



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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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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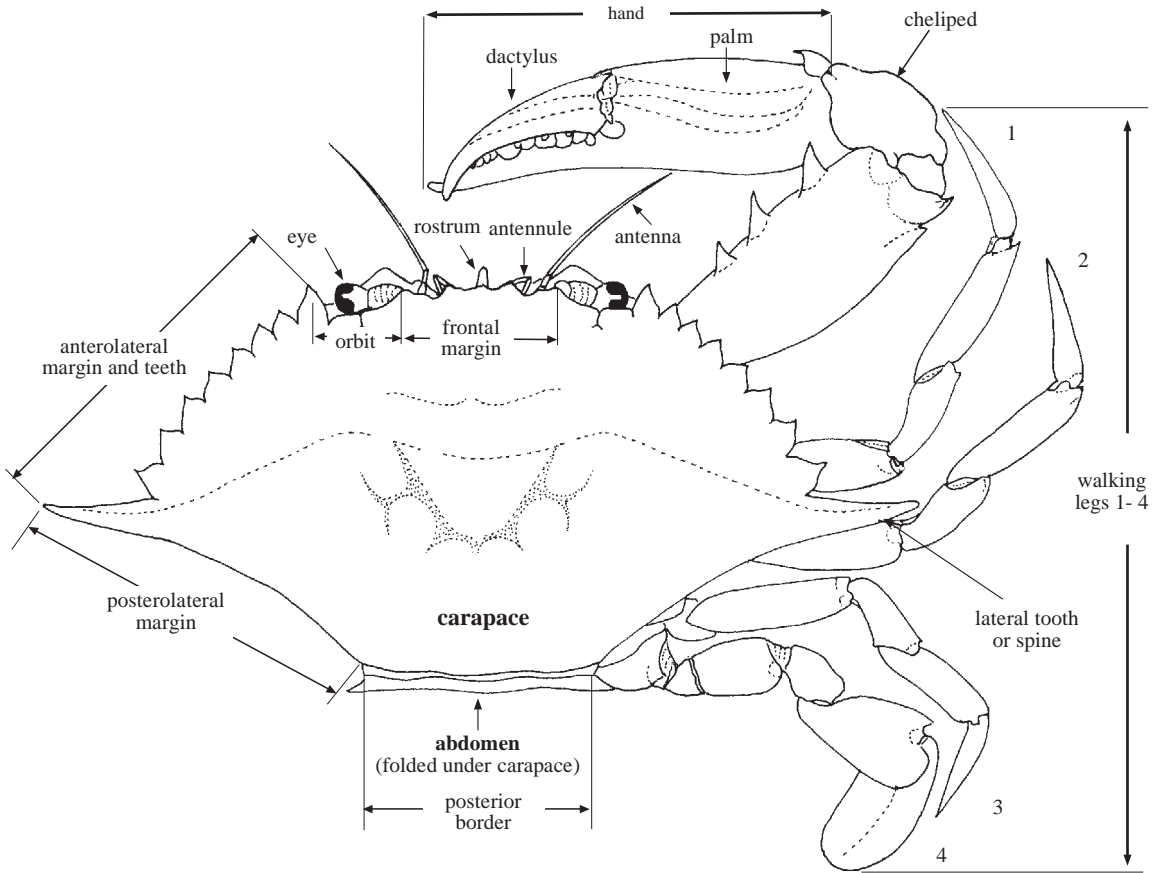
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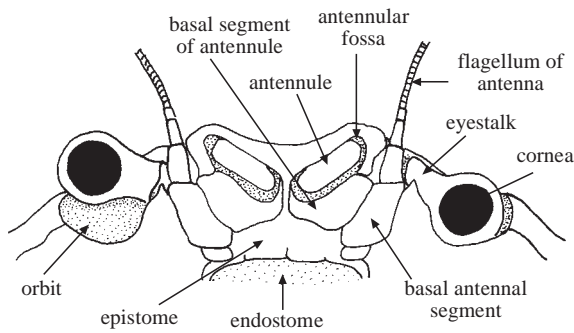
CRABS

