightly deeper waters. Probably the most common species of the genus in the Philippines, but still not very abundant and only occasionally sold in local fish markets. Marketed mainly fresh for local consumption. This species, *Solenocera alfonso*, *S. australiana*, and *S. halli* are probably often confused with each other.

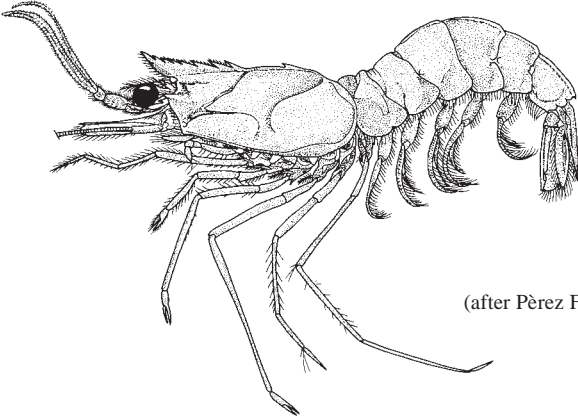
Distribution: Western Pacific and definitely known from Japan, Korea, Taiwan Province of China, coasts of China, the Philippines, and Indonesia.



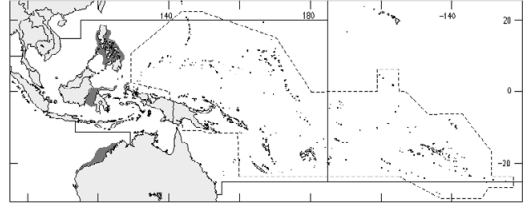
Solenocera alfonso Pérez Farfante, 1981

En - Deep-water mud shrimp.

Maximum body length about 12 cm (at a maximum carapace length of 4 cm). Inhabits the upper slopes of island shelves at depths from 176 to 547 m, on bottoms of green mud or fine sandy mud. So far only taken on the basis of experimental deep-water trawling. However, the size of this species and the fact that it is sometimes found in large quantities suggest it may have commercial potential with the development of a deep-sea fishery in the area. Indo-West Pacific and so far only known with certainty from the Philippines, Indonesia, and Northwestern Australia.



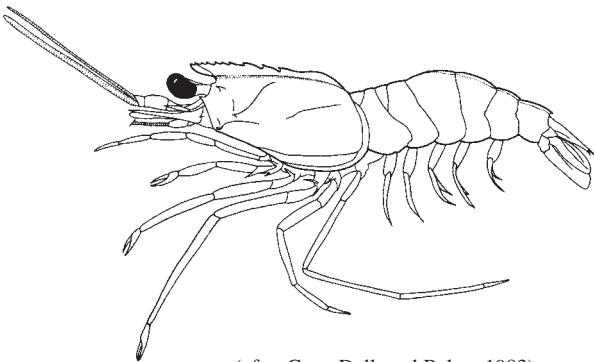
(after Pérez Farfante, 1981)



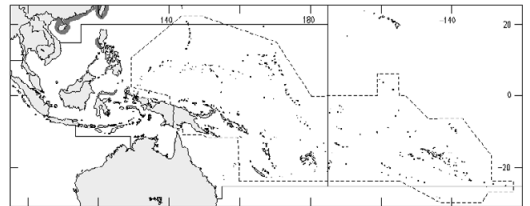
Solenocera alticarinata Kubo, 1949

En - High ridge mud shrimp.

Maximum body length 11 cm (females) and 9 cm (males), commonly between 7 and 9 cm. On sandy mud bottom, at depths from 50 to 180 m. Taken by trawls. Apparently restricted to the Western Pacific from Japan to Taiwan Province of China, the South China Sea, and the Philippines. Often confused with the closely related *Solenocera choprai*. In the area, so far only recorded from the Philippines where it is probably less common than *S. choprai*.



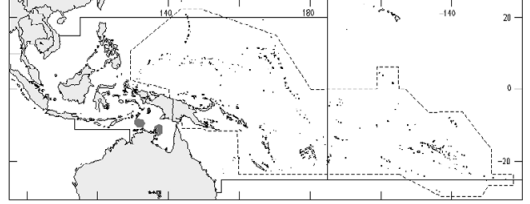
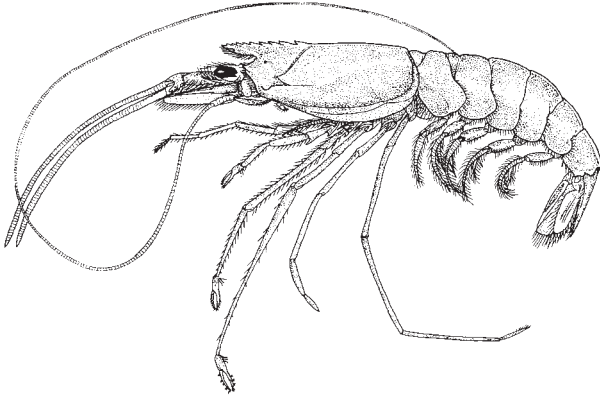
(after Grey, Dall, and Baker, 1983)



Solenocera australiana Pérez Farfante and Grey, 1980

En - Australia mud shrimp.

Maximum body length 12 cm (females) and 9 cm (males). In shallow water at depths from 15 to 40 m, over mud bottom with or without coral debris, rock, shell, or vegetation. Taken by commercial trawlers fishing for large penaeids in northern Australia, but so far without significant economic importance. Restricted to northern Australia.

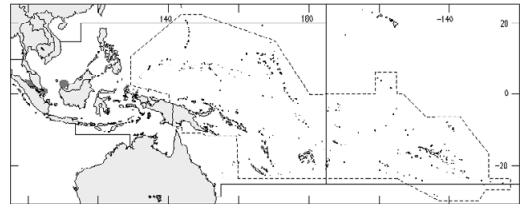
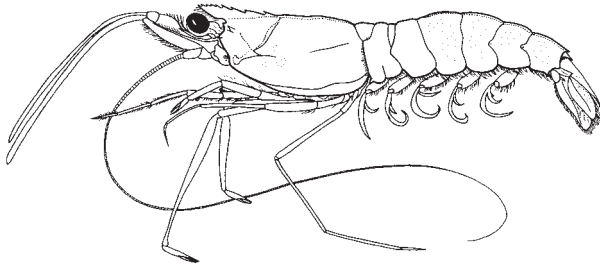


(after Pérez Farfante and Grey, 1980)

Solenocera halli Starobogatov, 1972

En - Malayan mud shrimp.

Maximum body length about 10 cm (at a maximum carapace length of 2.75 cm). Found in shallow waters at depths from 48 and 75 m. So far mainly caught by experimental trawlers but probably more common around Malaysia and Singapore. Indo-West Pacific; thus far known from Bay of Bengal, Strait of Malacca, Singapore, and the South China Sea. Often confused with *Solenocera melantho*.

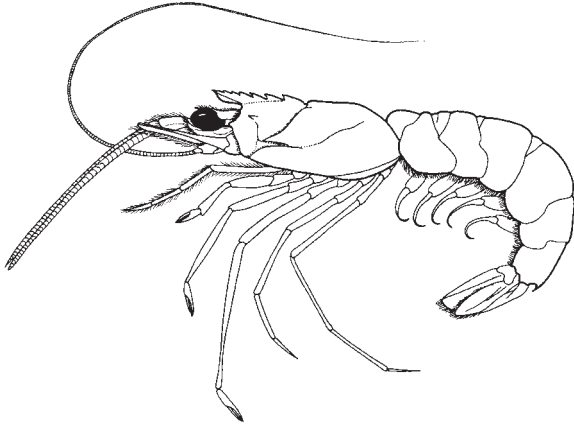


(after Hall, 1962)

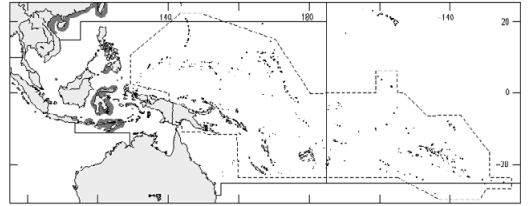
Solenocera koelbeli De Man, 1911

En - Chinese mud shrimp; **Fr** - Salicoque chinoise de vase; **Sp** - Camarón fanguero chino.

Maximum body length 15 cm, commonly between 5 and 10 cm. On soft bottom at depths from 21 to 241 m, usually between 60 and 90 m. A bycatch in trawl fisheries. Western Pacific from Japan to Taiwan Province of China, the South China Sea, Viet Nam, the Philippines, and Indonesia. Apparently not abundant in the area. Sometimes confused with *Solenocera alticarinata*, *S. choprai*, or *S. melantho*.



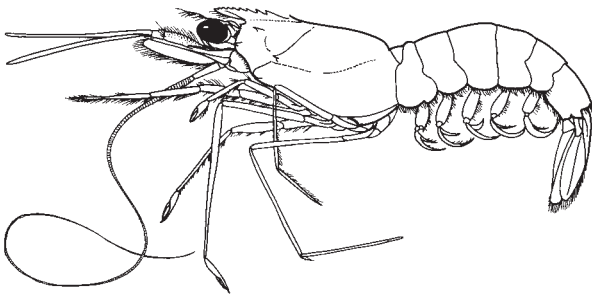
(after Lee and Yu, 1977)



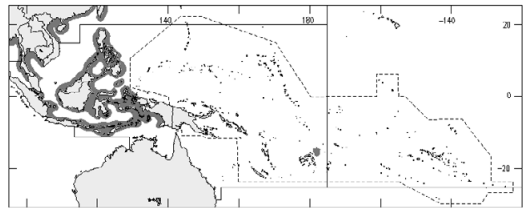
Solenocera pectinata (Bate, 1888)

En - Comb shrimp; **Fr** - Salicoque peigne; **Sp** - Camarón peine.

Maximum body length 6 cm. On soft bottom at depths from 4 to 205 m. A common bycatch of commercial trawlers but of no economic importance, due to its small size. Widely distributed in the Indo-West Pacific, from the eastern coast of Africa to Japan and Wallis Island in the South Pacific. Often confused with *Solenocera pectinulata* but generally found at shallower depths.

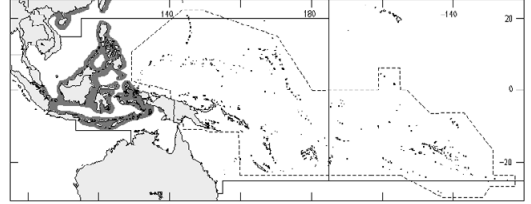
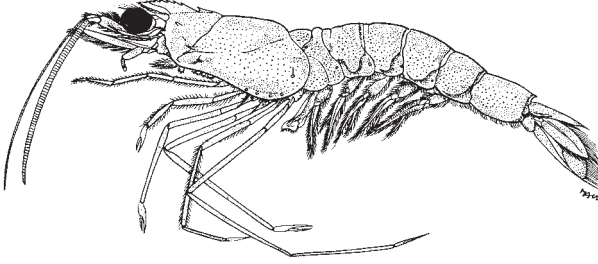


(after Hall, 1962)



Solenocera pectinulata* Kubo, 1949*En - False comb shrimp.**

Maximum body length 6.5 cm (carapace length to 2.2 cm), commonly between 3 and 5.5 cm. On bottoms of sand and/or mud, at depths from 75 to 350 m, usually deeper than 175 m. A common bycatch of commercial trawlers but without economic importance, due to its small size. Widely distributed in the Indo-West Pacific from the eastern coast of Africa to Japan and Indonesia. Often confused with *Solenocera pectinata* but generally has a deeper distribution.

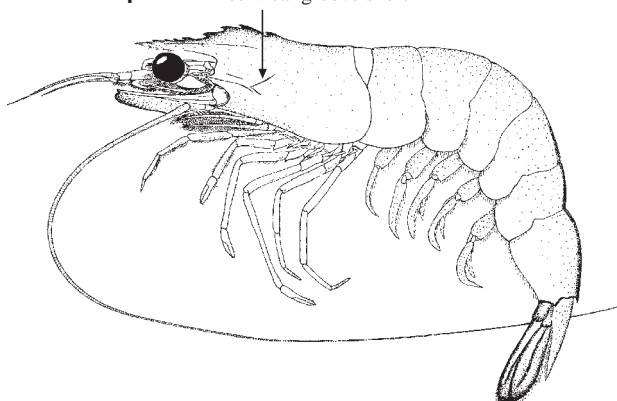


(after Motoh and Buri, 1984)

PENAEIDAE

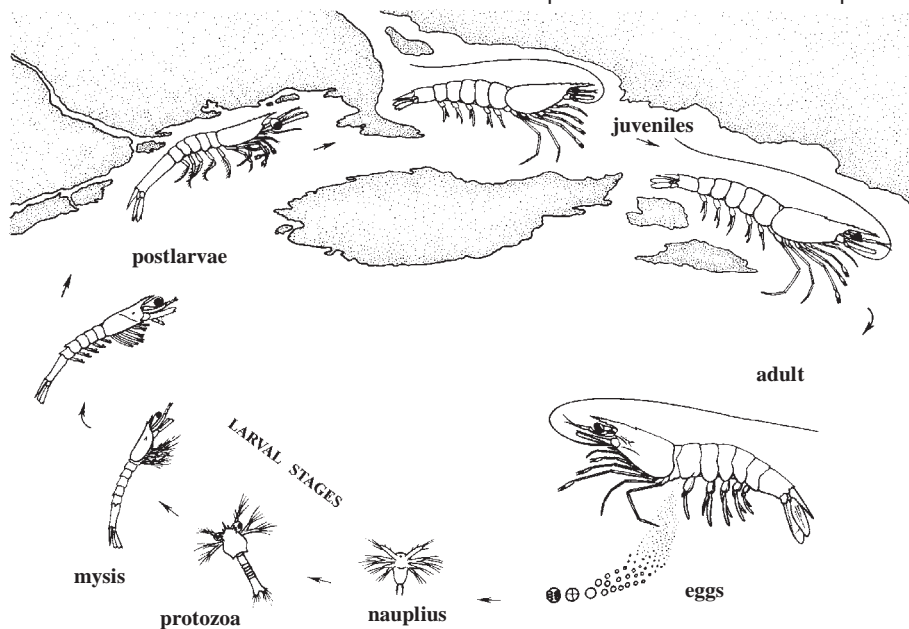
Penaeid shrimps

cervical groove short



Diagnostic characters: Rostrum well developed and generally extending beyond eyes, **always bearing more than 3 upper teeth. No styliform projection at base of eye-stalk and no tubercle on its inner border.** Both upper and lower antennular flagella of similar length, attached to tip of antennular peduncle. **Carapace lacking both postorbital or postantennal spines. Cervical groove generally short, always with a distance from dorsal carapace.** All 5 pairs of legs well developed, **fourth leg bearing a single well-developed arthrobranch (hidden beneath carapace, occasionally accompanied by a second, rudimentary arthrobranch).** In males, endopod of second pair of pleopods (abdominal appendages) with appendix masculina only. Third and fourth pleopods divided into 2 branches. Telson sharply pointed, with or without fixed and/or movable lateral spines. **Colour:** body colour varies from semi-translucent to dark greyish green or reddish, **often with distinct spots, cross bands and/or other markings on the abdomen and uropods; live or fresh specimens, particularly those of the genus *Penaeus*, can often be easily distinguished by their coloration.**

Habitat, biology, and fisheries: Members of this family are usually marine, although juveniles and young are often found in brackish water or estuaries, sometimes with very low salinities (a few unconfirmed fresh-water records exist). Some penaeids, mainly those of the genera *Parapenaeus* and *Penaeopsis*, occur in deep water at depths of more than 750 m. Penaeids are mostly benthic and mainly found on soft bottom of sand and/or mud, but a few species (e.g. genus *Funchalia*) are pelagic and others are known to inhabit coral reefs (e.g. the genera *Heteropenaeus*, *Trachypenaeopsis*, also some *Metapenaeopsis*). Their size ranges from 2.5 to 35 cm body length. The sexes are easily distinguished by the presence of a very large copulatory organ (petasma) on the first pair of pleopods (abdominal appendages) of males, while the females have the posterior thoracic sternites modified into a large sperm receptacle process (thelycum) which holds the spermatophores or sperm sacs (usually whitish or yellowish in colour) after mating. The shape of the petasma and thelycum is often specific and very useful for species identification. The eggs are small and numerous, and are released directly into the water and not retained on the female abdomen. The larvae are planktonic and have the nauplius stage.



life-cycle of shrimps of the genus *Penaeus*

The life cycle of species of *Penaeus* and *Metapenaeus*, the 2 most important commercial shrimp genera, is complex (see figure on previous page). Adults generally move from shallow coastal waters to offshore and spawn at depths between 10 to 80 m. The eggs hatch within 14 to 24 hours and release very small, simple larvae, the nauplii. The nauplius larva passes through several substages before it metamorphoses into the mysis stage. These larvae are planktonic and are carried by currents toward shore where they arrive as postlarvae; this occurs about three weeks after hatching when the animals are 6 to 14 mm long and shrimp-like in appearance. The postlarvae invade inshore brackish waters, abandon their planktonic way of life, and become bottom dwellers living in shallow littoral areas. In these rich nursery grounds they grow rapidly, develop into juveniles and, as size increases, move gradually back toward the mouths of bays or estuaries, where they become subadults. Soon the shrimps migrate offshore, continue growing and mate, and when they finally reach the spawning grounds, the mature females spawn and the cycle is repeated; most shrimps in these grounds are about 1 year old, rarely older than 2 (or perhaps 3) years old.

At present, 11 genera and 112 species of penaeids are known to occur in the Western Central Pacific. Among these, the genus *Penaeus* is of greatest economical importance. Species of *Penaeus* are caught extensively by trawls, seines, set nets, traps, and artisanal gear, with *P. merguensis* and *P. monodon* probably being the 2 most important species. Moreover, aquaculture of *Penaeus* is very popular in many countries, mostly using *Penaeus monodon*. The genus of secondary importance is *Metapenaeus*, often taken together with *Penaeus* and also extensively cultured in ponds. The third commercially important genus is probably *Parapenaeopsis*, which is quite common in the western part of the area and often forms a significant part of the bycatch in prawn fisheries. Therefore, species accounts are provided here for all species of *Penaeus*, *Metapenaeus*, and *Parapenaeopsis* that are known from the Western Central Pacific. The other genera seem to be less abundant, although species of *Metapenaeopsis* and *Trachypenaeus* are frequently found among catches of prawn fisheries and have some commercial value. The 2 deep-water genera *Parapenaeus* and *Penaeopsis* are not fished at present, although experimental deep-water trawling operations have shown that representatives of these 2 genera, particularly *Parapenaeus*, can be caught in large quantities and are potentially of interest to fisheries. The remaining 4 genera are all without economic interest: species of *Atyopopenaeus* are generally too small and not abundant, *Heteropenaeus* and *Trachypenaeopsis* occur in coral reefs and are small, and *Funchalia* is a pelagic deep-sea genus.

Since this family is of greatest commercial importance in the area, identification keys are given here for all penaeids, except for *Metapenaeopsis*, 40 species of which occur in the area, but most of these are either not common enough or found in deep waters, without any commercial potential. Therefore, an identification key is provided only for those species of *Metapenaeopsis* that may be found in commercial catches. For a full key to *Metapenaeopsis*, see the detailed revisions by A. Crosnier (1987-1994, published in "Bull. Mus. natn. Hist. nat., Paris", and "Résultats des Campagnes MUSORSTOM").

Identification note

The shapes of the male petasma and female thelycum are very important taxonomic characters in several genera of penaeid shrimps, such as *Metapenaeopsis*, *Metapenaeus*, *Parapenaeopsis*, *Parapenaeus*, and *Trachypenaeus*. However, as the petasma and thelycum are not fully developed in juveniles, a positive identification of juvenile specimens is often difficult. Therefore, it is highly recommended to use, if possible, adult specimens rather than juveniles when using the keys.

For the differentiation between adult and juvenile males, it should be remembered that, in adult males, the left and right parts of the petasma are very rigid and strongly fused to each other (i.e. very difficult to separate), while in juvenile males the left and right parts of the petasma are either not fused or only weakly united (i.e. easy to separate) and somewhat soft with the sculpture not well defined.

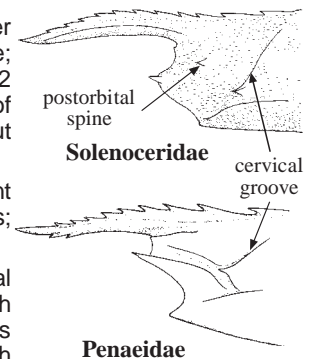
In adult females, the thelycum is clearly sculptured with the ridges and depressions very well marked, while in juvenile females the thelycum has only a shallow sculpture, not well defined.

Similar families occurring in the area

Aristeidae: either rostrum very short, armed with 1 or 2 upper teeth only, or upper antennular flagellum very short, not attached to tip of antennular peduncle; eyestalks generally with a tubercle on inner border; fourth leg bears 2 well-developed arthrobranchs (hidden beneath carapace); in males, endopod of second pair of pleopods with appendix masculina, appendix interna, but without lateral projection.

Sicyoniidae: shell generally hard and body "stony" in appearance; exopod present on first maxilliped only; abdomen often with deep grooves and numerous tubercles; third and fourth pleopods single-branched.

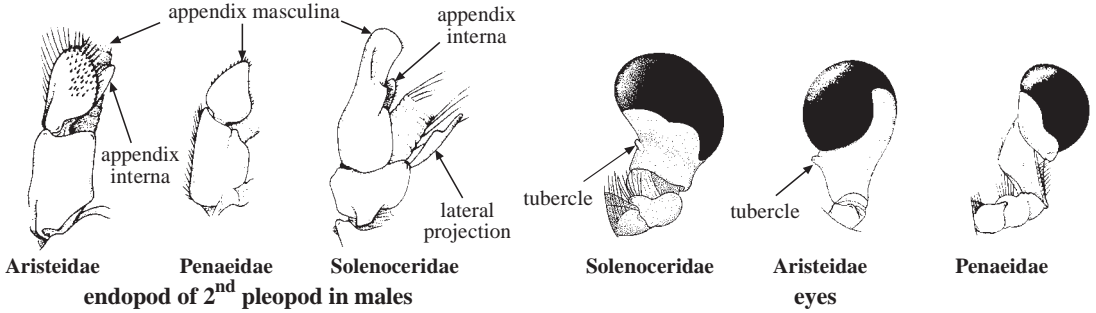
Solenoceridae: carapace either with postorbital or postantennal spine; cervical groove distinct and extending to about dorsal carapace; eyestalks generally with a tubercle on inner border; fourth leg bears 2 well-developed arthrobranchs (hidden beneath carapace); in males, endopod of second pair of pleopods with appendix masculina, appendix interna, and lateral projection.



Sergestidae: size small; rostrum very short; body strongly compressed laterally; shell soft; last 2 pairs of legs reduced or absent.

Stenopodidae: third pincer very large and massive; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.

Shrimps of the infraorder Caridea: third leg without pincer; second abdominal pleuron (lateral plate) greatly expanded, overlapping posterior part of first pleuron and anterior part of third pleuron; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Key to the genera of Penaeidae occurring in the area

- 1a. Rostrum with lower teeth (Fig. 1) → 2
- 1b. Rostrum without lower teeth (Fig. 2) → 3
- 2a. Abdomen with many deep pubescent grooves (Fig. 3) *Heteropenaeus*
(a single species, *H. longimanus*)
- 2b. Abdomen glabrous and smooth (Fig. 4) *Penaeus*

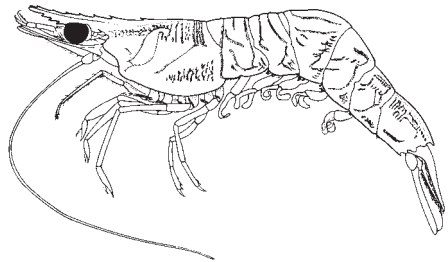
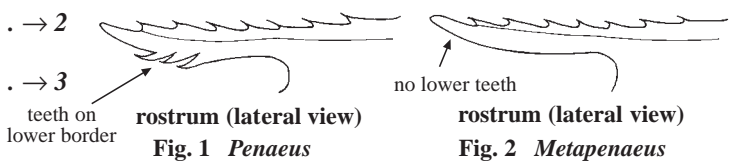


Fig. 3 *Heteropenaeus longimanus*
(after Hall, 1961)

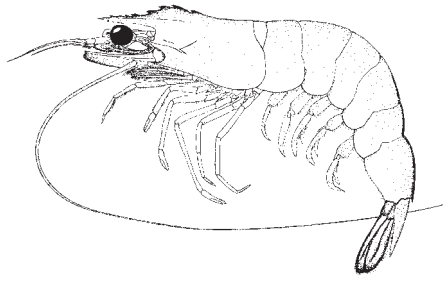


Fig. 4 *Penaeus*

- 3a. Telson with a pair of large subapical fixed lateral spines (Fig. 5) → 4
- 3b. Telson without large subapical fixed lateral spines → 7

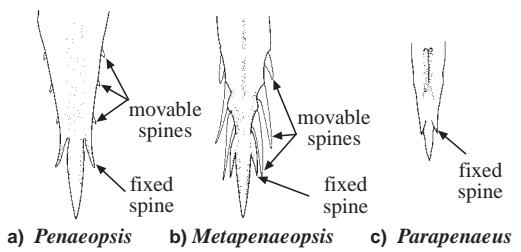
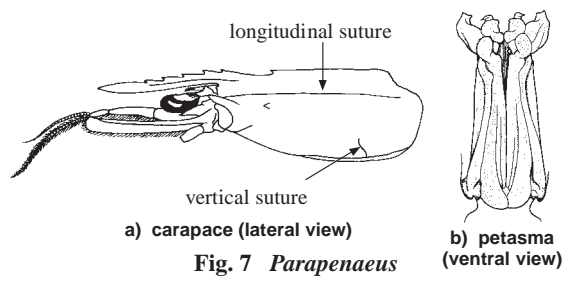
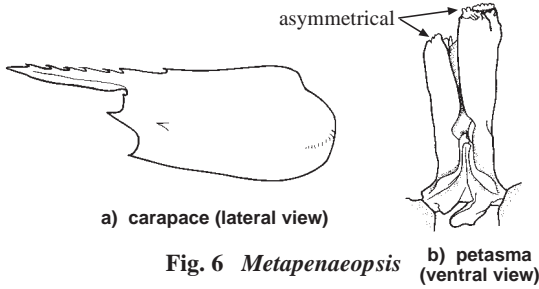
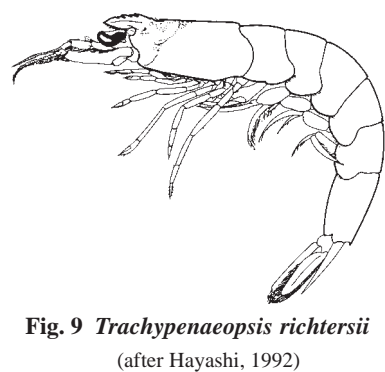
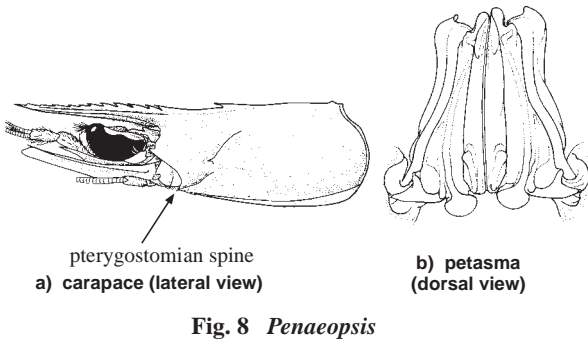


Fig. 5 telson (dorsal view)
(after Lee and Yu, 1977)

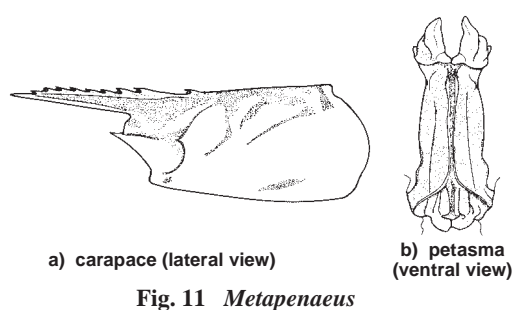
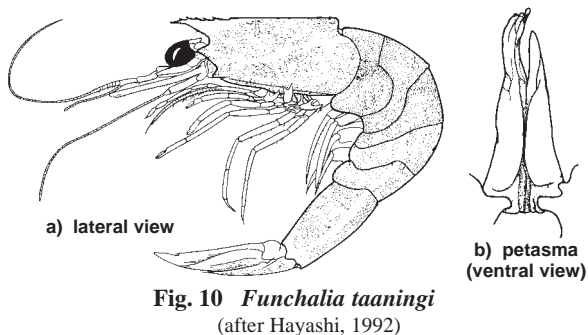
- 4a. Body densely covered with short hairs, with grooves and crests on carapace obscure (Fig. 6a); petasma asymmetrical (Fig. 6b) *Metapenaeopsis*
- 4b. Body almost naked, with crests and grooves on carapace distinct (Fig. 7a); petasma symmetrical (Figs 7b and 8b) → 5



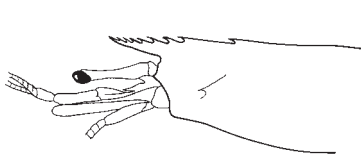
- 5b. Carapace with longitudinal and vertical sutures (Fig. 7a); telson without movable lateral spines (Fig. 5c) *Parapenaeus*
- 5a. Carapace lacking longitudinal and vertical sutures (Fig. 8a); telson with movable lateral spines → 6
- 6a. Rostrum extending far beyond eye; pterygostomial spine present (Fig. 8a); deep water. *Penaeopsis*
- 6b. Rostrum short, not extending beyond eye; pterygostomial spine absent (Fig. 9); on reefs *Trachypenaeopsis*
(a single species, *T. richtersi*, in the area)



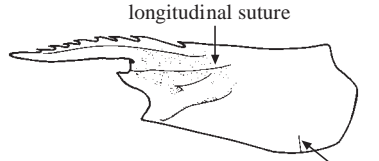
- 7a. Third maxilliped with epipod; male petasma asymmetrical (Fig. 10b); pelagic (Fig. 10a) . *Funchalia*
(a single species, *F. taaningi*, in the area)
- 7b. Third maxilliped without epipod; male petasma symmetrical (Fig. 11b); benthic → 8
- 8a. Fifth leg without exopod (carapace without longitudinal or vertical sutures, Fig. 11a). *Metapenaeus*
- 8b. Fifth leg with exopod → 9



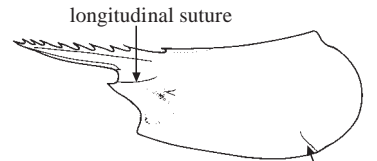
- 9a. Carapace without longitudinal or vertical sutures; second leg with ischial spine; eyes small (Fig. 12) *Atypopenaeus*
(the genus *Miyadiella* is not included in this key, as its status is rather controversial and specimens are interpreted as juveniles of *Atypopenaeus* by some authors)
- 9b. Carapace with both longitudinal and vertical sutures (Figs 13 and 14); second leg without ischial spine; eyes large →10
- 10a. Body naked, with crests and grooves on carapace distinct; longitudinal suture usually long (Fig. 13); third leg without epipod *Parapenaeopsis*
- 10b. Body usually hairy, with crests and grooves on carapace obscure (Fig. 14); longitudinal suture short; third leg generally with epipod *Trachypenaeus*



carapace (lateral view)
Fig. 12 *Atypopenaeus*



carapace (lateral view)
Fig. 13 *Parapenaeopsis*



carapace (lateral view)
Fig. 14 *Trachypenaeus*

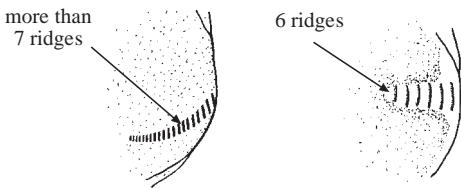
Key to the species of *Atypopenaeus* occurring in the area

- 1a. Rostrum short, not extending beyond eye → 2
- 1b. Rostrum extending far beyond eye → 3
- 2a. Hepatic spine present *Atypopenaeus stenodactylus*
- 2b. Hepatic spine absent *Atypopenaeus dearmatus*
- 3a. Crests on fourth and fifth abdominal segments very high and blade-like; fifth leg very slender, extending beyond body; colour pale pink *Atypopenaeus bicornis*
- 3b. Crests on fourth and fifth abdominal segments not blade-like; fifth leg about 2/3 the length of the body; colour reddish orange *Atypopenaeus formosus*

Key to species of *Metapenaeopsis* likely to be encountered in fishing activities in the area

Note: in addition to the following key characters, the shape of the petasma and thelycum can be very helpful for quick identification of mature specimens (see figures shown in the respective species accounts). For a full key to *Metapenaeopsis*, see the revisions by A.Crosnier (1987-1994), in "Bull. Mus. natn. Hist. nat., Paris" and "Rèultats des Campagnes MUSORSTOM".

- 1a. Posterolateral carapace with stridulating organs (Fig. 15). → 2
- 1b. Posterolateral carapace without stridulating organs → 7
- 2a. Stridulating ridges usually 4 to 6 (Fig. 15b) *Metapenaeopsis stridulans*
- 2b. Stridulating ridges more than 7 (Fig. 15a) → 3
- 3a. Rostrum far exceeding antennular peduncle, usually bearing 5 widely spaced upper teeth (Fig. 16) *Metapenaeopsis novaeguineae*
- 3b. Rostrum extending to about tip of antennular peduncle, bearing more than 6 regularly spaced upper teeth → 4



a) *Metapenaeopsis toloensis* b) *Metapenaeopsis stridulans*

Fig. 15 stridulating ridges on posterolateral carapace

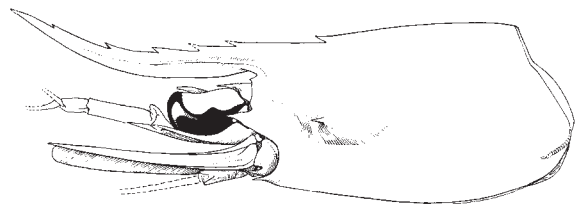


Fig. 16 *Metapenaeopsis novaeguineae*

(from Crosnier, 1994)

- 4a. Pterygostomian spine moderately to well developed (Fig. 17) → 5
- 4b. Pterygostomian spine reduced (Fig. 18). → 6

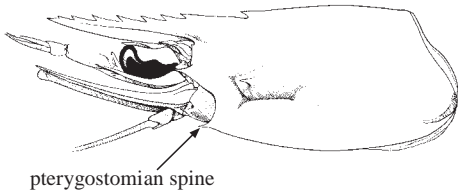


Fig. 17 *Metapenaeopsis barbata*
(from Crosnier, 1994)

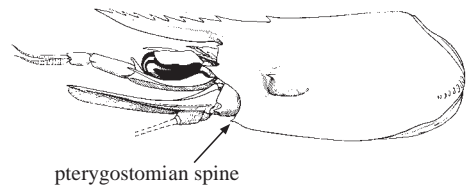


Fig. 18 *Metapenaeopsis palmensis*
(from Crosnier, 1994)

- 5a. Dorsal crest of third abdominal segment flat or very slightly concave (Fig. 19a) *Metapenaeopsis barbata*
- 5b. Dorsal crest of third abdominal segment with deep median groove (Fig. 19b) *Metapenaeopsis toloensis*
- 6a. Rostrum with 9 or 10 upper teeth *Metapenaeopsis rosea*
- 6b. Rostrum with 7 or 8 upper teeth (Fig. 18) *Metapenaeopsis palmensis*
- 7a. Rostrum forming a crest (Fig. 20) *Metapenaeopsis lamellata*
- 7b. Rostrum not forming a crest → 8
- 8a. Pterygostomian spine very strong (Fig. 21) *Metapenaeopsis wellsii*
- 8b. Pterygostomian spine minute or absent (Fig. 22) *Metapenaeopsis mogiensis*

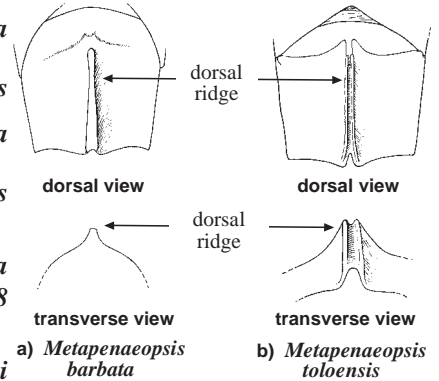


Fig. 19 third abdominal segment
(from Crosnier, 1994)

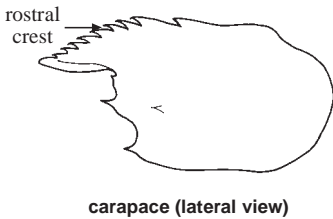


Fig. 20 *Metapenaeopsis lamellata*

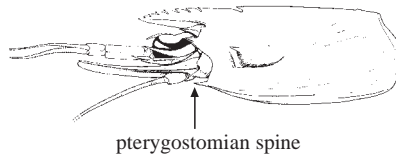


Fig. 21 *Metapenaeopsis wellsii*
(from Crosnier, 1991)

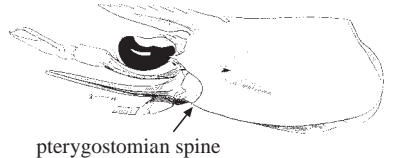


Fig. 22 *Metapenaeopsis mogiensis*
(from Crosnier, 1991)

Key to the species of *Metapenaeus* occurring in the area

Remarks on key characters: the shape of the petasma and thelycum are the main taxonomic characters to separate species of this genus (see figures shown in the respective species accounts). Therefore, correct identification of juveniles and immature specimens is sometimes difficult. See Miquel (1982, *Zool. Verh.*, 195) for more information on the species of this genus.

- 1a. Rostrum very short and high, not extending beyond eye (Fig. 23) *Metapenaeus lysianassa*
- 1b. Rostrum extending beyond eye → 2

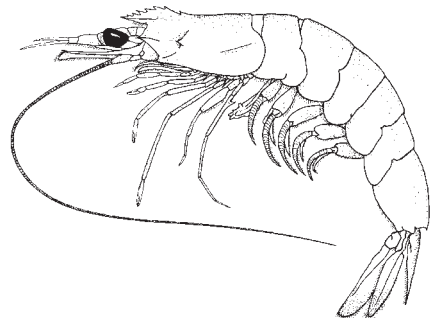


Fig. 23 *Metapenaeus lysianassa*

- 2a. Rostrum armed with teeth along entire upper border (Fig. 24) → 3
- 2b. Rostrum unarmed in its distal 1/3 to 1/2 (Figs 25 and 26) → 16

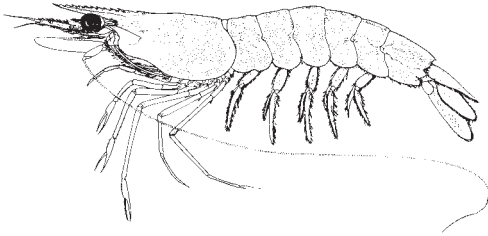


Fig. 24 *Metapenaeus ensis*

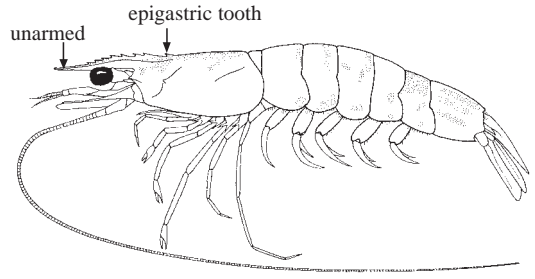


Fig. 25 *Metapenaeus eboracensis*
(after Miguel, 1982)

- 3a. Telson with 3 pairs of large movable spines (Fig. 27b) → 4
- 3b. Telson without large movable spines (although sometimes with many minute spinules; Fig. 27a) → 6

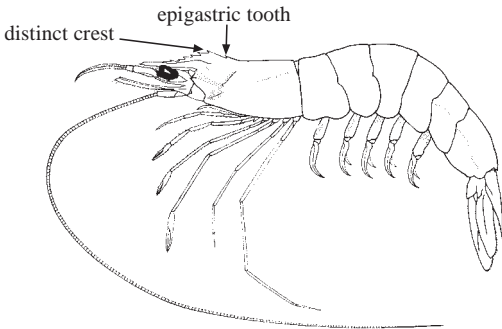


Fig. 26 *Metapenaeus tenuipes*
(after Miguel, 1982)

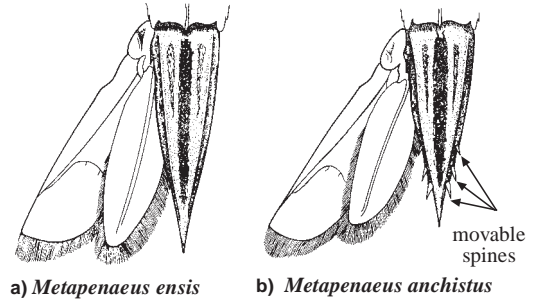


Fig. 27 telson and left uropod (dorsal view)
(after Motoh and Buri, 1984)

- 4a. In males, distolateral projections of petasma not reaching as far as distomedian ones, armed with a pair of spinules on each externodistal side; in females, thelycum with a posteromedian ogival boss, coxal projection of fourth leg very long, flat and truncate *Metapenaeus intermedius*
- 4b. In males, distolateral projections of petasma exceeding distomedian ones, without external spinules; in females, thelycum without a posteromedian boss, coxal projection of fourth leg a conical process → 5
- 5a. In males, a wide space between distomedian projections of petasma; in females, lateral plates of thelycum with raised posterior edge, a deep fissure between lateral plates and posterior transverse ridge *Metapenaeus endeavouri*
- 5b. In males, a narrow space between distomedian projections of petasma; in females, lateral plates of thelycum without raised posterior edge and continuous to posterior transverse ridge *Metapenaeus anchistus*
- 6a. First leg with ischial spine subequal to basal spine *Metapenaeus suluensis*
- 6b. Ischial spine of first leg much smaller than basal spine, minute or absent → 7
- 7a. In males, distomedian projection of petasma swollen; in females, lateral plates of thelycum with raised lateral or ventral ridges → 8
- 7b. In males, distomedian projection of petasma not swollen; in females, lateral plates of thelycum without raised ridges → 12

- 8a. In males, each distomedian projection of petasma forming a broad outward curved distal tooth; in females, anterior plate of thelycum with a pair of anterolateral rounded tubercles, each lateral plate with a short anteromedian ridge and a patch of setae. *Metapenaeus insolitus*
- 8b. In males, each distomedian projection of petasma without distolateral teeth; in females, anterior plate of thelycum without tubercles, lateral plates with long ridges and without patches of setae → 9
- 9a. In males, distomedian projections of petasma concealing distolateral ones in ventral view, merus of fifth leg with a long inward curved spiniform process followed by a distinct row of tubercles; in females, ridges on lateral plates of thelycum subparallel or forming posteriorly distinctly inward curved processes → 10
- 9b. In males, distomedian projections of petasma not concealing distolateral ones in ventral view, merus of fifth leg with a tubercle; in females, ridges on lateral plates of thelycum closer to each other posteriorly and without distinctly inward curved processes → 11
- 10a. Rostrum armed with 7 to 9 upper teeth; in males, distomedian projections of petasma reaching about as far as distolateral ones; in females, lateral plates of thelycum with strongly raised crescent-shaped ventral ridges, coming close together posteromedially *Metapenaeus conjunctus*
- 10b. Rostrum armed with 8 to 12 upper teeth; in males, distomedian projections of petasma reaching well beyond distolateral ones; in females, lateral plates of thelycum with strongly raised externolateral edges, a wide space separating them *Metapenaeus ensis*
- 11a. In males, distomedian projections of petasma directed forward, their inner margins almost parallel, tubercle on merus of fifth leg slightly bent inward; in females, ridges on lateral plates of thelycum curved outward posteriorly *Metapenaeus papuensis*
- 11b. In males, distomedian projections of petasma directed anterolaterally, diverging, with distinct longitudinal grooves, tubercle on merus of fifth leg slightly bent outward; in females, ridges on lateral plates of thelycum curved inward posteriorly *Metapenaeus elegans*
- 12a. Branchiocardiac crest reaching posterior extension of hepatic spine; in males, distomedian projections of petasma crescent-shaped; in females, posterior transverse ridge behind thelycum with 2 anterolateral rounded projections *Metapenaeus affinis*
- 12b. Branchiocardiac crest ending near posterior 1/3 of carapace; in males, distomedian projections of petasma never crescent-shaped; in females, posterior transverse ridge behind thelycum without projections → 13
- 13a. In males, distolateral projections of petasma widening distally, distomedian projections not reaching as far as distolateral ones; in females, anterior plate of thelycum very broad in its distal half and very narrow posteriorly, lateral plates fused and rounded W-shape *Metapenaeus demani*
- 13b. In males, distolateral projections of petasma tapering distally, distomedian projections exceeding distolateral ones; in females, anterior plate of thelycum about same width on anterior and posterior margins, lateral plates not rounded W-shape → 14
- 14a. In males, distomedian projections of petasma tubular and diverging; in females, anterior margin of anterior plate of thelycum with 2 fang-like teeth and a median indistinct tubercle *Metapenaeus dalli*
- 14b. In males, distomedian projections of petasma either tubular and subparallel or laminose and diverging; in females, anterior margin of anterior plate of thelycum with 3 tubercles. → 15
- 15a. In males, distomedian projections of petasma tubular and almost parallel, their distal part twisted dorsoventrally; in females, distal margin of anterior plate of thelycum triangular, median tubercle more prominent than lateral ones *Metapenaeus bennettiae*
- 15b. In males, distomedian projections of petasma laminose and diverging; in females, distal margin of anterior plate of thelycum convex, all tubercles of subequal size *Metapenaeus moyebi*
- 16a. Telson armed with 4 pairs of large movable spines *Metapenaeus macleayi*
- 16b. Telson without large movable lateral spines (though sometimes with many minute spinules) → 17

- 17a. In males, basal spine of third leg extremely long and barbed; in females, lateral plates of thelycum partially sheathing anterior plate *Metapenaeus dobsoni*
- 17b. In males, basal spine of third leg sample, not barbed; in females, lateral plates of thelycum not sheathing anterior plate →18
- 18a. Rostrum without a distinct crest; adrostral groove extending beyond epigastric tooth (Fig. 25) *Metapenaeus eboracensis*
- 18b. Rostrum with a distinct crest; adrostral groove not reaching epigastric tooth (Fig. 26) →19
- 19a. In males, distolateral projections of petasma directed outward, distomedian projections with slender apical filaments; in females, thelycum with a large anterior and small lateral plates *Metapenaeus brevicornis*
- 19b. In males, distolateral projections of petasma directed forward, distomedian projections with ribbon-like apical filaments; in females, thelycum with a small anterior and large lateral plates *Metapenaeus tenuipes*

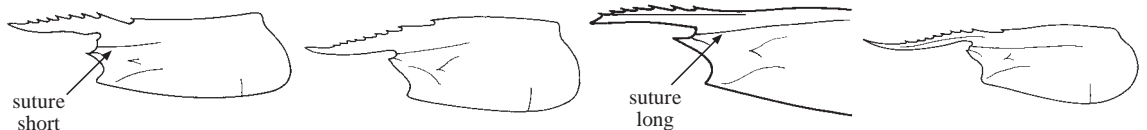
Key to the species of *Parapenaeopsis* occurring in the area^{1/}

Note: in addition to the following key characters, the shape of the petasma and thelycum can also be very helpful for quick identification of mature specimens (see figures shown in the respective species accounts).

- 1a. First and second legs with epipods → 2
- 1b. First and second legs without epipods → 8
- 2a. First leg without basal spine *Parapenaeopsis gracillima*
- 2b. First leg with basal spine → 3
- 3a. Second leg with basal spine absent or minute; carapace with a large dorsoposterior dark brown patch *Parapenaeopsis uncta*
- 3b. Second leg usually with a distinct basal spine; carapace without conspicuous dark patches on dorsal surface → 4
- 4a. Telson armed with 1 or 2 pairs of fixed lateral spines (Fig. 28) *Parapenaeopsis coromandelica*
- 4b. Telson without fixed lateral spines → 5
- 5a. Longitudinal suture short, reaching to about level of hepatic spine (Figs 29a, b); male petasma horn-like; in females, anterior and posterior plates of thelycum fused medially → 6
- 5b. Longitudinal suture long, extending near to posterior carapace (Figs 29c, d); male petasma not horn-like; in females, anterior and posterior plates of thelycum separated → 7
- 6a. Rostrum usually with 7 or 8 upper teeth (Fig. 29a); third leg without basal spine; in males, tip of distolateral projection of petasma with a small dorsal spiniform process; in females, posterior plate of thelycum without a median boss *Parapenaeopsis cornuta*
- 6b. Rostrum usually with 9 or 10 upper teeth (Fig. 29b); third leg with a basal spine; in males, tip of distolateral projection of petasma without dorsal spiniform processes; in females, posterior plate of thelycum with a median boss *Parapenaeopsis maxillipedo*



Fig. 28 *Parapenaeopsis coromandelica*



a) *Parapenaeopsis cornuta* b) *Parapenaeopsis maxillipedo* c) *Parapenaeopsis hardwickii* d) *Parapenaeopsis sculptilis*
Fig. 29 carapace (lateral view)

^{1/} The taxonomic status and the relationships of some species of this genus are still unclear. For example, *Parapenaeopsis probata* Hall, 1961 is here treated as a synonym of *P. uncta* Alcock, 1905, but its status probably should be re-examined.

- 7a. In males, distomedian projections wing-like, wider than long and with anterior margin often crenulate; in females, posterior plate of thelycum with a pair of anterolateral tooth-like projections and anteromedian margin bearing a transverse row of long hairs; body not strikingly cross-banded *Parapenaeopsis hardwickii*
- 7b. In males, distomedian projections rabbit ear-shaped, long and deeply concave ventrally; in females, posterior plate of thelycum without anterolateral tooth-like projections but with a median tubercle bearing a tuft of long hairs; body strikingly cross-banded . . . *Parapenaeopsis sculptilis*
- 8a. Epigastric tooth present → 9
- 8b. Epigastric tooth absent →10
- 9a. Rostrum long and exceeding antennular peduncle; longitudinal suture extending almost to posterior carapace *Parapenaeopsis hungerfordii*
- 9b. Rostrum short and extending just beyond eyes; longitudinal suture only reaching as far as level of hepatic spine *Parapenaeopsis venusta*
- 10a. Rostrum extending far beyond antennular peduncle; longitudinal suture reaching as far as level of hepatic spine; vertical suture absent *Parapenaeopsis arafurica*
- 10b. Rostrum not exceeding second antennular segment; longitudinal suture extending far behind level of hepatic spine; vertical suture present *Parapenaeopsis tenella*

Key to the species of *Parapenaeus* occurring in the area

Note: the shape of the petasma and thelycum can be very helpful for quick identification of mature specimens, and these are therefore depicted at the end of the key (Figs 39, 40, and 41). For more information on the species of this genus, see the work of Crosnier (1986, Résultats des Campagnes MUSORSTOM, Vol 2).

- 1a. Branchiostegal spine absent (Fig. 30) *Parapenaeus longipes*
- 1b. Branchiostegal spine present (Figs 31 to 38) → 2
- 2a. Branchiostegal spine situated behind anterior edge of carapace (Figs 31 and 32) → 3
- 2b. Branchiostegal spine situated on anterior edge of carapace (Figs 33 to 38) → 4

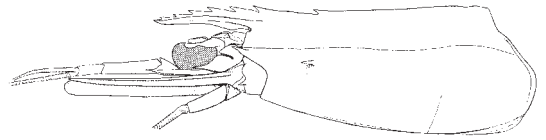


Fig. 30 *Parapenaeus longipes*
(from Crosnier, 1985)

- 3a. Rostrum slightly curved downward; postrostral crest extending close to posterior border of carapace (Fig. 31) (see also Figs 39a and 41a) *Parapenaeus investigatoris*
- 3b. Rostrum slightly curved upward; postrostral crest extending to slightly beyond midcarapace (Fig. 32; see also Figs 39b and 41b) *Parapenaeus murrayi*



Fig. 31 *Parapenaeus investigatoris*
(from Crosnier, 1985)

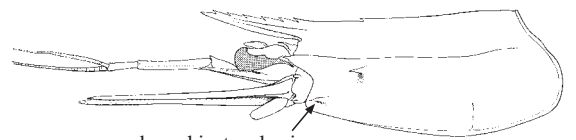


Fig. 32 *Parapenaeus murrayi*
(from Crosnier, 1985)

- 4a. Rostrum usually not exceeding basal segment of antennular peduncle (Figs 33; see also Figs 39c and 41c) . . . *Parapenaeus fissurus*
- 4b. Rostrum extending far beyond basal segment of antennular peduncle → 5

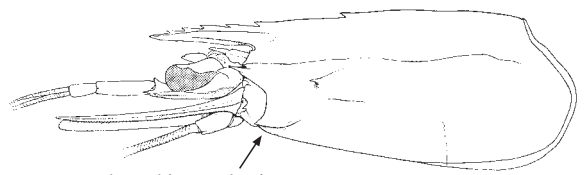


Fig. 33 *Parapenaeus fissurus*
(from Crosnier, 1985)

- 5a. Epigastric spine approximately above level of hepatic spine (Fig. 34; see also Figs 39d and 41d) *Parapenaeus perezfarfante*
- 5b. Epigastric spine distinctly behind level of hepatic spine (Fig. 35) → 6

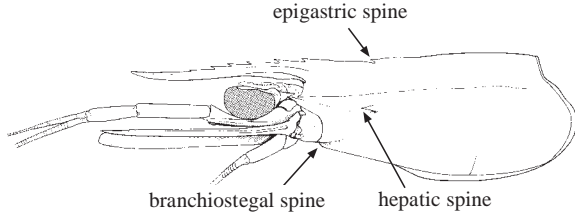


Fig. 34 *Parapenaeus perezfarfante*
(from Crosnier, 1985)

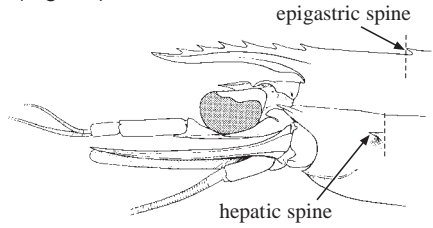


Fig. 35 *Parapenaeus sextuberculatus*
(from Crosnier, 1985)

- 6a. Rostrum slender and almost straight (see also Fig. 40a) . . *Parapenaeus ruberoculatus*
- 6b. Rostrum robust and sinuous → 7

- 7a. Rostrum extending to about the middle of second segment of antennular peduncle (Fig. 35; see also 40b and 41e) *Parapenaeus sextuberculatus*
- 7b. Rostrum extending beyond second segment of antennular peduncle (Figs 36 to 38) → 8

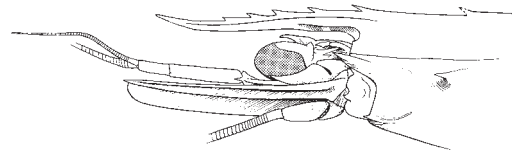


Fig. 36 *Parapenaeus fissuroides*
(from Crosnier, 1985)

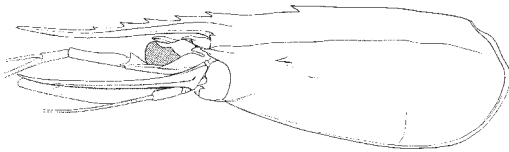


Fig. 37 *Parapenaeus lanceolatus*
(from Crosnier, 1985)

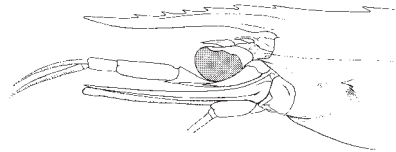


Fig. 38 *Parapenaeus australiensis*
(from Crosnier, 1985)

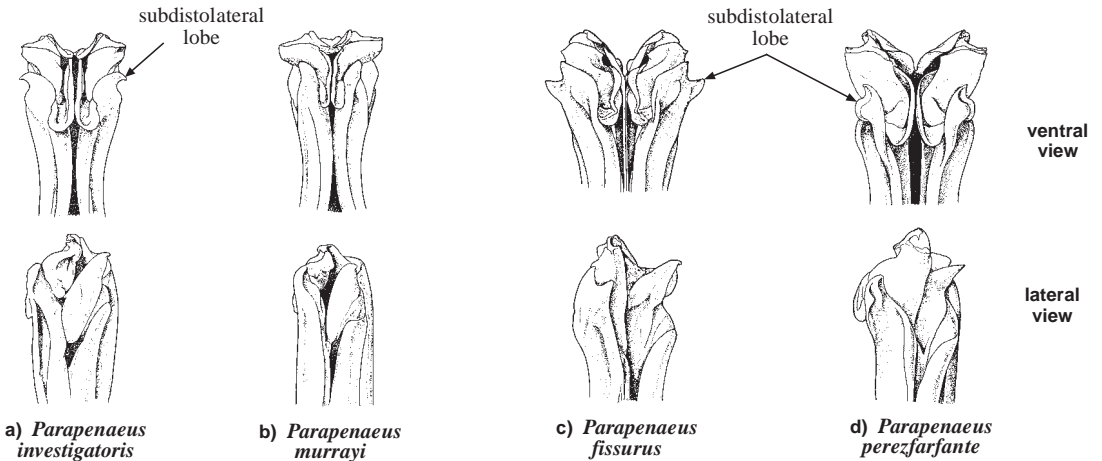


Fig. 39 distal part of petasma

(after Crosnier, 1985)

- 8a. In males, petasma with subdistolateral lobes bifurcate (Fig. 40c); in females median part of thelycum bearing a pair of longitudinal swellings (Fig. 41f) *Parapenaeus fissuroides*
- 8b. In males, petasma with subdistolateral lobes not bifurcate; in females, median part of thelycum without longitudinal swellings → 9

- 9a.** In males, petasma with subdistolateral lobes pointed (Fig. 40d); in females, thelycum with a distinct median pit (Fig. 41g) *Parapenaeus lanceolatus*
- 9b.** In males, petasma with subdistolateral lobes rounded (Fig. 40e); in females, thelycum without a pit at middle (Fig. 41h, sometimes bearing a tubercle) *Parapenaeus australiensis*

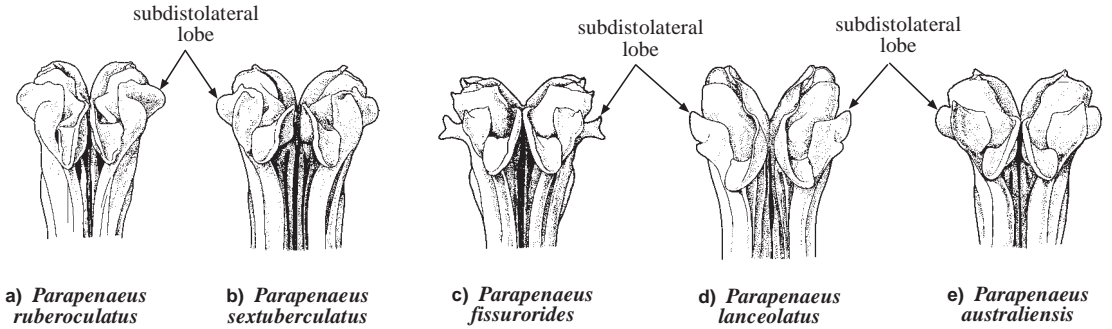


Fig. 40 distal part of petasma (ventral view)
(after Crosnier, 1985)

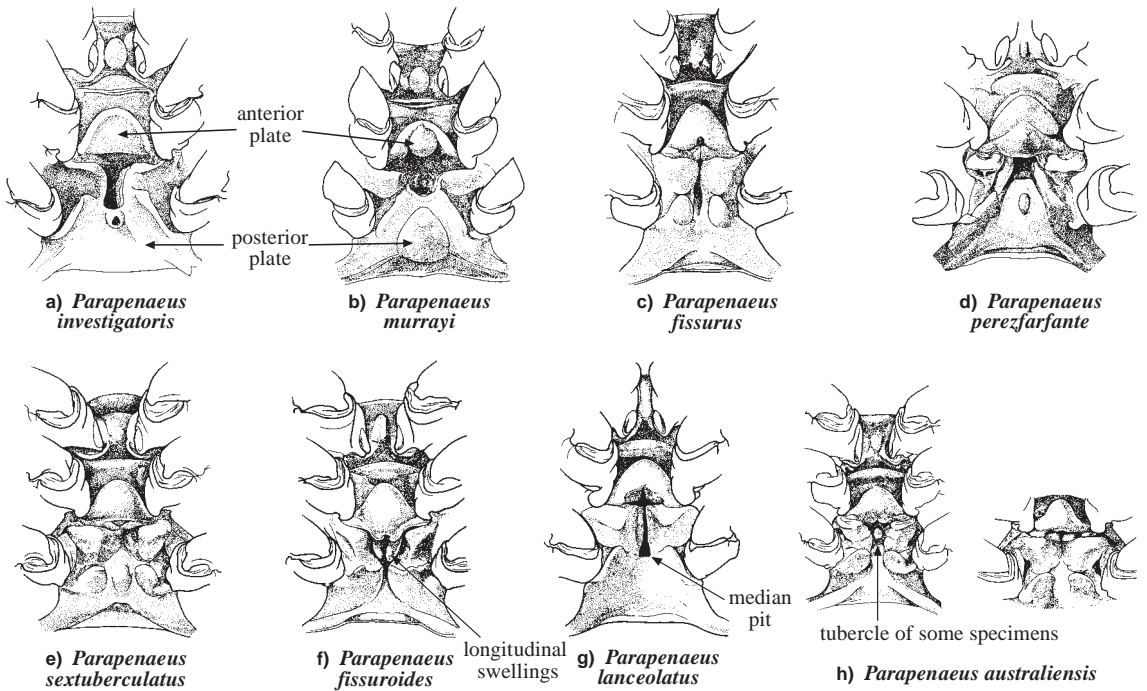


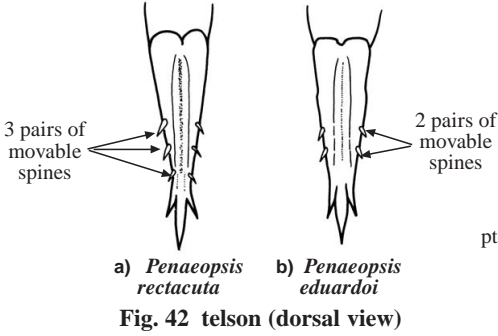
Fig. 41 thelycum
(after Crosnier, 1985)

Key to the species of *Penaeopsis* occurring in the area

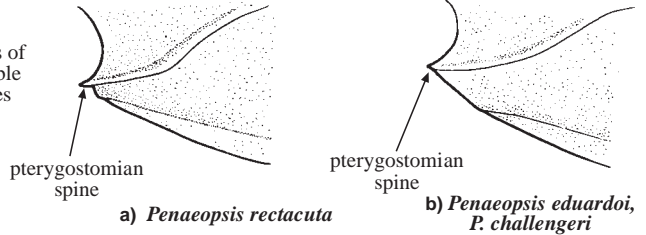
Note: for more information on the species of this genus, see the work of Pérez Farfante (1980, *Fish. Bull.*: 77).

- 1a.** Telson generally with 3 pairs of movable spines (Fig. 42a); pterygostomial spine above anterolateral corner of carapace (Fig. 43a) *Penaeopsis rectacuta*
- 1b.** Telson generally with 2 pairs of movable spines (Fig. 42b); pterygostomial spine at anterolateral corner of carapace (Fig. 43b) → 2

- 2a. In males, petasma with ventral costa produced distally into long spine considerably extending beyond level of row of cincinnuli; in females, thelycum with lateral plates turning abruptly mesially posterior to midlength, plate bearing short, pedunculate posteromedian protuberance *Penaeopsis eduardoi*
- 2b. In males, petasma with ventral costa ending distally in a blunt, short process or spine not extending beyond level of row of cincinnuli; in females, thelycum with lateral plates not turning abruptly mesially posterior to midlength, plate bearing short, subrectangular posteromedian protuberance *Penaeopsis challengerii*



a) *Penaeopsis rectacuta* b) *Penaeopsis eduardoi*
Fig. 42 telson (dorsal view)

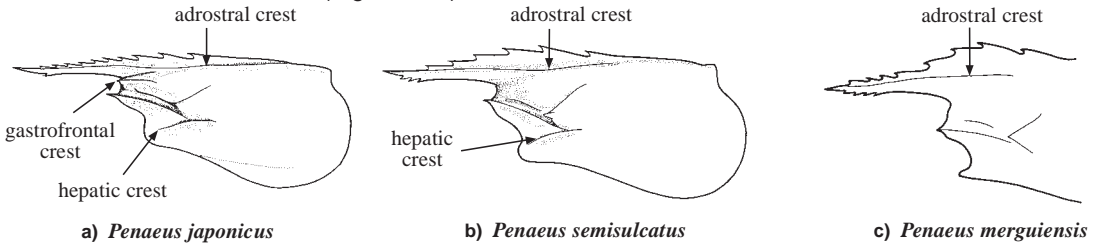


a) *Penaeopsis rectacuta* b) *Penaeopsis eduardoi*, *P. challengerii*
Fig. 43 anterolateral corner of carapace

Key to the species of *Penaeus* occurring in the area^{2/}

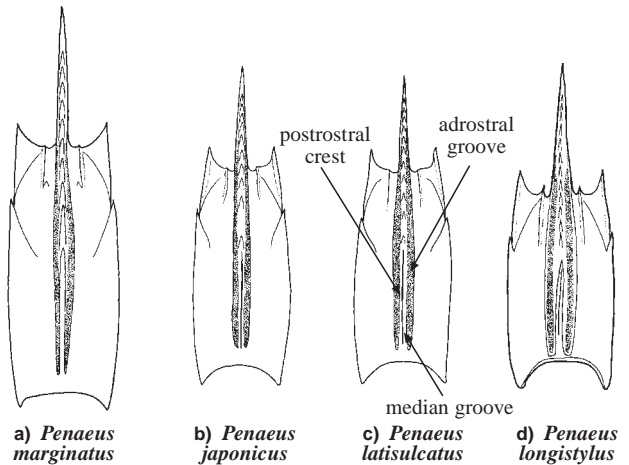
Note: live or fresh specimens of this genus can often be easily distinguished on the basis of their coloration.

- 1a. Adrostral crest extending almost to posterior border of carapace; gastrofrontal crest present; generally 1 or 2 lower rostral teeth (Fig. 44a) → 2
- 1b. Adrostral crest not extending beyond midcarapace; gastrofrontal crest absent; generally 3 to 6 lower rostral teeth (Figs 44b, c) → 7



a) *Penaeus japonicus* b) *Penaeus semisulcatus* c) *Penaeus merguensis*
Fig. 44 carapace (lateral view)

- 2a. Postrostral crest without median groove (Fig. 45a); usually 2 lower rostral teeth (body uniform colour) *Penaeus marginatus*
- 2b. Postrostral crest with median groove (Figs 45b, c, d); usually 1 lower rostral tooth → 3



a) *Penaeus marginatus* b) *Penaeus japonicus* c) *Penaeus latisulcatus* d) *Penaeus longistylus*
Fig. 45 carapace (dorsal view)

^{2/} This genus is sometimes subdivided into many subgenera or genera by some authors.

- 3a. Telson unarmed (Fig. 46a; body covered with cross bands) *Penaeus canaliculatus*
- 3b. Telson armed with movable lateral spines (Fig. 46b) → 4
- 4a. First leg bearing a distinct ischial spine (Fig. 47a); median groove on postrostral crest less than half carapace length (Fig. 45d, body without cross bands). *Penaeus longistylus*
- 4b. First leg with ischial spine minute or absent (Fig. 47b); median groove on postrostral crest extending almost to posterior carapace (Figs 45b, c). → 5

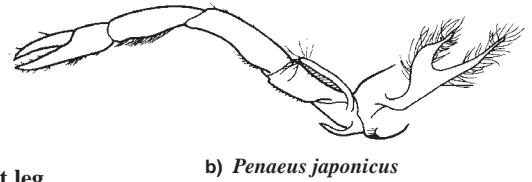
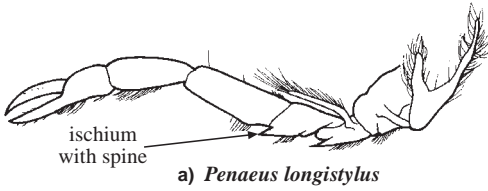
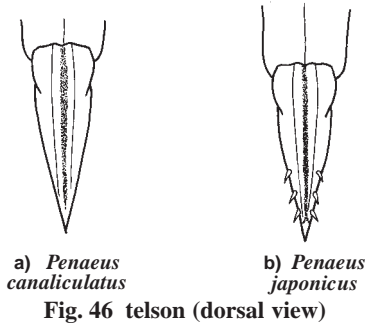
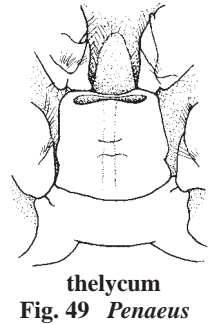
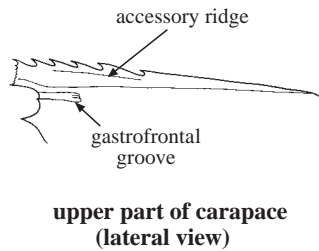


Fig. 47 first leg (after Hayashi, 1992)

- 5a. Rostrum with accessory ridges; gastrofrontal groove divided into 3 at posterior end (Fig. 48; body uniformly coloured) *Penaeus plebejus*
- 5b. Rostrum without distinct accessory ridges; gastrofrontal groove divided into 2 at posterior end. → 6



- 6a. Adrostral groove about as long as wide as postrostral crest (Fig. 45b, body covered with cross bands; shape of thelycum unique and pouch-like, Fig. 49, those of all other species flap-like) *Penaeus japonicus*
- 6b. Adrostral groove distinctly wider than postrostral crest (Fig. 45c, body without cross bands) *Penaeus latusulcatus*
- 7a. Hepatic crest present; body covered with cross bands; generally 3 lower rostral teeth (Fig. 44b) → 8
- 7b. Hepatic crest absent; body semi-transparent and densely covered with minute dark brown dots; generally 4 to 6 lower rostral teeth (Fig. 44c) → 10
- 8a. Fifth leg without exopod; hepatic crest nearly horizontal (Fig. 50); antennal flagella not banded *Penaeus monodon*
- 8b. Fifth leg bearing a small exopod; hepatic crest sloping anteroventrally (Fig. 51); antennal flagella banded → 9

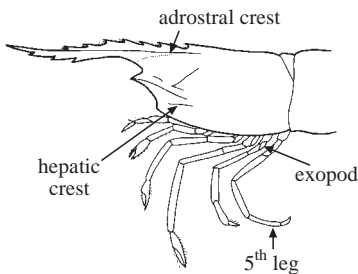


Fig. 50 *Penaeus monodon* (after Yu and Chan, 1986)

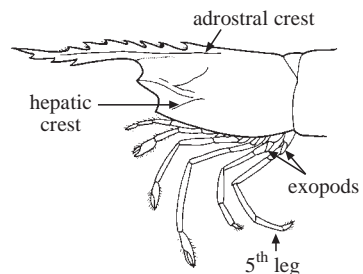
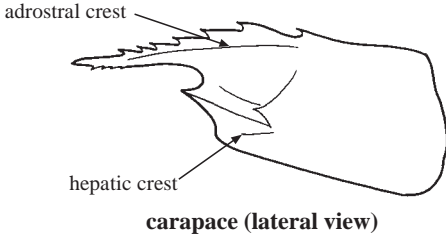
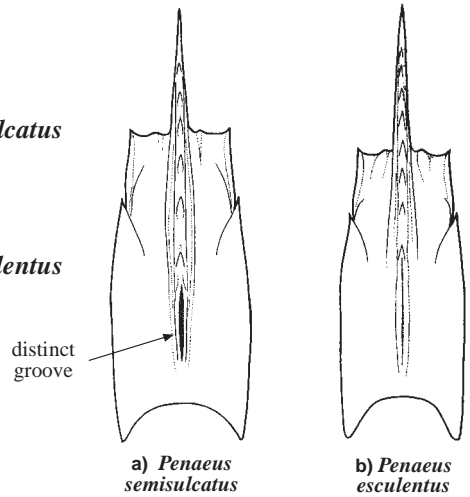


Fig. 51 *Penaeus semisulcatus* (after Yu and Chan, 1986)

- 9a. Adrostral crest extending behind last postrostral tooth (Fig. 51); postrostral crest distinctly grooved (Fig. 53a); hepatic crest extending well behind antennal crest (Fig. 51) *Penaeus semisulcatus*
- 9b. Adrostral crest at most extending to last postrostral tooth (Fig. 52); postrostral crest without a distinct groove (Fig. 53b); hepatic crest not extending behind antennal crest (Fig. 52) *Penaeus esculentus*



carapace (lateral view)
Fig. 52 *Penaeus esculentus*



dorsal view of carapace
Fig. 53

- 10a. Third maxilliped of males with distal segment about half as long as second segment which bears a tuft of hairs at tip (Fig. 54a, rostral crest high and broadly triangular in both sexes; body yellowish to greenish, antennal flagella reddish brown) . . . *Penaeus merguensis*
- 10b. Third maxilliped of males with distal segment longer or as long as second segment → 11

- 11a. Rostrum slightly curved at tip and sigmoidal shaped; antennal flagella yellowish (third maxilliped of males with second segment as long as distal segment and bearing a tuft of long hairs at tip, Fig. 54b; rostral crest slightly elevated in both sexes; body yellowish white to greyish green) *Penaeus indicus*

- 11b. Rostrum nearly horizontal straight; antennal flagella reddish brown → 12

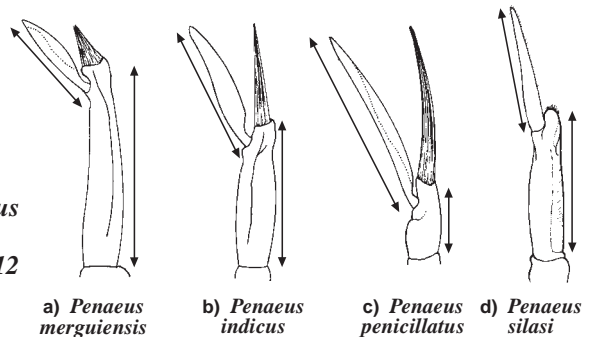


Fig. 54 distal part of third maxilliped in adult males

- 12a. Third maxilliped of males with distal segment 1.5 to 2.5 times longer than second segment which bearing a tuft of very long hairs at tip (Fig. 54c); rostral crest slightly elevated in males and moderately high in large females; body somewhat greenish *Penaeus penicillatus*

- 12b. Third maxilliped of males with distal segment as long as second segment which only bears a rudimentary tuft of hairs at tip (Fig. 54d); rostral crest slightly to moderately elevated in males but broadly triangular in large females; body yellowish white to pinkish *Penaeus silasi*

Key to the species of *Trachypenaeus* occurring in the area^{3/}

Remarks on key characters: occasionally, spermatophores or sperm sacs (a white or yellowish cement-like mass) are attached to the thelycum of mature females, making observation difficult. Nevertheless, they can be easily removed by using a pin, forceps, or finger nail.

- 1a. Second leg with epipod → 2
- 1b. Second leg without epipod → 6

3/ The taxonomic status and relationships of some species of this genus are still unclear, and this genus is sometimes subdivided into many genera by some authors.

- 2a. First leg without epipod *Trachypenaeus villaluzi*
- 2b. First leg with epipod. → 3
- 3a. Rostrum curved downward (female thelycum with sharply pointed apex) . *Trachypenaeus gonospinifer*
- 3b. Rostrum straight or curved upward → 4
- 4a. Male petasma horn-like; female thelycum with sharply pointed apex *Trachypenaeus sedili*
- 4b. Male petasma T-shaped, female thelycum with round apex → 5
- 5a. Rostrum straight and armed with 8 to 11 upper teeth; fourth and fifth abdominal segments without posteromedian incisions (Fig. 55a); fifth leg extending beyond antennal scale; posterior plate of female thelycum without distinct notch. . *Trachypenaeus longipes*
- 5b. Rostrum upturned at tip and armed with 6 to 8 upper teeth; fourth and fifth abdominal segments with posteromedian incisions (Fig. 55b); fifth leg not reaching tip of antennal scale; posterior plate of female thelycum having a distinct median notch *Trachypenaeus curvirostris*
- 6a. Male petasma T-shaped; posterior plate of female thelycum as a forwardly directed pocket *Trachypenaeus malaiana*
- 6b. Male petasma horn-like; posterior plate of female thelycum not forming a pocket →7
- 7a. In males, distolateral projections of petasma narrow; in females, anterior plate of thelycum without a backwardly directed projection *Trachypenaeus anchoralis*
- 7b. In males, distolateral projections of petasma widely apart; in females, anterior plate of thelycum with a backwardly directed projection *Trachypenaeus granulatus*

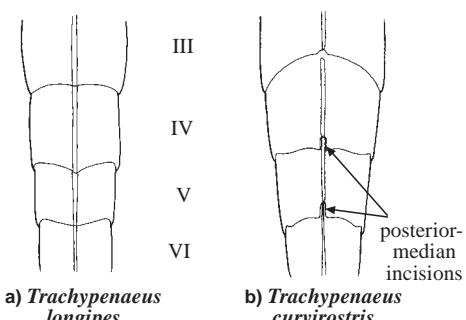















Fig. 55 abdominal segments (dorsal view)
(after Hayashi, 1992)

List of species occurring in the area

The symbol is given when species accounts are included.

- Atypopenaeus bricornis* Racek and Dall, 1965
- Atypopenaeus dearmatus* De Man, 1907
- Atypopenaeus formosus* Dall, 1957
- Atypopenaeus stenodactylus* (Stimpson, 1860)
- Funchalia taaningi* Burenroad, 1940
- Heteropenaeus longimanus* De Man, 1896
- Metapenaeopsis aegyptia* Galil and Golani, 1990
- Metapenaeopsis angusta* Crosnier, 1987
- Metapenaeopsis assimilis* (De Man, 1920)
- Metapenaeopsis barbata* (De Haan, 1844)
- Metapenaeopsis ceylonica* Starobogatov, 1972
- Metapenaeopsis commensalis* Borradaile, 1898
- Metapenaeopsis costata* Crosnier, 1991
- Metapenaeopsis difficilis* Crosnier, 1991
- Metapenaeopsis distincta* (De Man, 1907)
- Metapenaeopsis evermanni* (Rathbun, 1906)
- Metapenaeopsis fusca* R.J.G. Manning, 1988
- Metapenaeopsis gaillardi* Crosnier, 1991
- Metapenaeopsis gallensis* (Pearson, 1905)
- Metapenaeopsis hilarula* (De Man, 1911)
- Metapenaeopsis lamellata* (De Haan, 1844)
- Metapenaeopsis laubieri* Crosnier, 1991
- Metapenaeopsis liui* Crosnier, 1987

- Metapenaeopsis mannarensis* De Bruin, 1965
Metapenaeopsis marquesas Crosnier, 1991
Metapenaeopsis menoui Crosnier, 1991
 *Metapenaeopsis mogiensis* (Rathbun, 1902)
 *Metapenaeopsis novaeguineae* (Haswell, 1879)
 *Metapenaeopsis palmensis* (Haswell, 1879)
Metapenaeopsis parahilarula Crosnier, 1991
Metapenaeopsis parapalmensis Crosnier, 1994
Metapenaeopsis philippii (Bate, 1881)
Metapenaeopsis propinqua Crosnier, 1991
Metapenaeopsis provocatoria Racek and Dall, 1965
Metapenaeopsis quinquentata (De Man, 1907)
Metapenaeopsis richeri Crosnier, 1991
 *Metapenaeopsis rosea* Racek and Dall, 1965
Metapenaeopsis sibogae (De Man, 1907)
Metapenaeopsis sinica Liu and Zhong, 1988
Metapenaeopsis sinuosa Dall, 1957
Metapenaeopsis spatulata Crosnier, 1991
 *Metapenaeopsis stridulans* (Alcock, 1905)
Metapenaeopsis tarawensis Racek and Dall, 1965
 *Metapenaeopsis toloensis* Hall, 1962
Metapenaeopsis velutina (Dana, 1852)
 *Metapenaeopsis wellsi* Racek, 1967
 *Metapenaeus affinis* (H. Milne Edwards, 1837)
 *Metapenaeus anchistus* (De Man, 1920)
 *Metapenaeus benettiae* Racek and Dall, 1965
 *Metapenaeus brevicornis* (H. Milne Edwards, 1837)
 *Metapenaeus conjunctus* Racek and Dall, 1965
 *Metapenaeus dalli* Racek, 1957
 *Metapenaeus demani* (Roux, 1921)
 *Metapenaeus dobsoni* (Miers, 1878)
 *Metapenaeus eboracensis* Dall, 1957
 *Metapenaeus elegans* De Man, 1907
 *Metapenaeus endeavouri* (Schmitt, 1926)
 *Metapenaeus ensis* (De Haan, 1844)
 *Metapenaeus insolitus* Racek and Dall, 1965
 *Metapenaeus intermedius* (Kishinouye, 1900)
 *Metapenaeus lysianassa* (De Man, 1888)
 *Metapenaeus macleayi* (Haswell, 1879)
 *Metapenaeus moyebi* (Kishinouye, 1896)
 *Metapenaeus papuensis* Racek and Dall, 1965
 *Metapenaeus suluensis* Racek and Dall, 1965
 *Metapenaeus tenuipes* Kubo, 1949
 *Parapenaeopsis arafurica* Racek and Dall, 1965
 *Parapenaeopsis cornuta* (Kishinouye, 1900)
 *Parapenaeopsis coromandelica* Alcock, 1906
 *Parapenaeopsis gracillima* Nobili, 1903
 *Parapenaeopsis hardwickii* (Miers, 1878)
 *Parapenaeopsis hungerfordi* Alcock, 1905
 *Parapenaeopsis maxillipedo* Alcock, 1906
 *Parapenaeopsis sculptilis* (Heller, 1862)
 *Parapenaeopsis tenella* (Bate, 1888)
 *Parapenaeopsis uncta* Alcock, 1905
 *Parapenaeopsis venusta* De Man, 1907
Parapenaeus australiensis Dall, 1957
 *Parapenaeus fissuroides* Crosnier, 1986
Parapenaeus fissurus (Bate, 1881)
Parapenaeus investigatoris Alcock and Anderson, 1899

- Parapenaeus lanceolatus* Kubo, 1949
 *Parapenaeus longipes* Alcock, 1905
Parapenaeus murrayi Ramadan, 1938
Parapenaeus perezfarfante Crosnier, 1986
Parapenaeus ruberoculatus Hall, 1962
Parapenaeus sextuberculatus Kubo, 1949
- Penaeopsis challengerii* De Man, 1911
 *Penaeopsis eduardoi* Pérez Farfante, 1977
 *Penaeopsis rectacuta* (Bate, 1881)
-  *Penaeus canaliculatus* (Olivier, 1811)
 *Penaeus esculentus* Haswell, 1879
 *Penaeus indicus* H. Milne Edwards, 1837
 *Penaeus japonicus* Bate, 1888
 *Penaeus latisulcatus* Kishinouye, 1896
 *Penaeus longistylus* Kubo, 1943
 *Penaeus marginatus* Randall, 1840
 *Penaeus merguiensis* De Man, 1888
 *Penaeus monodon* Fabricius, 1798
 *Penaeus penicillatus* Alcock, 1905
 *Penaeus plebejus* Hess, 1865
 *Penaeus semisulcatus* De Haan, 1844
 *Penaeus silasi* Muthu and Motoh, 1979
- Trachypenaeopsis richtersii* (Miers, 1844)
-  *Trachypenaeus anchoralis* (Bate, 1881)
 *Trachypenaeus curvirostris* (Stimpson, 1860)^{4/}
 *Trachypenaeus gonospinifer* Racek and Dall, 1965
 *Trachypenaeus granulatus* (Haswell, 1879)^{5/}
 *Trachypenaeus longipes* (Paulson, 1875)
 *Trachypenaeus malaiana* Balss, 1933
 *Trachypenaeus sedili* Hall, 1961
 *Trachypenaeus villaluzi* Muthu and Motoh, 1979

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- Crosnier, A. 1991. Crustacea Decapoda: Les *Metapenaeopsis* indo-ouest-pacifiques sans appareil stridulant (Penaeidae). Deuxième partie. In Résultats des Campagnes MUSORSTOM, Vol. 9, edited by A. Crosnier. *Mém. Mus. natn. Hist. nat., (A)*, 152:155-297.
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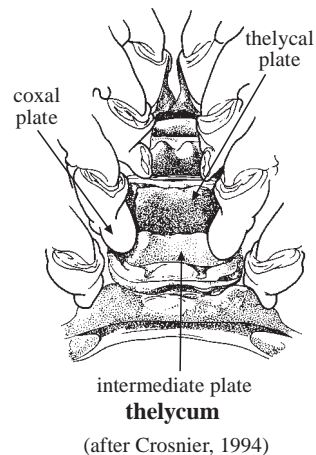
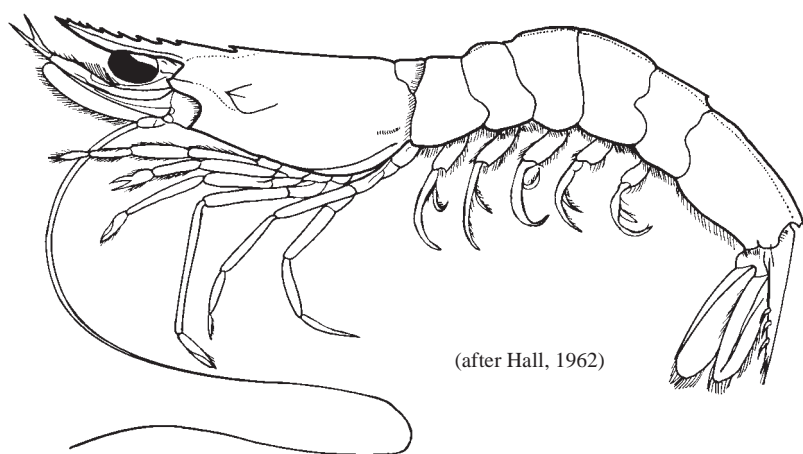
^{4/} Includes *Trachypenaeus asper* Alcock, 1905 which is probably a synonym of *T. curvirostris*.

^{5/} Includes *Trachypenaeus pescadorensis* Schmitt, 1931 which is probably a synonym of *T. granulatus*.

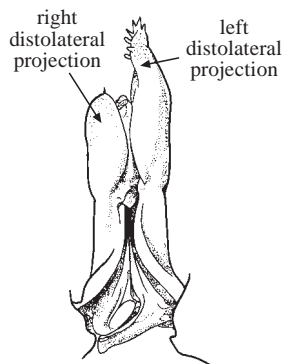
***Metapenaeopsis barbata* (De Haan, 1844)**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Whiskered velvet shrimp; Fr - Crevette chamois barbulée; Sp - Camarón gamuza barbudo.



Diagnostic characters: Body densely covered with short hairs; grooves and crests on carapace obscure. **Rostrum directed slightly upward, almost straight and armed with 6 or 7 regularly spaced upper teeth** (excluding epigastric tooth on carapace); rostrum **extending to about tip of antennal scale**. **Pterygostomian spine well developed**; generally 16 to 27 stridulating organs present on posterolateral carapace. Abdomen with dorsal crest on third segment narrow and more than 9 times as long as broad, median groove on crest indistinct or very shallow; sixth segment about 2 times as long as fifth segment. **Petasma of males asymmetrical, left distoventral projection longer, bearing 7 to 12 well-developed sharp projections at tip, while right distoventral projection bears 1 or 2 small spinule(s) at tip**. **Thelycum of females with thelycal plate broadly subquadrate, 0.5 to 0.6 times as long as broad; intermediate plate broadly trapezoidal and slightly concave, posterior ridge with a small but distinct median tubercle**. Telson with 1 pair of fixed and 3 pairs of movable lateral spines. **Colour: body whitish and mottled with irregular red blotches**; eyes dark brown; antennal flagella indistinctly crossed with red and white bands; legs reddish; pleopods with white markings on sides; **uropods reddish, with distal and basal parts pale yellowish**.

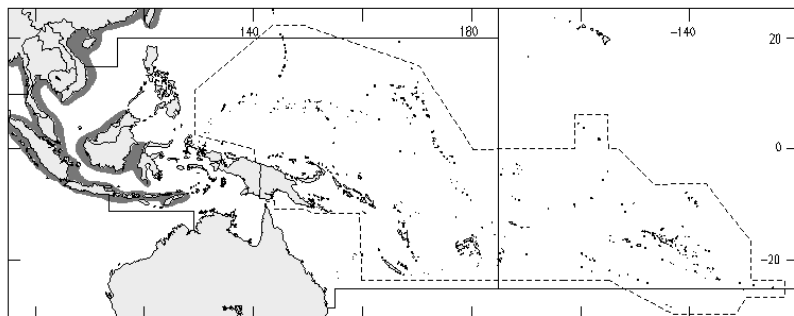


petasma (ventral view)
(after Crosnier, 1994)

Size: Maximum body length 11.6 cm (females) and 7.8 mm (males), commonly between 7 and 9 cm.

Habitat, biology, and fisheries: Found on sand, mud or sandy-mud bottoms, from depths of 2 to 219 m, usually less than 90 m. Taken mainly by trawls. Appears to be common but nowhere abundant throughout its range in the area. Of minor commercial importance, generally taken as bycatch. Marketed mainly fresh for local consumption.