by P.K.L. Ng

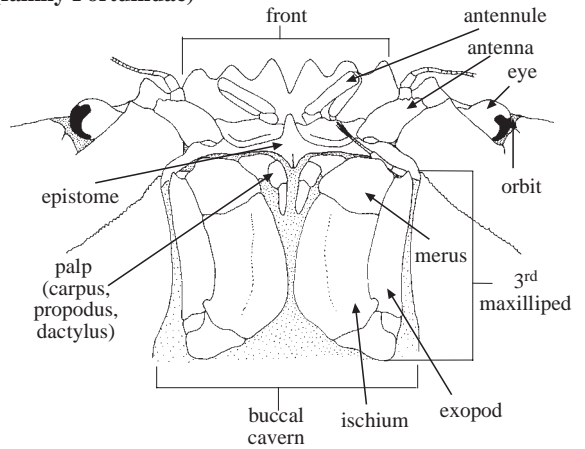
TECHNICAL TERMS AND MEASUREMENTS



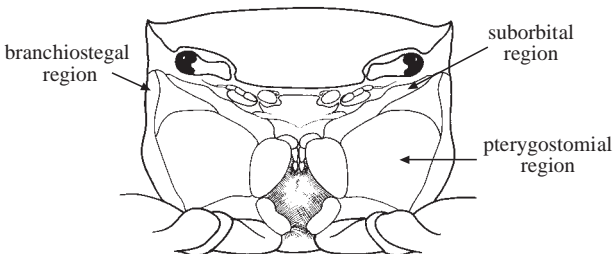
general shape (dorsal view) of a brachyuran crab (family Portunidae)



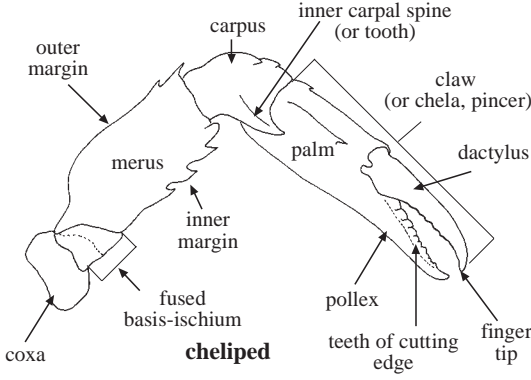
eyes, antennae, and antennules (ventral view)



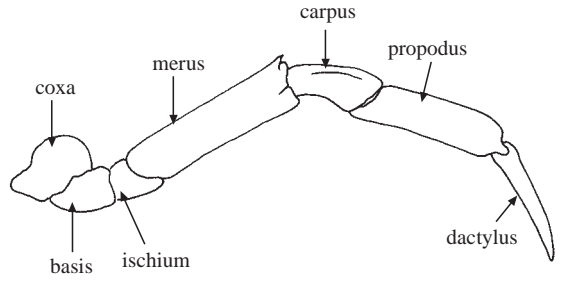
mouth field



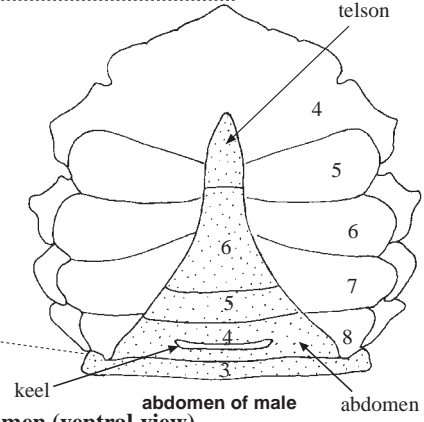
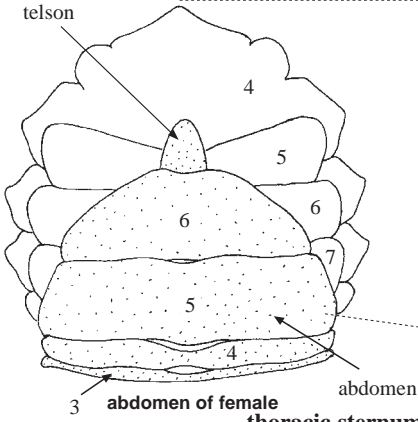
frontal view of body