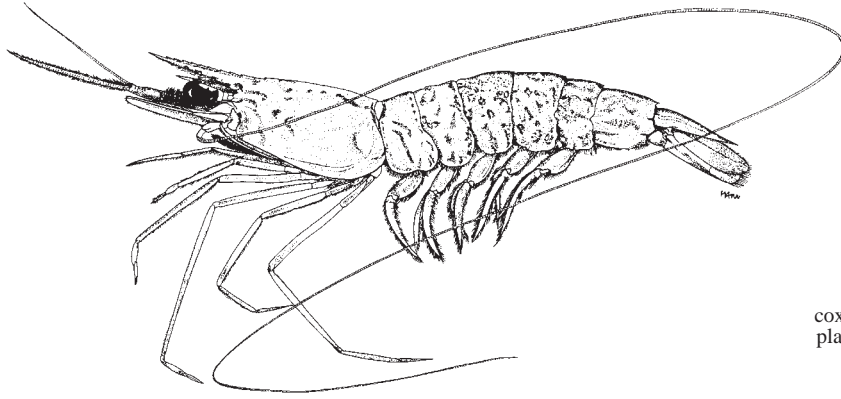
Distribution: Indo-West Pacific from the Gulf of Bengal to Japan and Indonesia.



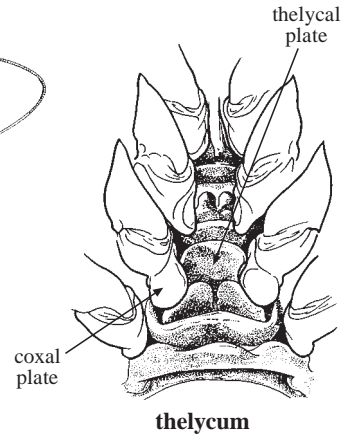
Metapenaeopsis palmensis (Haswell, 1879)

Frequent synonyms / misidentifications: *Metapenaeopsis barbeensis* Hall, 1962 / *Metapenaeopsis novaeguineae* (Haswell, 1879); *M. stridulans* (Alcock, 1905).

FAO names: **En** - Southern velvet shrimp; **Fr** - Crevette chamois méridionale; **Sp** - Camarón gamuza sureño.



(after Motoh and Buri, 1984)



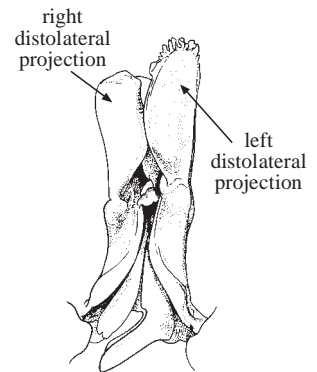
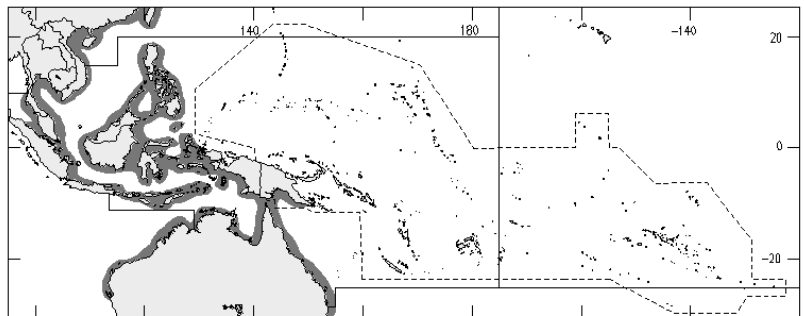
(after Crosnier, 1994)

Diagnostic characters: Body densely covered with hairs; grooves and crests on carapace obscure. **Rostrum nearly straight or slightly curved upward, armed with 7 or 8 regularly spaced upper teeth** (excluding epigastric tooth on carapace); rostrum **extending just to distal antennular segment**. **Pterygostomian spine reduced and small; 8 to 13 (mostly 9 or 10) stridulating organs present on posterolateral carapace**. Abdomen with dorsal crest on third segment narrow and more than 9 times as long as broad, **median groove on crest narrow but deep**; sixth segment about 2 times as long as fifth segment. **Petasma of males asymmetrical, left distoventral projection longer, bearing about 10 rather blunt projections at tip; right distoventral projection usually without spinules at tip**. **Thelycum of females with thelycal plate slightly concave, inverted trapezoidal, 0.6 to 0.7 times as long as broad; intermediate plate concave, with lateral parts expanded into 2 small flaps, posterior edge very thick**. Telson with 1 pair of fixed and 3 pairs of movable lateral spines. **Colour: body whitish, mottled with irregular red stripes**; eyes dark brown; antennal flagella pale red; legs whitish, with some red spots on the sides of pleopods; **distal half of uropods reddish**.

Size: Maximum body length 12 cm (females) and 8.5mm (males), commonly between 5 and 8 cm.

Habitat, biology, and fisheries: Found on sandy-mud or mud bottoms, from depths of 5 to 100 m, usually less than 90 m. Taken mainly as bycatch in trawls. Probably the most common species of the genus in the area, but nowhere very abundant and only of limited commercial importance, due to its small size. Marketed mainly fresh for local consumption.

Distribution: Indo-West Pacific from the western coast of Thailand to Japan and Australia.

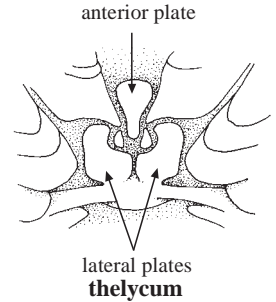
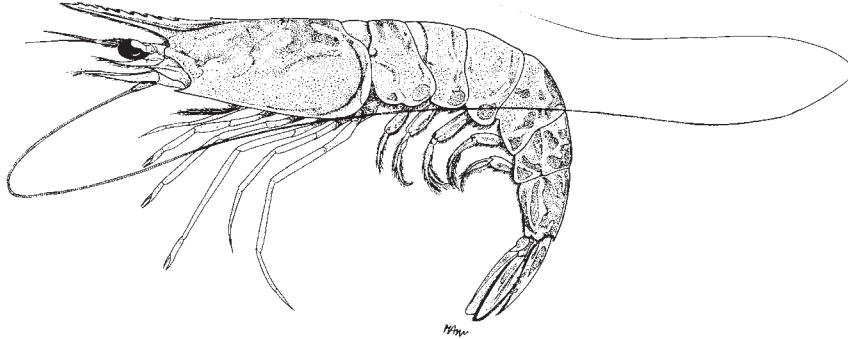


(after Crosnier, 1994)

Metapenaeus anchistus (De Man, 1920)

Frequent synonyms / misidentifications: None / *Metapenaeus endeavouri* Schmitt, 1926; *M. intermedius* (Kishinouye, 1900).

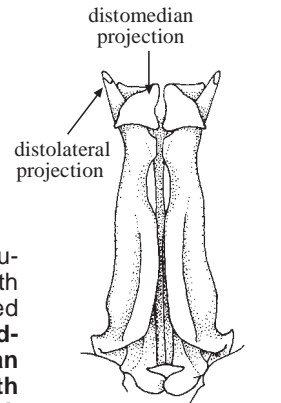
FAO names: En - Spiny greasyback shrimp.



Diagnostic characters: Body covered with fine pubescence. Rostrum distinctly directed upward, bearing 10 to 12 teeth along entire upper margin, almost straight and slightly curved downward at tip; rostrum extending to about distal segment of antennular peduncle. Postrostral crest low. **Branchiocardiac crest distinct.** First leg with distinct ischial spine. In adult males, merus of fifth leg with a basal notch followed by a prominent keel. **Petasma of males with distolateral projections exceeding distomedian processes and without external spinules; distomedian processes triangular and close to each other. Thelycum of females with anterior plate expanded at anterior half; lateral plates generally leveled, posterior margin not raised and continuous with posterior transverse ridge; coxal projections of fourth leg conical. Telson with 3 pairs of large lateral spines. Colour: body rather yellowish and covered with dense dark brown dots; eyes dark brown; rostrum and dorsal abdominal crest black-brown; antennal flagella reddish brown; legs somewhat yellowish or pink; pleopods more pinkish, with white markings on outer sides; distal part of uropods bluish, with margins reddish brown to somewhat purplish.**



merus of fifth leg (male)

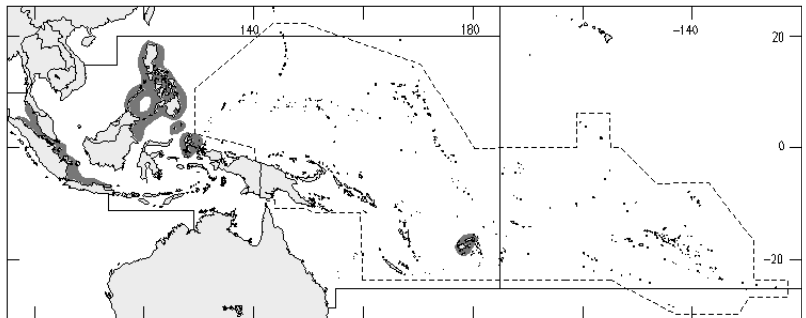


petasma (ventral view)

Size: Maximum body length 16.5 cm (females) and 14.6 cm (males), commonly between 7 and 14 cm.

Habitat, biology, and fisheries: Found mainly in depths to about 30 m. Caught by trawls and fish corrals. Commonly found in the Philippines and of moderate commercial importance because of its relatively large size; apparently less common or even rare in other parts of the area. Marketed mainly fresh for local consumption.

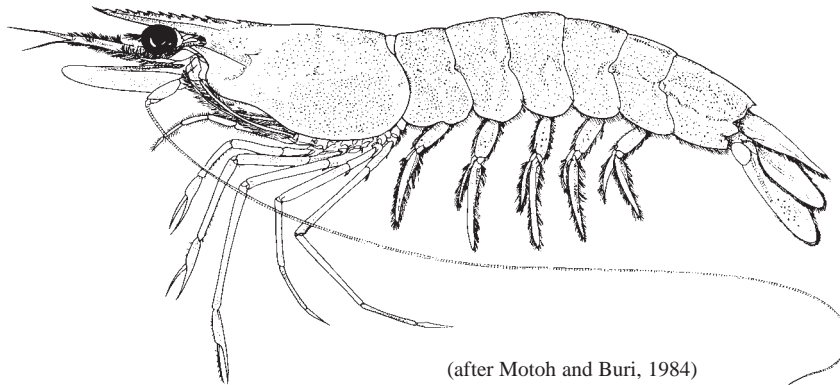
Distribution: Western Pacific from the Strait of Malacca to the Philippines and Fiji.



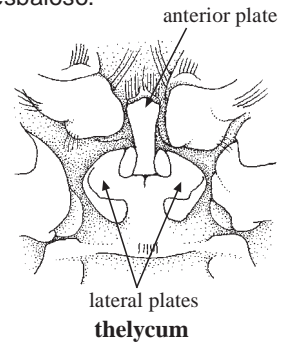
Metapenaeus ensis (De Haan, 1844)

Frequent synonyms / misidentifications: *Metapenaeus ensis baramensis* Hall, 1962; *M. incisipes* (Bato, 1888); *M. mastersii* (Haswell, 1879); *M. philippinensis* Motoh and Muthu, 1979 / *Metapenaeus monoceros* (Fabricius, 1798).

FAO names: **En** - Greasyback shrimp; **Fr** - Crevette glissante; **Sp** - Camarón resbaloso.

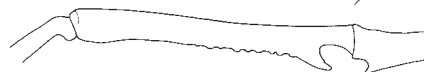


(after Motoh and Buri, 1984)

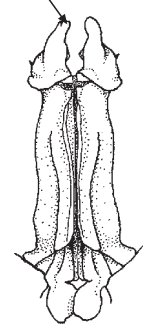


lateral plates
thelycum

distomedian projection



merus of fifth leg (male)



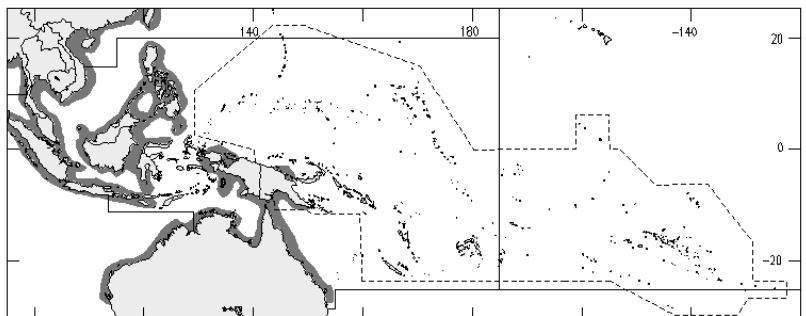
petasma (ventral view)

Diagnostic characters: Body covered with fine pubescence. **Rostrum armed with 8 to 11 teeth along entire upper margin, nearly straight** and extending to about tip of antennular peduncle. **Postrostral crest low. Branchiocardiac crest generally distinct and curved, almost reaching hepatic spine.** First leg bearing a small ischial spine. **In adult males, merus of fifth leg with a basal notch followed by a long, inwardly curved spine-like process and a row of tubercles.** Petasma of males with distomedian process very large and triangular, covering almost entire distolateral projection in ventral view. Thelycum of females with long anterior plate; lateral plates with posterolateral edges strongly raised and curving inward, forming a pair of triangular projections. Telson without distinct lateral spines. **Colour:** body greyish green or dark green and covered with dense dark brown dots, large adults somewhat pinkish; eyes black-brown; antennal flagella reddish; legs generally whitish, in large adults basal segments covered with red bands; **distal part of uropods somewhat bluish with reddish brown margins.**

Size: Maximum body length 18.9 cm (females) and 15.4 cm (males), commonly between 7 and 14 cm.

Habitat, biology, and fisheries: Mainly in turbid waters down to a depth of 95 m over bottoms of mud, sandy-mud or silt. Juveniles are found in estuaries and backwaters, sometimes also in seagrass beds, mangrove banks, mud flats, and open channels. Caught by trawls, set nets, scoop nets, traps, and artisanal gear. Also a common byproduct or a secondary species in prawn culture. Probably the most abundant and the most commercially important species of the genus in the area, constituting a large part of the *Metapenaeus* catches and pond industry in the Philippines (609 t and 670 t, respectively, in 1987), Singapore, Thailand (11 400 t and 2 700 t, respectively, in 1987), Indonesia (17 588 t and 13 784 t, respectively, in 1987), Viet Nam, and Malaysia. Fished commercially in northern Australia, with a catch of about 2 400 t (together with *Metapenaeus endeavouri*, catches from western Australia not included) during the annual period of 1989/1990. Marketed mainly fresh or frozen, also cooked or salted and sometimes used as bait, consumed locally and exported.

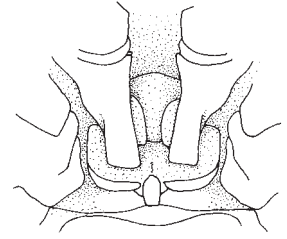
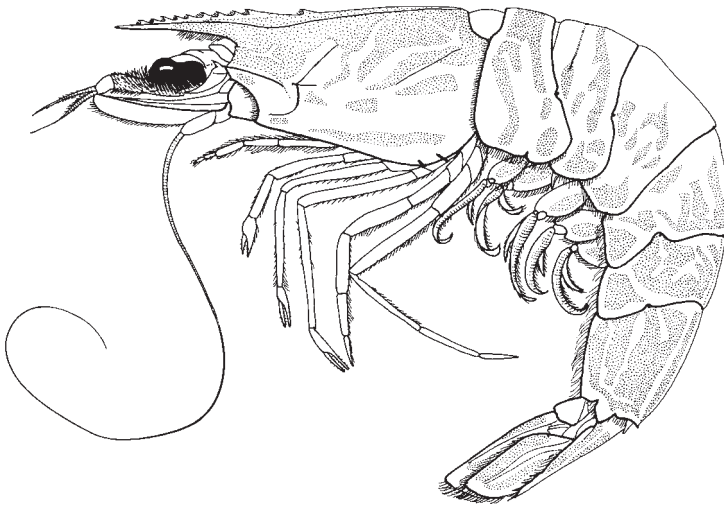
Distribution: Indo-West Pacific from the eastern coast of India and Sri Lanka to Japan and Australia.



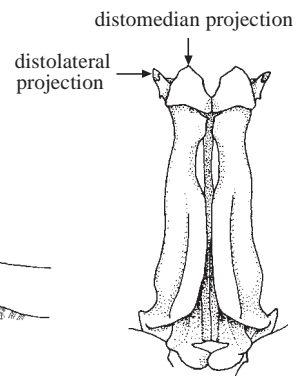
Metapenaeus intermedius (Kishinouye, 1900)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Middle shrimp; Fr - Crevette ceinture; Sp - Camarón cintura.



thelycum



petasma (ventral view)



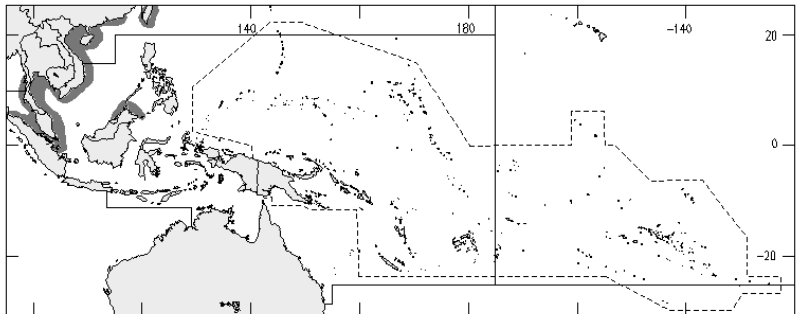
merus of fifth leg (male)

Diagnostic characters: Body covered with fine pubescence. **Rostrum distinctly directed upward and very straight, bearing 8 to 12 teeth along entire upper margin** and extending to about distal segment of antennular peduncle. **Postrostral crest low. Branchiocardiac crest distinct.** First leg bearing a distinct ischial spine. In adult males, merus of fifth leg with a basal notch followed by a distinct keel. **Petasma of males with distomedian processes triangular and exceeding distolateral projections; outer margin of distomedian processes bearing an external spinule. Thelycum of females bearing a posteromedian ogival boss; posterior edges of lateral plates slightly raised; coxal projections of fourth leg long, flat and truncate. Telson with 3 pairs of large lateral spines. Colour:** body somewhat whitish, becoming slightly pinkish in large adults, covered with dense dark brown dots; eyes dark brown; rostrum, outer margin of antennal scale, and dorsal abdominal crest black-brown; antennal flagella reddish brown; legs whitish; pleopods slightly reddish with white markings on outer sides; **distal part of uropods bluish, with margins reddish brown to somewhat purplish.**

Size: Maximum body length 19.3 cm (females) and 13.6 cm (males), commonly between 10 and 14 cm.

Habitat, biology, and fisheries: Found mainly in depths to 130 m, usually between 20 and 60 m. Taken mainly by trawls. Very common in the Strait of Malacca and Gulf of Thailand, probably also abundant in Viet Nam. Of moderate commercial importance because of its relatively large size. Marketed mostly fresh for local consumption.

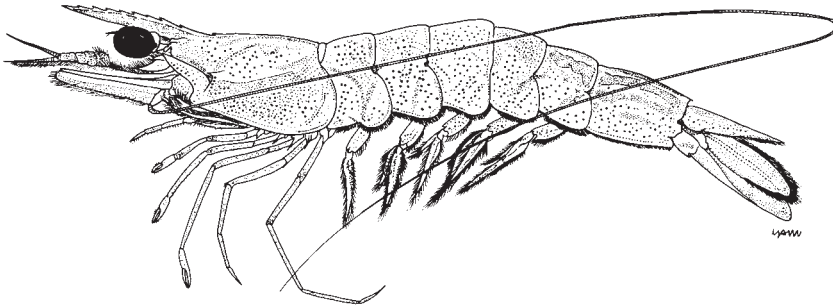
Distribution: Indo-West Pacific from the Andaman Sea to Malaysia, southern coast of China, and Japan.



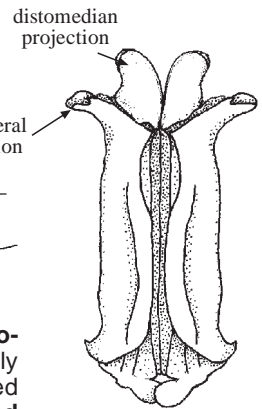
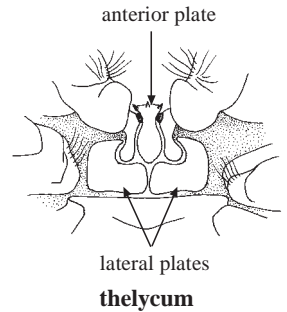
Metapenaeus moyebi (Kishinouye, 1896)

Frequent synonyms / misidentifications: *Metapenaeus burkenroadi* Kubo, 1954 / *Metapenaeus dalli* Racek, 1957; *M. mastersii* (Haswell, 1879) (= *M. ensis* (De Haan, 1844)).

FAO names: En - Moyebi shrimp; Fr - Crevette moyebi; Sp - Camarón moyebi.



(after Motoh and Buri, 1984)



petasma (ventral view)

distolateral projection



merus of fifth leg (male)

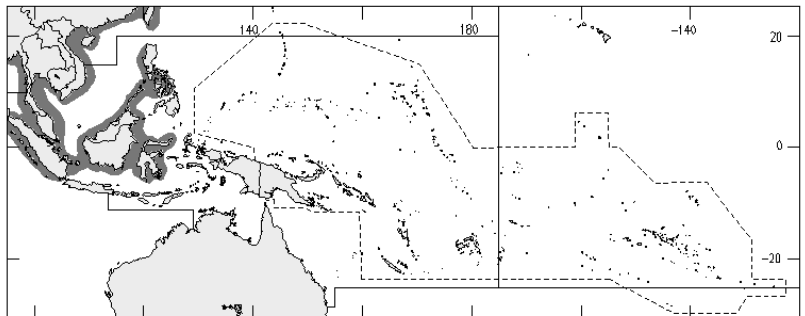
Diagnostic characters: Body covered with fine pubescence. Rostrum armed with 7 to 10 teeth along entire upper margin, nearly straight or slightly uptilted at tip, extending to about middle of distal antennular article. Postrostral crest low. Branchio-cardiac crest weak and indistinct. First leg with ischial spine small or nearly absent. In adult males, merus of fifth leg with a basal notch followed by a twisted keeled tubercle. Petasma of males with distomedian process enlarged and laminose or flap-like, strongly projected forward and diverging; distolateral projection directed anterolaterally. Thelycum of females with anterior plate

flask-shaped, its anterior margin slightly convex and bearing 3 tubercles of subequal size; lateral plates kidney-shaped and often with angular contours. Telson without distinct lateral spines. **Colour:** body semi-translucent, somewhat pale green and covered with with dense dark brown dots; eyes black-brown; antennal flagella reddish; pleopods slightly pinkish; distal part of uropods somewhat yellowish green and with reddish brown margins.

Size: Maximum body length 12.6 cm (females) and 8.3 cm (males), commonly between 5.5 and 9.5 cm.

Habitat, biology, and fisheries: Found on mud or sandy-mud bottom in estuaries, backwaters, and nearshore waters to depths of about 45 m. Caught by trawls, set nets, seines, traps, and artisanal gear. Appears to be quite abundant throughout its range in the area and is frequently seen in local markets, but only of secondary economic importance due to its relatively small size. Also reported to be used for aquaculture in Malaysia and Singapore but probably not the main cultured species there. Marketed mainly fresh for local consumption.

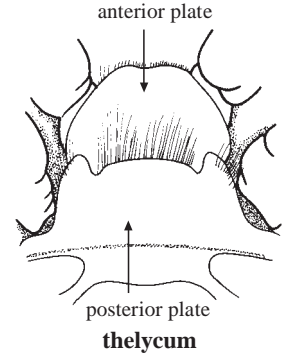
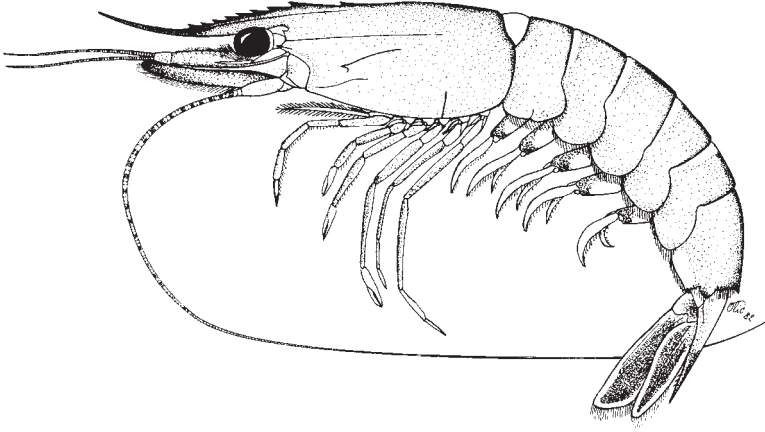
Distribution: Indo-West Pacific from the eastern coast of India and Sri Lanka to Japan and Indonesia.



***Parapenaeopsis hardwickii* (Miers, 1878)**

Frequent synonyms / misidentifications: None / *Parapenaeopsis cultrirostris* Alcock, 1906 (undetermined taxonomic status; generally considered as a synonym of *Parapenaeopsis sculptilis* (Heller, 1862).

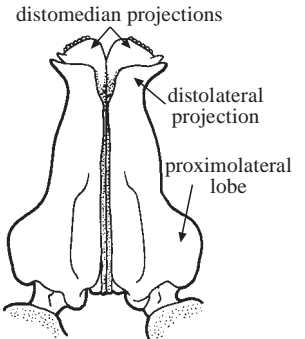
FAO names: En - Spear shrimp; Fr - Crevette javelot; Sp - Camarón lanzón.



Diagnostic characters: 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. First and second legs bearing epipod and basal spine, basis of third leg unarmed. **Petasma of males with distomedian projection bluntly protruded and short, somewhat wing-like, anterior margin often crenulate; distolateral projection short and directed laterally.**



rostrum of large males



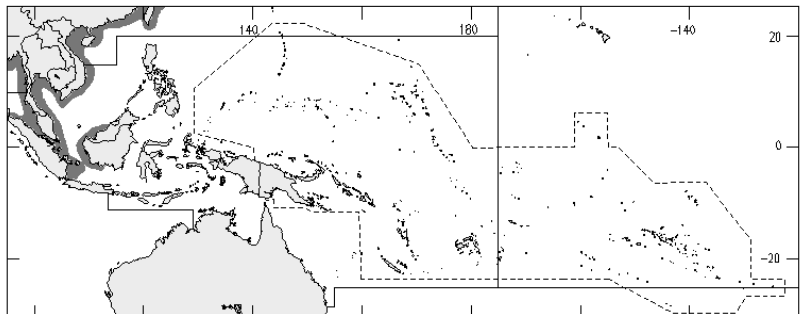
petasma (ventral view)

Thelycum of females with anterior plate concave and semi-circular in shape; posterior plate flat, its anterior margin slightly convex and bearing a transverse row of long hairs, with anterolateral angles strongly protruded forward. 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; eyes dark brown; rostrum black-brown; basal 1/3 of antennal flagella crossed with brown narrow bands; legs generally whitish to pinkish; pleopods reddish and with white and yellowish green markings on lateral surfaces; **uropods dark reddish brown with yellowish margins.**

Size: Maximum body length 13.5 cm (females) and 11.1 cm (males), commonly between 6 and 10 cm.

Habitat, biology, and fisheries: Found from the coastline to depths of about 90 m, usually less than 20 m, on bottom of mud, sandy-mud or sand. Juveniles mainly inhabit estuaries and backwaters. Caught by trawls, sometimes also by boat seines and stake nets, with females usually outnumbering males in the catches. Probably the most common species of the genus in the area and of moderate commercial importance. Appears to be rather abundant along the Malay Peninsula and in adjacent waters, where it often constitutes a significant part of the bycatch of prawn fishery. Marketed mainly fresh for local consumption.

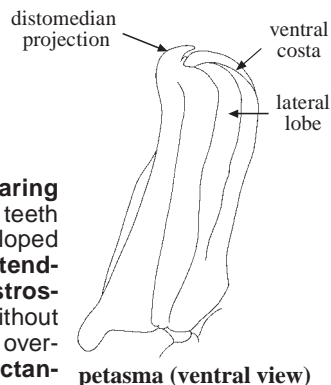
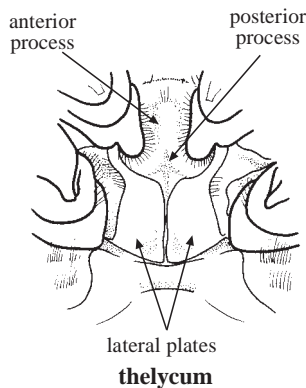
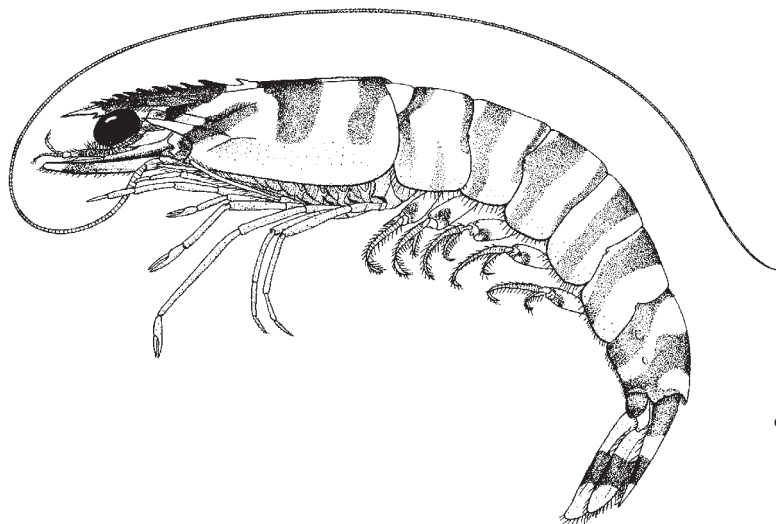
Distribution: Indo-West Pacific from Pakistan to Taiwan Province of China and Indonesia.



Penaeus canaliculatus (Olivier, 1811)

Frequent synonyms / misidentifications: None / *Penaeus japonicus* Bate, 1888.

FAO names: En - Witch prawn; Fr - Crevette soricère; Sp - Camarón brujo.

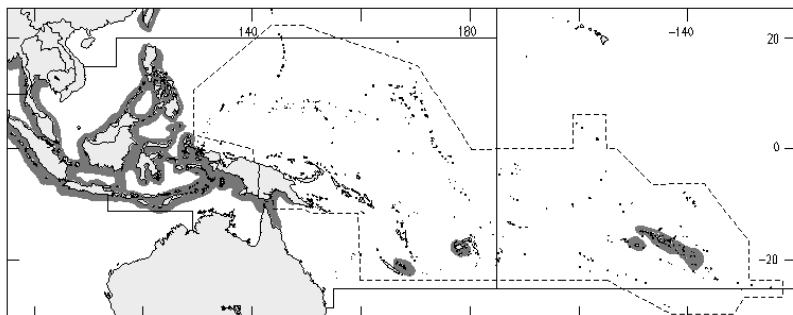


Diagnostic characters: Carapace with grooves and crests very distinct, **bearing both gastrofrontal and hepatic crests**; rostrum armed with 10 or 11 upper teeth (including those on carapace) and **1 lower tooth**; postrostral crest well developed and with a deep median groove throughout its length; **adrostral groove extending almost to posterior margin of carapace and slightly wider than postrostral crest**; posterior end of gastrofrontal groove divided into 2. First leg without ischial spine. Petasma of males with very short distomedian projections overhanging distal margin of costae. **Thelycum of females formed by 2 subrectangular lateral plates, with their anterolateral angles diverging**; anterior process suboval; posterior process somewhat triangular. **Telson without lateral spines. Colour:** body pale yellowish and crossed with dark brown transverse bands; those on carapace not extending over lower half of carapace while those on last abdominal segment usually continuous to the ventral margin; eyes dark brown; antennal scale somewhat greenish and with white tips, flagella yellowish; legs yellowish to whitish; pleopods yellowish to reddish and with brown and white spots at bases; **distal part of uropods with a patch of bright yellow, followed by another patch of bright blue, and with reddish margins.**

Size: Maximum body length 18.2 cm (females) and 14.5 cm (males), commonly between 10 and 13 cm.

Habitat, biology, and fisheries: Found on sandy bottoms, from shallow water to depths of about 50 m. Taken by trawls and artisanal gear. An occasional bycatch in fisheries for other *Penaeus* species throughout its range in the area, but reported to be rather common in eastern New Guinea. Marketed fresh and frozen, often mixed with other species of *Penaeus*, and consumed locally. Can be easily confused with *Penaeus japonicus* in colour, and *Penaeus latisulcatus* when without colour.

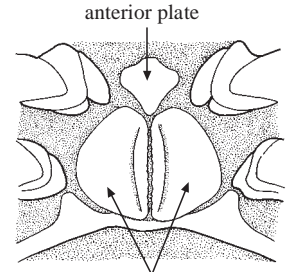
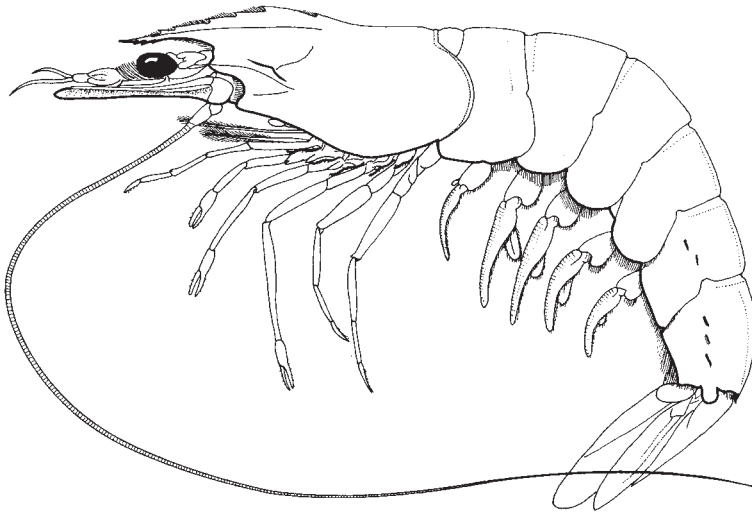
Distribution: Widely distributed in the Indo-West Pacific, from the eastern coast of Africa to the Red Sea, Taiwan Province of China, Okinawa, and Polynesia.



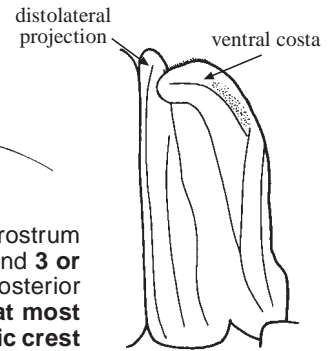
Penaeus esculentus Haswell, 1879

Frequent synonyms / misidentifications: None / None.

FAO names: En - Brown tiger prawn; Fr - Crevette tigrée brune; Sp - Camarón tigre marrón.



lateral plates
thelycum
(after Dall, 1957)



petasma (ventral view)

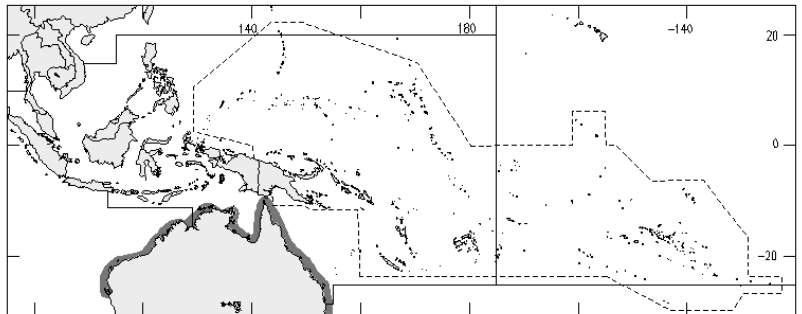
(after Dall, 1957)

Diagnostic characters: Carapace with grooves and crests distinct, rostrum generally armed with 5 to 7 upper teeth (including those on carapace) and **3 or 4 lower teeth**; postrostral crest well developed and reaching nearly to posterior margin of carapace, without a distinct median groove; **adrostral crest at most extending to last postrostral tooth; gastrofrontal crest absent; hepatic crest short, not extending behind antennal crest and slightly sloping anterovertrally. Fifth leg bearing an exopod (somewhat hidden beneath carapace).** Petasma of males with distomedian projections overhanging distal margin of costae. Thelycum of females formed by 2 suboval lateral plates with tumid lips; anterior process rounded and with lateral edges somewhat raised, posterior process convex and partly inserted between lateral plates. Telson without lateral spines. **Colour: body brownish and covered with mud-yellow cross bands; eyes light brown with many black dots; rostral teeth reddish brown; antennal flagella alternated with white and brown bands; both legs and pleopods reddish and with some white markings on basal segments; distal half of uropods brown with red margins.**

Size: Maximum body length 23.5 cm (females) and 19 cm (males), commonly between 15 and 20 cm.

Habitat, biology, and fisheries: On the continental shelf from the coastline to a depth of 200 m, but usually between 10 and 20 m, on mud, sandy-mud or coarse bottoms. Juveniles inhabit shallow waters in estuaries, or are associated with seagrass beds, and sometimes found on the top of coral reef platforms. Feed primarily at night and are caught then by demersal otter trawls or beam trawls. Fished commercially in Australia, with a catch of about 3 300 t (together with *Penaeus semisulcatus*) in the Northern Prawn Fishery during the annual period of 1989/1990. Most of the catch is exported (mainly to Japan) and packed as frozen whole "green" (uncooked) prawns.

Distribution: Endemic to Australia from Sharks Bay (Western Australia) to Wallis Lake (New South Wales).

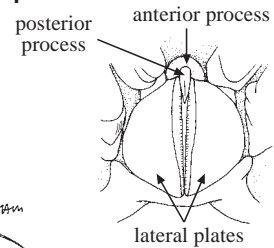
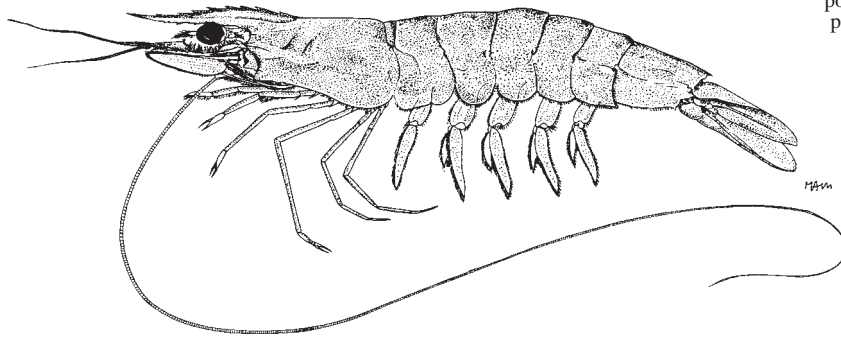


Penaeus indicus H. Milne Edwards, 1837

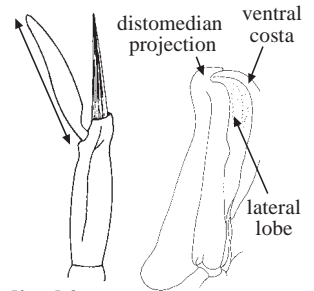
PNI

Frequent synonyms / misidentifications: None / *Penaeus merguensis* De Man, 1888; *P. penicillatus* Alcock, 1905; *P. silasi* Muthu and Motoh, 1979.

FAO names: En - Indian white prawn; Fr - Crevette royale blanche (des Indes); Sp - Camarón blanco de la India.



thelycum



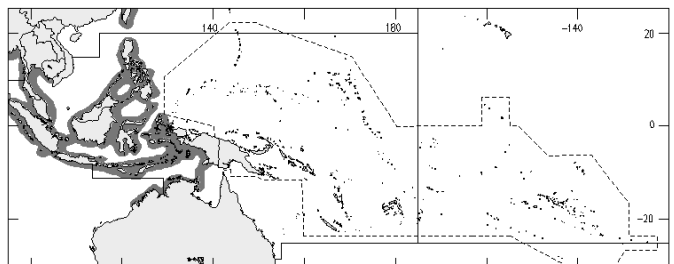
distal 2 segments of third maxilliped (male) petasma (ventral view)

Diagnostic characters: 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**; **rostral crest generally slightly elevated in large specimens including adult females (but still with crest in females slightly higher than in males)**; postrostral crest extending near to posterior margin of carapace; **gastro-orbital crest distinct, extending over posterior 3/5 to 2/3 of distance between hepatic spine and orbital margin**. In adult males, **third maxilliped with distal segment about as long as second segment which bears a tuft of dense long hairs (same length as distal segment) at tip**. Petasma of males with distomedian projections strongly curved and overhanging distal margin of costae. Thelycum of females formed by 2 semi-circular lateral plates, with their median margins forming tumid lips; anterior process slightly rounded and slightly convex; posterior process elongated and inserted between anterior part of lateral plates; **both anterior and posterior processes rather distinct**. Telson lacking lateral spines. **Colour:** **body semi-translucent, somewhat yellowish white (small specimens) or greyish green and covered with numerous minute dark brown dots**; eyes light brown and covered with some dark brown mesh-like stripes; rostral and abdominal dorsal crests reddish brown to dark brown; **antennal flagella yellowish**; antennular flagella of same colour as body and covered with many dark spots; legs translucent and somewhat whitish, pleopods yellowish to pinkish; **distal part of uropods yellowish with red margins**.

Size: Maximum body length 23 cm (females) and 18.4 cm (males), usually less than 17 cm.

Habitat, biology, and fisheries: On sandy and muddy bottoms, from the coastline to depths of about 90 m. Caught by trawls, fish corrals, gill nets, beach seines, and artisanal gear. Also a suitable candidate for the prawn pond industry. An abundant species and of commercial importance in the Philippines, Singapore, and Australia. Also reported to be very abundant in Thailand (where it is one of the main pond cultured prawn species), Malaysia, and Indonesia. However, as this shrimp is often confused with *Penaeus silasi*, its reported abundance from Thailand to Indonesia remains uncertain. In the Philippines, it is often mixed and sold together with *Penaeus merguensis*. In northern Australia, it occurs in deeper waters (deeper than 35 m) and is sold at slightly higher prices than *P. merguensis* (together their catches were about 3 000 t in the annual period of 1989/1990). Marketed fresh and frozen, consumed locally and exported.

Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Red Sea, Japan, and Australia.

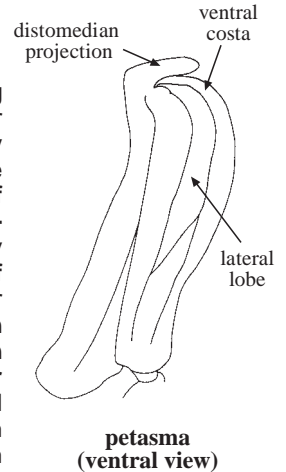
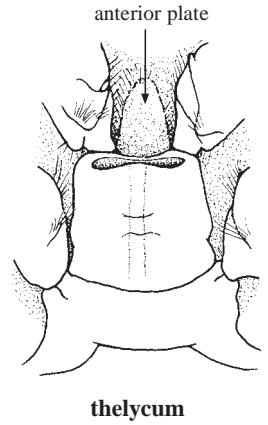
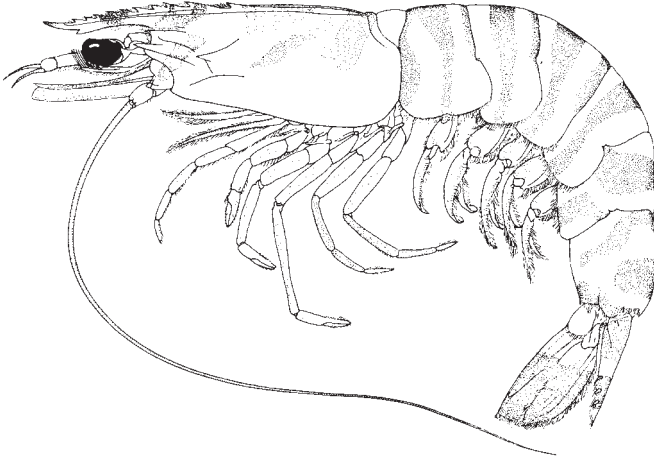


Penaeus japonicus Bate, 1888

KUP

Frequent synonyms / misidentifications: None / None.

FAO names: En - Kuruma prawn; Fr - Crevette kuruma; Sp - Camarón kuruma.

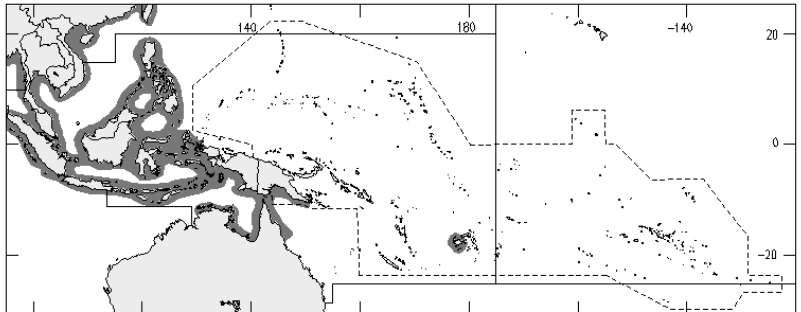


Diagnostic characters: Carapace with grooves and crests very distinct, bearing both gastrofrontal and hepatic crests; rostrum generally armed with 9 or 10 upper teeth (including those on carapace) and 1 lower tooth, lacking distinct accessory crest on the blade; postrostral crest well developed and with a deep median groove throughout its length; adrostral groove extending near to posterior margin of carapace and almost as wide as postrostral crest; posterior end of gastrofrontal groove divided into 2. First leg without ischial spine. Petasma of males with very long distomedian projections overhanging distal margin of costae. Thelycum of females a well-developed pouch with double tubes, opened anteriorly; anterior and posterior processes fused, forming a subtriangular concave plate. 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; eyes dark brown; antennal scale somewhat greenish with white tips, flagella yellowish; legs whitish to yellowish (large specimens); pleopods yellowish to reddish (large specimens) and with brown and/or white spots at bases; distal part of uropods with a patch of bright yellow, followed by another patch of bright blue, and with red margins.

Size: Maximum body length 30 cm (females) and 20 cm (males), commonly between 11 and 20 cm.

Habitat, biology, and fisheries: Inhabits shelf areas from the coastline to depths of about 90 m, but usually less than 50 m, on sandy or sandy-mud bottoms. Adults usually are buried in the substrate during the daytime and are active at night. Caught by trawls, drift nets, set nets, traps, and artisanal gear. Common, but apparently not particularly abundant in the area; usually taken as bycatch in fisheries for other *Penaeus* species. Marketed fresh and frozen, often sold together with other species of *Penaeus*. Consumed locally and probably also exported to some extent.

Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Red Sea, Japan, Australia, and Fiji; also entered the eastern Mediterranean through the Suez Canal.

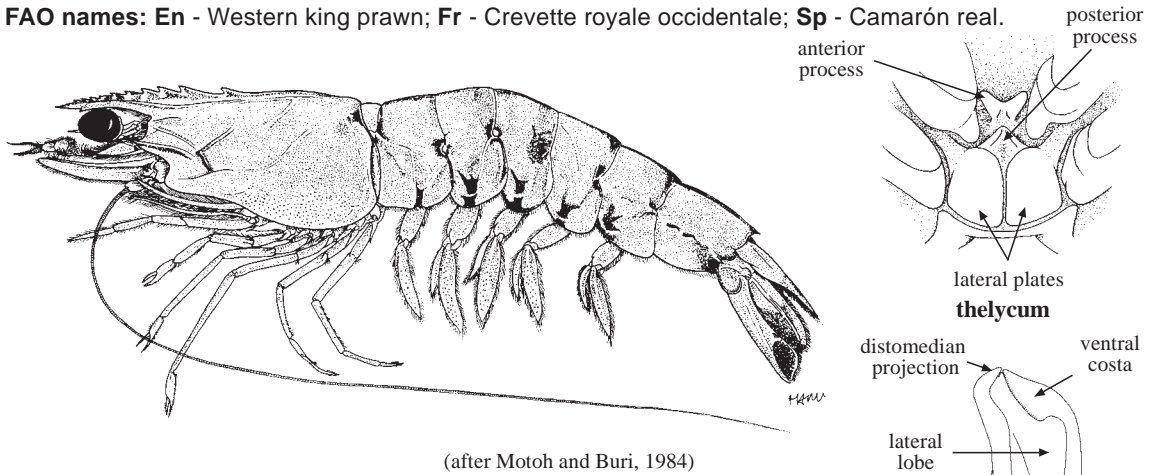


Penaeus latisulcatus Kishinouye, 1896

WKP

Frequent synonyms / misidentifications: *Penaeus latisulcatus hathor* Burkenroad, 1959 / None.

FAO names: En - Western king prawn; Fr - Crevette royale occidentale; Sp - Camarón real.

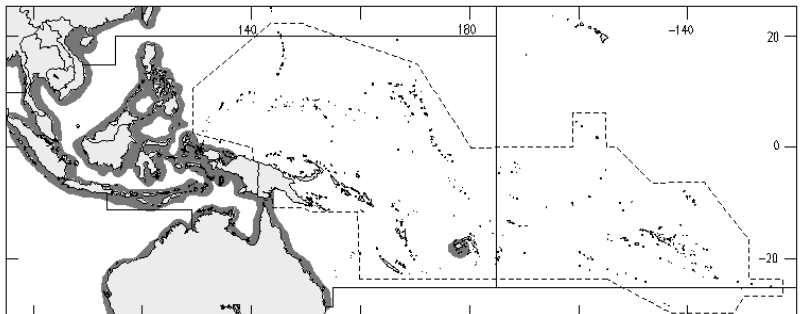


Diagnostic characters: Carapace with grooves and crests very distinct, bearing both gastrofrontal and hepatic crests; rostrum generally armed with 10 or 11 upper teeth (including those on carapace) and 1 lower tooth, lacking distinct accessory crest on the blade; postrostral crest well developed and 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. Ischial spine on first leg indistinct or nearly absent. Petasma of males with short distomedian projections slightly overhanging distal margin of costae. **Thelycum of females** formed by 2 subrectangular lateral plates and with anterolateral angles diverging; anterior process strongly bifurcate and horn-like; posterior process triangular. 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 (these 2 markings usually absent in specimens from Australia); eyes brownish and with many dark dots; rostrum, postrostral crest, antennal crest, and dorsal crests of abdomen dark brown to reddish brown; antennal scale with tip whitish and outer margin dark brown, flagella whitish, becoming yellowish distally; legs whitish to bluish or reddish; pleopods yellowish, with bases somewhat reddish; uropods bright yellow, with distal half and outer margins of exopods bright blue, other margins reddish.

Size: Maximum body length 20.2 cm (females) and 16.2 cm (males), commonly between 10 and 16 cm.

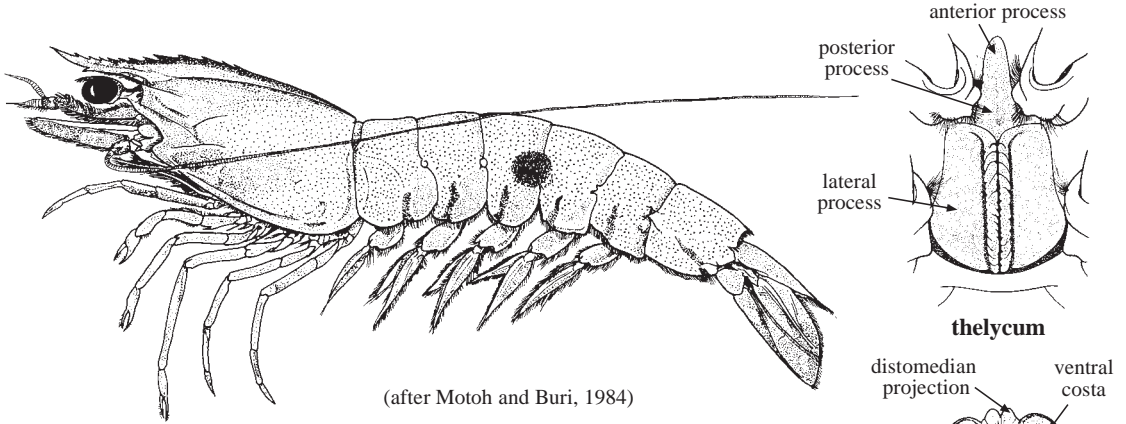
Habitat, biology, and fisheries: From the coastline to depths of about 90 m, on bottoms of sand, mud, or gravel, with a clear preference for sandy substrates. Adults are buried in the substrate during the daytime and come out to feed at night. Mainly taken offshore by trawls, sometimes also caught in shallow waters by traps, fish corrals, and other artisanal gear. Common in the area. From 1990 to 1995, the reported annual catch of *Penaeus latisulcatus* in the Western Central Pacific (Thailand) ranged from 1 271 to 1 624 t (FAO Yearbook of Fishery Statistics). Its annual catch (together with *Penaeus longistylus*) in northern Australia was about 100 t in the period of 1989/1990. Marketed fresh or frozen, consumed locally and exported.

Distribution: Widely distributed in the Indo-West Pacific and reported from the eastern coast of Africa to the Red Sea, Japan, Australia, and Fiji (specimens from the Indian Ocean are sometimes treated as a different subspecies).



Penaeus longistylus Kubo, 1943

Frequent synonyms / misidentifications: *Penaeus caesius* Dall, 1957; *P. jejunus* Hall, 1956 / None.
FAO names: En - Red-spot king prawn; Fr - Crevette royale à taches rouges; Sp - Camarón real manchado.



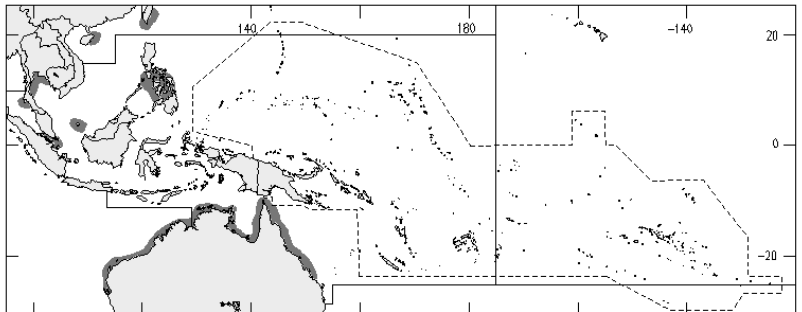
(after Motoh and Buri, 1984)

Diagnostic characters: Carapace with grooves and crests very distinct, bearing both **gastrofrontal and hepatic crests**; rostrum with tip distinctly upturned, armed with 10 to 12 upper teeth (including those on carapace) and 1 **lower tooth, lacking distinct accessory crest on the blade**; **postrostral crest well developed, with a deep median groove extending to about half of its length**; **adrostral groove extending almost to posterior margin of carapace and about twice as wide as postrostral crest**; posterior end of gastrofrontal groove divided into 2. **First leg bearing a strong ischial spine**. Petasma of males with short distomedian projections not overhanging distal margin of costae. Thelycum of females formed by 2 subrectangular lateral plates with tumid lips; anterior and posterior processes somewhat fused, with anterior end rounded. Telson with 3 pairs of movable lateral spines. **Colour: body generally yellowish green, becoming slightly pinkish in large adults; lower border of carapace reddish; posteroventral carapace and abdominal pleura each with a short vertical black bar except fifth pleuron which bears 2 vertical bars; lateral side of third abdominal segment often with a large red-brown circular spot**; eyes brownish and with many dark dots. Rostrum, postrostral crest, distal part of antennal scale, antennal carina, and dorsal crests of abdomen dark brown to red-brown; **antennal flagella yellowish white**; legs yellowish to reddish; pleopods yellowish; **uropods yellowish at basal half and purplish at distal half, with margins red and black except outer margins of exopods bright blue**.

Size: Maximum body length 18 cm (females) and 15 cm (males), commonly between 10 and 15 cm.

Habitat, biology, and fisheries: Inhabits reefs, sand or sandy-mud bottoms in depths from 18 to 60 m. Taken by trawlers offshore at night and in the vicinity of coral reefs, often together with *Penaeus latisulcatus*. Less common than *P. latisulcatus* in the area, except off northeastern Australia, where a commercial fishery has been developed for this species, with an annual catch ranging from 600 t to 1 800 t between 1983 and 1990. Marketed fresh or frozen, often sold together with *P. latisulcatus*, both locally consumed and exported.

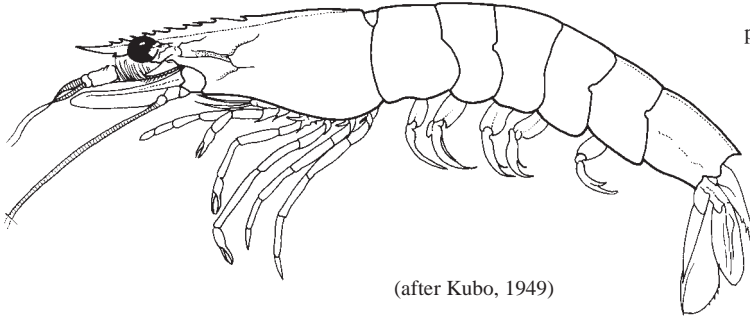
Distribution: Western Pacific; reported from Thailand, Malaysia, Singapore, South China Sea, Taiwan Province of China, the Philippines, Australia, and Lord Howe Island.



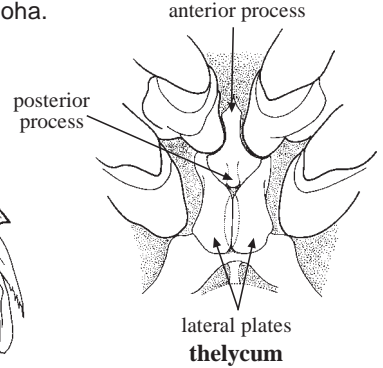
Penaeus marginatus Randall, 1840

Frequent synonyms / misidentifications: *Penaeus teraoi* Kubo, 1949 / None.

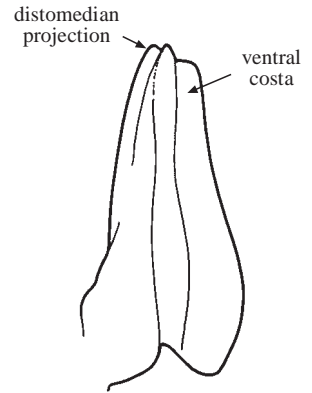
FAO names: En - Aloha prawn; Fr - Crevette aloha; Sp - Camarón aloha.



(after Kubo, 1949)



Diagnostic characters: Carapace with grooves and crests very distinct, bearing both **gastrofrontal and hepatic crests**; rostrum armed with 9 or 10 upper teeth (including those on carapace) and 1 to 3 (mostly 2) **lower teeth**; **postrostral crest well developed but lacking median groove**; adrostral groove extending almost to posterior margin of carapace and about as long as wide as postrostral crest; posterior end of gastrofrontal groove divided into 2. First leg armed with a strong ischial spine. Petasma of males with very short distomedian projections. **Thelycum of females formed by 2 subrectangular lateral plates and with anterolateral angles diverging; anterior and posterior processes fused with anterior end sharply pointed.** Telson with 3 pairs of movable lateral spines. **Colour:** body generally yellowish brown and becoming pinkish brown in large adults; eyes brownish and with many dark dots; rostrum, and dorsal crests of abdomen dark brown; **antennal scale reddish brown with white tips, flagella whitish but distally becoming somewhat yellowish**; legs whitish at distal parts and orange-red at basal parts; pleopods pale red; **uropods bright yellow at basal part and pinkish purple at distal part, submarginal regions bright blue, margins reddish.**



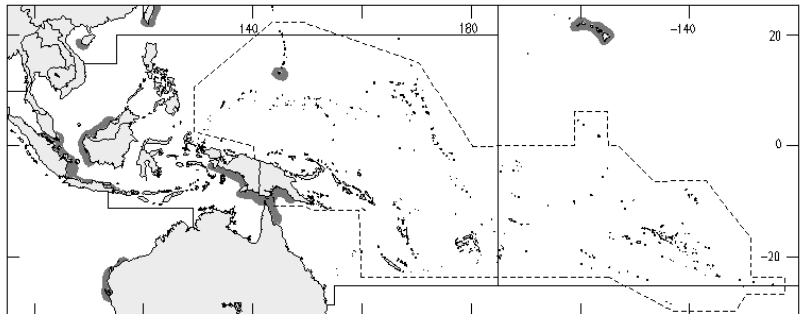
petasma (ventral view)

(after Lee and Yu, 1977)

Size: Maximum body length 20.5 cm, commonly between 13 and 17 cm.

Habitat, biology, and fisheries: Found on bottoms of sand and sandy mud, from the surface to a depth of 300 m, with adults preferring deeper waters. Mainly caught offshore by trawlers and apparently not very common in the area.

Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to Japan, Australia, Hawaii, and Cocos Islands.

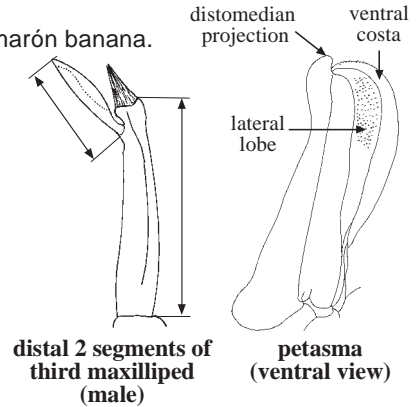
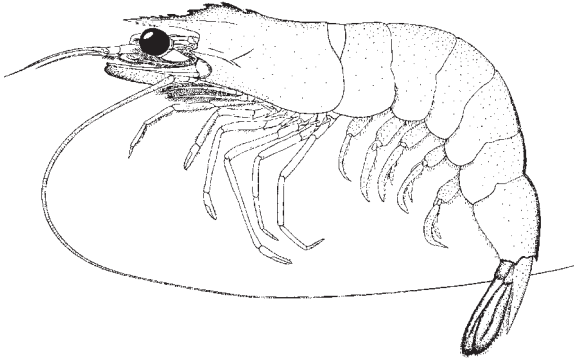


Penaeus merguensis De Man, 1888

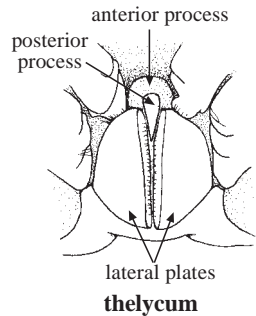
PBA

Frequent synonyms / misidentifications: None / *Penaeus indicus* H. Milne Edwards, 1837; *P. penicillatus* Alcock, 1905; *P. silasi* Muthu and Motoh, 1979.

FAO names: En - Banana prawn; Fr - Crevette banane; Sp - Camarón banana.



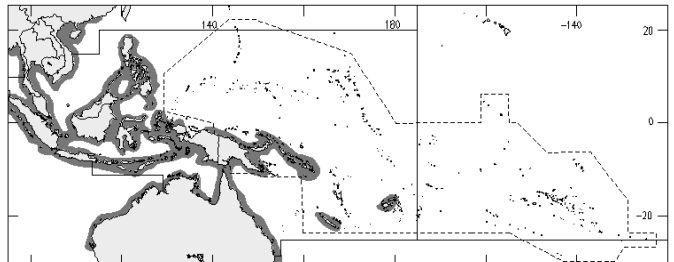
Diagnostic characters: Carapace rather smooth, lacking gastrofrontal and hepatic crests; adrostral crest extending to, or just before, epigastric tooth; tip of rostrum horizontally straight, and rostral crest becoming very high and broadly triangular in large specimens (even stronger in females), generally bearing 6 to 9 upper teeth (including those on carapace) and mostly 3 to 5 lower teeth; postrostral crest extending near to posterior margin of carapace; gastro-orbital crest varying from distinct to nearly absent (in some specimens from the Philippines to Australia), extending over middle third to posterior 2/3 of the distance between hepatic spine and orbital margin. In adult males, third maxilliped with distal segment only about half as long as second segment which bears a tuft of dense short hairs (slightly shorter than distal segment) at tip. Petasma of males with distomedian projections short, not reaching distal margin of costae. Thelycum of females formed by 2 semi-circular lateral plates, with their median margins forming tumid lips; anterior process slightly rounded and concave, obscured by hairs; posterior process elongated and inserted between anterior part of lateral plates. Telson lacking lateral spines. **Colour:** body semi-translucent, somewhat yellowish (in young and moderate-sized specimens) to greenish (in very large specimens) and covered with numerous minute dark brown dots; eyes light brown and covered with some dark brown mesh-like stripes; rostral and abdominal dorsal crests reddish brown to dark brown; antennal flagella reddish brown; antennular flagella of same colour as body and covered with many dark spots; legs translucent and somewhat whitish; pleopods pinkish to reddish; distal part of uropods yellowish green with red margins; young specimens often with many longitudinal black broken lines on abdomen.



Size: Maximum body length 24 cm (carapace length about 6 cm) in females and 20 cm (carapace length about 5 cm) in males, commonly between 13 and 15 cm.

Habitat, biology, and fisheries: On bottoms of sand and mud, from the coastline and river mouths to depths of about 55 m, usually less than 20 m; prefers turbid waters. Sometimes forms very dense shoals and good catches are often linked with heavy rainfall. One of the economically most important shrimp species in the area. From 1990 to 1995, the reported annual catch of *P. merguensis* in the Western Central Pacific ranged from 44 303 to 52 087 t. About 4/5 of this production originated in Indonesia. Caught by trawls, fish corrals, pocket netting, beach seining, cast nets, and artisanal gear. Also plays an important role in pond culture in Thailand (1 814 t in 1995), Malaysia (66 t in 1995), Indonesia (24 610 t in 1995), and the Philippines (all these data from FAO Aquaculture Statistics). Marketed mostly fresh and frozen, consumed locally and exported. In the Philippines, this prawn has only about half the market value of *P. monodon* and in Australia it is sold at slightly lower prices than *P. indicus*.

Distribution: Indo-West Pacific from the Arabian Sea to the South China Sea and Fiji.

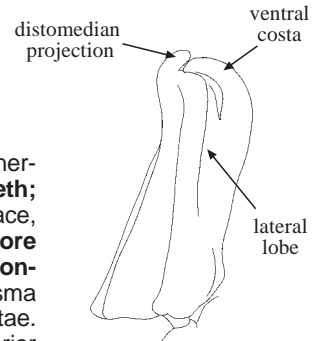
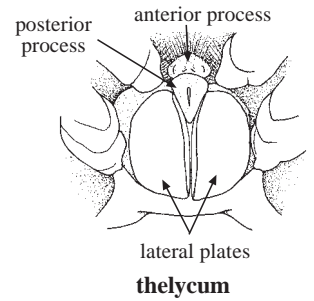
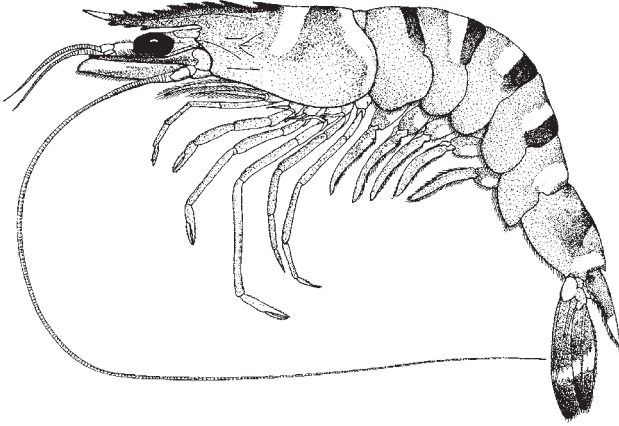


Penaeus monodon Fabricius, 1798

GIT

Frequent synonyms / misidentifications: *Penaeus bubulus* Kubo, 1949; *P. carinatus* Dana, 1852; *P. semisulcatus exsulcatus* Hilgendorf, 1879 / None.

FAO names: **En** - Giant tiger prawn; **Fr** - Crevette géante tigrée; **Sp** - Camarón tigre gigante.



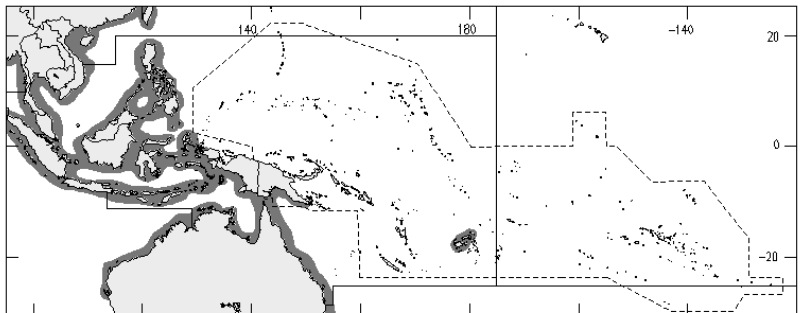
petasma (ventral view)

Diagnostic characters: Carapace with grooves and crests distinct, 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 leg without exopod. Petasma of males with distomedian projections slightly overhanging distal margin of costae. Thelycum of females formed by 2 suboval lateral plates with tumid lips; anterior process concave and rounded distally; posterior process subtriangular and partly inserted between lateral plates. Telson without lateral spines. **Colour: body greyish 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; eyes light brown with many black dots; antennal flagella uniformly greenish brown; legs of same colour as body but sometimes reddish or provided with bright yellow and blue bands; pleopods somewhat reddish or pale red, with bases bright yellow and blue; distal half of uropods dark blue or dark brown with a red or mud-yellow median transverse band, and margins reddish.**

Size: Probably the largest known penaeid, with a maximum body length of 35 cm (females) and 26.8 cm (males), commonly between 12 and 20 cm.

Habitat, biology, and fisheries: From the coastline to depths of about 150 m, usually less than 30 m, on bottoms of sand, mud, or slits. Juveniles usually inhabit seagrass beds, mangrove swamps, and estuaries. Taken by trawls, gill nets, seine nets, stake nets, traps, and artisanal gear. More abundant in the western part of the area and of major economic importance. From 1990 to 1995, the reported yearly catch of *Penaeus monodon* in the Western Central Pacific ranged from 8 513 to 17 194 t (FAO Yearbook of Fishery Statistics). Also commercially very important for aquaculture. Large-scale pond culture of this prawn is practised in many Southeast Asian countries such as Thailand (276 982 t in 1995), Malaysia (6 713 t in 1995), Indonesia (84 100 t in 1995), Philippines (88 815 t in 1995), and Australia (1 613 t in 1995). Marketed mostly fresh and frozen, consumed locally and exported. In the Philippines, it is an expensive food item and ranks above other *Penaeus* species.

Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Red Sea, Japan, Australia, and Fiji.

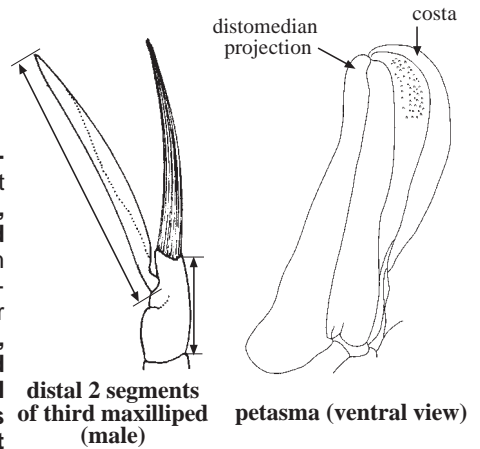
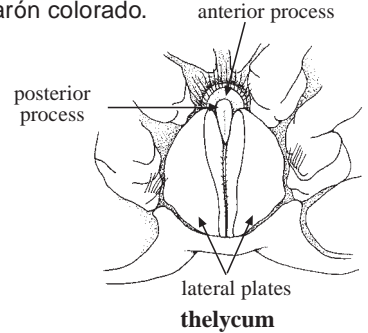
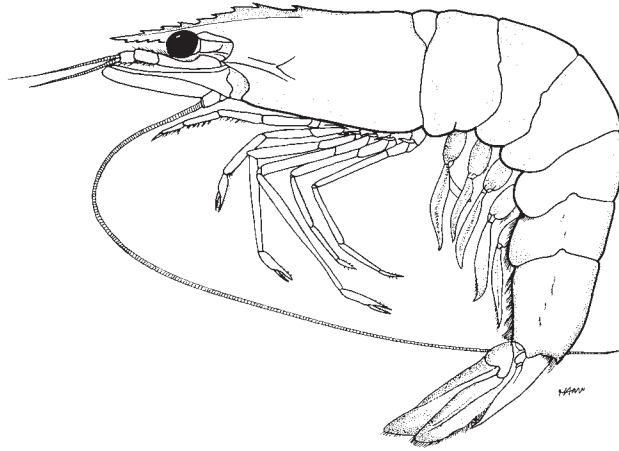


Penaeus penicillatus Alcock, 1905

REP

Frequent synonyms / misidentifications: None / *Penaeus indicus* H. Milne Edwards, 1837; *P. merguensis* De Man, 1988; *P. silasi* Muthu and Motoh, 1979.

FAO names: En - Redtail prawn; Fr - Crevette queue rouge; Sp - Camarón colorado.

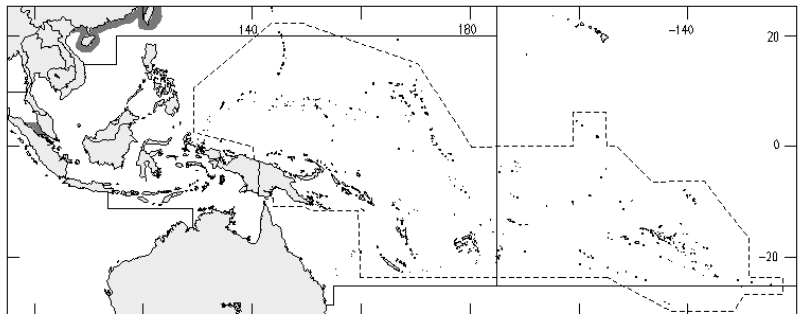


Diagnostic characters: Carapace rather smooth, lacking gastrofrontal and hepatic crests; adrostral crest extending just beyond epigastric tooth; tip of rostrum horizontally straight, and rostral crest generally slightly elevated in young and adult males, to moderately high in large females; rostrum usually armed with 7 to 9 upper teeth (including those on carapace) and 3 to 5 lower teeth; postrostral crest extending near to posterior margin of carapace; gastro-orbital crest distinct, occupying 1/2 to 1/3 the distance between hepatic spine and orbital margin. 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. Petasma of males with distomedian projections slightly bent and not reaching distal margin of costae. Thelycum of females formed by 2 semi-circular lateral plates, with their median margins as tumid lips; anterior process slightly rounded and obscured by hairs; posterior process elongated and inserted between anterior part of lateral plates. Telson lacking lateral spines. **Colour:** body semi-translucent, slightly greenish and covered with numerous minute dark brown dots; eyes light brown and covered with some dark brown mesh-like stripes; rostral and abdominal dorsal crests reddish brown to dark brown; antennal flagella reddish brown; antennular flagella of same colour as body and covered with many dark spots; legs translucent and somewhat whitish; pleopods rather reddish; distal half of uropods yellowish to greenish but always with reddish tips.

Size: Maximum body length 21.2 cm (carapace length 3.3 cm) in females and 16.3 cm (carapace length 3.1 cm) in males, commonly between 10 and 16 cm.

Habitat, biology, and fisheries: On soft bottoms, from the coastline to a depth of about 90 m. Caught by trawls, seines, scoop nets, and artisanal gear. Marketed fresh and frozen. Reported to be rather common in Malaysia, but can be easily confused with *Penaeus indicus*, *P. merguensis*, and *P. silasi*, and is probably not so common in the area.

Distribution: Indo-West Pacific from Pakistan to Taiwan Province of China and Indonesia.

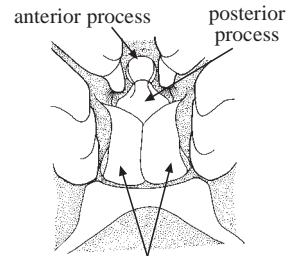
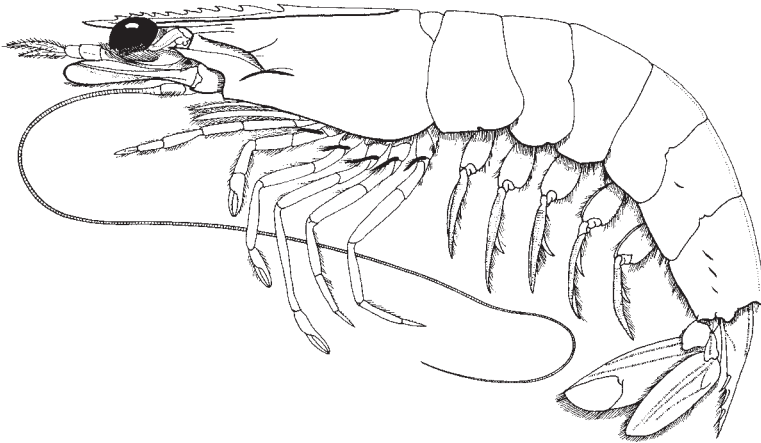


Penaeus plebejus Hess, 1865

PNP

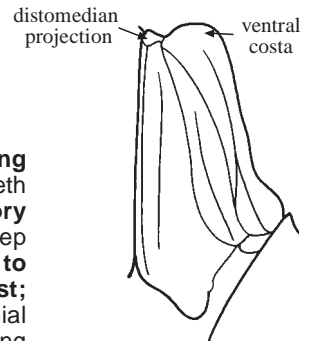
Frequent synonyms / misidentifications: None / None.

FAO names: En - Eastern king prawn; Fr - Crevette royale orientale; Sp - Camarón real oriental.



lateral plates

thelycum



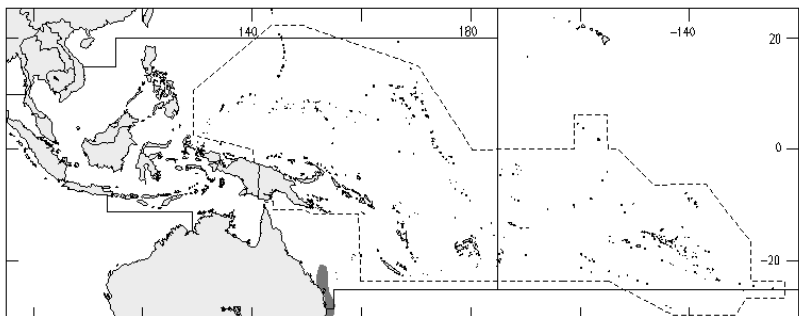
petasma (ventral view)

Diagnostic characters: 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, bearing distinct accessory crest on blade also in adults; postrostral crest well developed, with a deep median groove all along its length; adrostral groove extending almost to posterior margin of carapace and distinctly wider than postrostral crest; posterior end of gastrofrontal groove divided into 3. First leg without ischial spine. Petasma of males with short distomedian projections not overhanging distal margin of costae. Thelycum of females formed by 2 subrectangular lateral plates and with anterolateral angles diverging; anterior process bearing 2 minute, almost contiguous horns; posterior process somewhat triangular. Telson with 3 pairs of movable lateral spines. **Colour:** body generally yellowish cream, abdominal segments with faint dark spots at hinges and a faint dark vertical bar on each pleuron; rostrum dark brown with white tip; eyes deep brown; antennal scale with dark brown outer margins and white tip, flagella whitish; postrostral crest and dorsal crests of abdomen dark brown to red-brown; legs slightly pinkish; pleopods pinkish to slightly yellowish; uropods of same colour as body but with pale blue margins and red-brown fringes.

Size: Maximum body length 30 cm (females) and 19 cm (males), commonly between 14 and 20.5 cm.

Habitat, biology, and fisheries: Found on sandy bottoms of bare and vegetated areas from depths of 2 to 220 m, with a migration pattern from estuaries to deeper marine waters northward along the coasts. This prawn forms the basis of an important fishery in eastern Australia, with a catch of about 3 250 t in the annual period of 1989/1990 (60% of the total commercial catch originating in southern Queensland). Subadults and adults are mainly caught by trawlers offshore at depths below 60 m. Juveniles are caught mainly within estuaries by trawling, set pocket, running netting, hauling, seining, and hand netting. Marketed locally fresh, frozen, or cooked. Larger specimens are exported mainly to Spain and Japan as "green" (uncooked), frozen, or headed prawns.

Distribution: Restricted to eastern Australia, from southern Queensland to Victoria and Lord Howe Island.

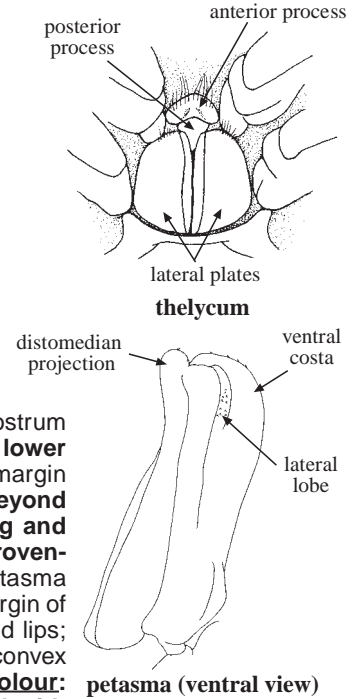
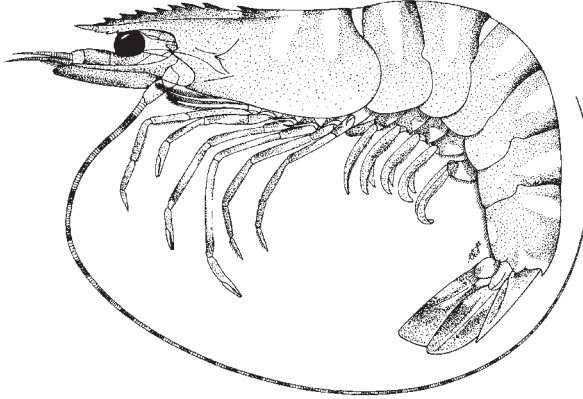


Penaeus semisulcatus De Haan, 1844

TIP

Frequent synonyms / misidentifications: *Penaeus ashiaka* Kishinouye, 1900; *P. monodon manillensis* Villaluz and Arriola, 1938; *P. semisulcatus paucidentatus* Parisi, 1919 / None.

FAO names: **En** - Green tiger prawn; **Fr** - Crevette tigrée verte; **Sp** - Camarón tigre verde.

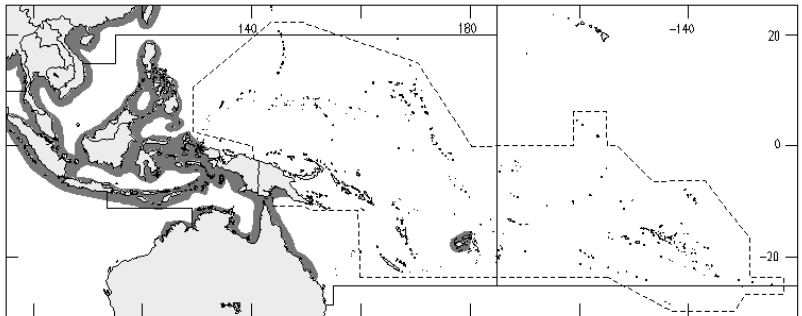


Diagnostic characters: Carapace with grooves and crests distinct, rostrum generally armed with 6 to 8 upper teeth (including those on carapace) and **3 lower teeth**; postrostral crest well developed and reaching nearly to posterior margin of carapace, with a distinct median groove; **adrostral crest extending beyond last postrostral tooth**; **gastrofrontal crest absent**; **hepatic crest long and extending behind antennal crest, straight but distinctly sloping anteroventrally**. **Fifth leg with exopod (somewhat hidden beneath carapace)**. Petasma of males with distomedian projections short and not overhanging distal margin of costae. Thelycum of females formed by 2 suboval lateral plates with tumid lips; anterior process subtriangular and with raised edges, posterior process convex and partly inserted between lateral plates. Telson without lateral spines. **Colour:** **body reddish brown to pale brown or dark green, carapace covered with mud-yellow transverse bands while abdomen including tail fan bears greyish brown and mud-yellow cross bands**; eyes light brown with many black dots; rostral teeth dark brown; **antennal flagella alternated with white and brown bands**; both legs and pleopods reddish and covered with some white markings, with tips of legs whitish, and bases of legs and pleopods also whitish; **distal half of uropods dark reddish brown and with red margins**.

Size: Maximum body length 25 cm (females) and 18 cm (males), commonly between 13 and 18 cm.

Habitat, biology, and fisheries: On the continental shelf from the coastline to depths of about 130 m, usually less than 60 m, over bottoms of sand, mud, or sandy-mud. Seems to prefer high salinity waters, with juveniles often associated with seagrass beds and sometimes found on the top of coral reef platforms. Reported to form small shoals and to be predominantly nocturnal, buried in the substrate during the daytime. Mainly taken offshore by trawls, sometimes also caught by fish corrals in coastal areas. Commonly seen in the markets of Thailand and Indonesia, and the most dominant prawn species in offshore fisheries in the Philippines. FAO's Yearbook of Fishery Statistics records 650 t of this species taken in 1995 from the Western Central Pacific, this figure comprising exclusively catches from Thailand. Also caught commercially in Australia, with an annual catch of about 3 300 t (together with *Penaeus esculentus*) from the Northern Prawn Fishery during the annual period of 1989/1990. Marketed mostly fresh and frozen, consumed locally and exported.

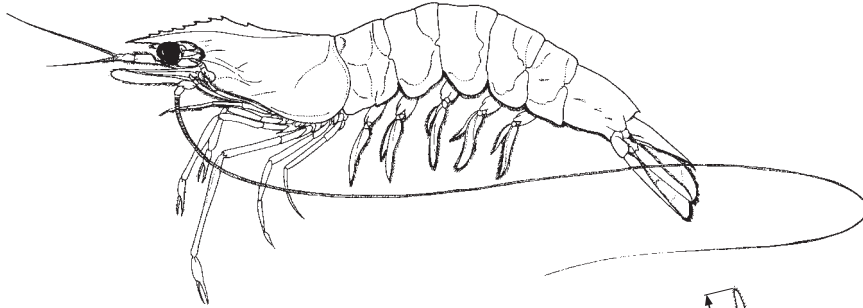
Distribution: Widely distributed in the Indo-West Pacific from the eastern coast of Africa to Japan, Australia, and Fiji; also entered the eastern Mediterranean through the Suez Canal.



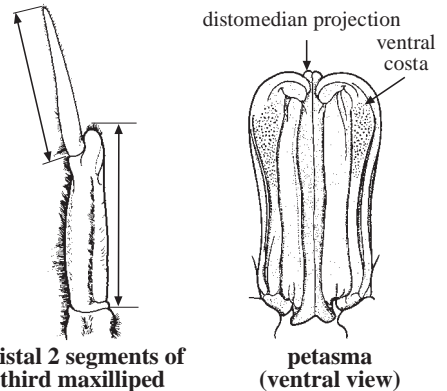
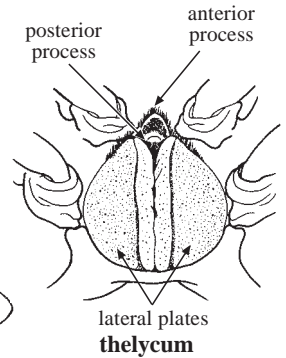
***Penaeus silasi* Muthu and Motoh, 1979**

Frequent synonyms / misidentifications: None / *Penaeus indicus* H. Milne Edwards, 1837; *P. merguensis* De Man, 1888; *P. penicillatus* Alcock, 1905.

FAO names: En - False white prawn.



(after Muthu and Motoh, 1979)



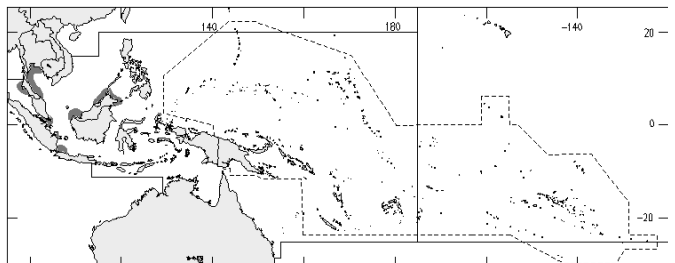
(after Muthu and Motoh, 1979)

Diagnostic characters: Carapace rather smooth, **lacking gastrofrontal and hepatic crests**; adrostral crest extending to about epigastric tooth; **tip of rostrum horizontally straight**; **rostral crest slightly to moderately elevated in young and adult males but high and broadly triangular in large females**, with 7 to 9 upper teeth (including those on carapace) and **4 or 5 lower teeth**; postrostral crest extending near to posterior margin of carapace; **gastro-orbital crest distinct, extending over posterior 3/5 to 2/3 of distance between hepatic spine and orbital margin**. In adult males, third maxilliped with distal segment about as long as second segment which bears **only a rudimentary tuft of hairs at tip**. Petasma of males with distomedian projections slightly bent and not overhanging distal margin of costae. Thelycum of females formed by 2 semi-circular lateral plates, with their median margins forming tumid lips; **anterior process rounded and slightly concave, generally distinct and not obscured by hairs (more clear in adults)**; posterior process elongated and inserted between anterior part of lateral plates. Telson without lateral spines. **Colour: body semi-translucent, somewhat yellowish white (small specimens) to pinkish (large specimens) and covered with numerous minute dark brown dots (dots becoming obscure in large specimens)**; eyes light brown and covered with some dark brown mesh-like stripes; rostral and abdominal dorsal crests reddish brown to dark brown; **antennal flagella reddish brown**; antennular flagella of same colour as body and covered with many dark spots; legs translucent and somewhat whitish, while pleopods yellowish to pinkish; **distal part of uropods yellowish with red margins**; **young specimens often with short longitudinal black broken lines on abdomen**.

Size: Maximum body length 20 cm in females (carapace length 4.8 cm) and 15.3 cm in males (carapace length 4.1 cm), commonly between 12 and 16 cm.

Habitat, biology, and fisheries: Found on muddy bottom in shallow waters to a depth of about 36 m. Caught by trawlers and probably artisanal gear. An abundant species in the markets of Singapore and of commercial importance. Probably also common in Thailand, Malaysia, and Indonesia, where it is often confused with *Penaeus indicus*. Marketed fresh and frozen, mainly for local consumption.