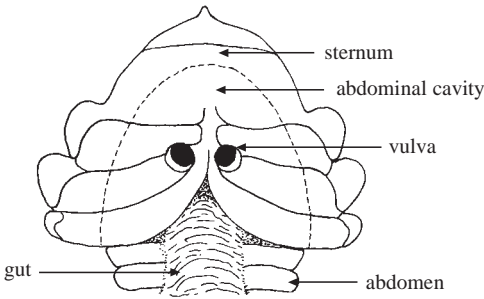
cheliped



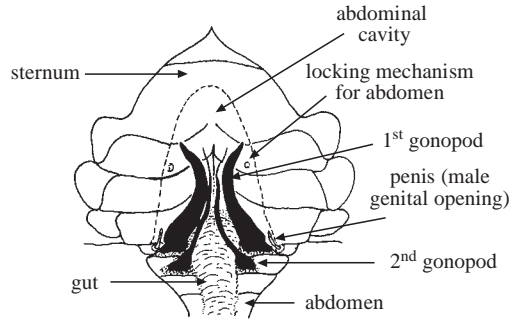
walking leg



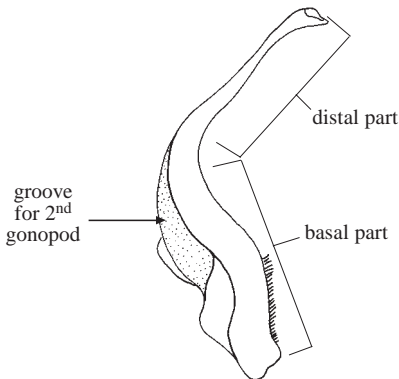
thoracic sternum and abdomen (ventral view)



female abdominal cavity and vulvae

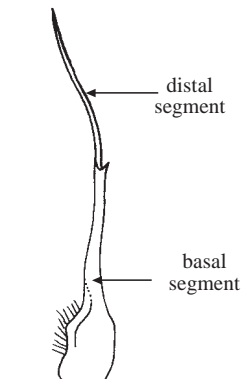


male abdominal cavity and gonopods



first gonopod

male gonopods



second gonopod

GENERAL REMARKS

Introduction

Like the shrimps and lobsters, crabs belong to the order Decapoda (= "ten-legged", referring to the 10 thoracic appendages normally present in these crustaceans). Crabs can be classified into 2 main groups, brachyuran crabs (infraorder Brachyura) and anomuran crabs (infraorder Anomura). Most species of Brachyura, or true crabs, can easily be separated from the so-called "false crabs" belonging to the infraorder Anomura by having 4 pairs of well-developed walking legs. Anomuran crabs always have only 3 pairs of walking legs clearly visible, while the fourth (last) pair is very small, normally tucked under the body and hardly noticeable. However, this is just a general rule rather than a distinct separating character as there are a number of true crabs which have their fourth pair of legs greatly reduced as well (e.g. Dynomenidae and Retroplumidae) or even completely reduced (Hexapodidae).

A more recent compilation of the actual number of all species of crabs known to date is pending. The last census was done by Fenner Chace Jr. (1951), who recorded worldwide 4 428 and 1 270 species of brachyuran and anomuran crabs, respectively. The late Raoul Serène (1968) estimated that perhaps some 1 000 species of brachyuran crabs occur in the Indo-Malayan area. However, these numbers have substantially increased over the last 40 years, due to the rapid pace of crab discoveries. It is not unreasonable to believe that the current number of brachyuran and anomuran crabs in the world ranges from 5 000 to 6 000 and 1 500 to 2 000 species, respectively. Of these, the largest proportion is found in the Western Central Pacific, where around 1 500 to 2 000 brachyuran crab species (marine and fresh-water taxa) are probably present.

The present contribution focuses on 15 families of brachyuran crabs and a single family of anomuran crabs which include commercially important species in the Western Central Pacific. The majority of edible crab species belong to the Brachyura, and accordingly, a large number of brachyuran crabs are caught for human consumption in the Western Central Pacific. It is important to note, however, that a much greater number of brachyuran crab species than listed here are collected for food by many poorer communities and indigenous people in the area. Any edible species which are common enough to be collected in great numbers can be eaten, even if they are small in size. To these belong many ocypodids such as soldier crabs (*Dotilla* spp.), fiddler crabs (*Uca* spp.), and periscope crabs (*Macrophtalmus* spp.), but also several medium-sized species of vinegar crabs (Sesarinae, Grapsidae). In addition, many medium-sized species of reef crabs of the families Xanthidae and Eriphiidae are locally consumed among natives of several Pacific islands. However, it is unrealistic to list and discuss every single species that is eaten once in a while or might be collected for food. Therefore, a selection has been made here of those species which at present have a distinct fishery value, are larger and more common, or have a good potential in the future as their fisheries develop. It is also worth noting that several species of fresh-water crabs of the families Potamidae and Parathelphusidae are consumed in many parts of Southeast Asia and Indo-China.