Distribution: Indo-West Pacific; so far only reported from Thailand (Andaman Sea and Gulf of Thailand), Indonesia, Malaysia, and Singapore. Since this shrimp can be easily confused with *P. indicus*, *P. merguensis*, and *P. penicillatus*, its actual distribution is likely to be wider in the Indo-Malay region.

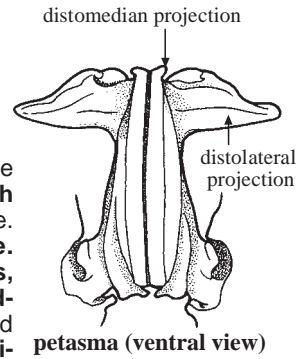
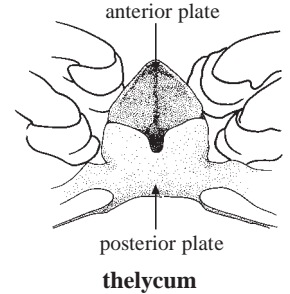
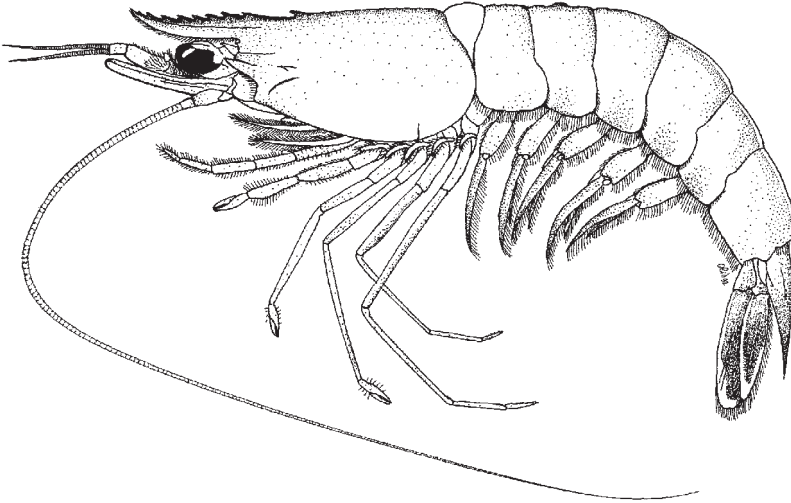


Trachypenaeus curvirostris (Stimpson, 1860)

TRV

Frequent synonyms / misidentifications: ? *Trachypenaeus asper* Alcock, 1905 / *Trachypenaeus longipes* (Paulson, 1875); *T. malaiana* Balss, 1933.

FAO names: **En** - Southern rough shrimp; **Fr** - Crevette gambri archée; **Sp** - Camarón fijador arquero.

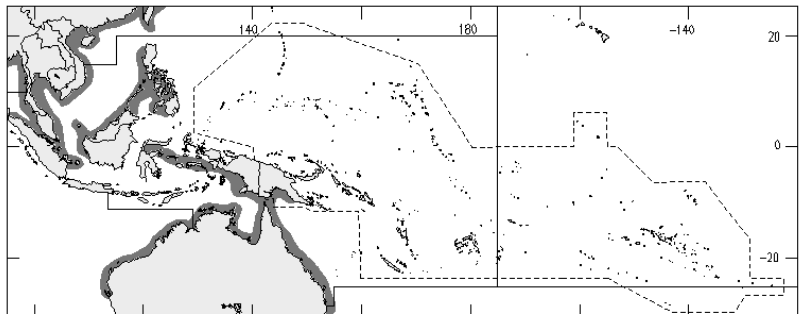


Diagnostic characters: Entire body hairy, with grooves and crests on carapace obscure. Rostrum slightly upcurved at tip, armed with 6 to 8 upper teeth (including those on carapace) and extending to about distal antennular article. Postrostral crest low and extending almost to posterior margin of carapace. 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. Thelycum of females with anterior plate concave and bluntly pointed anteriorly, bearing a median groove; posterior plate with a distinct median notch on anterior margin. Telson generally armed with 3 or 4 pairs of small movable lateral spines. **Colour:** body greyish pink to greyish blue, sometimes whitish on sides; eyes dark brown; antennal flagella reddish; legs pinkish and with some white patches; pleopods reddish with white markings on sides; uropods almost entirely reddish, with margins whitish to yellowish.

Size: Maximum body length 10.5 cm (females) and 8.1 cm (males), commonly between 5 and 8 cm.

Habitat, biology, and fisheries: Found on sand, mud, or sandy-mud bottom, from depths of 10 to 300 m, but usually between 30 and 60 m. Reported from many places in the area, but its actual distribution is unclear as it is often confused with other species of the genus. Probably of minor commercial importance. Caught mainly at night by trawls and bottom gill nets, also by artisanal gear. Marketed mainly fresh for local consumption.

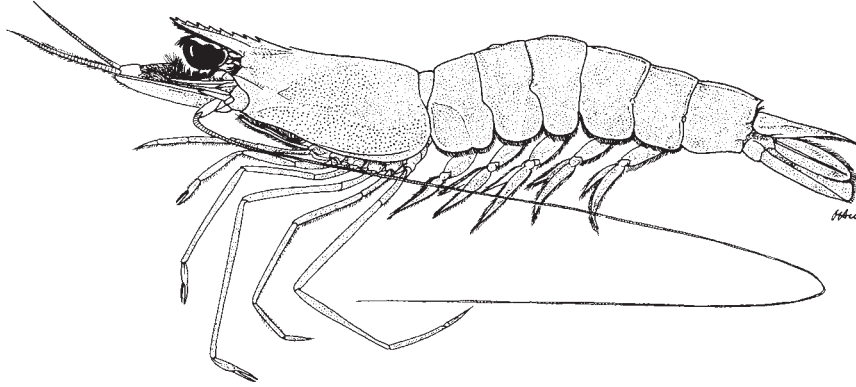
Distribution: Indo-West Pacific from eastern coast of Africa to Japan and northern Australia, also entered the eastern Mediterranean through the Suez Canal.



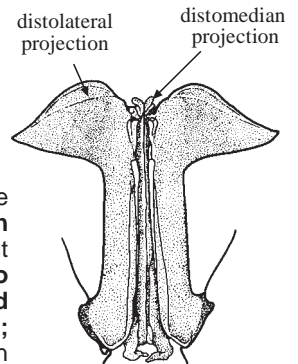
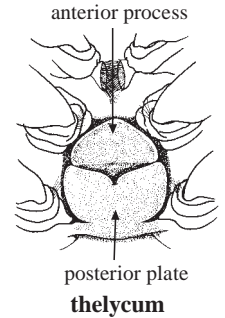
***Trachypenaeus malaiana* Balss, 1933**

Frequent synonyms / misidentifications: *Trachypenaeus fulvus* Dall, 1957; *T. unicus* Hall, 1961 / *Trachypenaeus curvirostris* (Stimpson, 1860).

FAO names: **En** - Malayan rough shrimp; **Fr** - Crevette gambri malaise; **Sp** - Camarón fijador malayo. (these FAO names were previously used for *Trachypenaeus sedili*).



(after Motoh and Buri, 1984)



petasma (ventral view)

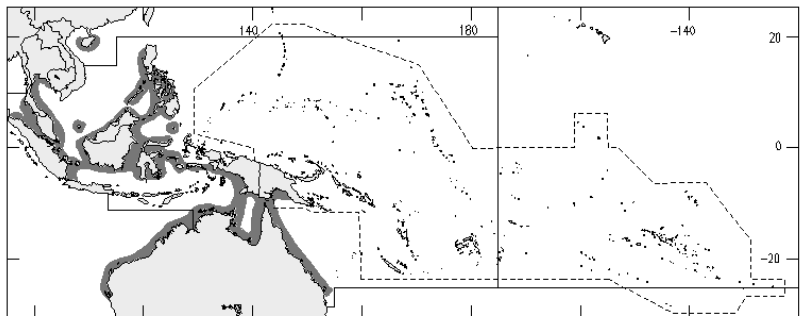
(after Motoh and Buri, 1984)

Diagnostic characters: Entire body hairy, with grooves and crests on carapace obscure. **Rostrum armed with 9 or 10 upper teeth (including those on carapace), nearly straight or slightly curved upward at tip, extending to about second antennular article. Postrostral crest low and extending almost to posterior margin of carapace. Longitudinal suture on carapace short. Epipod present only on third leg; ischial spine on first leg small to entirely absent; fifth leg extending beyond antennal scale.** Abdomen bearing a small median tubercle on second segment, last 4 segments with a low dorsal crest. **Petasma of males T-shaped, with distolateral projections broadly wing-like and directed laterally, distomedian projections small. Thelycum of females with anterior plate semi-circular and edges slightly raised, bearing a low median groove; posterior plate with anterior margin broadly V-shaped and bearing a narrow but deep median notch.** Telson generally armed with 1 pair of small movable lateral spines. **Colour:** body generally greyish to greyish blue, posterior margin of each abdominal segment covered with an indistinct narrow dark grey band; eyes dark brown; antennal flagella greyish brown; legs yellowish to pinkish; pleopods pinkish, with whitish to yellowish markings on sides; uropods almost entirely dark grey to brownish and with yellowish margins.

Size: Maximum body length 10.5 cm (females) and 8 cm (males), commonly between 5.5 and 8 cm.

Habitat, biology, and fisheries: Found in offshore waters at depths from 5 to 60 m, over muddy bottoms, juveniles in brackish water. Taken mainly by trawls. Probably the most common species of the genus in the area, but of limited commercial importance due to its small size and nowhere very abundant. Forms a bycatch in prawn fisheries. Marketed mainly fresh or frozen for local consumption.

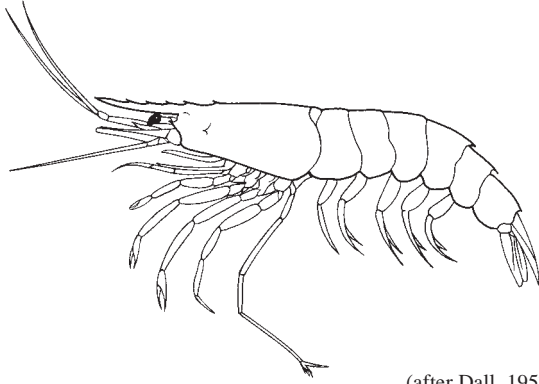
Distribution: Western Pacific from the Strait of Malacca to the Philippines, South China Sea, and northern Australia.



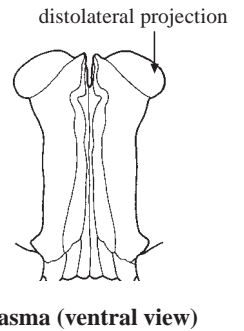
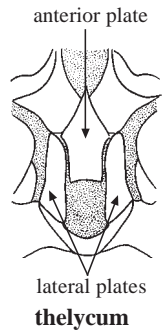
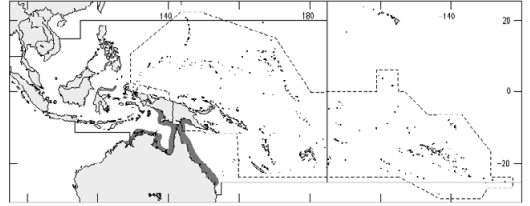
***Atypopenaeus formosus* Dall, 1957**

En - Orange shrimp; **Fr** - Crevette orange; **Sp** - Camarón naranja.

Maximum body length 10 cm (females) and 8 cm (males). Inhabits shallow inshore waters to depths of about 30 m, usually less than 10 m, over soft mud bottoms. Taken as bycatch in trawls. Of minor commercial importance. Its local name in Australia, "go home prawn", refers to the common reaction of fishermen upon finding large numbers of this shrimp in their catches. Marketed fresh or frozen for local consumption. Restricted to the waters between New Guinea and northern Australia.



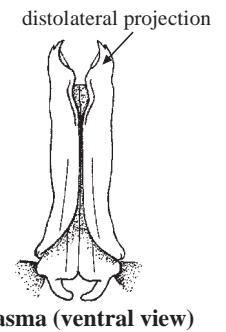
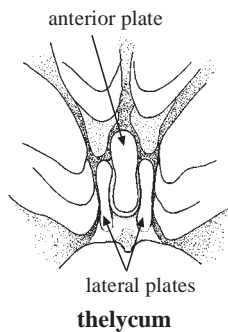
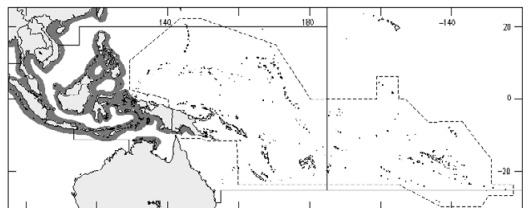
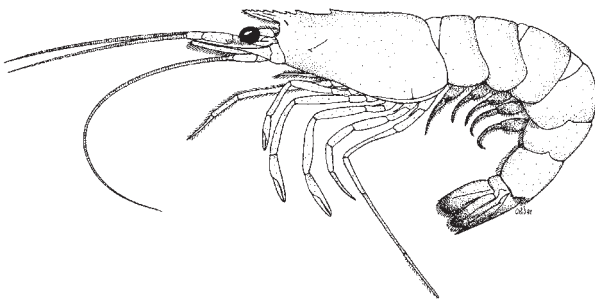
(after Dall, 1957)



***Atypopenaeus stenodactylus* (Stimpson, 1860)**

En - Periscope shrimp; **Fr** - Crevette périscope; **Sp** - Camarón periscopio.

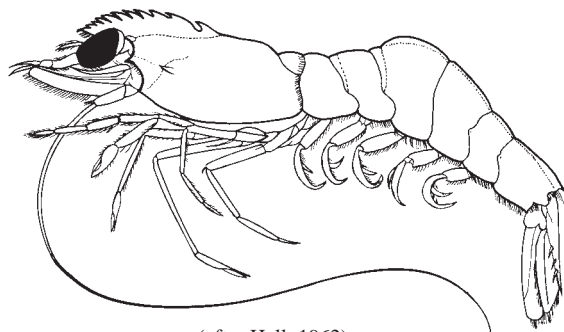
Maximum body length 5 cm (females) and 4 cm (males). On muddy bottoms close to the shore, from depths of 10 to 30 m. Taken by trawls, bag nets, and artisanal gear. Generally of no commercial importance in the area, due to its very small size, and not particularly abundant in the catches. Marketed mainly fresh for local consumption. Indo-West Pacific from India to Japan and northern Australia.



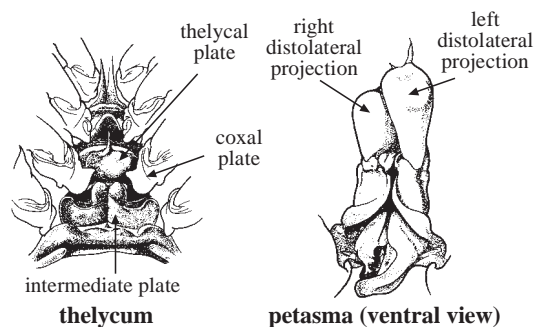
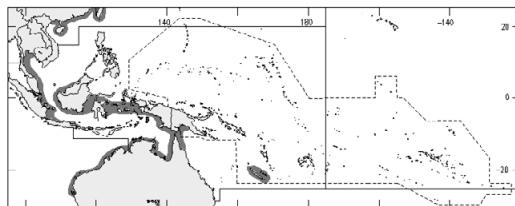
Metapenaeopsis lamellata (De Haan, 1844)

En - Humpback shrimp; **Fr** - Crevette bossue; **Sp** - Camarón jorobado.

Maximum body length 10 cm (females) and 6 cm (males). At depths between 4 and 200 m, associated with hard bottoms of reef and coral debris. Sometimes taken by trawls. Not very common throughout its range in the area and of very limited commercial interest. Marketed fresh for local consumption. Western Pacific from the Gulf of Thailand to Japan, Australia, and New Caledonia.



(after Hall, 1962)

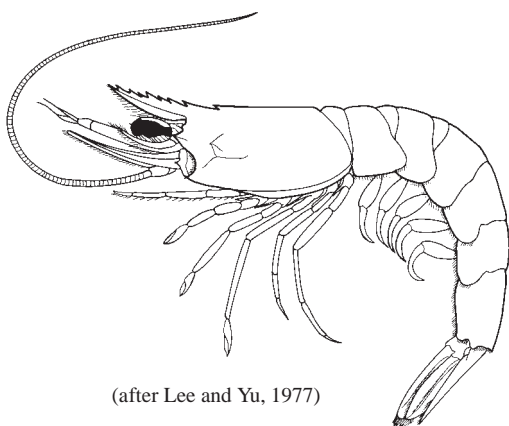


(after Crosnier, 1994)

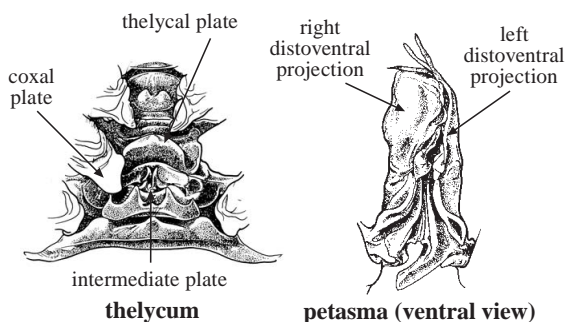
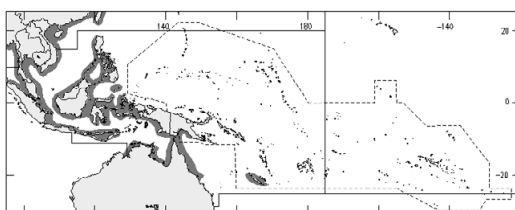
Metapenaeopsis mogiensis (Rathbun, 1902)

En - Mogi velvet shrimp; **Fr** - Crevette chamois mogi; **Sp** - Camarón gamuza mogi.

Maximum body length 10.1 cm (females) and 8.2 cm (males); commonly between 5 and 7 cm. Over hard bottoms adjacent to coral reefs, from depths of 10 to 156 m, usually less than 50 m. Not particularly common in the area and of very limited commercial importance; sometimes taken as bycatch in trawls. Marketed fresh for local consumption. Widely distributed in the Indo-West Pacific from the eastern coast of Africa to Japan, Australia, and New Caledonia (sometimes divided into 4 subspecies).



(after Lee and Yu, 1977)

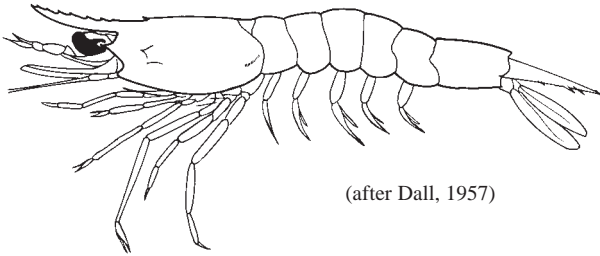


(after Crosnier, 1991)

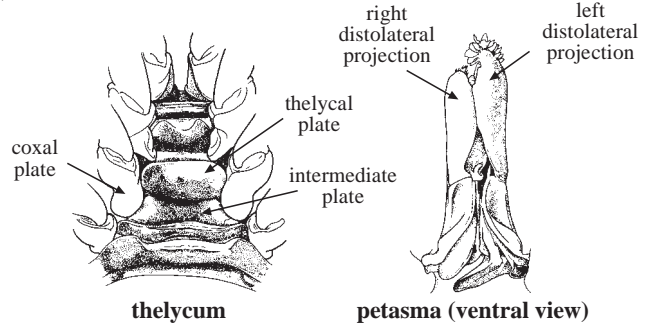
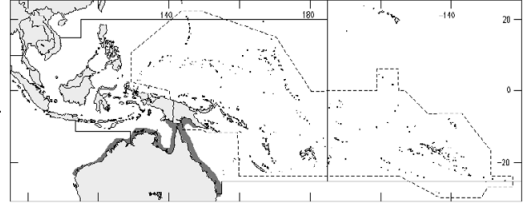
Metapenaeopsis novaeguineae (Haswell, 1879)

En - Northern velvet shrimp; **Fr** - Crevette chamois nordique; **Sp** - Camarón gamuza norteño.

Maximum body length 11.5 cm (females) and 7 cm (males). Over muddy to sandy bottoms, from depths of 5 to 30 m. Taken by trawls. A common bycatch in the prawn fishery operating in its range, but of minor commercial importance, due to its small size. Marketed fresh or frozen together with other small species and used for local consumption. Restricted to the waters between New Guinea and Australia.



(after Dall, 1957)

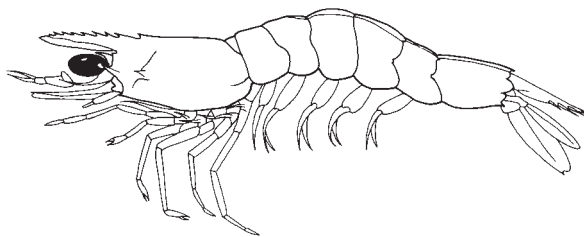


(after Crosnier, 1994)

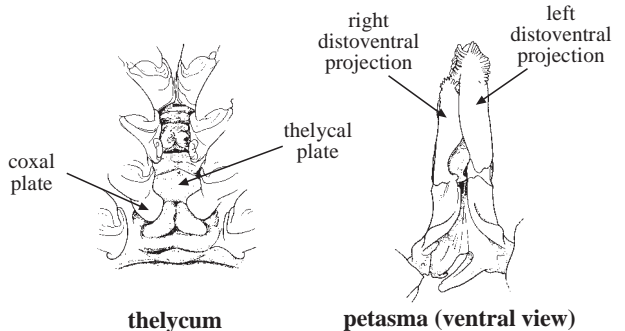
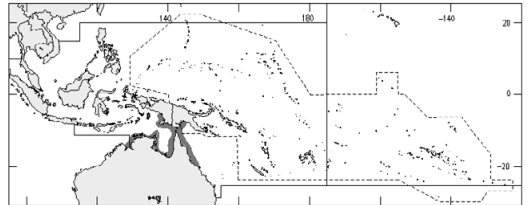
Metapenaeopsis rosea Racek and Dall, 1965

En - Pink velvet shrimp; **Fr** - Crevette chamois rosée; **Sp** - Camarón gamuza rosado.

Maximum body length 12.2 cm (females) and 11 cm (males). On muddy bottoms, from depths of 7 to 52 m. Restricted to the waters between New Guinea and Australia. Not abundant and of very limited commercial importance.



(from Crosnier, 1994)

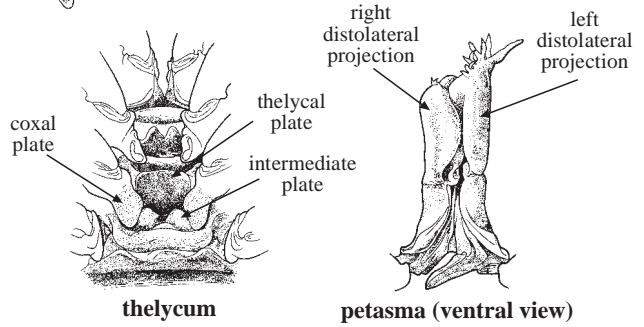
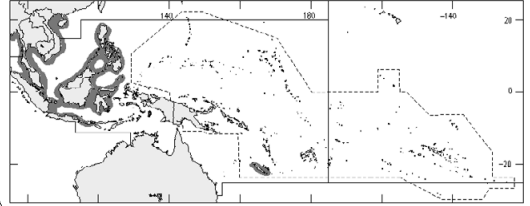
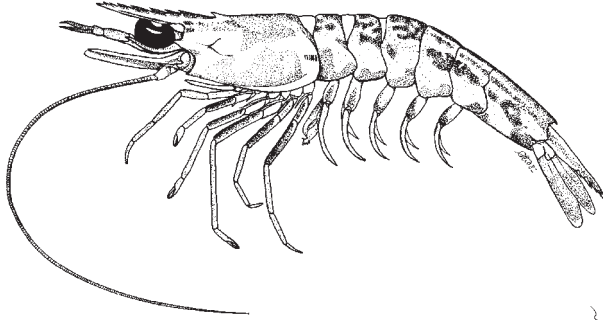


(after Crosnier, 1994)

***Metapenaeopsis stridulans* (Alcock, 1905)**

En - Fiddler shrimp; **Fr** - Crevette violoneux; **Sp** - Camarón violinista.

Maximum body length 10.6 cm (females) and 8.9 cm (males); commonly between 6 and 9 cm. On sandy or muddy bottoms, from depths of 9 to 90 m. Taken by trawls, gill nets, seines, and artisanal gear. Of limited commercial importance and apparently nowhere abundant in the area. Marketed mainly fresh for local consumption. Indo-West Pacific from the Persian Gulf to the South China Sea and New Caledonia.

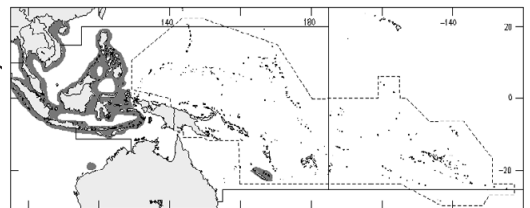
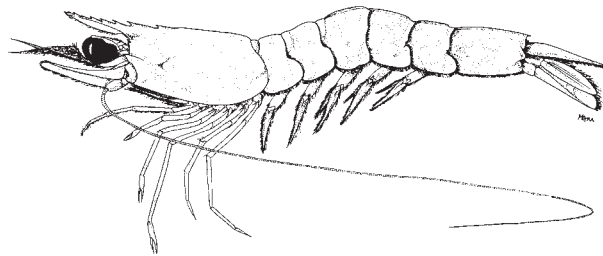


(after Crosnier, 1994)

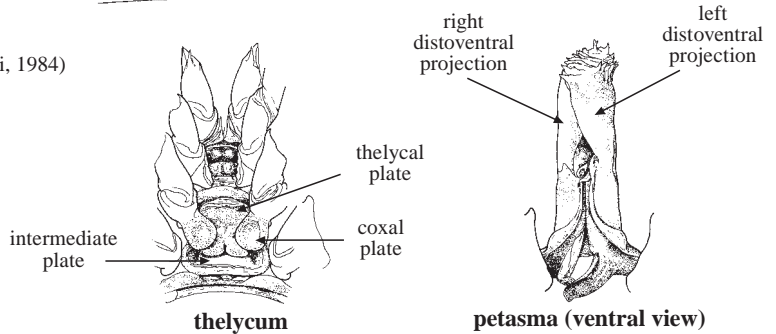
***Metapenaeopsis toloensis* Hall, 1962**

En - Tolo velvet shrimp; **Fr** - Crevette chamois tolo; **Sp** - Camarón gamuza tolo.

Maximum body length 10 cm (females) and 8 cm (males); commonly between 6 and 9 cm. On sandy or muddy bottoms, from depths of 8 to 73 m. Taken by trawls and artisanal gear. Not particularly common in the area and of minor or no commercial importance. Marketed mainly fresh for local consumption. Indo-West Pacific from the Maldives to Japan and New Caledonia.



(after Motoh and Buri, 1984)



(after Crosnier, 1994)

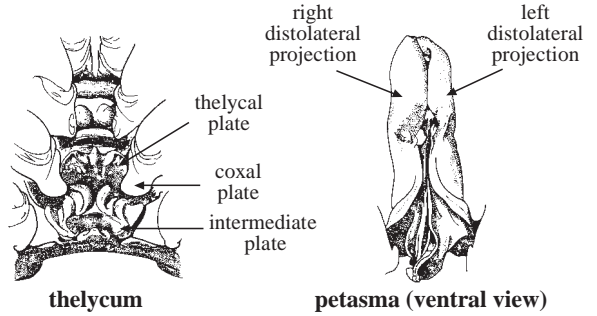
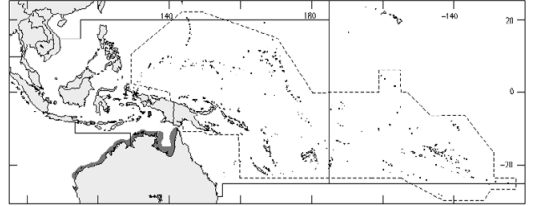
***Metapenaeopsis wellsii* Racek, 1967**

En - Velvet shrimp.

Maximum body length 11 cm (females) and 11.8 cm (males). At depths between 13 and 78 m. Restricted to northern Australia from Shark Bay (Western Australia) to Gulf of Carpentaria (Queensland). Of minor commercial importance, taken as bycatch in trawls. Marketed fresh or frozen for local consumption.



(from Crosnier, 1991)



thelycum

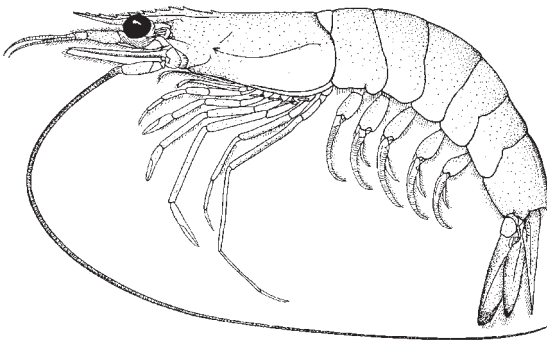
petasma (ventral view)

(after Crosnier, 1991)

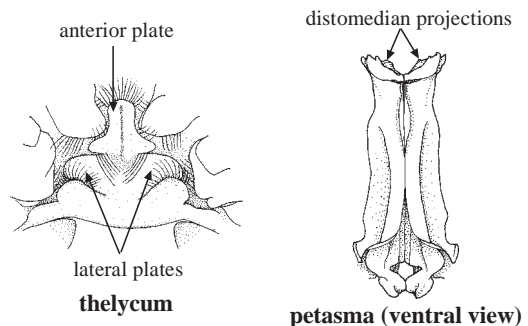
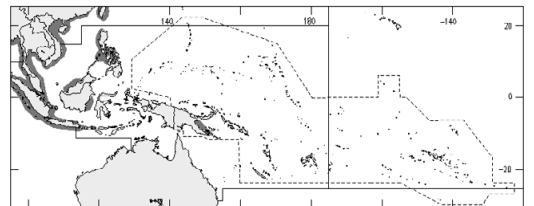
***Metapenaeus affinis* (H. Milne Edwards, 1837)**

En - Jingga shrimp; **Fr** - Crevette jingga; **Sp** - Camarón jingga.

Maximum body length 18.6 cm for females (perhaps to 22.2 cm) and 14.6 cm for males; commonly between 10 and 14 cm. On mud or sandy-mud bottoms, from the coastline to depths of about 90 m, usually less than 55 m. Juveniles generally are found in estuaries and backwaters. Caught by trawlers, traps, seine nets, and artisanal gear. Marketed fresh or frozen, probably mainly for local consumption. Widespread in the Indo-West Pacific from the Persian Gulf to Taiwan Province of China, the Philippines, and Papua New Guinea. Can be easily confused with *Metapenaeus ensis* and seems to occur mainly in the western part of the area, from Viet Nam to Thailand, Malaysia, and Indonesia.



merus of fifth leg (male)



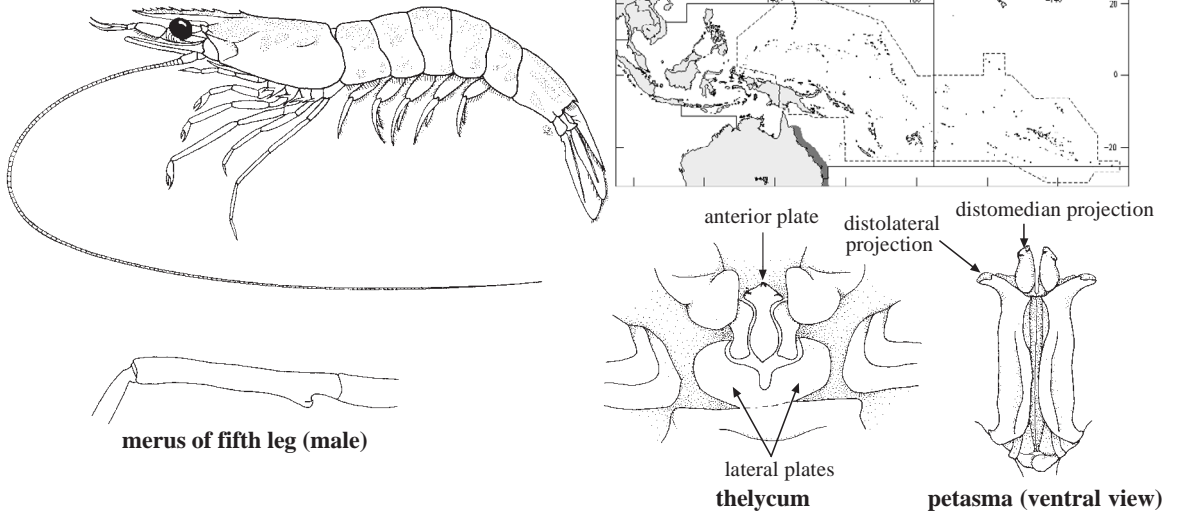
thelycum

petasma (ventral view)

***Metapenaeus benettiae* Racek and Dall, 1965**

En - Greentail shrimp; **Fr** - Crevette queue verte; **Sp** - Camarón rabo verde.

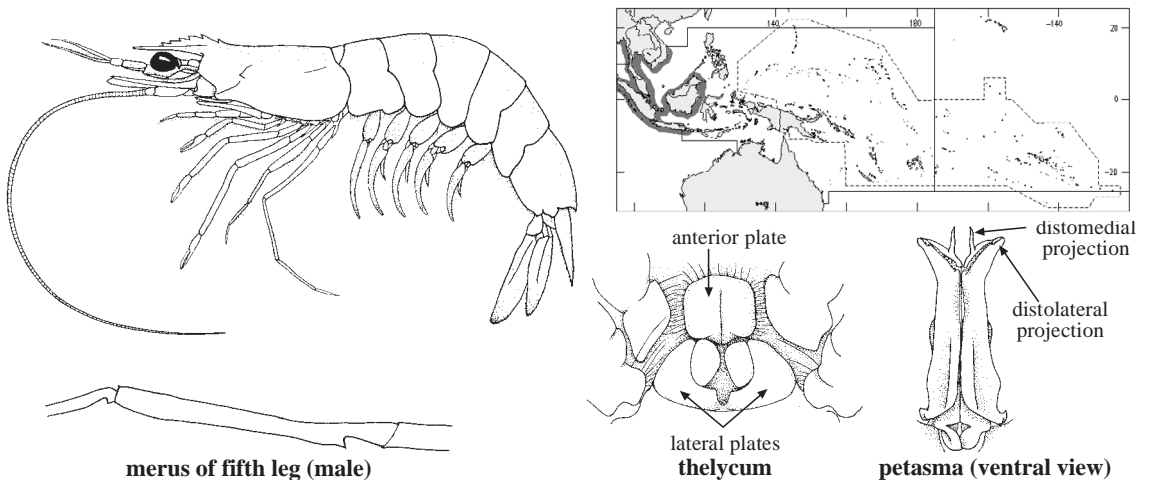
Maximum body length 13 cm (females) and 10.5 cm (males). Found mainly on soft mud bottoms in estuaries, coastal lakes, and rivers, to a depth of 22 m. Juveniles generally inhabit upstream waters, mangrove canals or intertidal seagrass areas of low salinity and abundant algal cover. Caught by beam trawls in rivers and otter trawl in coastal waters, sometimes also by cast nets. Of commercial importance in eastern Australia, above all in southeastern Queensland (about 650 t in the annual period of 1989/1990). Marketed mainly fresh and consumed locally, also used as bait. Restricted to eastern Australia, from Rockhampton (Queensland) to eastern Victoria.



***Metapenaeus brevicornis* (H. Milne Edwards, 1837)**

En - Yellow shrimp; **Fr** - Crevette jaune; **Sp** - Camarón amarillo.

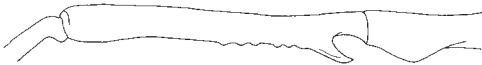
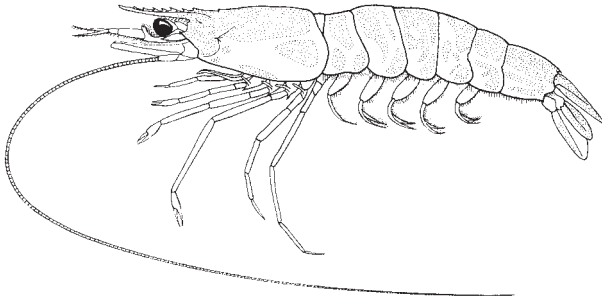
Maximum body length 13.2 cm (perhaps to 15.2 cm) for females and 9.8 cm for males. A marine to almost fresh-water species, found on sand or mud to depths of about 90 m, usually less than 30 m. Juveniles generally found in estuaries, backwaters, and deltas. A common species in the western part of the area. Mainly fished by set nets, traps, cast nets, scoop nets, drag nets, and artisanal gear, sometimes also by trawls. Often enters *Penaeus* culture ponds in Thailand, Singapore, Indonesia, and Viet Nam, and is harvested together with the cultured species. Marketed usually fresh or frozen, probably mainly for local consumption. Indo-West Pacific from Pakistan to Viet Nam, and Indonesia.



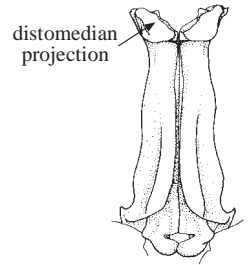
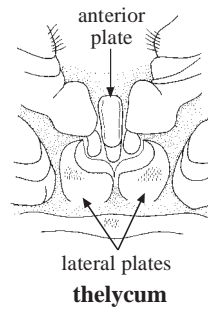
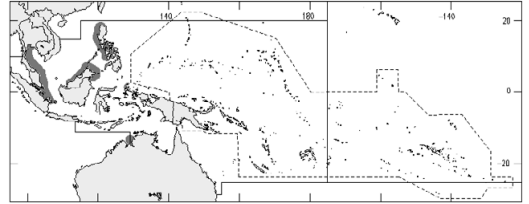
***Metapenaeus conjunctus* Racek and Dall, 1965**

En - Wood shrimp; **Fr** - Crevette bois; **Sp** - Camarón leña.

Maximum body length 14.3 cm (females) and 11.5 cm (males). Inhabits estuarine and brackish waters to depths less than 15 m. Taken by traps and seines. Generally not very common and of minor commercial importance. Found mainly mixed in the catches of *Metapenaeus ensis* or other species of the genus. Western Pacific from Thailand to Malaysia, Singapore, Indonesia, the Philippines, and northern Australia.



merus of fifth leg (male)

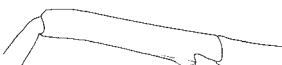
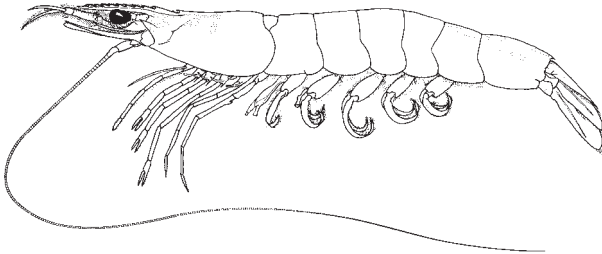


petasma (ventral view)

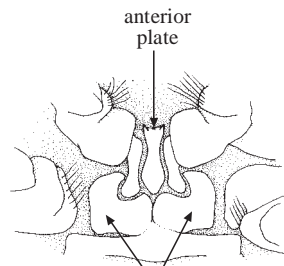
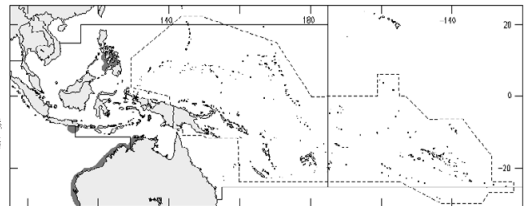
***Metapenaeus dalli* Racek, 1957**

En - Western school shrimp; **Fr** - Crevette dali; **Sp** - Camarón dali.

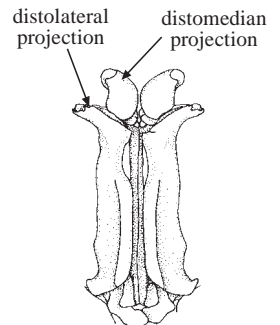
Maximum body length 9.8 cm (females) and 7.8 cm (males). On bottoms of mud and sand in estuarine and brackish waters, to a depth of about 33 m. Caught mainly with hand nets, also by seines and traps. Not common in the area and of very limited commercial importance, due to its small size. Mainly known from western Australia but also found in the Philippines and Indonesia (southeastern coast of Java).



merus of fifth leg (male)



thelycum

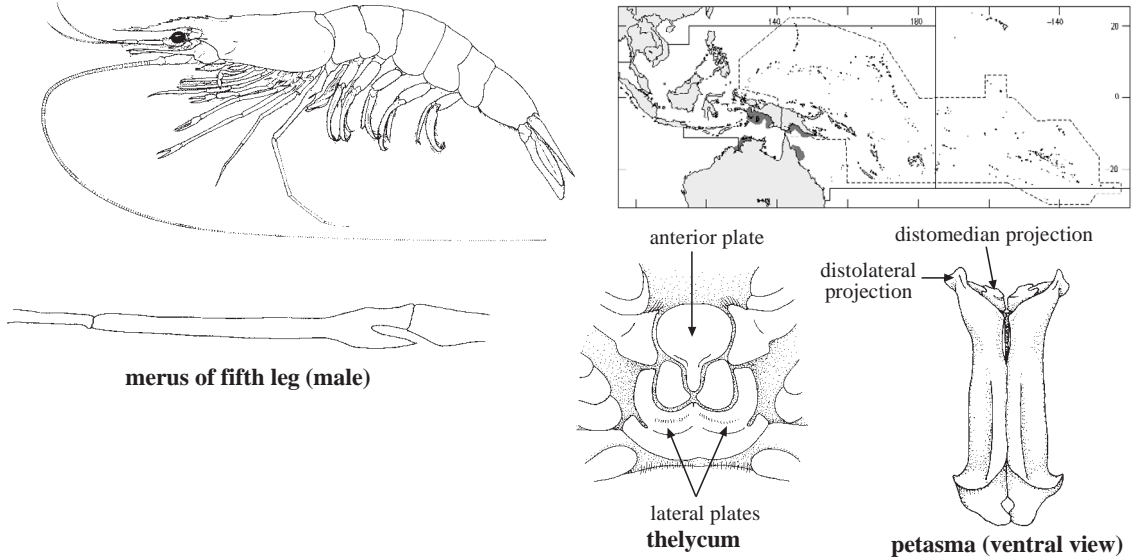


petasma (ventral view)

***Metapenaeus demani* (Roux, 1921)**

En - Demon shrimp; **Fr** - Crevette diable; **Sp** - Camarón diablo.

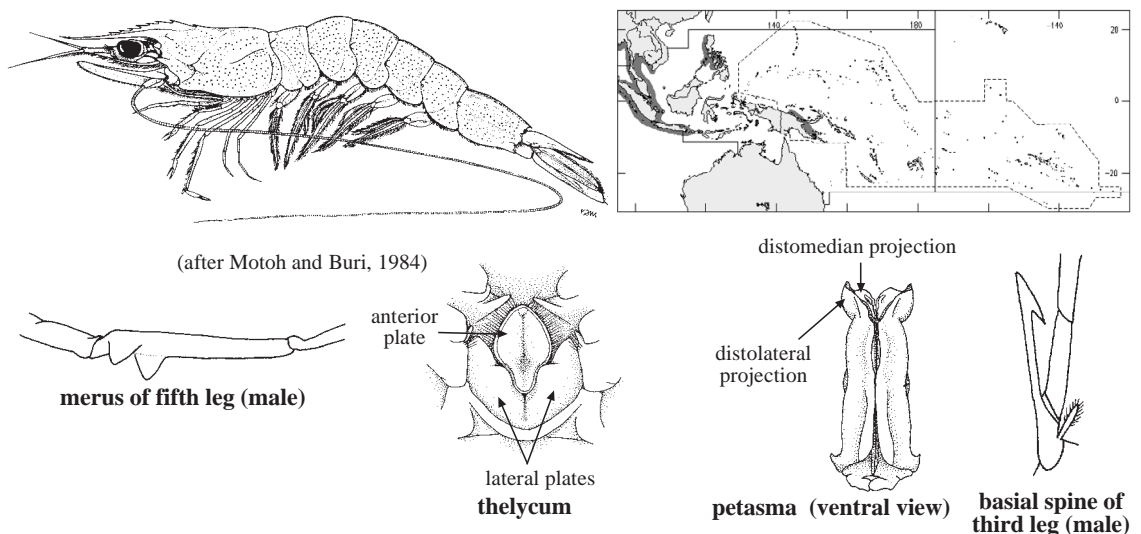
Maximum body length 12.2 cm (females) and 10.4 cm (males). Over muddy bottoms in estuarine and coastal waters, to a depth of 50 m, usually less than 30 m. Caught mainly by trawl nets and artisanal gear. Of some commercial importance in the Gulf of Papua prawn fishery where it constitutes about 50% of the shrimp catches. Probably mainly consumed locally. Restricted to the waters between New Guinea and Australia (sometimes divided into 2, eastern and western, subspecies).



***Metapenaeus dobsoni* (Miers, 1878)**

En - Kadal shrimp; **Fr** - Crevette kadal; **Sp** - Camarón kadal.

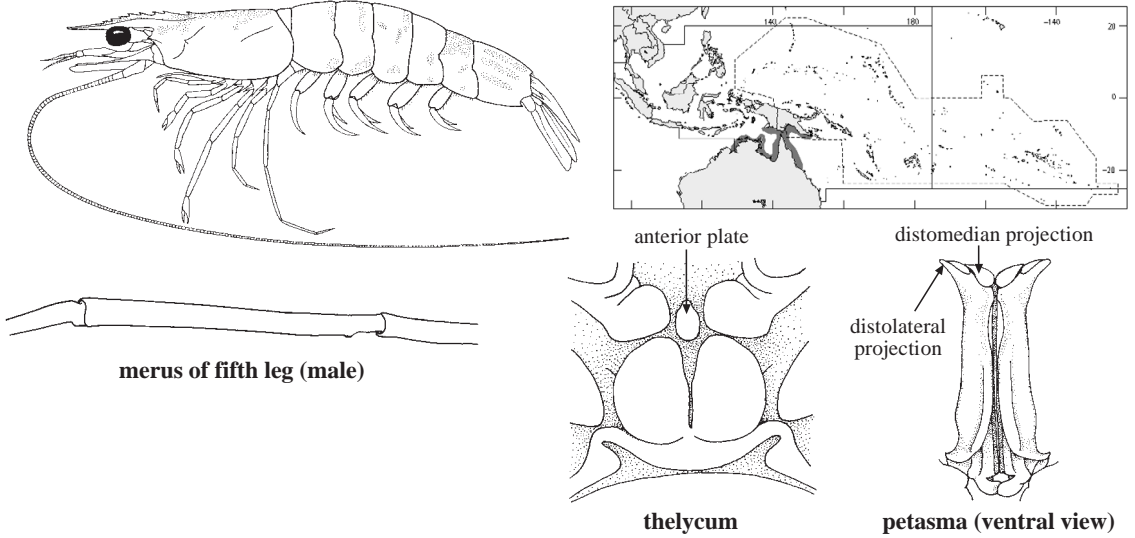
Maximum body length 13 cm (females) and 11.8 cm (males). Occurs mainly in low salinity lagoons and adjacent marine areas on muds to a depth of 37 m. Juveniles inhabit estuarine and backwaters. Caught mainly by trawls, seines, stake nets, and artisanal gear. Generally not very common in the area although reported to be quite abundant in New Guinea and appears in culture ponds in Thailand. Indo-West Pacific from India to the Philippines and New Guinea.



***Metapenaeus eboracensis* Dall, 1957**

En - York shrimp; **Fr** - Crevette york; **Sp** - Camarón york.

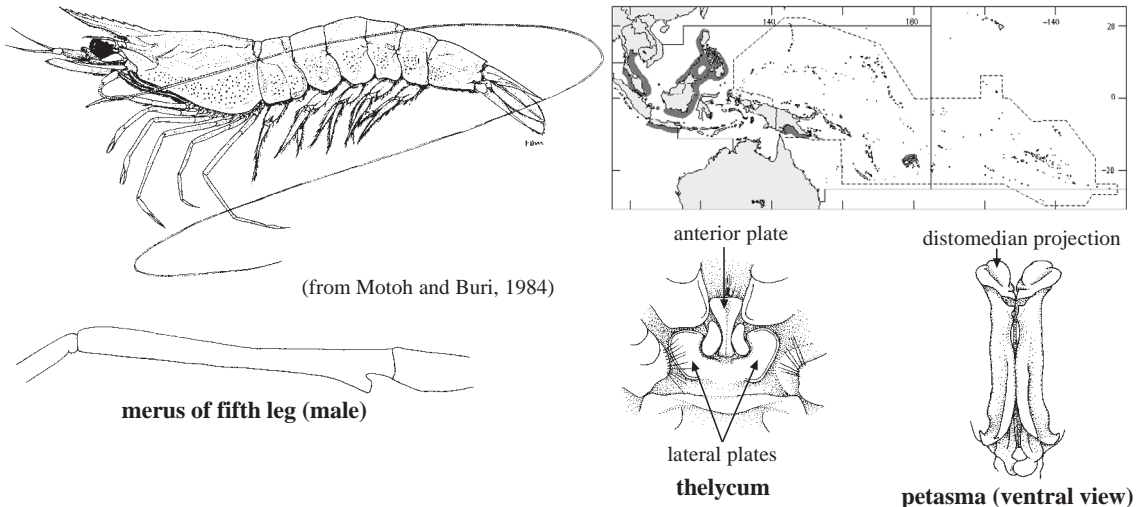
Maximum body length 11.6 cm (females) and 9.8 cm (males). On sandy or muddy bottoms in inshore waters, rivers and estuaries, to a depth of 45 m, usually between 10 and 20 m. Caught by trawls, seines, hand nets, and artisanal gear. Of minor commercial importance, due to its small size. Constitutes only about 5% of the prawn fishery catches in the Gulf of Papua and supports a small amateur fishery in northern Australia. Mainly consumed locally. Restricted to the waters between southern New Guinea and northern Australia.



***Metapenaeus elegans* De Man, 1907**

En - Fine shrimp; **Fr** - Crevette élégante; **Sp** - Camarón fino.

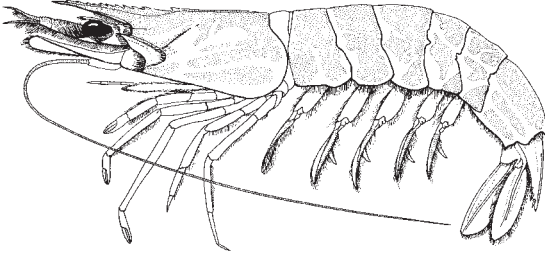
Maximum body length 11.8 cm (females) and 8.4 cm (males). Usually in estuaries, ponds, and inland lagoons with low salinity, but also found at sea to a depth of 55 m, on mud or sandy-mud bottoms. Caught mainly by traps, also by trawls, push nets, set nets, and artisanal gear. Reported to be of limited commercial importance in the area, but can be easily confused with the commercially important *Metapenaeus ensis*; seems to be rather common in markets of the Philippines and probably is more commonly marketed in other countries as well. Marketed mainly fresh for local consumption. Indo-West Pacific from Sri Lanka to the Philippines and Fiji.



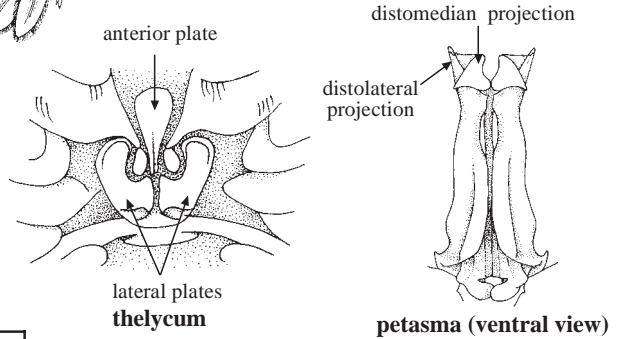
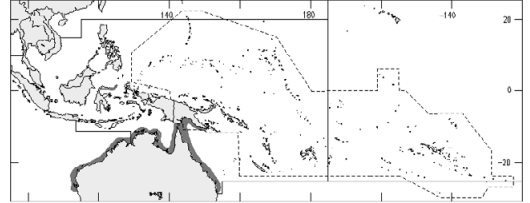
***Metapenaeus endeavouri* (Schmitt, 1926)**

En - Endeavour shrimp; **Fr** - Crevette devo; **Sp** - Camarón devo.

Maximum body length 17.5 cm (females) and 14 cm (males). On sandy or sandy-mud bottoms, found from the coastline to depths of 50 or 60 m. Juveniles generally associated with seagrass areas in shallow estuaries. Caught mainly at night by demersal otter trawls, sometimes also by beam trawls. Caught commercially in northern Australia, with a catch of about 2 400 t (together with *Metapenaeus ensis*), catches from western Australia not included, in the annual period of 1989/1990. Marketed mainly frozen, cooked or salted, sometimes used as bait; consumed locally and also exported. In 1995, the reported aquaculture production of this species (probably a misidentification of *Metapenaeus anchistus*) in the Philippines amounted to 1 295 t (FAO Aquaculture Production Statistics). Restricted to northern Australia and the Gulf of Papua.



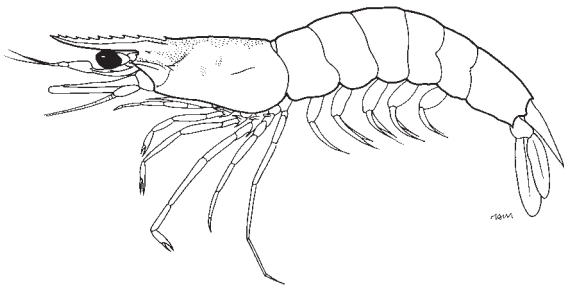
merus of fifth leg (male)



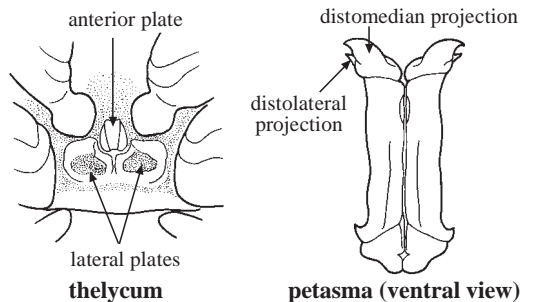
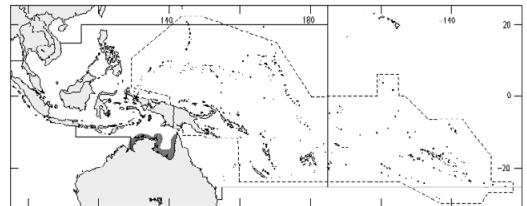
***Metapenaeus insolitus* Racek and Dall, 1965**

En - Emerald shrimp; **Fr** - Crevette émeraude; **Sp** - Camarón esmeralda.

Maximum body length 12 cm (females) and 8 cm (males). Over muddy or sandy bottoms in inshore waters, including creeks and estuaries, to a depth of 35 m, usually less than 8 m. Mainly caught by hand nets in amateur fisheries and consumed locally. Moderately abundant in inshore habitats, but of limited commercial importance, due to its small size. Restricted to northern Australia.



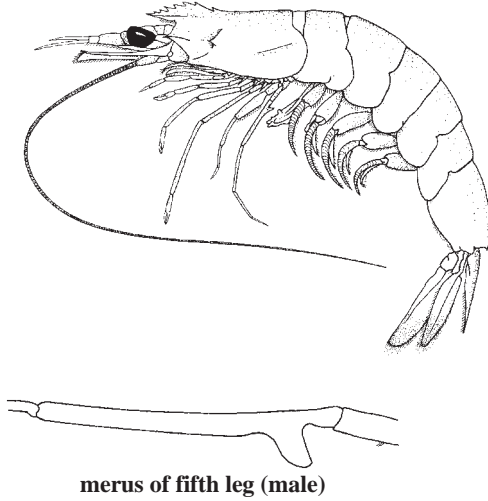
(after Racek and Dall, 1965)



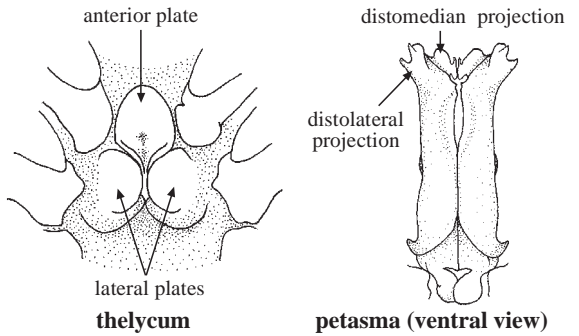
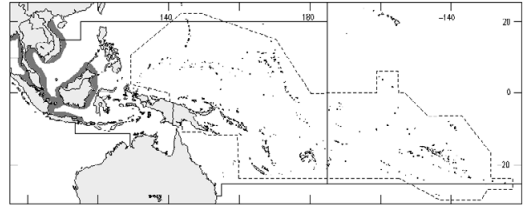
***Metapenaeus lysianassa* (De Man, 1888)**

En - Bird shrimp; **Fr** - Crevette oiseau; **Sp** - Camarón parancero.

Maximum body length 9 cm (females) and 6.1 cm (males). On muddy bottom in inshore waters, to depths of about 28 m. Caught by stake nets, traps, set nets, push nets, seines, and trawls. Abundant in the western part of the area, but of secondary commercial importance, due to its small size. Marketed fresh, frozen, or dried and mainly for local consumption. Indo-West Pacific from India to Viet Nam, Malaysia, and Indonesia.



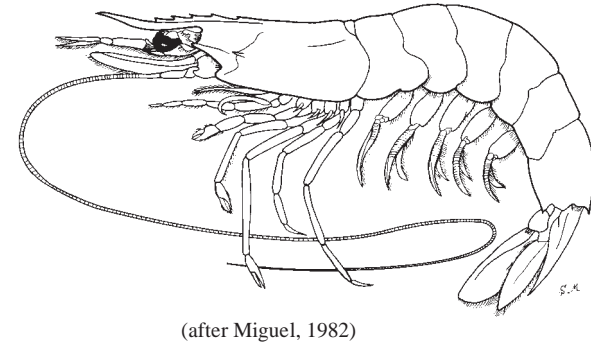
merus of fifth leg (male)



***Metapenaeus macleayi* (Haswell, 1879)**

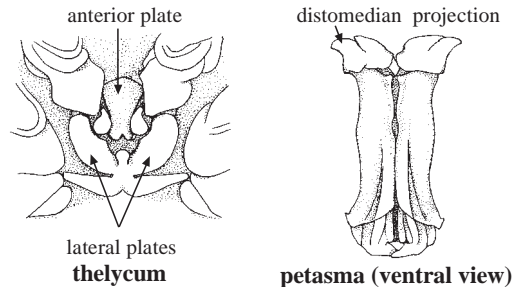
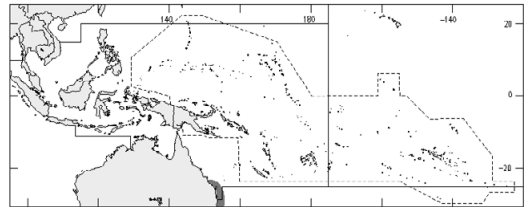
En - Eastern school shrimp; **Fr** - Crevette de macleay; **Sp** - Camarón macleayo.

Maximum body length 17.5 cm (females) and 14.6 cm (males). In estuaries and inshore waters, to a depth of 55 m. Juveniles inhabit seagrass areas within estuaries. Caught by means of trawling (mainly), hauling, and seining; also obtained on the basis of small-scale aquaculture. Of commercial importance in eastern Australia, but its catch in Queensland was only about 100 t in the annual period of 1989/1990. Marketed cooked or uncooked ("green"), mainly for local consumption. Restricted to eastern Australia, from Tin Can Bay (Queensland) to Corner Inlet (Victoria).



(after Miguel, 1982)

merus of fifth leg (male)



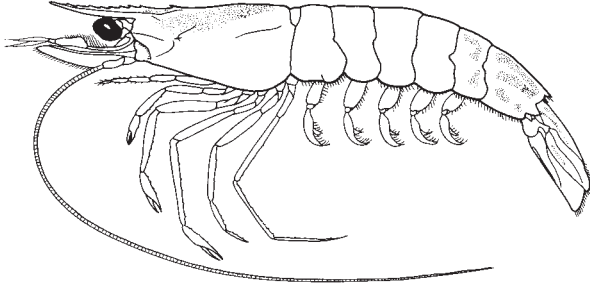
lateral plates
thelycum

petasma (ventral view)

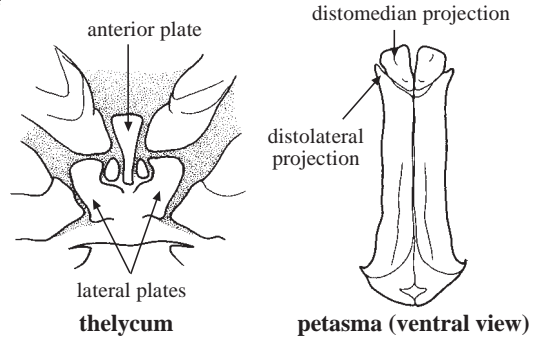
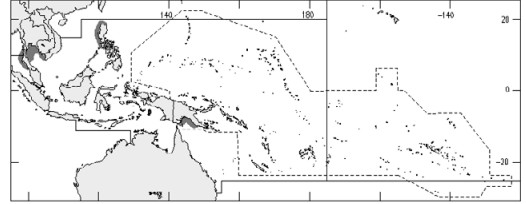
***Metapenaeus papuensis* Racek and Dall, 1965**

En - Papua shrimp; **Fr** - Crevette papou; **Sp** - Camarón papuense.

Maximum body length 11.8 cm (females) and 8.6 cm (males). Found in estuaries and inshore waters to depths of about 60 m. Probably not very common and without commercial importance. Very similar to *Metapenaeus elegans*. Indo-West Pacific, reported from the Philippines, Thailand, New Guinea, and probably also found in the Bay of Bangal.



(after Miguel, 1982)

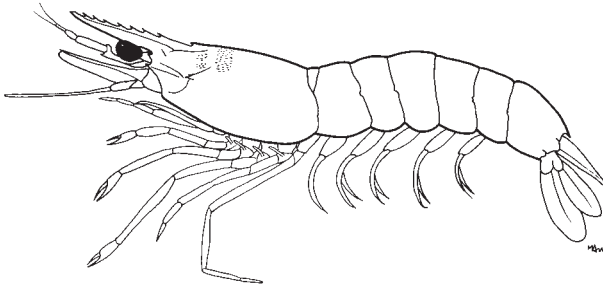


(after Miguel, 1982)

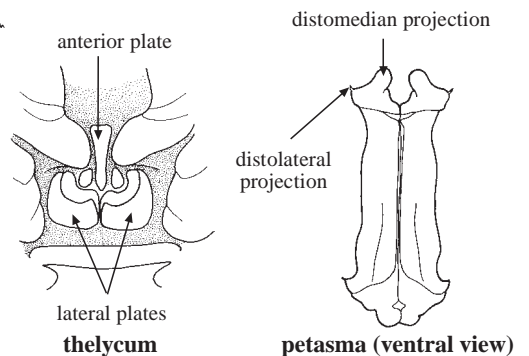
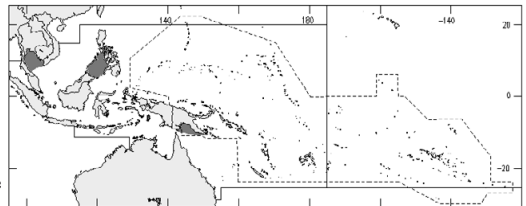
***Metapenaeus suluensis* Racek and Dall, 1965**

En - Sulu shrimp.

Maximum body length 12 cm (females) and 9.9 cm (males). Found from the coastline to depths of about 40 m. Probably not very common and without commercial importance. Very similar to *Metapenaeus ensis*. Indo-West Pacific, reported from the Philippines, Gulf of Thailand, and New Guinea.



(after Racek and Dall, 1965)

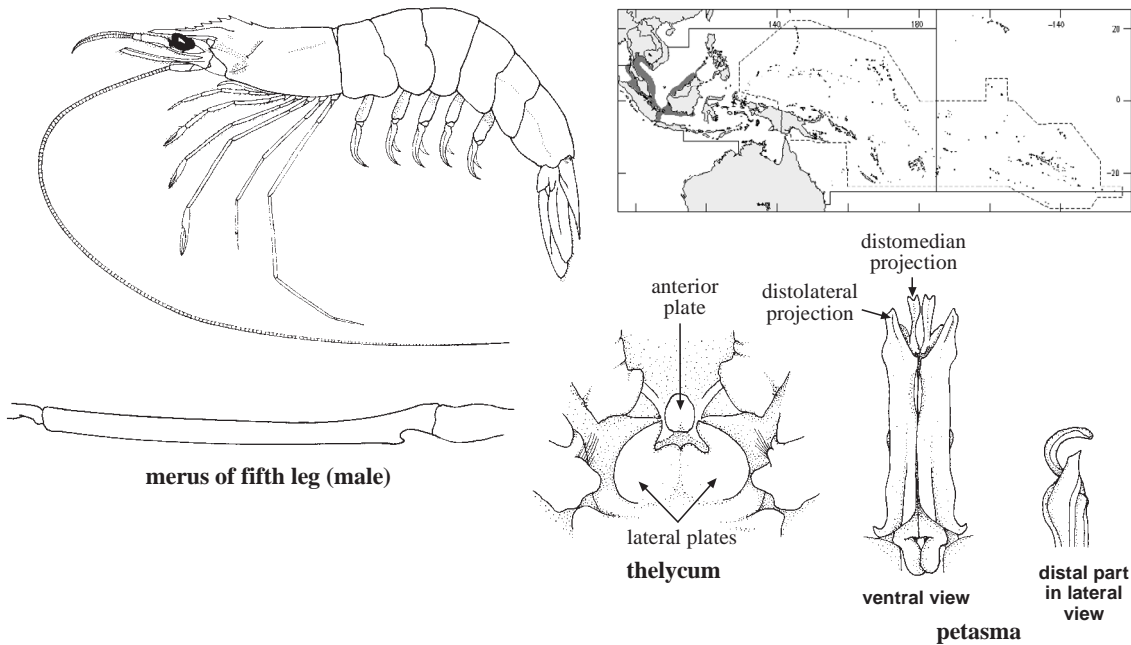


(after Miguel, 1982)

***Metapenaeus tenuipes* Kubo, 1949**

En - Stork shrimp; **Fr** - Crevette cigogne; **Sp** - Camarón cigüeña.

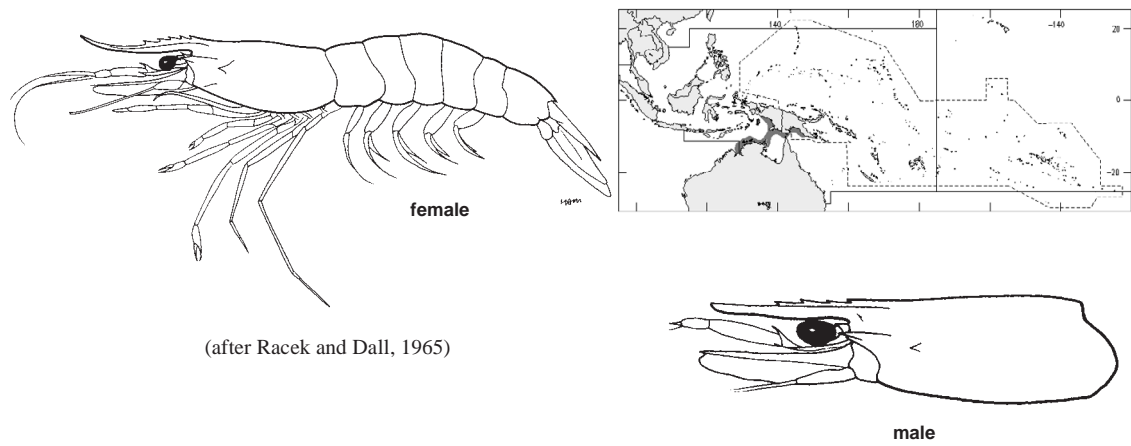
Maximum body length 9.5 cm (females) and 7.5 cm (males). Occurs from the coastline and brackish waters to a depth of 30 m. Caught by trawls, set nets, traps, seines, and artisanal gear. Commonly found in the western part of the area, but nowhere very abundant and mainly forms a bycatch in prawn fisheries. Marketed fresh or frozen, mainly consumed locally. Western Pacific from Thailand to Malaysia, Singapore, and Indonesia.



***Parapenaeopsis arafurica* Racek and Dall, 1965**

En - Arafura shrimp; **Fr** - Crevette arafura; **Sp** - Camarón arafura.

Maximum body length 14 cm (females) and 8 cm (males). Found over soft mud bottoms at depths from 5 to 30 m. Caught mainly as bycatch in trawls. Apparently not very common and of no commercial importance. Restricted to the area between New Guinea and northern Australia.

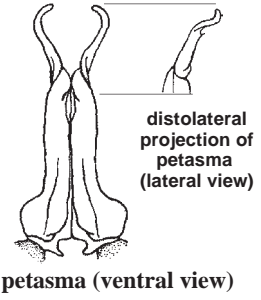
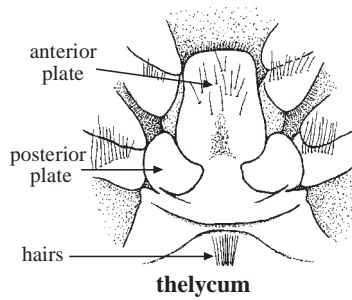
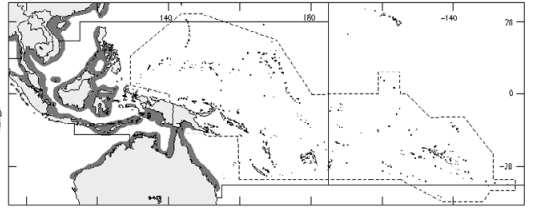
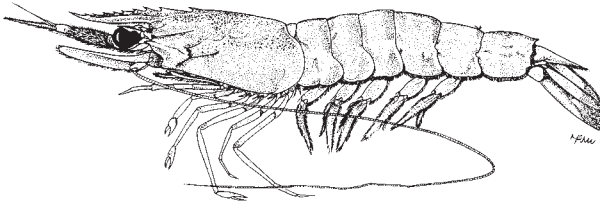


(after Racek and Dall, 1965)

***Parapenaeopsis cornuta* (Kishinouye, 1900)**

En - Coral shrimp; **Fr** - Crevette corail; **Sp** - Camarón coral.

Maximum body length 10 cm (females) and 8.5 cm (males), commonly between 5 and 8 cm. Generally inhabits river mouths and estuaries, but sometimes found at sea to depths of about 40 m, on bottom of sandy-mud or mud. Caught by trawls, seines, stake nets, and artisanal gear. Reported to be found occasionally in large quantities in Thailand and the Philippines. However, as this species can be easily confused with *Parapenaeopsis maxillipedo*, its abundance in the area remains uncertain. Indo-West Pacific from the western coast of India to Japan and northern Australia.

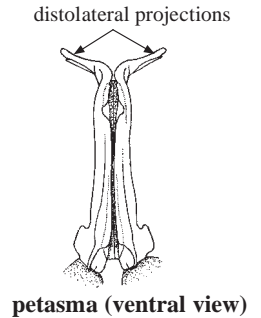
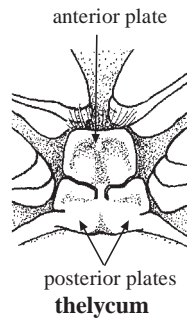
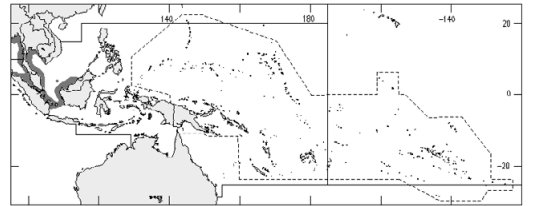
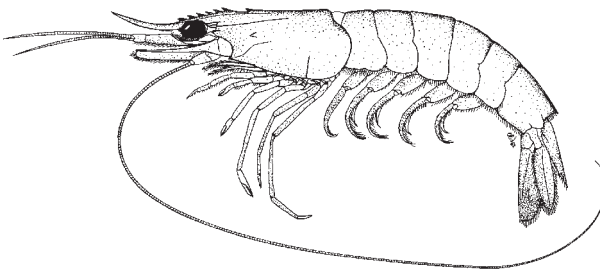


(after Motoh and Buri, 1984)

***Parapenaeopsis coromandelica* Alcock, 1906**

En - Coromandel shrimp; **Fr** - Crevette coromandel; **Sp** - Camarón coromandel.

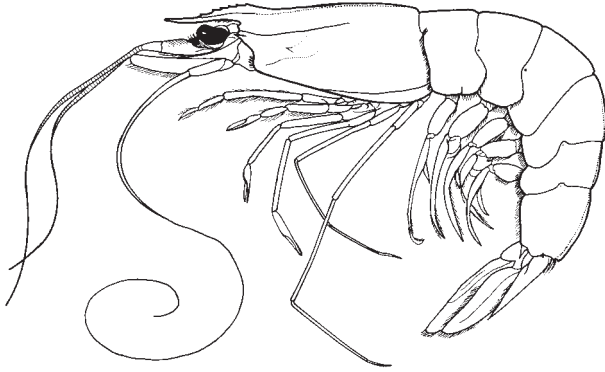
Maximum body length about 12 cm (males and females). Found in shallow waters to a depth of about 11 m, mainly on mud. Caught mainly by seine nets and shrimp gill nets, also by artisanal gear. Probably not very common in the Western Central Pacific, although reported to be moderately abundant at the northwestern coast of Malaysia and along the western coast of Thailand. Indo-West Pacific from southern India to the Gulf of Thailand, Indonesian Archipelago, and Borneo.



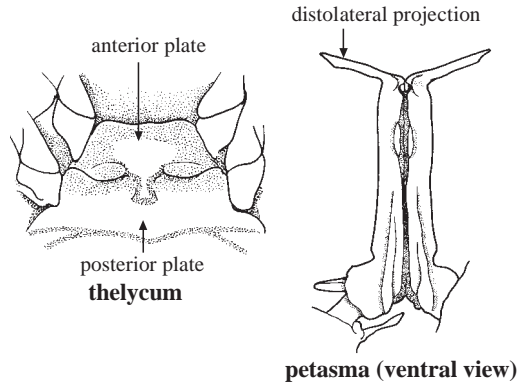
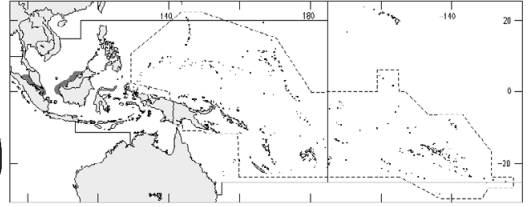
***Parapenaeopsis gracillima* Nobili, 1903**

En - Thin shrimp.

Maximum body length about 7 cm for females, males smaller. Prefers sandy bottoms, occasionally also on mud, at depths from 30 to 60 m. Caught by trawlers. Probably not common and of no commercial importance. Only known from the Strait of Malacca and northern Borneo of Malaysia.



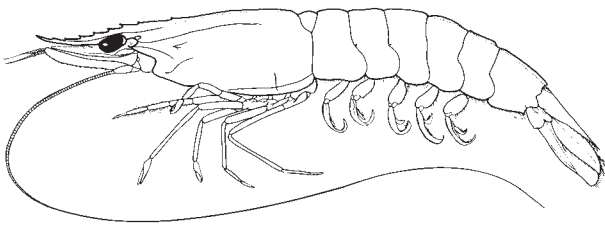
(after Hall, 1962)



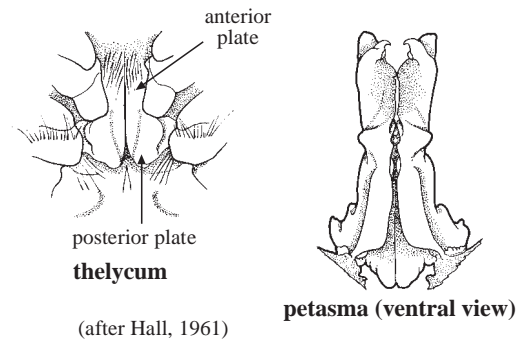
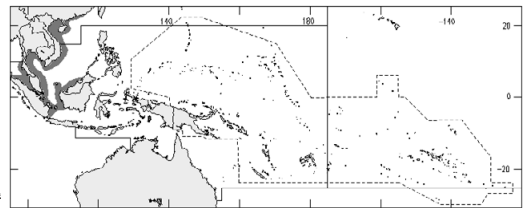
***Parapenaeopsis hungerfordi* Alcock, 1905**

En - Dog shrimp; **Fr** - Crevette chien; **Sp** - Camarón perro.

Maximum body length 10.4 cm (females) and 7.8 cm (males), commonly between 4 and 9.5 cm. Found on mud or sandy mud bottoms, from depths of 5 to 45 m, usually less than 25 m. Taken mainly by trawls. Reported to be one of the dominant species in shrimp catches off northwestern Malaysia, the western coast of Thailand, and off the southern coast of China. Its abundance in the area is uncertain. Marketed fresh or frozen for local consumption. Indo-West Pacific from the western coast of Thailand to Malaysia, Indonesia, and along the southern coasts of China, including Hong Kong.



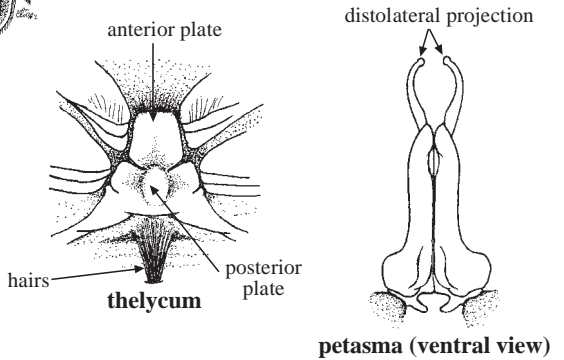
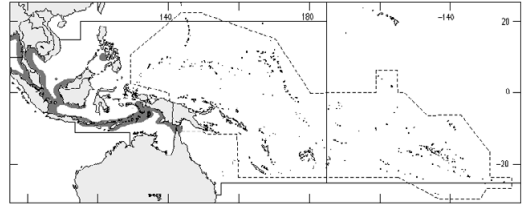
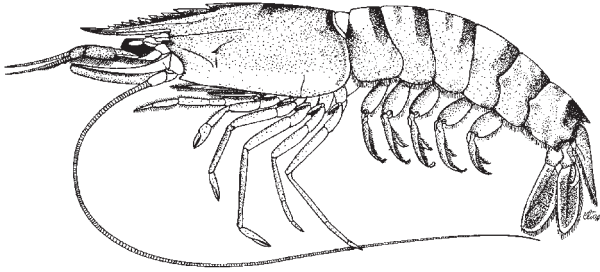
(after Hall, 1962)



Parapenaeopsis maxillipedo Alcock, 1906

En - Torpedo shrimp; **Fr** - Crevette torpille; **Sp** - Camarón torpedo.

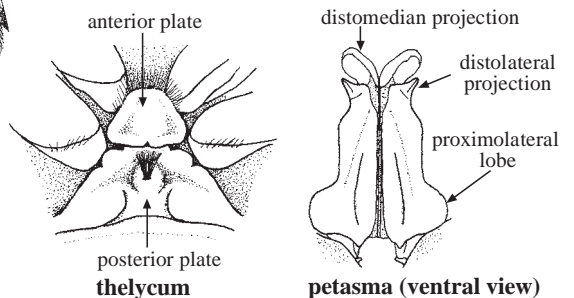
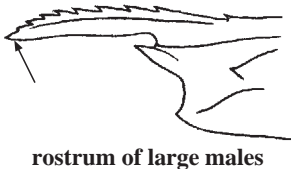
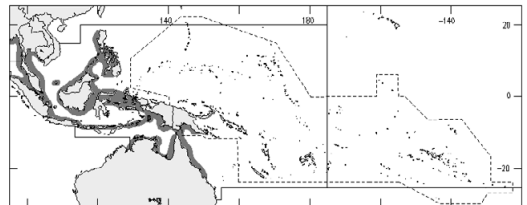
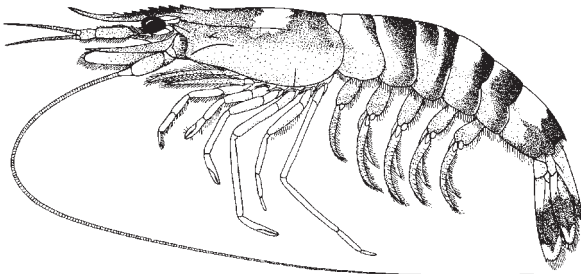
Maximum body length 12.5 cm (females; perhaps to 15 cm) and 10 cm (males). Found at sea in shallow depths of less than 30 m on mud-banks, sometimes also on sandy-mud bottom. Caught by trawls, bottom gill nets, push nets, and shore seines. Reported to be commonly found in commercial catches in Malayan waters. However, as this species is often confused with *Parapenaeopsis cornuta*, its abundance in the area remains uncertain. Indo-West Pacific from the western coast of India to the Philippines and northern Australia.



Parapenaeopsis sculptilis (Heller, 1862)

En - Rainbow shrimp; **Fr** - Crevette arc-en-ciel; **Sp** - Camarón arco iris.

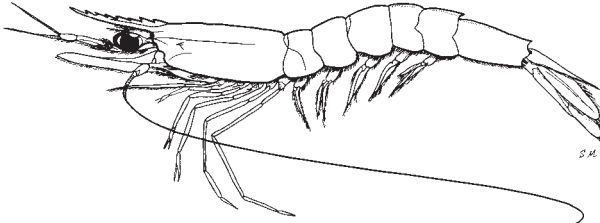
Maximum body length 17 cm (females) and 13 cm (males). Usually inhabits shallow waters from the coastline to depths of about 90 m, but mainly less than 40 m, on sand, mud, or mixed bottoms. Caught mainly by stake nets, seines, and trawls. Reported to be of some commercial importance in Malaysia and Singapore, but its abundance in these areas is uncertain. Relatively common in inshore commercial catches in northern Australia, but only of minor importance and mostly used as bait. Marketed mainly fresh or frozen for local consumption. Indo-West Pacific from Pakistan to the Philippines and northern Australia.



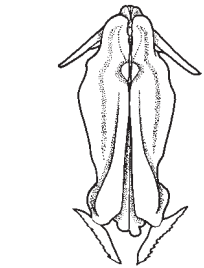
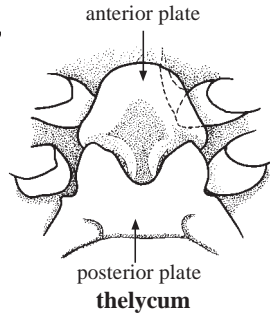
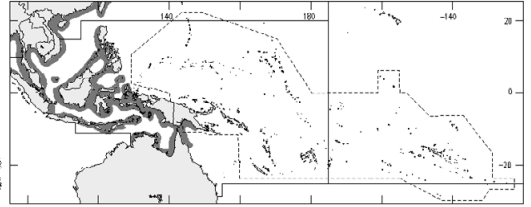
***Parapenaeopsis tenella* (Bate, 1888)**

En - Smoothshell shrimp; **Fr** - Crevette glabre; **Sp** - Camarón liso.

Maximum body length 7 cm (females) and 5 cm (males), commonly between 4 and 6 cm. Found from depths of 5.5 to 50 m, but mostly around 10 m, on muddy or sandy mud bottoms. Taken mainly by trawls. Apparently common in the western part of the area, but of very limited commercial importance due to its small size. Marketed fresh for local consumption. Indo-West Pacific from Pakistan to Japan and northern Australia.



(after Motoh and Buri, 1984)

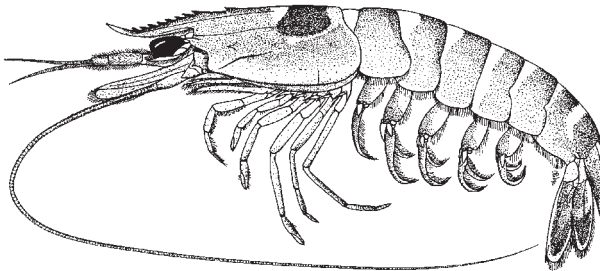


petasma (ventral view)

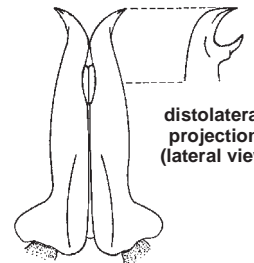
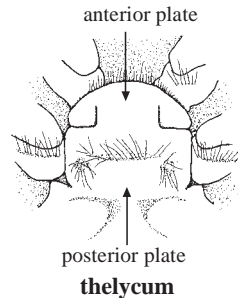
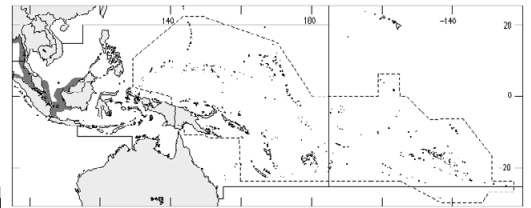
***Parapenaeopsis uncta* Alcock, 1905**

En - Uncta shrimp; **Fr** - Crevette uncta; **Sp** - Camarón uncta.

Maximum body length 13 cm (females) and 8.3 cm (males). Found from depths of 40 to 90 m on clean sand, sometimes mixed with shell fragments. Taken by trawls. One of the relatively larger representatives of the genus, but nowhere abundant and only sporadically found in shrimp catches. Marketed mainly fresh or frozen for local consumption. Indo-West Pacific from Kuwait to India, Malaysia, and Indonesia.



rostrum of large males



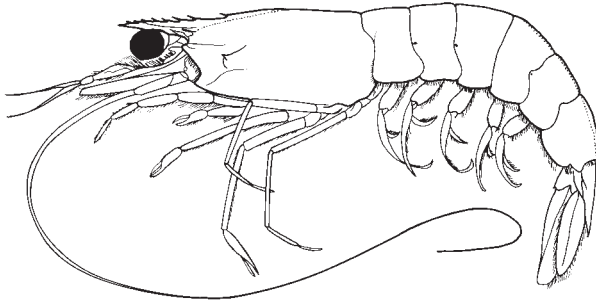
distolateral projection (lateral view)

petasma (ventral view)

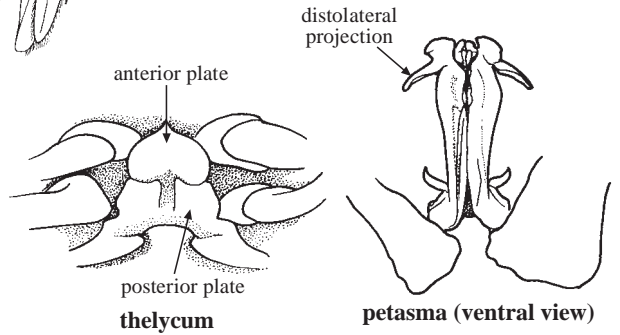
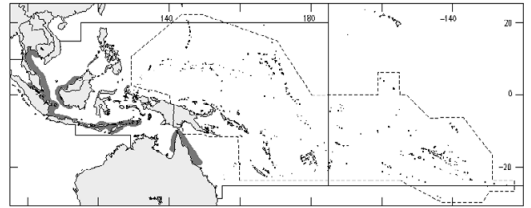
***Parapenaeopsis venusta* De Man, 1907**

En - Adonis shrimp; **Fr** - Crevette adonis; **Sp** - Camarón adonis.

Maximum body length 4.5 cm. Found from depths of 11 to 44 m on bottoms of sand, shells, stones, and mud. Taken mainly by trawls. Probably not common and of no commercial importance, due to its small size. Western Pacific from the Gulf of Thailand to Malaysia, Indonesia, and Queensland (Australia).



(after Hall, 1962)

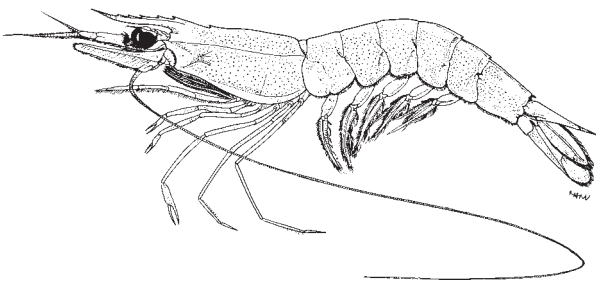


(after Hall, 1961)

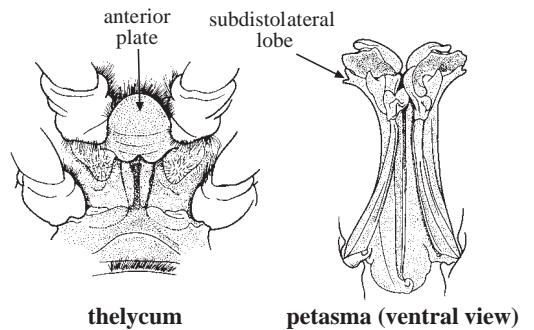
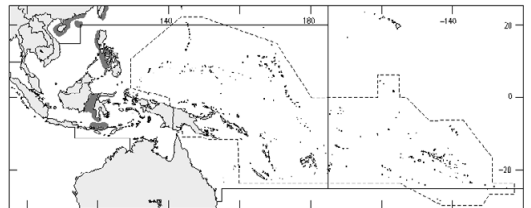
***Parapenaeus fissuroides* Crosnier, 1986**

En - False rose shrimp.