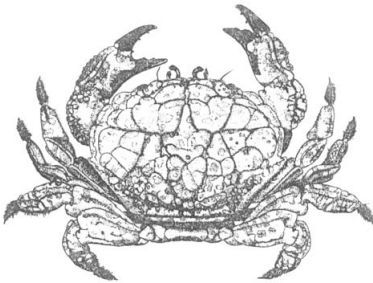
In contrast to the brachyurans, few anomuran crabs have a major fishery value in the Western Central Pacific, with a single species (the "coconut crab", *Birgus latro*) being of distinct commercial importance. The stone crabs (Lithodidae) are represented by several species within the area, but none of them are harvested so far, although some species are utilized for food in other regions of the world (the best known example is the large fishery for the "Alaskan king crab", *Paralithodes camtschaticus*, in the northern Pacific). The lithodid species occurring in the Western Central Pacific, however, are generally too rare to show any significant commercial importance, although it may be possible that a number of species can be utilized in the future. Reports that some large hermit crabs (Paguridae and Diogenidae) are sometimes caught for food are actually not very reliable, and almost certainly none of these show any commercial importance. Many species of land hermit crabs (genus *Coenobita*), however, are regularly collected for the pet trade. The so-called squat lobsters (Anomura: Galatheididae), which actually have a more crab-like than lobster-like appearance, are represented by a few edible species in the Atlantic, but none of the species in the Western Central Pacific are large or common enough to have any food value. The same is true for the deep-water chirostylids (deep-water squat lobsters). However, because of their crab-like shape, galatheids and chirostylids have been included in the present key to families of marine crab-like Anomurans. On the other hand, several anomurans of clearly lobster- or shrimp-like appearance, such as the mud lobsters (*Thalassinina* spp., Thalassinidae, notably *T. anomala*) and mud shrimps (*Upogebia* spp., Upogebiidae), are occasionally caught for food in the Western Central Pacific.

Poisonous Crabs

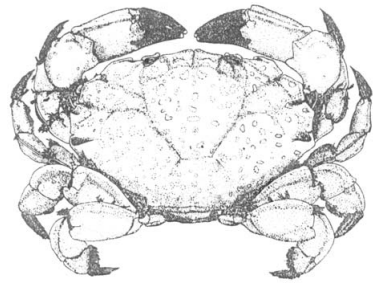
Although poisonous crabs have been known for a very long time, only in recent years have the necessary biochemical studies been done to quantify and qualify the toxins involved. Some people become violently sick after consumption of crabs because of allergic responses, a response not related to poison. In general, there are 2 categories of poisonous crabs:

The **first category** includes the permanent highly toxic species. These crabs are always poisonous, and include taxa such as the "mosaic crab" (*Lophozozymus pictor*), "demon crabs" (*Demania* spp.), "jewel crab" (*Zosimus aeneus*), "crested reef crab" (*Platypodia granulosa*), and "green egg crab" (*Atergatis floridus*). The consumption of any of these crabs, even if well cooked, is extremely dangerous and has proved fatal in several instances. It is important to note here that all these species belong to the family Xanthidae and they all have distinctive colour markings or striking colours, presumably to warn potential predators. All species are of moderately large size, reaching carapace widths from 7 to 10 cm, and as such, may be picked up by fishermen or collectors. The toxins that have been identified include palytoxins, saxitoxins, and tetroxins, and occur throughout the tissues and exoskeleton, being most concentrated in the liver and gonads. All these toxins act on the nervous system. As they lose their toxins when kept in captivity and fed on normal food, it is believed that the crabs obtain these toxins directly or indirectly from the food. The 2 most notorious genera are *Lophozozymus* and *Demania*, and a number of human deaths have been attributed to them. Tests on *Lophozozymus pictor* have shown that, although the degree of toxicity varies from individual to individual, they all contain enough toxins to kill an adult human. In a single analysis, 1 g of the crab's flesh contained enough toxins to kill 42 000 mice. A large specimen of *L. pictor*, however, can easily reach a weight of 100 g. This makes it one of the (if not THE) most poisonous crabs known. Not all species of *Lophozozymus* and *Demania* have been analyzed biochemically, but the general consensus is that most, if not all their members are highly toxic.

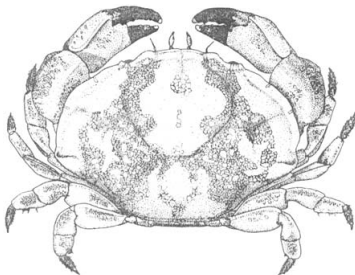
The **second category** of toxic crabs are those which are mildly poisonous and/or occasionally poisonous. The consumption of such crabs may cause illness but rarely death. The species involved here include "reef crabs" (*Carpilius* spp., Carpiliidae), "red-eyed crabs" (*Eriphia* spp., Eriphiidae), coral reef crabs like *Etisus* spp. and *Atergatis* spp. (Xanthidae) and "land crabs" (*Cardisoma* spp., Gecarcinidae). In most instances, these crabs are also not always poisonous, with their toxicity varying with place and time of year. This is very likely to be associated with the food habits of the crabs. In some cases, this is because the crabs have consumed poisonous fruits or leaves (e.g. for land crabs like *Cardisoma*). Poisonous crabs have also been associated with red-tide algal or dinoflagellate blooms. Species like the "red egg crab" (*Atergatis integerimus*) are probably poisonous because they only occasionally feed on organisms which are toxic and only in small quantities. This second category of poisonous crabs poses problems for fishery officers as a species which is poisonous in one area may be totally harmless in another. Obviously, great care has to be taken in harvesting and consumption of those species.