Maximum body length 14 cm (females) and 11.7 cm (males), commonly between 7 and 11 cm. Found from depths of 65 to 908 m, mainly between 110 and 400 m, on bottoms of sand, mud, sandy mud, and soft mud. Taken by trawls. Of limited commercial importance and only sporadically taken as bycatch in deeper waters. It may have some economic potential with the development of a deep-sea fishery. Marketed mainly fresh for local consumption. Widely distributed from the eastern coast of Africa to Japan and Indonesia (populations in the Indian Ocean are sometimes considered to be 2 subspecies). Often confused with *Parapenaeus fissurus* and in the past mostly reported under this name.



(after Motoh and Buri, 1984)



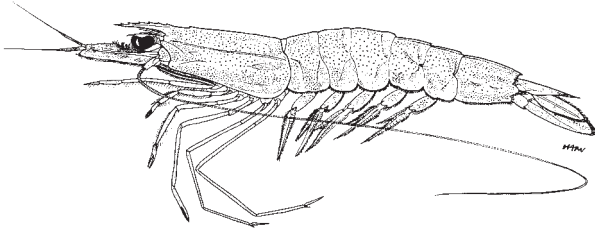
thelycum

petasma (ventral view)

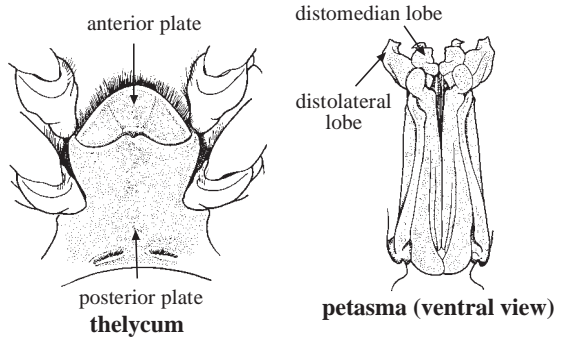
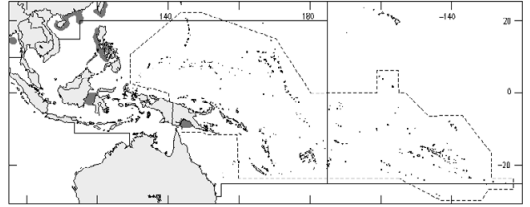
***Parapenaeus longipes* Alcock, 1905**

En - Flamingo shrimp; **Fr** - Crevette flamand; **Sp** - Camarón flamenco.

Maximum body length 11.5 cm (females) and 8.5 cm (males), commonly between 5 and 8 cm. Found usually between depths of 30 and 90 m, sometimes to a depth of 165 m. Taken mainly as bycatch in trawls. This species has the shallowest vertical distribution in the genus, but is nowhere abundant and of very limited commercial importance. Marketed mainly fresh for local consumption. Indo-West Pacific from eastern coast of Africa to Japan and New Guinea.



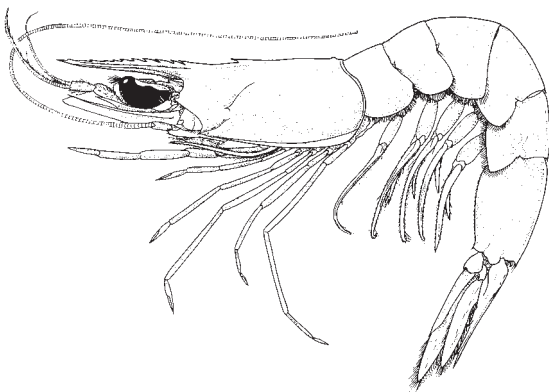
(after Motoh and Buri, 1984)



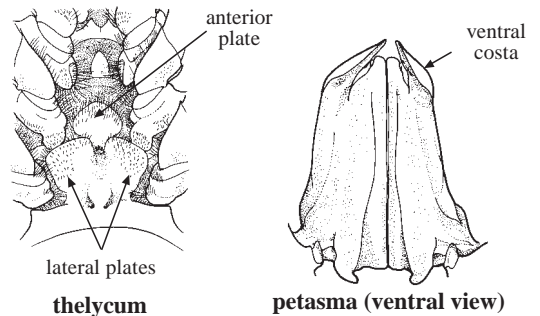
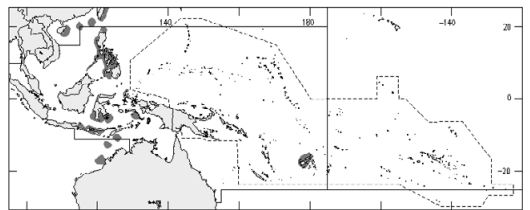
***Penaeopsis eduardoi* Pérez Farfante, 1977**

En - Four-spined needle shrimp.

Maximum body length 13 cm (females) and 12 cm (males), commonly between 8 and 11 cm. Found on sandy mud bottoms from depths of 289 to 570 m, usually deeper than 300 m. So far taken mainly during exploratory trawling operations, but sometimes found in large quantities and may therefore have some economic potential with the development of a deep-sea fishery. Western Pacific from Japan to the Timor Sea and Fiji. Can easily be confused with *Penaeopsis rectacuta*.



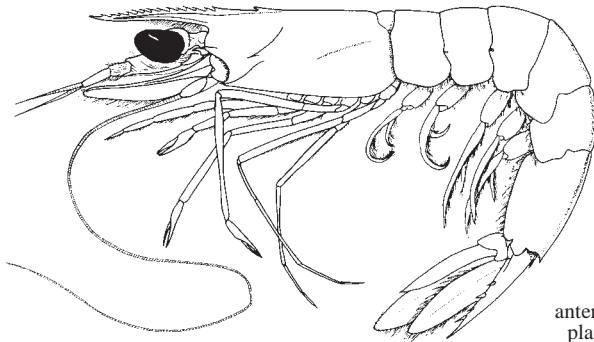
(after Pérez Farfante, 1977)



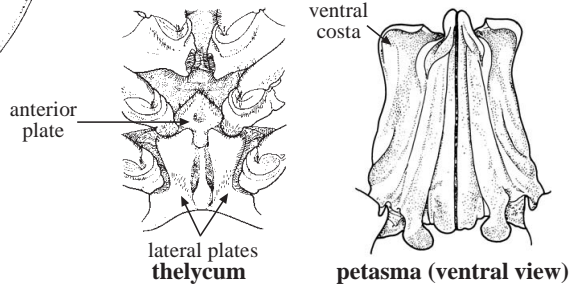
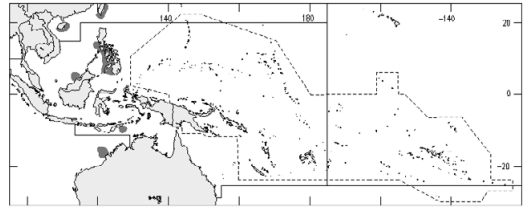
***Penaeopsis rectacuta* (Bate, 1881)**

En - Needle shrimp; **Fr** - Crevette aiguille; **Sp** - Camarón aguji.

Maximum body length 13.5 cm (females) and 11 cm (males), commonly between 8 and 11 cm. Found on sandy mud bottom from depths of 174 to 410 m, usually deeper than 300 m. Mainly taken by experimental trawlers, but sometimes found in fair quantities and may therefore have some commercial potential once that a deep-sea fishery is developed in the area. Western Pacific from Taiwan Province of China to the Philippines, South China Sea, and Timor Sea. Often confused with *Penaeopsis eduardoi*.



(after Hall, 1962)

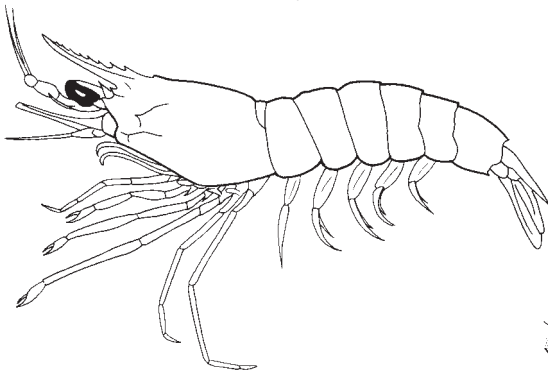


(after Pérez Farfante, 1979)

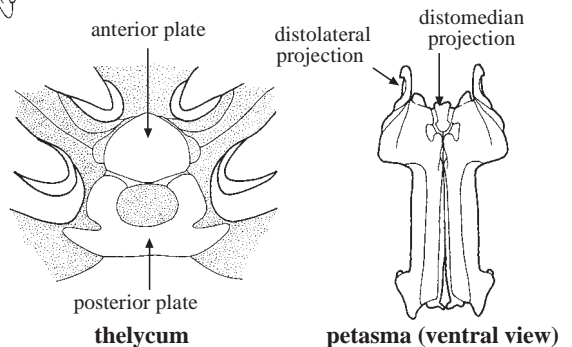
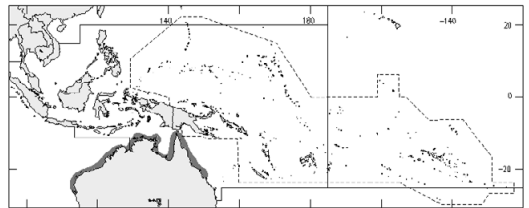
***Trachypenaeus anchoralis* (Bate, 1881)**

En - Hardback shrimp; **Fr** - Crevette os; **Sp** - Camarón huesudo.

Maximum body length 10.4 cm (females) and 7 cm (males). Found on bottoms of mud to coral debris, from depths of 12.5 to 60 m. Taken mainly by trawls. Caught incidentally in the northern prawn fishery of Australia, but without much economic importance, due to its relatively small size. Generally believed to be restricted to northern Australia from Shark Bay (western Australia) and Keppel Bay (Queensland), but probably also occurs in southern Taiwan Province of China.



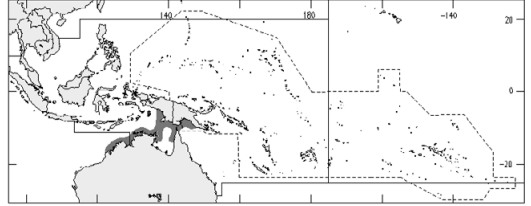
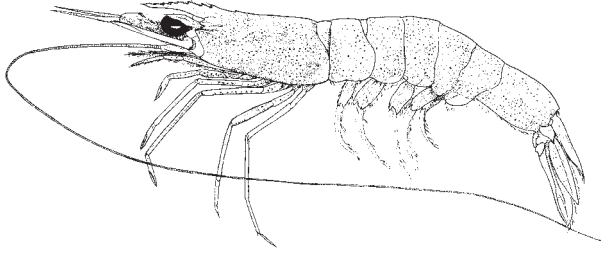
(after Dall, 1957)



***Trachypenaeus gonospinifer* Racek and Dall, 1965**

En - Northern rough shrimp; **Fr** - Crevette gambri nordique; **Sp** - Camarón fijador norteño.

Maximum body length 8 cm (females) and 5 cm (males). Found over muddy bottom from depths of 13 to 52 m. Taken as incidental catch by trawlers. Not particularly abundant and without commercial importance, due to its small size. Restricted to the waters between New Guinea and northern Australia.

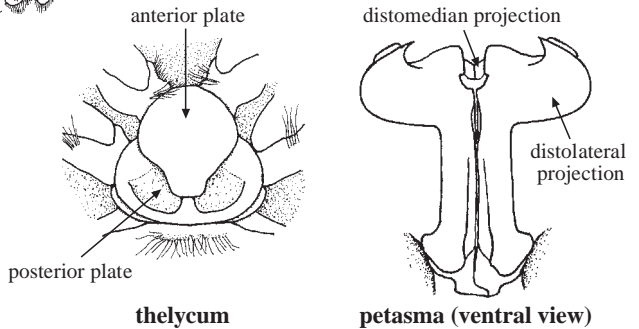
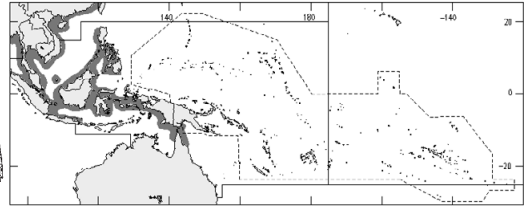
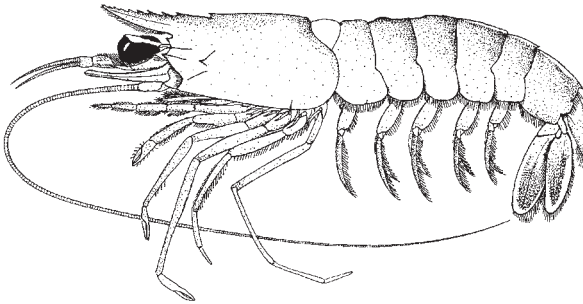


(after Grey, Dall, and Baker, 1983)

***Trachypenaeus granulosis* (Haswell, 1879)**

En - Coarse shrimp; **Fr** - Crevette gambri grenue; **Sp** - Camarón fijador de granos.

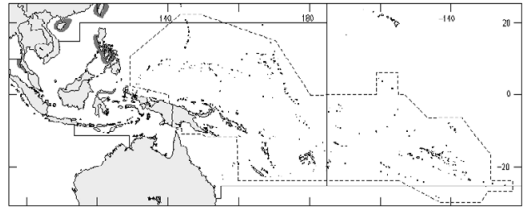
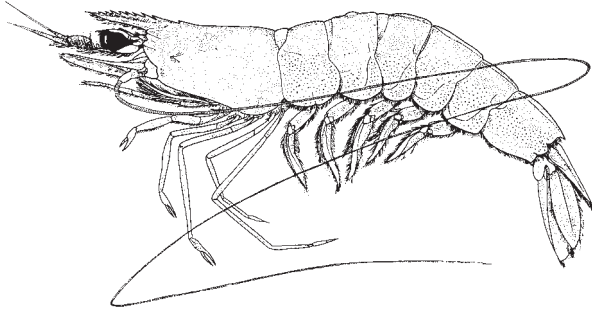
Maximum body length 9.5 cm (females) and 7.2 cm (males), commonly between 6 to 8 cm. Found over bottoms of mud, hard sand or rocks, from depths of 5 to 81 m. Taken as incidental catch, mainly at night by trawlers, also with artisanal gear. Of minor economic importance because of its small size and hard shell. Marketed mainly fresh for local consumption. Indo-West Pacific from Persian Gulf to Taiwan Province of China and northern Australia.



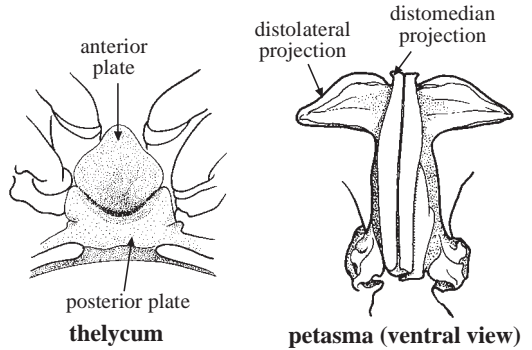
***Trachypenaeus longipes* (Paulson, 1875)**

En - Longlegged rough shrimp.

Maximum body length 10.5 cm (females) and 8 cm (males). Found from nearshore waters to depths of about 220 m, usually between 40 and 60 m. Taken mainly by trawls. This species is often confused with *Trachypenaeus curvirostris* (sometimes under the name *T. asper*), and therefore its actual distribution and occurrence in the area is unclear. Probably not very common and of limited or no commercial importance. Indo-West Pacific from the Red Sea to Japan and the Philippines.



(after Motoh and Buri, 1984)

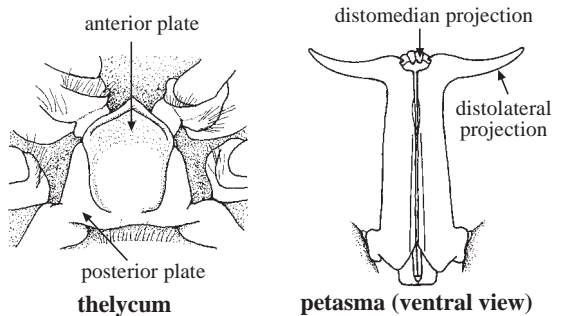
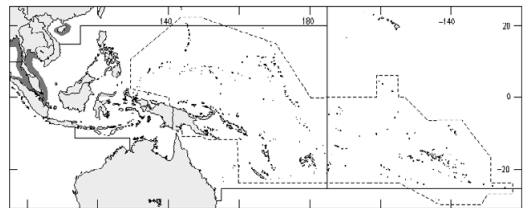
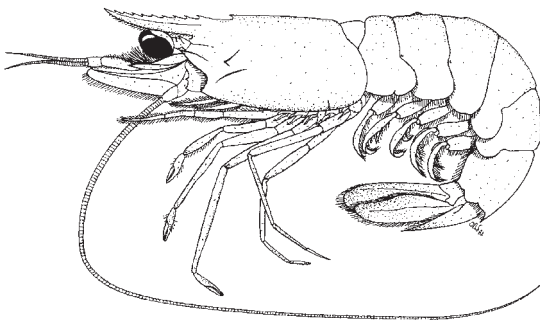


(after Hayashi, 1992)

***Trachypenaeus sedili* Hall, 1961**

En - Singapore rough shrimp. (the FAO names previously used for this species are now used for *Trachypenaeus malaiana*)

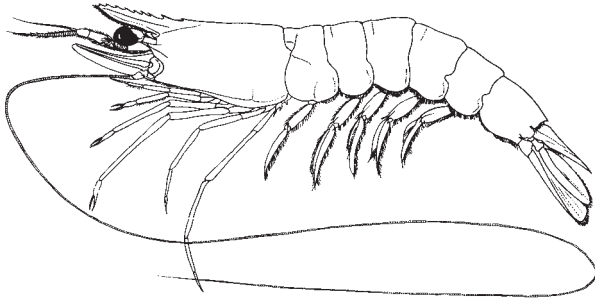
Maximum body length 8.8 cm (females) and 5.1 cm (males), commonly between 6 and 8 cm. Found on mud or sand bottom, from nearshore waters to depths of about 45 m. Taken by trawls and artisanal gear. Probably not a common species in the area and without commercial importance. Indo-West Pacific from India (perhaps Somalia) to the Malay Peninsula and South China Sea.



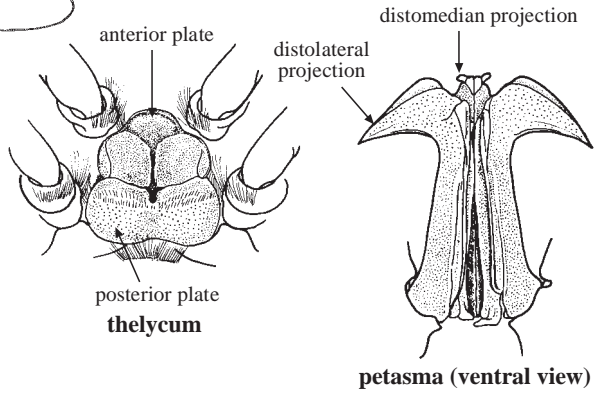
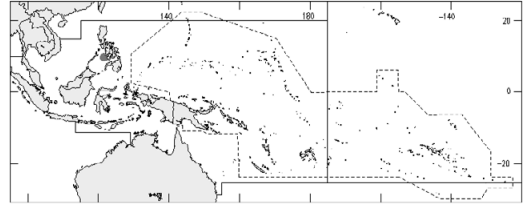
***Trachypenaeus villaluzi* Muthu and Motoh, 1979**

En - Philippines rough shrimp.

Maximum body length 7.3 cm (females) and 5.3 cm (males). Caught by otter trawls at a depth of about 7 m, on mud bottom. Probably not common and without commercial importance. So far only known from the Philippines.



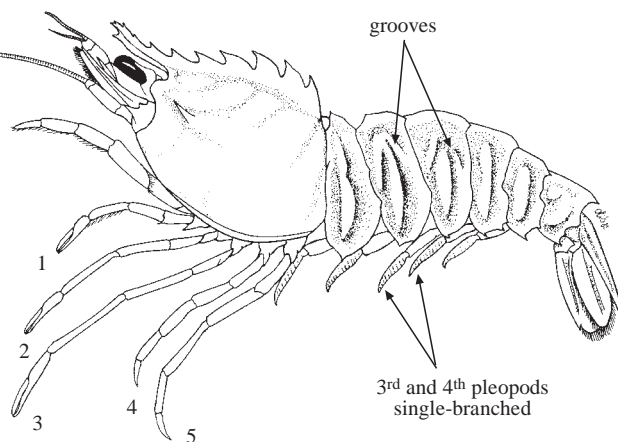
(after Motoh and Buri, 1984)



SICYONIIDAE

Rock shrimps

Diagnostic characters: Body generally robust, with shell very hard, of "stony" appearance; abdomen often with deep grooves and numerous tubercles. Rostrum well developed and extending beyond eyes, always bearing more than 3 upper teeth (including those on carapace); base of eyestalk with styliform projection on inner surface, but without tubercle on inner border. Both upper and lower antennular flagella of similar length, attached to tip of antennular peduncle. Carapace lacks both postorbital and postantennal spines, cervical groove indistinct or absent. Exopod present only on first maxilliped. All 5 pairs of legs well developed, fourth leg bearing a single well-developed arthrobranch (hidden beneath carapace). In males, endopod of second pair of pleopods (abdominal appendages) with appendix masculina only. Third and fourth pleopods single-branched. Telson generally armed with a pair of fixed lateral spines. **Colour:** body colour varies from dark brown to reddish; often with distinct spots or colour markings on carapace and/or abdomen - such colour markings are specific and very useful in distinguishing the species.

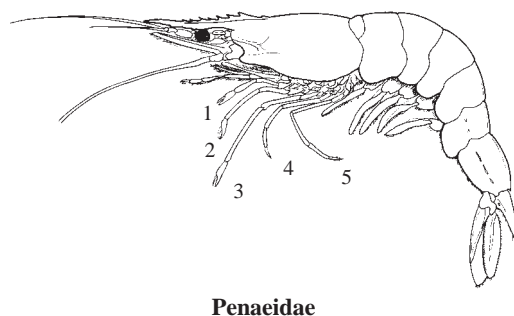
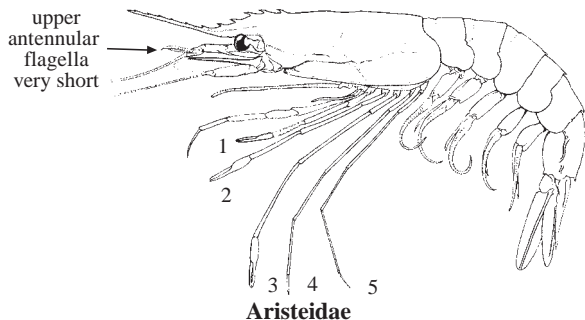


Habitat, biology, and fisheries: All members of this family are marine and can be found from shallow to deep waters (to depths of more than 400 m). They are all benthic and occur on both soft and hard bottoms. Their sizes are generally small, about 2 to 8 cm, but some species can reach a body length over 15 cm. The sexes are easily distinguished by the presence of a large copulatory organ (petasma) on the first pair of pleopods of males, while the females have the posterior thoracic sternites modified into a large sperm receptacle process (thelycum) which holds the spermatophores or sperm sacs (usually whitish or yellowish in colour) after mating. The shape of the petasma and thelycum is often specific and very useful for species identification. The eggs are small and numerous, and are released directly into the water and not retained on the female abdomen. The larvae are planktonic and have the nauplius stage. This family contains a single genus only and at present about 14 species are recorded from the Western Central Pacific. However, the taxonomic status and relationships of these species are generally unclear. Moreover, none of them are large enough or abundant enough to be of commercial importance in the area. Therefore, no identification key is provided here, and a species account is given for *Sicyonia lancifera* only, the most common representative of this family in the Western Central Pacific.

Similar families occurring in the area

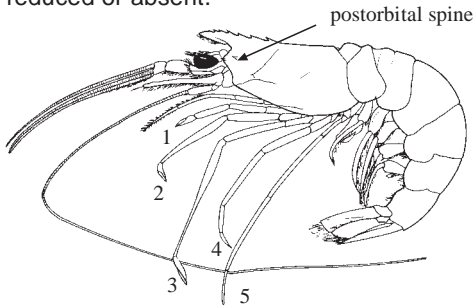
Aristeidae: body not "stony" in appearance, abdomen without deep grooves or tubercles; either rostrum very short, armed with 1 or 2 upper teeth only, or upper antennular flagellum very short, not attached to tip of antennular peduncle; third and fourth pleopods divided into 2 branches; telson without fixed lateral spine.

Penaecidae: body not "stony" in appearance, abdomen without deep grooves or tubercles; exopod present posterior to first maxilliped; third and fourth pleopods divided into 2 branches.

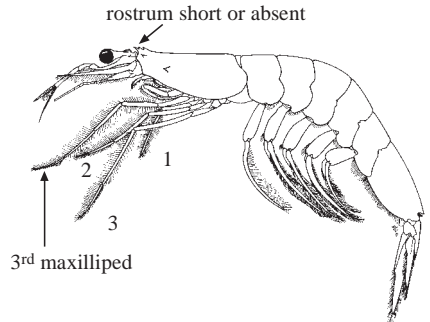


Solenoceridae: body not “stony” in appearance, abdomen without deep grooves or tubercles; carapace either with postorbital or postantennal spine; cervical groove distinct, extending to about dorsal carapace; third and fourth pleopods divided into 2 branches.

Sergestidae: size small; rostrum very short; body strongly compressed laterally; shell soft; last 2 pairs of legs reduced or absent.



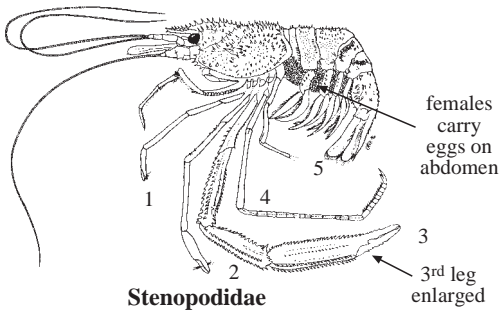
Solenoceridae



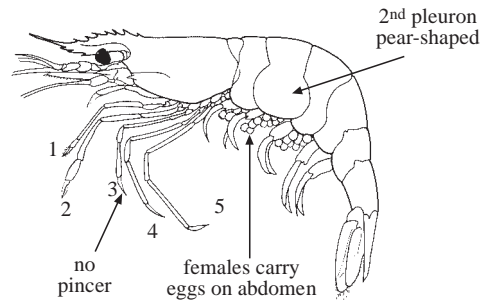
Sergestidae

Stenopodidae: third pincer extraordinary large and massive; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.

Shrimps of the infraorder Caridea: third leg without pincer; second abdominal pleuron (lateral plate) greatly expanded, overlapping posterior part of first pleuron and anterior part of third pleuron; males and females without large copulatory organ on first pair of pleopods or posterior thoracic sternites, respectively; females carry the eggs on the abdomen until hatching.



Stenopodidae



Caridea

List of species occurring in the area

The symbol  is given when species accounts are included.

- Sicyonia benthophila* De Man, 1907
- Sicyonia bispinosa* (De Haan, 1844)
- Sicyonia curvirostris* Balss, 1914
- Sicyonia fallax* De Man, 1907
- Sicyonia furcata* Miers, 1878
- Sicyonia inflexa* (Kubo, 1949)
- Sicyonia laevis* Bate, 1881
-  *Sicyonia lancifera* (Olivier, 1811)
- Sicyonia nebulosa* Kubo, 1949
- Sicyonia ocellata* Stimpson, 1860
- Sicyonia ommanneyi* Hall, 1961
- Sicyonia parvula* (De Haan, 1850)
- Sicyonia rectirostris* De Man, 1907
- Sicyonia trispinosa* De Man, 1907

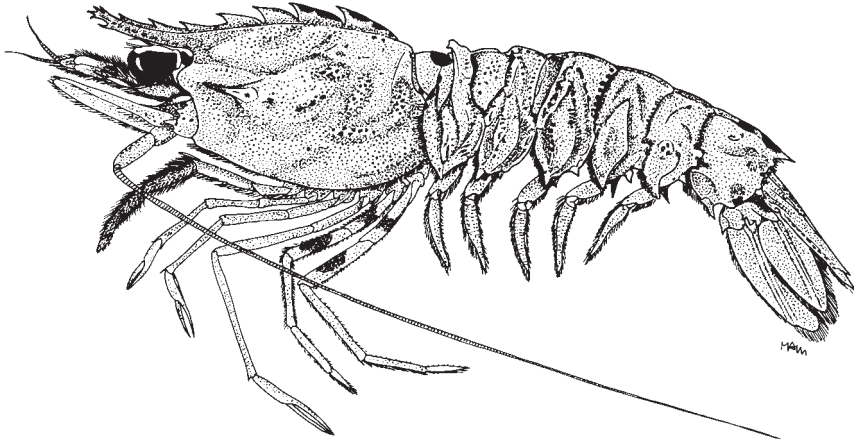
References

- Chan, T.Y. and H.P. Yu. 1985. On the rock shrimps of the family Sicyoniidae (Crustacea: Decapoda) from Taiwan, with description of one new species. *Asian Mar. Biol.*, 2:93-106.

Sicyonia lancifera (Olivier, 1811)

Frequent synonyms / misidentifications: *Sicyonia cristata* (De Haan, 1844) / None.

FAO names: **En** - Knight rock shrimp; **Fr** - Boucot chevalier; **Sp** - Camarón de piedra lanzón.



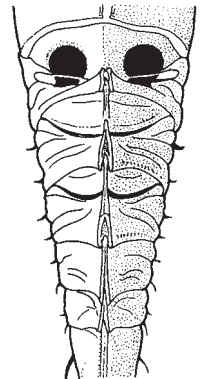
(after Motoh and Buri, 1984)

Diagnostic characters: Body robust, with shell very hard, of “stony” appearance. Rostrum nearly straight, with 3 to 6 upper teeth and 1 to 3 apical teeth, lower border usually bearing 1 tooth only. Carapace armed with 3 to 5 large, crest-like postrostral teeth as well as a very strong hepatic spine. Abdomen heavily sculptured and with each pleura ending in 2 or 3 sharp spines. Pleopods with a single branch only. **Colour:** body brownish, with a complicated pattern of white stripes and black dots; ventral surface somewhat reddish brown; dorsal surface of first abdominal segment whitish, with a pair of large black spots; eyes light brown; antennal flagella and thoracic appendages covered with white and brown bands; tail fan with a thick white band near base.

Size: Maximum body length 8 cm (females larger), commonly between 3 and 5 cm.

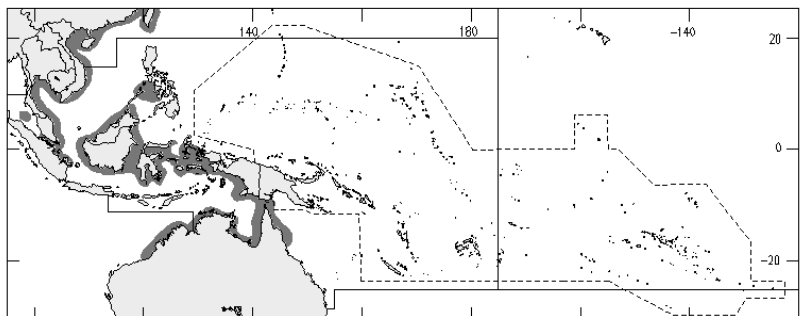
Habitat, biology, and fisheries: Found on sandy-mud bottoms, at depths from 25 to 350 m, usually less than 100 m. Probably burrows in sand during the daytime. When it comes out, often walks on the bottom with the abdomen strongly curved upward. Probably the most common species of the family in the area, but still few in numbers and only caught incidentally during prawn trawling operations. Without commercial value throughout its range because of its small size and low quantities.

Distribution: Widely distributed in the Indo-West Pacific from Mozambique to Japan and northern Australia.



abdomen
(dorsal view)

(after Motoh and Buri, 1984)



Infraorder STENOPODIDEA

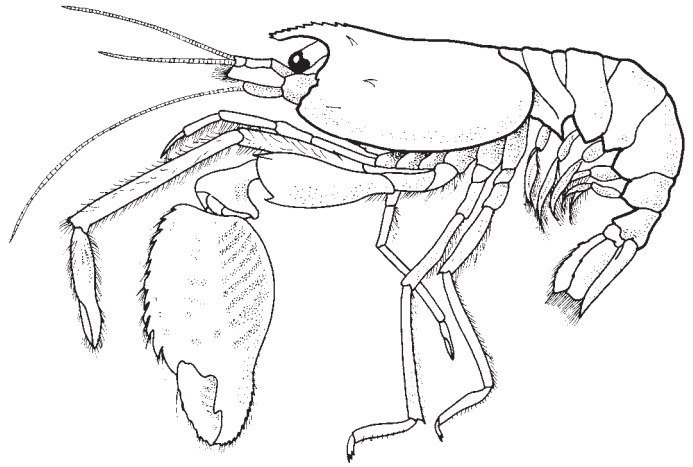
Family STENOPODIDAE

Stenopodid shrimps

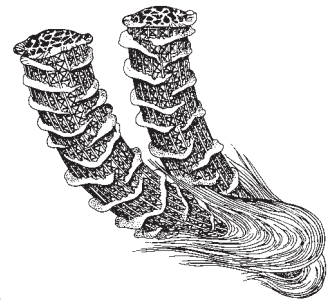
Diagnostic characters: Usually small-sized, with a body length from 1 to 6 cm. All 5 pairs of legs well developed, with first 3 pairs of legs forming a pincer, third pair huge and massive. Abdomen with posterior part of pleura covering anterior part of succeeding pleura. Males and females without large copulatory organ on first pair of pleopods (abdominal appendages) or posterior thoracic sternites, respectively. Females carry the eggs on the abdomen until hatching.

Habitat, biology, and fisheries: This infraorder contains a single family and about 60 species (divided into 2 families by some authors). Altogether, 7 genera and 19 species have been reported from the Western Central Pacific. All species are marine and benthic, and can be found from shallow coral reef areas to deep sea at depths of more than 800 m, with some species living in symbiosis with other invertebrates or fishes. Amongst these, the cleaner shrimps of the genus *Stenopus* and the venus shrimp *Spongicola venusta* are best known. *Stenopus* shrimps inhabit coral reefs and set up "cleaning stations" which are regularly visited by fishes which allow the shrimps to clean their wounds, skins, and mouths. *Spongicola venusta* lives in pairs inside the body of the deep-sea hexactinellid sponges (i.e. the Venus' flower basket). They enter the body of the sponges when they are in the postlarvae stage. As they grow, their size becomes too large and thus they cannot escape from the sponges where both the male and female spend the rest of their life.

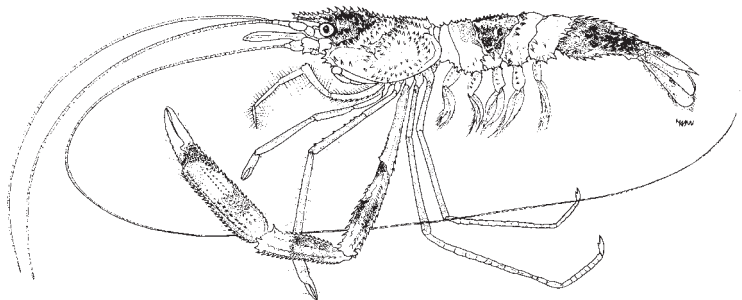
Members of this infraorder are generally without any economic importance. Therefore, no species accounts are included here and no key is provided. For keys to the genera of this infraorder users can refer to L.B. Holthuis (1993), "The recent genera of the Caridean and Stenopodidean shrimps (Crustacea, Decapoda): with an appendix on the order Amphionidacea, C.H.J.M. Fransen and C. van Achterberg eds, Nationaal Natuurhistorisch Museum, Leiden." Only the cleaner shrimps of the genus *Stenopus* may sporadically enter the aquarium trade and have some commercial value. In the Western Central Pacific, the most commonly found species is *Stenopus hispidus* (Olivier, 1811). A key to species of *Stenopus* is given in J.W. Goy (1992, *J. Nat. Hist.*, 26:79-102), and good colour photos of this genus are included in H. Debelius and H.A. Baensch (1994, *Marine Atlas: The joint aquarium care of invertebrates and tropical marine fishes*, published by Mergus).



Spongicola venusta
(after Holthuis, 1993)



Hexactinellid sponges
(Venus' flower basket)
(after Tan et al., 1995)



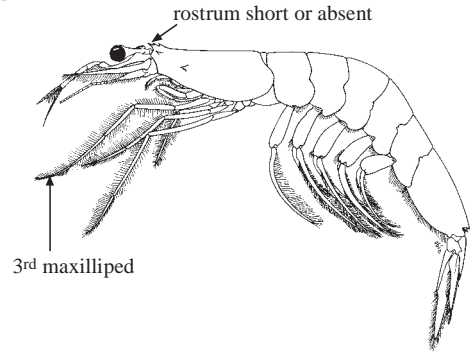
Stenopus hispidus

Other major groups of shrimps and prawns occurring in the area

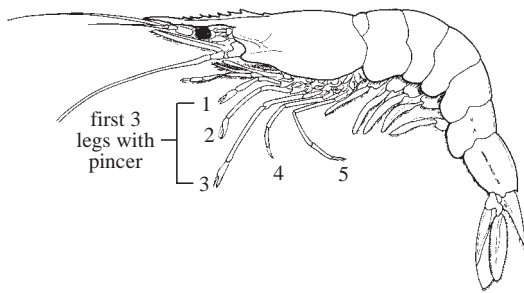
Sergestoidea: body strongly compressed laterally; shell soft; rostrum and last 2 pairs of legs reduced or absent; males with large copulatory organ on first abdominal appendage; eggs usually released directly into water, not retained by the female.

Penaeoidea: first 3 pairs of legs forming a pincer, none of them particularly large; with large copulatory organ, on first pair of pleopods in males, and on posterior thoracic sternites in females; eggs released directly into water, not retained by the female.

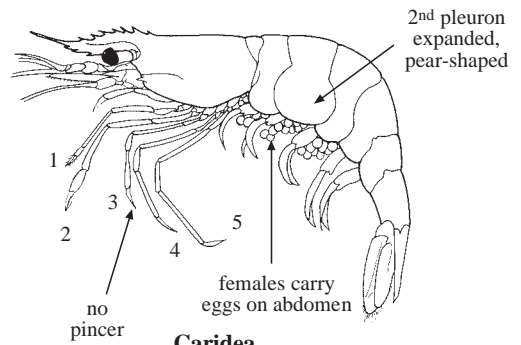
Caridea: third leg without pincer; pleuron of second abdominal segment greatly expanded and overlapping those of first and third segments.



Sergestoidea



Penaeoidea (after Liu, 1955)



Caridea

List of species occurring in the area

Engystenopus palmipes Alcock and Anderson, 1894

Engystenopus spinulatus Holthuis, 1946

Microprosthemata scabricaudatum Richters, 1880

Microprosthemata validum Stimpson, 1860

Odontozona ensifera (Danna, 1852)

Odontozona sculpticaudata Holthuis, 1946

Paraspongicola pusilla De Saint Laurent and Cleva, 1981

Spongicola henshawi Rathbun, 1906

Spongicola holthuisi De Saint Laurent and Cleva, 1981

Spongicola inflata De Saint Laurent and Cleva, 1981

Spongicola venusta De Haan, 1841

? *Spongicoloides japonica* (Kubo, 1942)

Stenopus chrysexanthus Goy, 1992

Stenopus cyanoscelis Goy, 1984

Stenopus devaneyi Goy and Randall, 1984

Stenopus hispidus (Olivier, 1811)

Stenopus pyronotus Goy and Davaney, 1980

Stenopus tenuirostris De Man, 1888

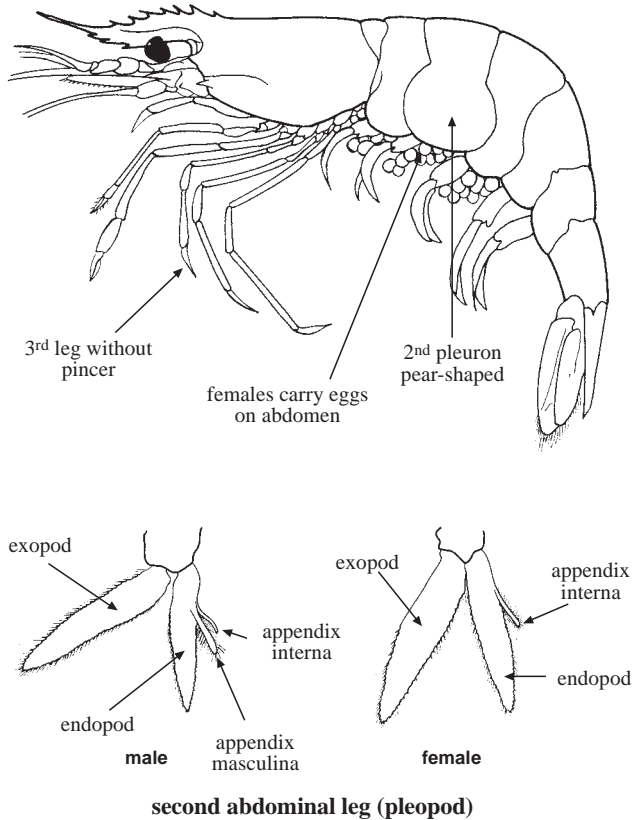
Stenopus zanzibaricus Bruce, 1976

Infraorder CARIDEA

Caridean shrimps

Diagnostic characters: Very small to large-sized, with a body length from 0.5 to 32 cm. All 5 pairs of legs well developed, the first 2 pairs with or without a pincer, **but third leg never bearing a pincer. Second abdominal pleuron (lateral plate) greatly expanded, pear-shaped and overlapping posterior part of first pleuron as well as anterior part of third pleuron. Males and females without large copulatory organ on first pair of pleopods (abdominal appendages) or posterior thoracic sternites, respectively. Females carry the eggs on the abdomen until hatching.**

Habitat, biology, and fisheries: This large infraorder contains at least 2 517 species in 28 families (the number of families in this infraorder is controversial among crustacean taxonomists). They can occur in all kinds of aquatic habitats such as high mountain streams (at altitudes of more than 2 500 m), lakes, caves, underground waters, rivers, estuaries, littoral zones, beaches, bays, coral reefs, continental shelves, and the deep sea (at depths of at least 6 364 m, perhaps even 10 912 m for a red "shrimp" sighted by a bathyscaphe at Challenger Deep, near Guam). A few species inhabit the upper littoral zone and are able to endure short periods of desiccation. Both benthic and/or pelagic (including epi- and bathypelagic) ways of life are found in members of this infraorder, and a large number of marine species live in symbiosis with other invertebrates or fishes. The sexes are generally separated, but certain species, such as some *Pandalus*, commonly first undergo a male phase and later transform into females. The gonopores are situated at the bases of fifth or third leg in males and females, respectively. However, as many caridean shrimps are of very small size, with the thoracic sternum being narrow, sexing caridean shrimps by observing the position of gonopores is often difficult. A more simple way to distinguish the sexes of caridean shrimps is to determine the presence or absence of the so-called appendix masculina on the second pair of pleopods (or abdominal appendages; see figure above). In females, the endopod of the second pair of pleopods bears an appendix interna as well, but additionally bears an appendix masculina, which, when observed under magnification, is distinct, even in juveniles. Besides, a remarkable sexual dimorphism (e.g. the size of the second pincer, the curvature of the rostrum, the shape of the abdominal pleura, etc.) is present in many species, but such a dimorphism is often specific and not necessarily the same in different species. The females of caridean shrimps carry the eggs on the abdomen. Their larvae leave the eggs in relatively advanced stages (i.e. lacking the nauplius stage) and some even directly as juveniles.



At present, 22 families of caridean shrimps are known to occur in the Western Central Pacific, but the exact number of species in the area is unclear. This is mainly due to fact that most of them are without any economic importance and therefore, have rarely been studied. However, recent extensive studies on carideans from the Philippines and adjacent areas have shown that 528 species are found in that region alone. Despite the large number of species, most caridean shrimps are small and do not occur in sufficient quantities to be actively fished, and/or live in very deep sea. Therefore, they are generally of no commercial importance in the Western Central Pacific. So far, only the giant river prawn *Macrobrachium rosenbergii* is both actively fished and extensively cultured in the area. It is mainly marketed live or fresh for local consumption, sometimes also exported. Several other fresh-water and coastal caridean shrimps in the area also have a relatively larger size or are easy to catch, and are likely to be used as food by natives in several countries. However, information on local use of caridean shrimps is mostly lacking and the exact identities of the species in question are often uncertain and/or confusing in literature. On the other hand, some deep-sea caridean shrimps, mostly belonging to the family Pandalidae

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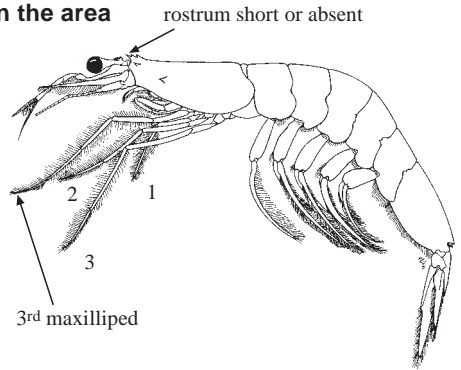
(particularly those of the genus *Heterocarpus*), are large in size and are often caught in great numbers during exploratory trawling operations. They are generally considered to have commercial potential with the development of a future deep-sea fishery in the area. Finally, it should be mentioned that some coral reef carideans (mainly members of the families Alpheidae, Gnathophyllidae, Hippolytidae, Hymenoceridae, Palaemonidae, and Rhynchocinetidae) have an attractive coloration and can be sporadically found in the aquarium trade, where those uncommon species often command a high price. Nevertheless, their supply are usually unstable and they are commercially much less important as marine coral fishes. Therefore, individual identification sheets are provided here for several selected species only, as representatives of the infraorder in the area. For keys to the families and genera of carideans, users may consult L.B. Holthuis (1993), "The recent genera of the Caridean and Stenopodidean shrimps (Crustacea, Decapoda): with an appendix on the order Amphionidacea, C.H.J.M. Fransen and C. van Achterberg (eds), Nationaal Natuurhistorisch Museum, Leiden." For the identification of species, users may refer to the keys published by F.A. Chace, Jr (1976-1997: *Smithson. Contrib. Zool.* 222, 277, 381, 384, 397, 411, 432, 466, 543, 587), or are encouraged to send the sample(s) to the author of the present contribution.

Other major groups of shrimps and prawns occurring in the area

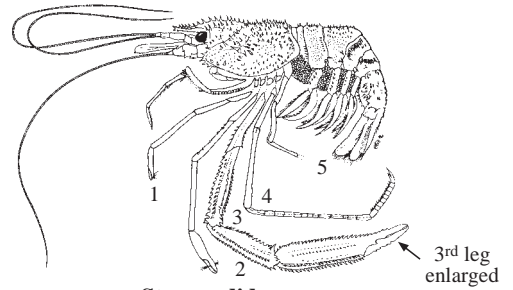
Sergestoidea: last 2 pairs of legs reduced or absent; anterior part of second abdominal pleuron not overlapping first abdominal pleuron; males with large copulatory organ on first pair of pleopods; eggs usually released directly into water, not retained by the female.

Penaeoidea: third leg with pincer; anterior part of second abdominal pleuron not overlapping first abdominal pleuron; with large copulatory organ, on first pair of pleopods in males, and on posterior thoracic sternites in females; eggs released directly into water, not retained by the female.

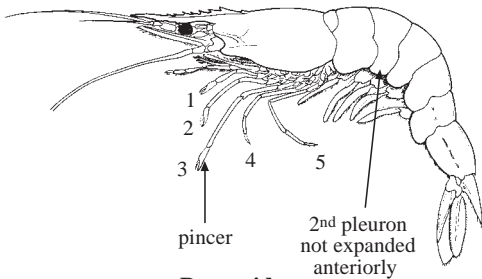
Stenopodidea: third leg bearing a very large pincer; anterior part of second abdominal pleuron not overlapping first abdominal pleuron.



Sergestoidea



Stenopodidea



Penaeoidea

(after Liu, 1955)

List of families and species treated in this contribution

The symbol  is given when species accounts are included.

Infraorder CARIDEA

Superfamily PASIPHAEOIDEA

PASIPHAEIDAE


Superfamily OPLOPHORIDEA

OPLOPHORIDAE

Superfamily ATYOIDEA

ATYIDAE

 *Atyopsis moluccensis* (De Haan, 1849)

 *Atyopsis spinipes* (Newport, 1847)

 *Caridina weberi* De Man, 1892

Superfamily BRESILIOIDEA

BRESILIIDAE

Superfamily NEMATOCARCINOIDEA

EUGONATONOTIDAE

NEMATOCARCINIDAE

RHYNCHOCINETIDAE

 *Rhynchocinetes durbanensis* Gordon, 1936

Superfamily PSALIDOPODOIDEA

PSALIDOPODIDAE

Superfamily STYLODACTYLOIDEA

STYLODACTYLIDAE

Superfamily CAMPYLONOTIDEA


BATHYPALAEEMONELLIDAE

Superfamily PALAEMONOIDEA

ANCHISTIOIDIDAE


GNATHOPHYLLIDAE

HYMENOCERIDAE

 *Hymenocera picta* Dana, 1852

PALAEEMONIDAE


 *Exopalaemon styliferus* (H. Milne Edwards, 1840)


 *Exopalaemon vietnamicus* Nguyễn, 1992


 *Leandrites indicus* Holthuis, 1950

 *Leptocarpus potamiscus* (Kemp, 1917)

 *Macrobrachium equidens* (Dana, 1852)

 *Macrobrachium lar* (Fabricius, 1798)

 *Macrobrachium mirabile* (Kemp, 1917)

 *Macrobrachium rosenbergii* (De Man, 1879)

 *Nematopalaemon tenuipes* (Henderson, 1893)

 *Palaemon concinnus* Dana, 1852

Superfamily ALPHEOIDEA

ALPHEIDAE

HIPPOLYTIDAE

 *Lysmata amboinensis* (De Man, 1888)

 *Lysmata debelius* Bruce, 1983

 *Saron neglectus* De Man, 1902


OGYRIDIDAE


Superfamily PROCESSOIDEA


PROCESSIDAE

Superfamily PANDALOIDEA

PANDALIDAE

 *Heterocarpus hayashii* Crosnier, 1988

 *Heterocarpus parvispina* De Man, 1917

 *Heterocarpus sibogae* De Man, 1917

THALASSOCARIDIDAE

Superfamily CRANGONOIDEA

CRANGONIDAE

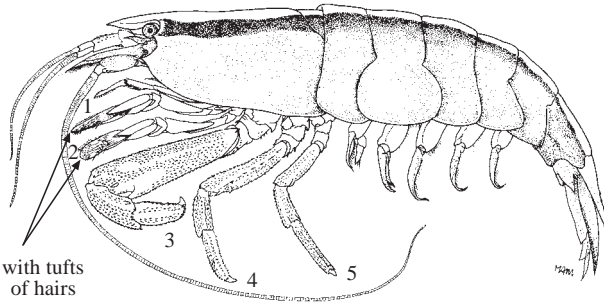
GLYPHOCRANGONIDAE

ATYIDAE

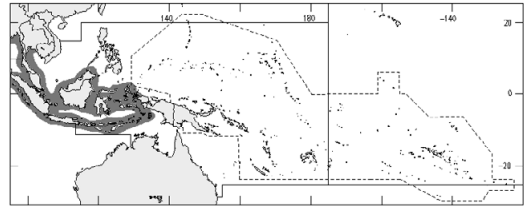
Atyopsis moluccensis (De Haan, 1849)

En - Moluccas brush shrimp.

Maximum total length 7.7 cm (occasionally 8.6 cm); males larger. Inhabits upper or middle parts of fast-flowing streams. Probably reproduce in brackish water and juveniles are tolerant of salt water. Abundance of this shrimp in the area is uncertain. Atyid shrimps are reported to be used as food or fertilizer in many parts of the area. Although the size of this species is large for atyids, its economic importance is probably still minor. Atyids are mainly marketed fresh or dry for local consumption. Recently, live specimens, probably originating from Indonesia, have been seen in the aquarium trade, for which this shrimp is a suitable candidate, due to the attractive bandings on the body and since it can easily be kept in captivity. Indo-West Pacific, and known with certainty from Sri Lanka to Thailand, Malaysia, Indonesia, and perhaps the Philippines. Often confused with *Atyopsis spinipes*.



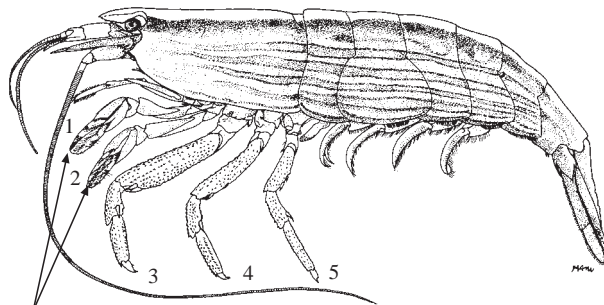
(adapted from Chace, 1983)



Atyopsis spinipes (Newport, 1847)

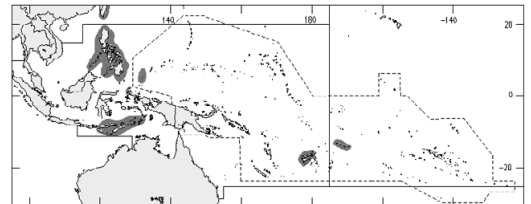
En - Soldier brush shrimp; **Fr** - Saltarelle soldat; **Sp** - Camarón soldado.

Maximum total length 7.1 cm, commonly between 4 and 5 cm (females larger). Adults mainly occur in fresh water, in upper or middle parts of fast-flowing streams. Reproduce in brackish water. Abundance of this shrimp in the area is uncertain. Although atyid shrimps are reported to be used as food or fertilizer in many parts of the area and this species is relatively large amongst the atyids, its economic importance is probably only minor. Atyids are mainly marketed fresh or dry for local consumption. This shrimp has recently been introduced to the aquarium trade (place of origin probably Indonesia), because of the attractive bandings on the body and as it can easily be kept in captivity. Western Pacific, and known with certainty from Ryukyus, Taiwan Province of China, the Philippines, Lesser Sunda Islands, Palau, Fiji, and Samoa.



with tufts
of hairs

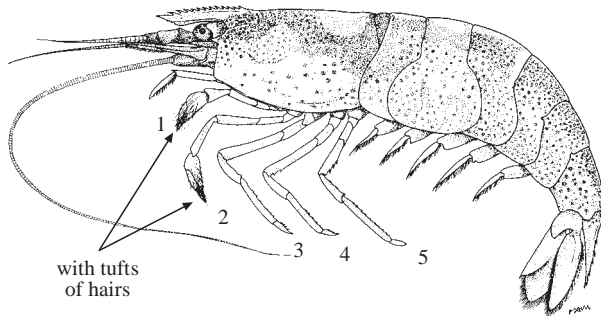
(adapted from Chace, 1983)



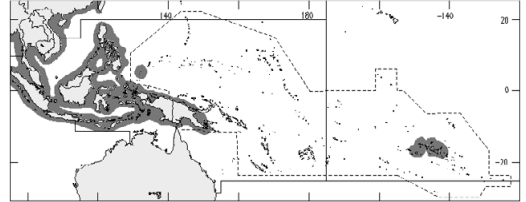
Caridina weberi De Man, 1892

En - Pugnose caridina; **Fr** - Saltarelle nez-camus; **Sp** - Camarón ñata.

Maximum total length about 3 cm, commonly between 1.5 and 2 cm (females usually larger). Inhabits mainly in middle or lower parts of rivers, often around heavy vegetation. Reproduce in brackish water and juveniles are tolerant of salt water. Abundance of this shrimp in the area is uncertain although it has been reported to be of some economic value in Indonesia. Considering their very small size, all species of *Caridina* probably have very limited, if any, commercial importance. Indo-West Pacific from India to Japan and Polynesia.



(adapted from Holthuis, 1993)

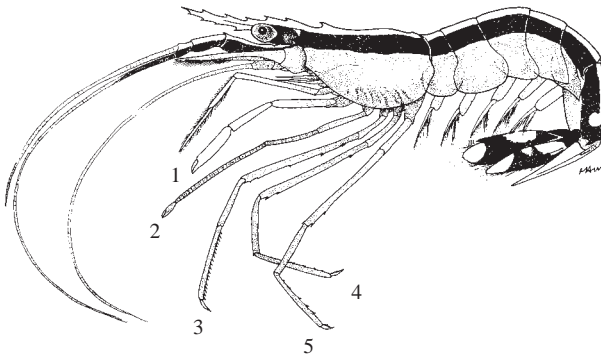


HIPPOLYTIDAE

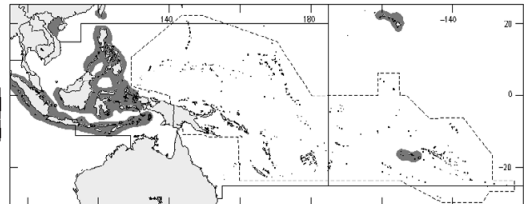
Lysmata amboinensis (De Man, 1888)

En - Common cleaner shrimp.

Body length around 5 cm. Shallow marine reef areas. Well known for its fish cleaning behaviour and sometimes encountered in large groups. Popular and often seen in the marine aquarium trade where it is sold at moderate prices. Nevertheless, its unstable supply suggests that this shrimp is not abundant in its natural habitats. Widely distributed in the Indo-West Pacific from Kenya to Japan, French Polynesia, and Hawaii.



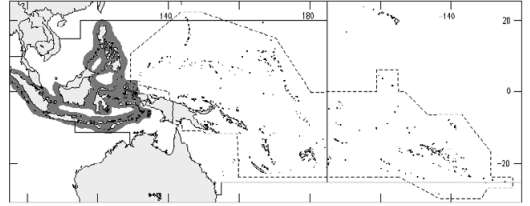
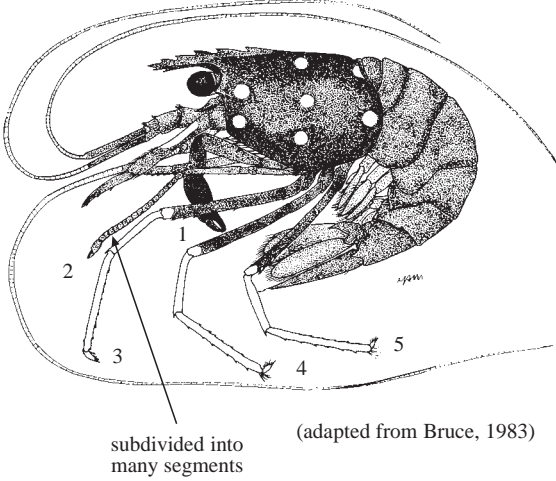
(adapted from Holthuis, 1947)



Lysmata debelius Bruce, 1983

En - Cardinal shrimp.

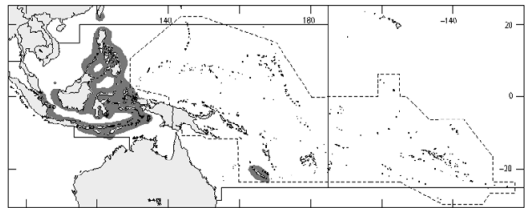
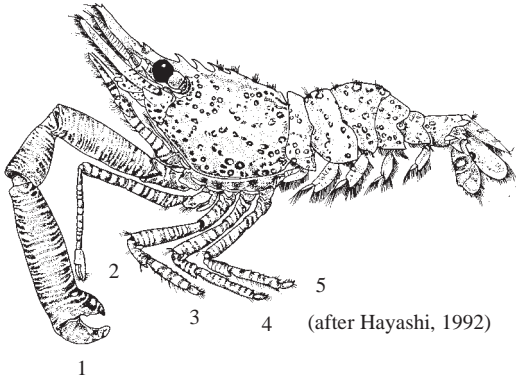
Body length around 4 to 5 cm. Marine reef areas in depths from 10 to 28 m. Normally found in pairs and behave as fish cleaners. A popular shrimp in the marine aquarium trade and sold at somewhat higher prices than most of the other marine aquarium shrimps. However, its supply is not large and unstable, indicating that this shrimp is not abundant in its natural habitats. Known with certainty from the Philippines, Indonesia, and Sri Lanka.



Saron neglectus De Man, 1902

En - Spotted marbled shrimp.

Body length around 2 to 4 cm. Shallow marine reef areas. Nocturnal and usually hiding under rocks and caves, no fish cleaning behaviour reported. Males with first leg greatly enlarged. Probably the most common species of the genus seen in the marine aquarium trade (live specimens originated probably mainly from Indonesia). Sold at moderate prices, due to its unstable supply. Widely distributed in the Indo-West Pacific from Madagascar to the Red Sea, Japan, and New Caledonia. Can be easily confused with *Saron marmoratus* (Olivier, 1811).

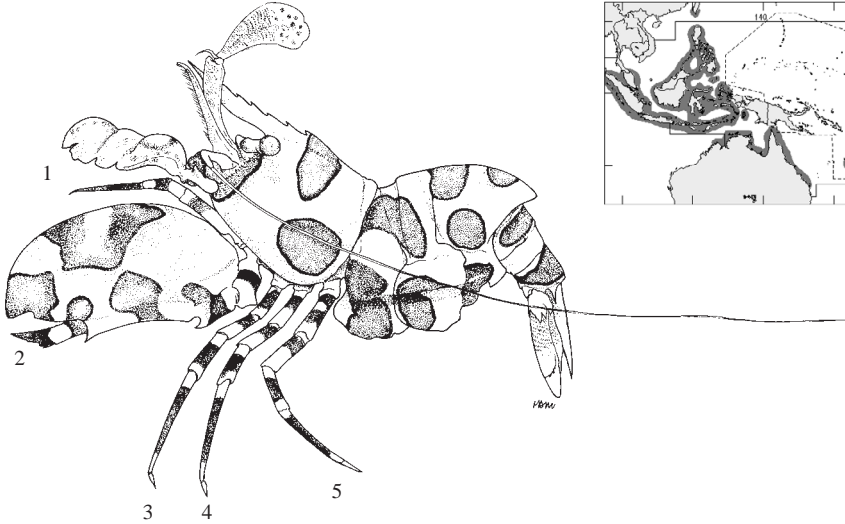


HYMENOCERIDAE

Hymenocera picta Dana, 1852

En - Painted harlequin shrimp.

Body length around 2 to 5 cm. Shallow marine reef areas in depths from 1 to 20 m. Usually live in pairs and reported to be strongly territorial. No fish cleaning behavior observed but reported to kill and feed on starfishes, at least under aquarium conditions. A popular shrimp in the aquarium trade because of its bizarre looking and amazing coloration. Sold at moderately high prices due to its rare supply, indicating that this shrimp is not commonly found in its natural habitats. Widely distributed in the Indo-West Pacific from eastern Africa to Japan, Hawaii, and French Polynesia.



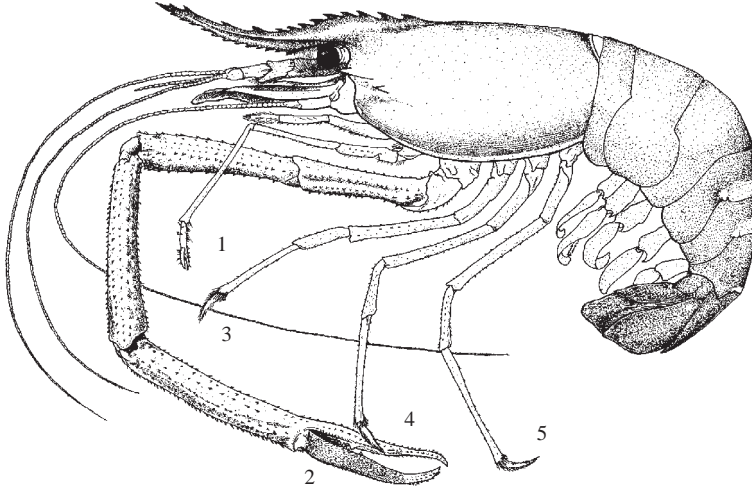
PALAEMONIDAE

Macrobrachium rosenbergii (De Man, 1879)

PRF

Frequent synonyms / misidentifications: *Macrobrachium rosenbergii dacqueti* (Sunier, 1925) / *Macrobrachium carcinus* (Linnaeus, 1758).

FAO names: **En** - Giant river prawn; **Fr** - Bouquet géant; **Sp** - Camarón gigante.

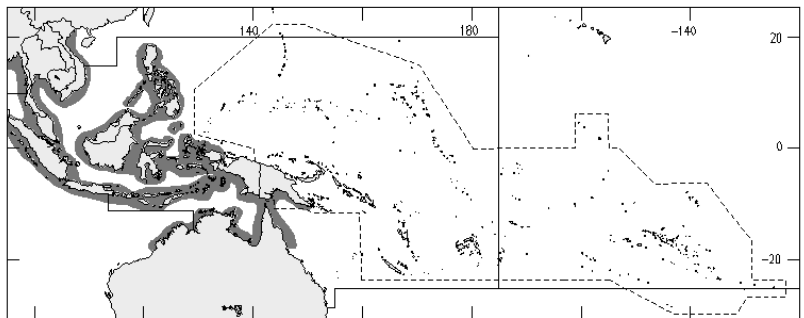


Diagnostic characters: **Rostrum long**, well extending beyond antennal scale; **forming a high basal crest above the eye**; armed with 11 to 14 upper teeth (including those on carapace and with distal teeth more widely spaced) and 8 to 14 lower teeth. **Hepatic spine situated distinctly below antennal spine**. **Second legs very large, robust and of same size, with carpus longer than merus; in adult males, entire second leg densely covered with spines and sharp tubercles, cutting edges of fingers bearing only 1 or 2 large basal teeth and without rows of tubercles on either side, movable finger very hairy except at tip, carpus shorter than pincer**. Telson tapering posteriorly, with tip exceeding posterolateral spines. **Colour:** body generally dark green to greyish blue, with longitudinal or irregular streaks of darker and lighter colour, **hinges of abdominal segments often orange**; eyes dark brown; antennal flagella dark blue to greyish; large pincer bluish to dark blue; eggs yellowish; young and berried females often with some longitudinal golden strips on the sides of body.

Size: The largest known caridean shrimp, maximum body length 34 cm (females) and 26 cm (males), commonly between 10 and 20 cm.

Habitat, biology, and fisheries: Inhabits mainly estuarine areas and rivers but sometimes also found at sea; requires brackish water for spawning and nursing up to postlarval stage, while juveniles are mainly found in fresh-water zones. An omnivorous, very large and common fresh-water shrimp that is extensively caught in the area. Taken by bamboo barriers, fish corrals, traps, set nets, cast nets, hook-and-line, and artisanal gear. Big catches are often linked to heavy rains. Also an important candidate for fresh-water aquaculture in many countries. In 1995, the harvest of this species reported from the area amounted to 9 732 t from capture fishery in Indonesia and Thailand, and 5 040 t from aquaculture in Thailand. Marketed live, fresh or frozen, mainly for local consumption but sometimes also for export.

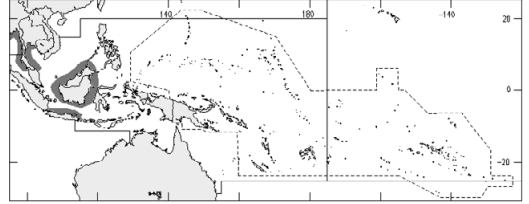
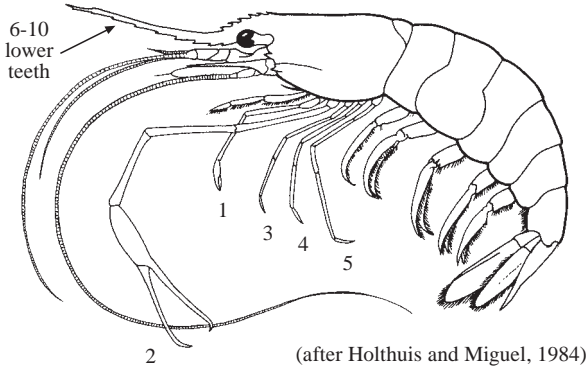
Distribution: Indo-West Pacific from Pakistan to Viet Nam, the Philippines, New Guinea, and northern Australia (the western form from India to Malaysia is sometimes treated as a different subspecies). This shrimp has been introduced to many parts of the world for use in aquaculture.



Exopalaemon styliferus (H. Milne Edwards, 1840)

En - Roshna prawn; **Fr** - Bouquet rosna; **Sp** - Camarón rosna.

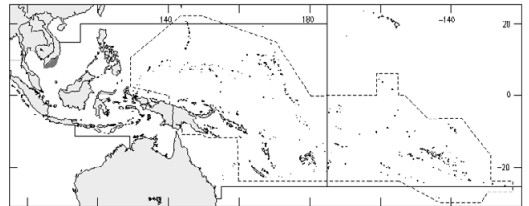
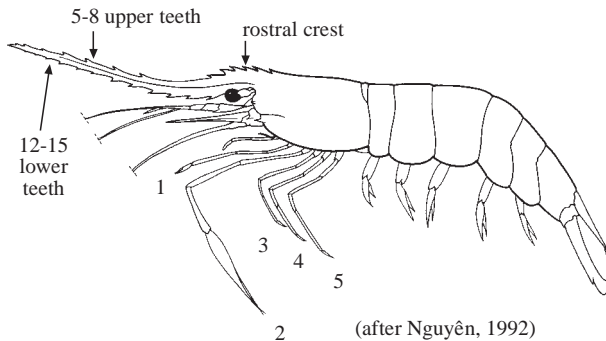
Maximum total length for males 9 cm; egg-bearing females 6.8 to 8.6 cm. Inhabits shallow coastal waters, brackish or marine, occasionally also in fresh water. A small species, abundance in the area uncertain, probably without commercial importance and only caught incidentally in fisheries for other shrimps. Indo-West Pacific from Pakistan to Thailand and Borneo.



Exopalaemon vietnamicus Nguyễn, 1992

En - Vietnamese crest prawn.

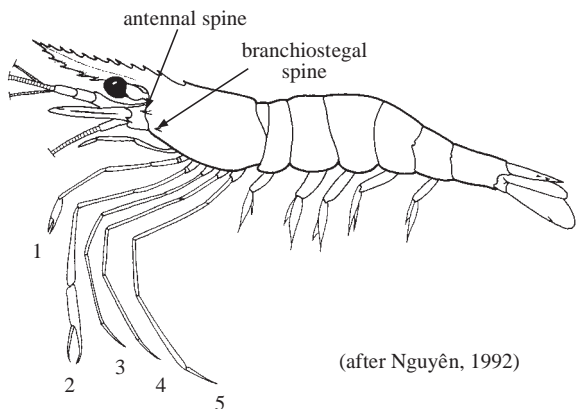
Maximum body length 7.7 cm; egg-bearing females more than 4 cm body length. Inhabits estuaries and shallow coastal mud flat areas near river mouths. Caught by conical set nets and push nets. Often occurs in large quantities in coastal rice shrimp farming areas and semi-extensive shrimp culture ponds. Sometimes too abundant, becoming a food competitor of cultured penaeid prawns. In certain areas it constitutes 40 to 50% of the total shrimp harvest at the end of the rainy season. Marketed dried or fresh and usually mixed with other small penaeids; an important food source for local consumption. Restricted to southeastern Viet Nam near Ho Chi Min City.



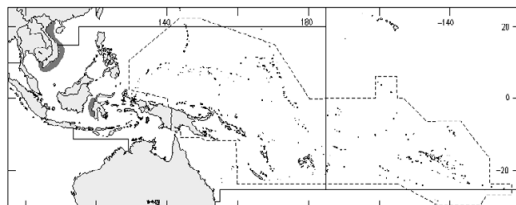
***Leandrites indicus* Holthuis, 1950**

En - Indian small prawn.

Maximum total length about 3 cm. Inhabits brackish water in mangrove areas. A bycatch of fisheries for *Acetes* species, caught by conical set nets and push nets. In certain parts of Viet Nam, this small species is very abundant and constitutes a good food source for local consumption. Sometimes also enters penaeid culture ponds. Marketed fresh and mixed with *Acetes* species, also used in the processing of native shrimp paste. Western Pacific, and so far only recorded from Makasar (Celebes) and Viet Nam.



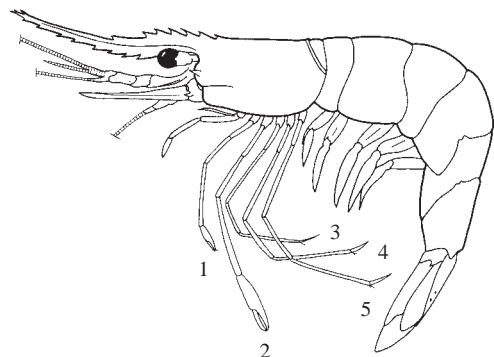
(after Nguyễn, 1992)



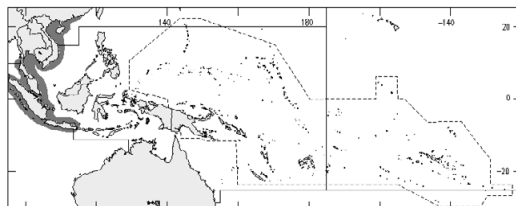
***Leptocarpus potamiscus* (Kemp, 1917)**

En - Bombay prawn; **Fr** - Bouquet bombay; **Sp** - Camarón de Bombay.

Maximum total length about 6 cm (females) and 4.5 cm (males). Inhabits fresh to brackish water. In Viet Nam, this shrimp is reported to occur in great quantities in the irrigation ditches designed for culture of *Macrobrachium rosenbergii* and is a valuable species for local fisheries. Indo-West Pacific from India to southern China and Indonesia.



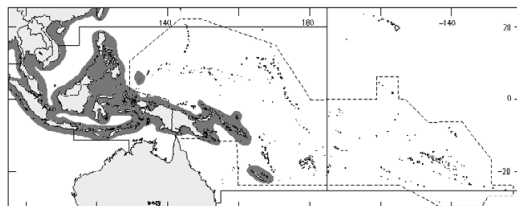
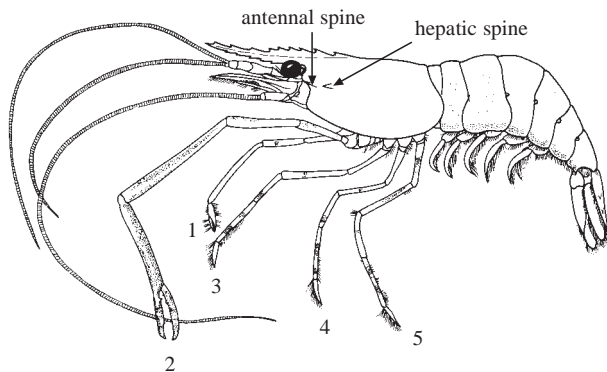
(after Nguyễn, 1992)



Macrobrachium equidens (Dana, 1852)

En - Rough river prawn; **Fr** - Bouquet chagrin; **Sp** - Camarón lija.

Maximum total length 9.8 cm (males usually larger). Inhabits lower parts of streams, river mouths, estuaries, and brackish waters of high salinity; rarely found in pure fresh water but often in sea water (near river mouths) to a depth of at least 30 m. Reproduce in brackish and sea water, larvae have about 11 stages and transform into postlarvae in 43 days. A common species in the area but nowhere abundant. Similarly to other small to medium-sized species of the genus, it is frequently found in mixed catches of fresh-water shrimps. Since this shrimp also occurs in pure sea water, it is often caught incidentally in penaeid fisheries. Marketed mainly live or fresh, generally sold at low prices and consumed locally. Widely distributed in the Indo-West Pacific from eastern Africa to the Ryukyu Islands, New Caledonia, and Solomon Islands, also introduced to Nigeria.

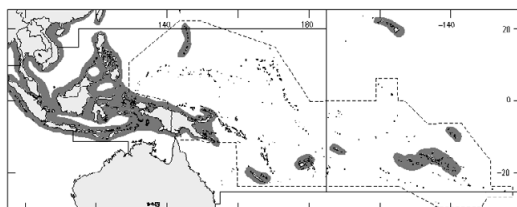
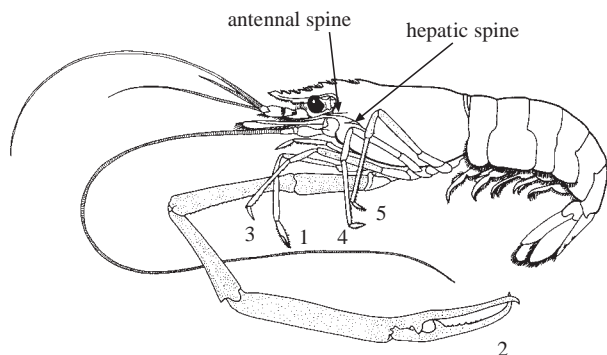


(after Holthuis and Miguel, 1984)

Macrobrachium lar (Fabricius, 1798)

En - Monkey river prawn; **Fr** - Bouquet singe; **Sp** - Camarón mono.

Maximum total length 18.1 cm (males usually much larger). Adults occur in fresh water, mainly in upper and middle parts of rivers; able to endure short time of desiccation and occasionally observed to crawl on land during heavy rainfall. Migrate to the river mouth or estuary for reproduction, with juvenile stages in brackish and sometimes also in salt water. Fished throughout its range. Caught by traps and artisanal gear. A large species, but nowhere very abundant and marketed mainly locally, live or fresh. In the Philippines, this shrimp is not always available in the fish markets, sold at about half the price of *Macrobrachium rosenbergii*. Aquaculture experiments have been carried out by many countries but were so far unsuccessful, due to the very long larval stage in this species (at least 100 days). Widely distributed in the Indo-West Pacific, from eastern Africa to Ryukyu Islands and the Marquesas Islands; probably not indigenous (i.e. introduced) in Hawaii.

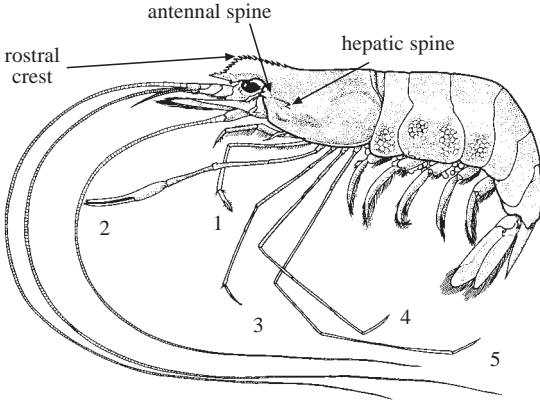


(after Holthuis, 1993)

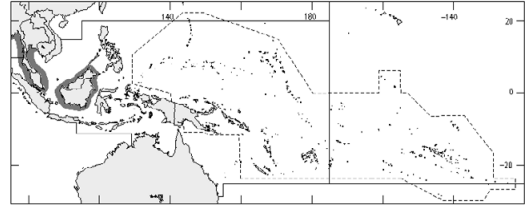
***Macrobrachium mirabile* (Kemp, 1917)**

En - Shortleg river prawn; **Fr** - Bouquet tipattes; **Sp** - Camarón patojo.

Maximum total length 6 cm (females) and 4 cm (males). Inhabits fresh and brackish water. Similarly to the other small species of the genus, its fishery in the area is unclear, probably caught incidentally with other fresh-water shrimps and used as food whenever available. Indo-West Pacific, and recorded from eastern India, Bangladesh, Myanmar, Thailand, Malaysia, and Borneo.



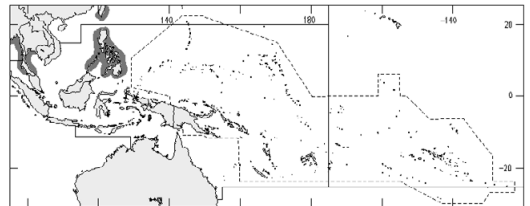
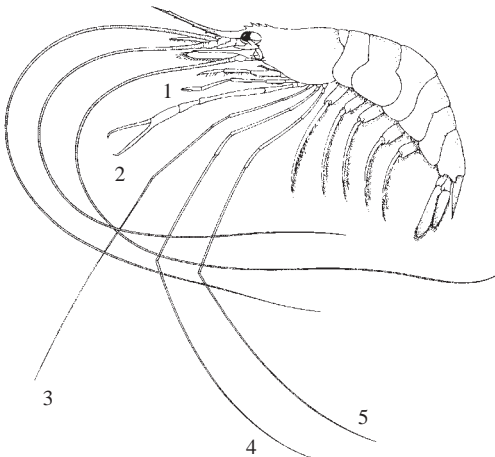
(after Kemp, 1917)



***Nematopalaemon tenuipes* (Henderson, 1893)**

En - Spider prawn; **Fr** - Bouquet araignée; **Sp** - Camarón araña.

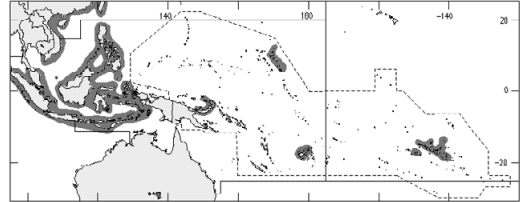
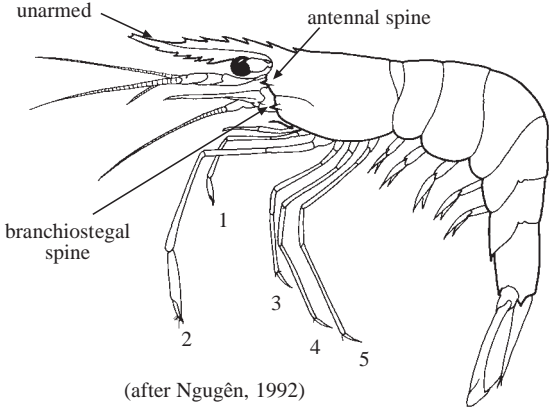
Maximum total length 8 cm. Inhabits shallow coastal waters to depths of about 20 m, and also found in estuarine and brackish waters. Abundance of this species in the area is unclear, but it has been reported to be used as food in the Philippines. Marketed dried or salted for local consumption. Widely distributed in the Indo-West Pacific from eastern Africa to Taiwan Province of China and the Philippines, probably also from New Zealand.



***Palaemon concinnus* Dana, 1852**

En - Mangrove prawn; **Fr** - Bouquet mangrove; **Sp** - Camarón de manglar.

Maximum total length 7 cm (females), smallest egg-bearing females 4.9 cm. Restricted to brackish water in the lower part of rivers, rarely found in pure fresh or sea water. In Viet Nam, this shrimp forms a bycatch of fisheries for *Macrobrachium* species and is offered for sale in local markets. Probably also used as food in the Philippines. Widely distributed in the Indo-West Pacific, from eastern Africa to Taiwan Province of China and Polynesia.

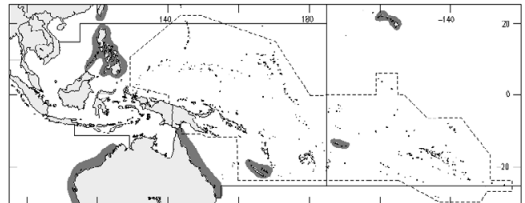
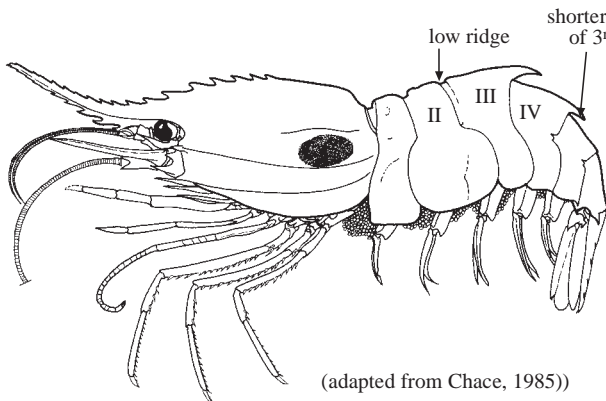


PANDALIDAE

***Heterocarpus hayashii* Crosnier, 1988**

En - Japanese nylon shrimp.

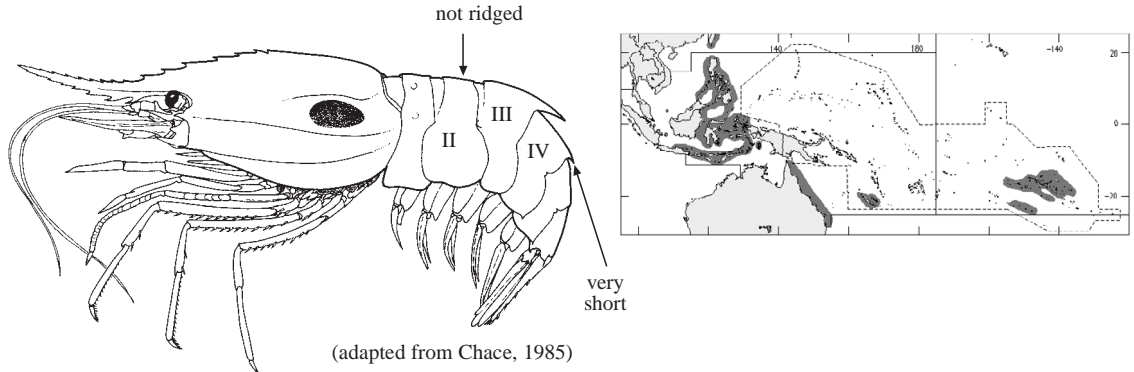
Maximum body length about 11 cm (females larger), commonly between 6 and 10 cm. Found on bottoms of sand and mud, at depths from 150 to 625 m, usually around 200 m, or deeper. So far not fished commercially but sometimes caught in large quantities on the basis of exploratory deep-water trawling. The moderate size of this shrimp and the fact it is found in not very deep water suggests that it may have commercial potential with the development of a deep-sea fishery in the area. Western Pacific, reported from Japan, Taiwan Province of China, the Philippines, Australia, New Caledonia, Chesterfield Islands, and Hawaii. Often confused with *Heterocarpus ensifer* A. Milne Edwards, 1881, *H. parvispina*, and *H. sibogae*.



***Heterocarpus parvispina* De Man, 1917**

En - Short-spined nylon shrimp.

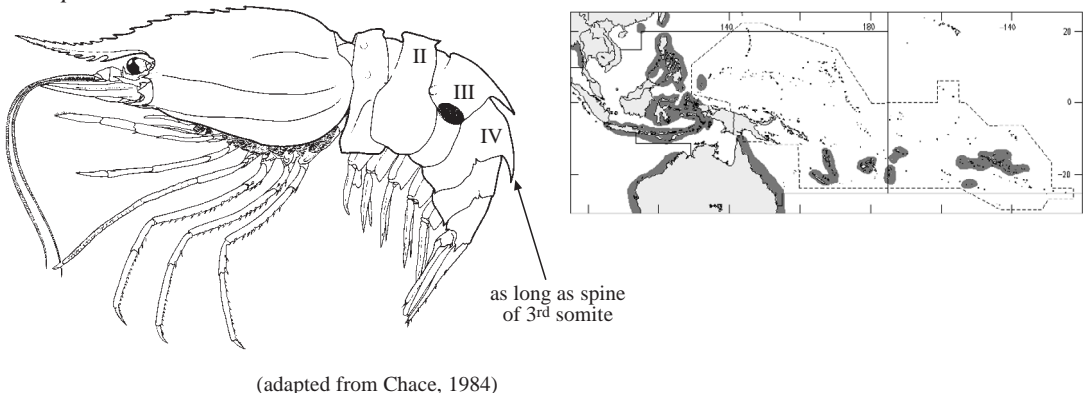
Maximum body length about 9 cm (females larger), commonly between 6 and 8 cm. Found on sandy-mud bottoms, at depths from 230 to 815 m, mostly less than 600 m. Not fished commercially at present. Occasionally caught in large quantities on the basis of exploratory deep-water trawling (more abundant from 350 m depth downward) and may have commercial potential with the development of deep-sea fisheries in the area. Western and southern Pacific from Taiwan Province of China to Indonesia, Australia, and French Polynesia. Often confused with *Heterocarpus ensifer* A. Milne Edwards, 1881, *H. hayashii*, and *H. sibogae*.



***Heterocarpus sibogae* De Man, 1917**

En - Mino nylon shrimp; **Fr** - Crevette nylon mino; **Sp** - Camarón nailón mino.

Maximum body length about 11 cm (females larger), commonly between 6 and 10 cm. Found on bottoms of sand and mud from depths of about 150 to 950 m. Although at present not commercially fished, it is the most common caridean shrimp caught during exploratory deep-water trawling operations in the area. Often caught in large quantities from moderate depths (about 200 m downward) in the area (e.g. the Philippines, Indonesia, Australia, New Caledonia, Fiji, Vanuatu, Samoa, Tonga, French Polynesia, and probably also Palau) and therefore has a very high commercial potential. Widely distributed in the Indo-West Pacific from Madagascar to Japan and French Polynesia. Often confused with *Heterocarpus ensifer* A. Milne Edwards, 1881, *H. hayashii*, and *H. parvispina*.



RHYNCHOCINETIDAE***Rhynchocinetes durbanensis* Gordon, 1936**

En - Striped hinge-beak shrimp.

Body length around 3 to 4 cm. Shallow marine reef areas. Gregarious and usually hiding under rocks and caves, also active during the daytime (afternoon); no fish cleaning behavior reported. Probably the most common shrimp in the area seen in the marine aquarium trade (with live specimens originating from Sri Lanka, the Philippines, and Indonesia), where it is regularly offered for sale. Very popular for its attractive coloration and as it easily adapts to captivity; sold at inexpensive prices. Widely distributed in the Indo-West Pacific from the eastern coast of South Africa to the Ryukyu Islands and Indonesia. Previously often confused with *Rhynchocinetes uritai* Kubo, 1942.