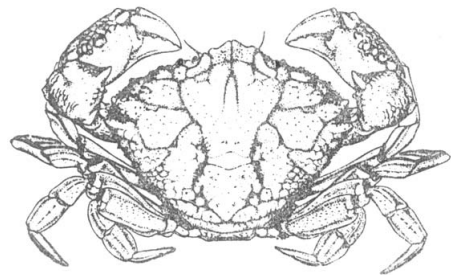
Zosimus aeneus



Lophozozymus pictor

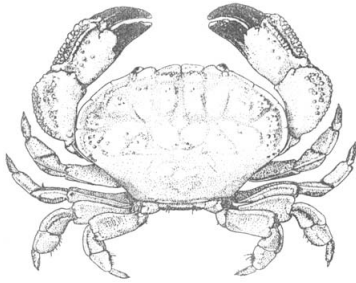
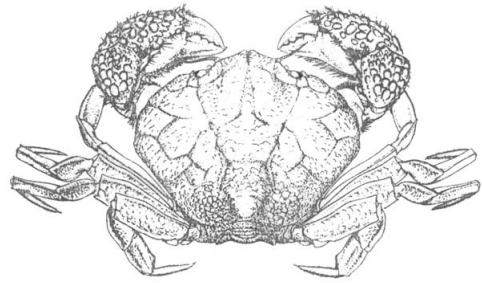


Atergatis floridus



Demania cultripes

(after Garth and Alcalá, 1977)

*Platypodia granulosa**Demania toxica*

(after Garth and Alcalá, 1977)

Notes on the classification of brachyurans

The total number of families of Brachyura is still undetermined. Although many authors still follow the classification presented by Balss (1957), more recent studies by Guinot (1978, 1979) have shown that this system is artificial. Unfortunately, not all the brachyuran families currently recognized were dealt with by Guinot in detail and the status of a number of them remains unresolved. For the present report, the writer has essentially adopted Guinot's (1978) system of higher classification. Accordingly, 53 families are recognized, following mainly Guinot (1978) and Manning and Holthuis (1981). Out of these, 8 families are found in fresh water only and thus are outside the scope of the present contribution. Nevertheless, it is relevant to note that out of these 8 fresh-water families, 3 occur in the Western Central Pacific, namely the Potamidae (= Isolapotamidae), Gecarcinucidae, and Parathelphusidae (= Sundathelphusidae) (Ng, 1988). Of the 45 marine families, 40 have been recorded in the Western Central Pacific thus far, with only the Orithyiidae, Thiidae, Cheiragonidae, Pirimelidae, and Platyxanthidae apparently being absent from the area.

Some of the families recognized here have undergone nomenclatural changes. The Eriphiidae has previously been known as the Menippidae and Oziidae. However, Eriphiidae is the oldest name and thus has nomenclatural priority. The Mimilambriidae Williams, 1979, is considered a junior synonym of Parthenopidae MacLeay, 1838 (see Ng and Rodriguez, 1986). The recognition of a separate family for the Eumedonidae, symbionts on echinoderms, follows Stevcic et al. (1988). Stevcic (1988) recognized a separate family, Cheiragonidae, for crabs previously classified in the Telmessinae (Atelecyclidae). Finally, the Camptandriidae, previously considered to be a subfamily of the Ocypodidae, is regarded here as a separate family, following the suggestions of Harminto and Ng (1991).

Characters useful for identification

The teeth of the **anterolateral margins** of the **carapace** are also known as the epibranchial teeth. The **first anterolateral tooth** is often called the "external orbital" or "exo-orbital" angle (or tooth) and is counted separately from the following **anterolateral teeth** by many authors (but not here). The **frontal margin** (or **front**) becomes elongate and/or spiniform in many crabs such as the homolids (deep-water porter crabs) and majids (spider crabs), and is then frequently called a **rostrum**.

The maximum **carapace width** is used as principal measurement indicating the size of a crab, measured as the greatest distance between the lateral margins of the carapace.

The **buccal cavern** (location of the mouthparts), is bordered on both sides by the **pterygostomial regions**, and above by the **epistome**. The calcareous plate inside the buccal cavern is called the **endostome**. Usually, only the anterior part of the endostome is visible, even when the mouthparts are moved aside. The outer mouth parts or **third maxillipeds** are often just referred to as "**the mouthparts**", even though there are actually 6 pairs of feeding appendages. Underneath the third maxillipeds, the **second maxillipeds** and **first maxillipeds** are located, normally covered by the third maxillipeds in life. Two smaller feeding appendages are situated below the 3 pairs of maxillipeds: the first maxilla (or maxilla) and second maxilla (or maxillules). Finally, the mouth is bordered by a pair of well-calcified, jaw-like, and highly modified appendages, the **mandibles**.

The 5 pairs of locomotory appendages of a crab (the pereopods) are made up of a pair of usually powerful **chelipeds** (legs carrying a **chela** or **pincer**) and normally of 4 pairs of **walking** (or ambulatory) **legs**. For the present contribution, the first appendage is referred to as the **cheliped** and the last 4 appendages (walking legs) as **legs**. The claw (or chela) itself consists of a **palm** (or manus) and 2 **fingers**, one of which is movable (the **dactylus** or **movable finger**), whereas the other one (**pollex**) is fixed. The tips or edges of the fingers may be **pectinated**. In some families the last pair or all walking legs are modified for swimming or burrowing, as seen in the Portunidae and the Matutinae (the latter a subfamily of the Calappidae).

Adult male and female crabs are easily distinguished by the shape of their **abdomen**. In males, the abdomen is triangular to broadly T-shaped, whereas in females it is broad, usually semicircular, often covering most part of the ventral surface. Almost all crabs have 7 **abdominal segments** (although the seventh segment or **telson** is actually not a true segment), but in a number of families, several segments are partially or completely fused. This fusion may be complete (i.e. with the sutures between segments no longer visible) or incomplete (i.e. with parts of the sutures still present or obscure). In both cases, however, the segments are immovable.

Many crab species show a sexual dimorphism, with the males usually being larger or possessing special or excessively developed structures. In some species, however, it is the female which grows larger. Males possess **2 pairs of gonopods**, that is, modified pleopods specifically adapted for copulation (most crabs practice internal fertilization). The pleopods (abdominal appendages) of females are branched, setose and serve to carry the eggs: fertilized eggs are exuded, attached to the setose pleopods of females, and kept there for several weeks until the planktonic larvae (zoeae) hatch out. The larvae pass several stages before they finally metamorphose to a young crab.

Many species of crabs possess **pubescence** to varying degrees on their body and appendages. The hair (or more appropriately called **setae**) may be soft or stiff, simple or plumose (plume-like), or so short that it becomes pile-like, sometimes even short and dense, giving a velvet-like appearance. The setae may sometimes be hard and spine-like, especially on the propodus and dactylus of legs. Unlike real spines, however, those stiff setae are never calcareous. Majids often possess hook-like setae that attach to sponges, algae, and debris (similar in action to velcro), supporting the camouflage of the crab. In other species, the longer and/or plumose setae gather dirt and mud in order to obscure the animal's outline. Most of the softer setae on the legs and chelae have a sensory function.

Carapace types

The shape of the carapace is often used as a descriptive character in many guides and keys. Unfortunately, a large variety of terms have been introduced in the past, not always applied with exactly the same meaning. Therefore, an approximate categorization has been attempted here and those carapace types which belong to a respective category are illustrated below. It should be remembered, however, that there are sometimes no clear lines separating the different carapace types, and so the designation of a particular type may be somewhat subjective in certain cases. Nevertheless, the use of carapace shapes is still a useful character in many instances.

The carapace types utilized here are shown in Figures A to N.

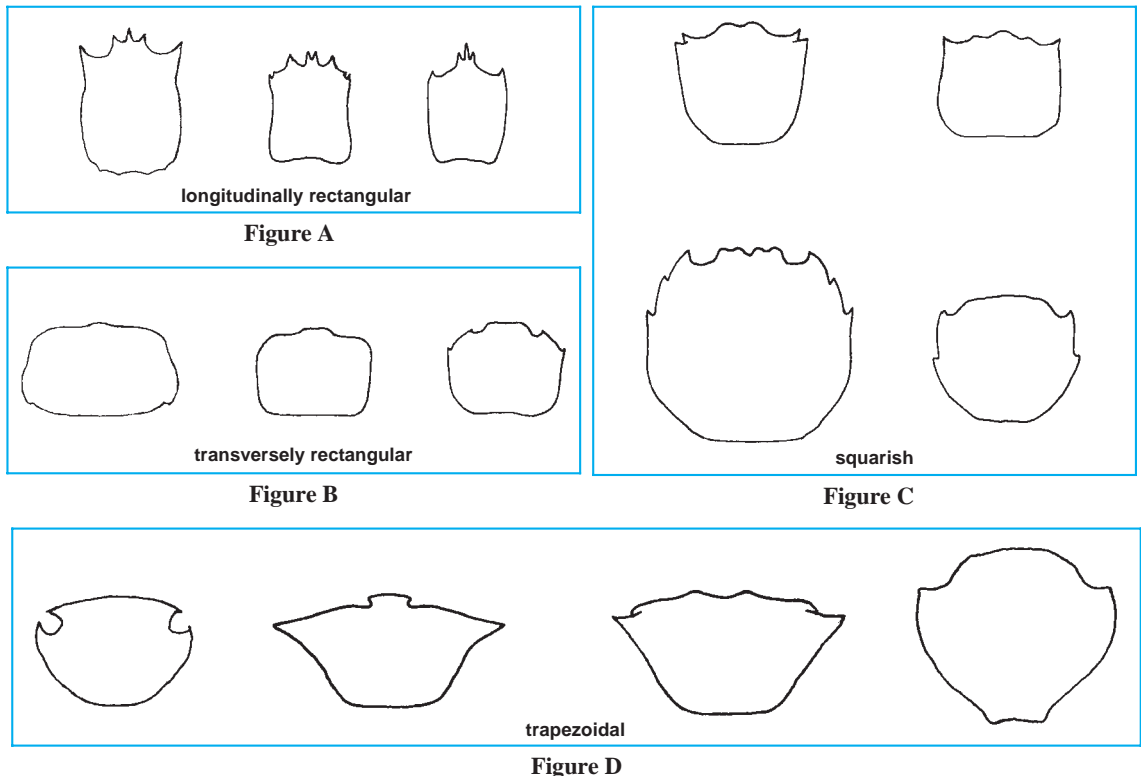
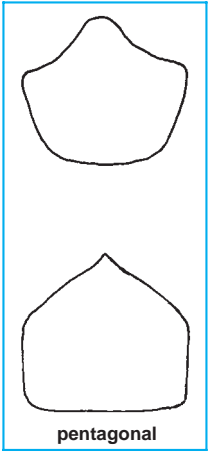
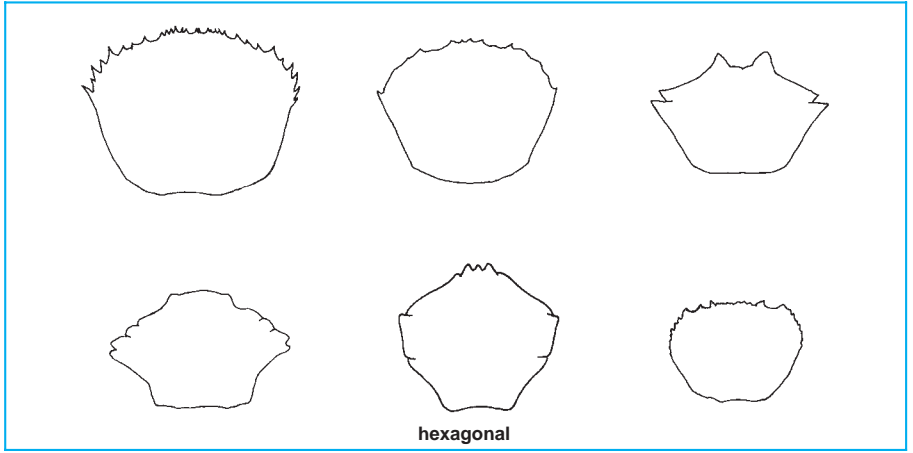


Figure D



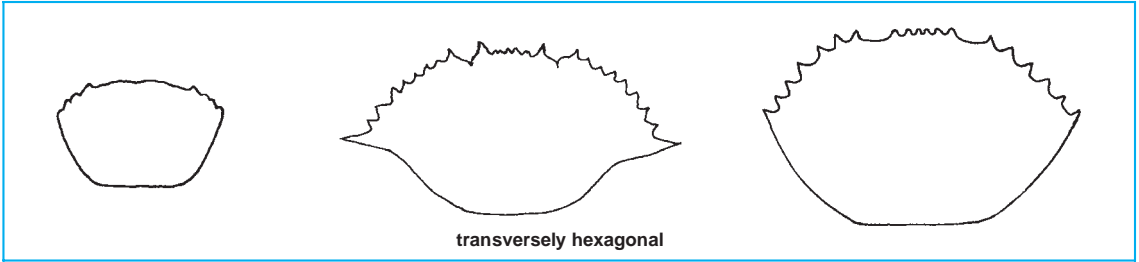
pentagonal

Figure E



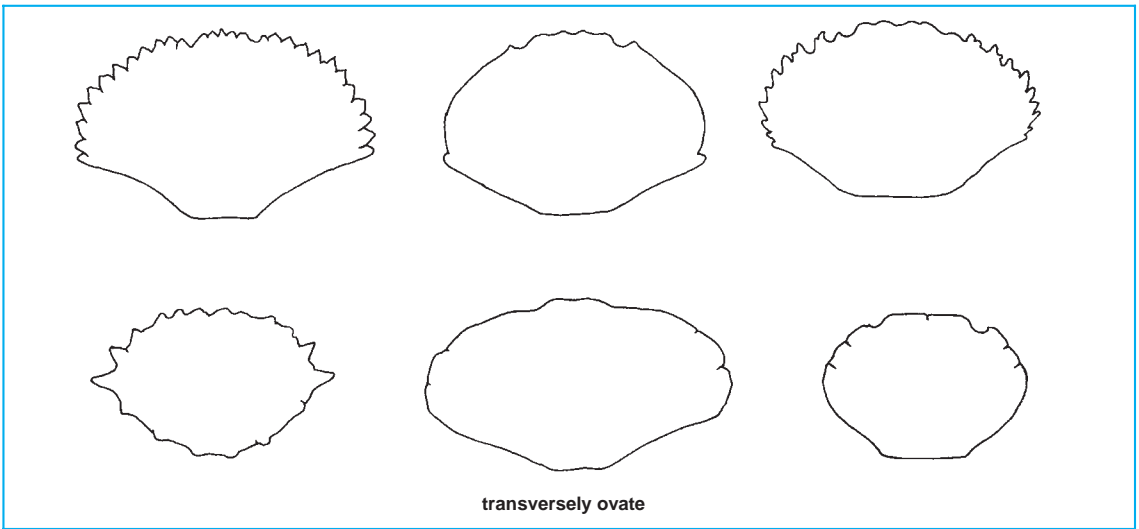
hexagonal

Figure F



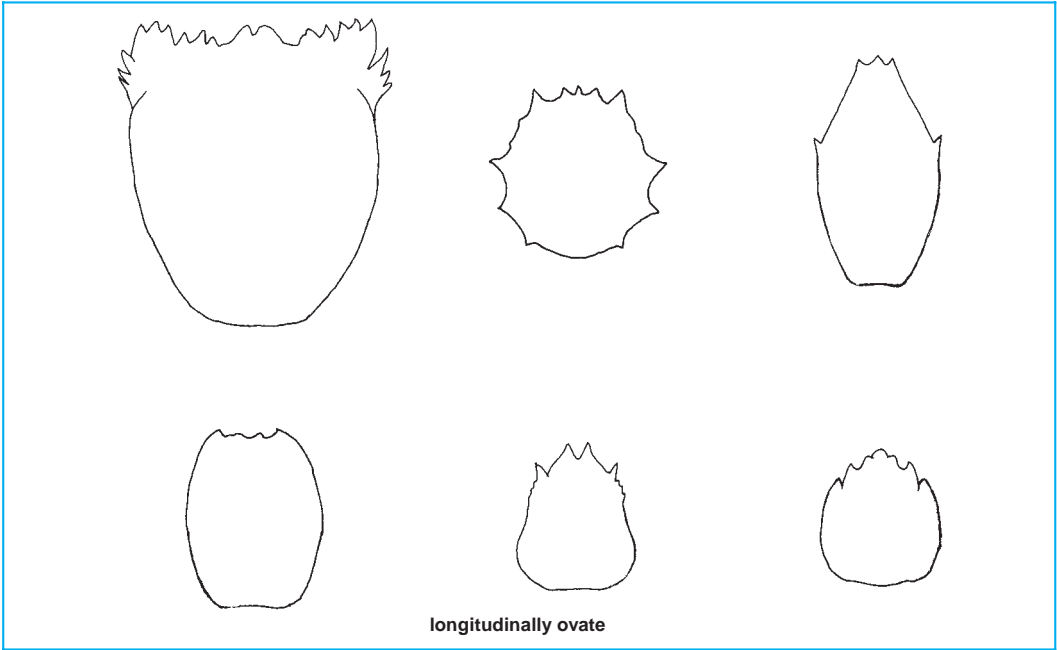
transversely hexagonal

Figure G



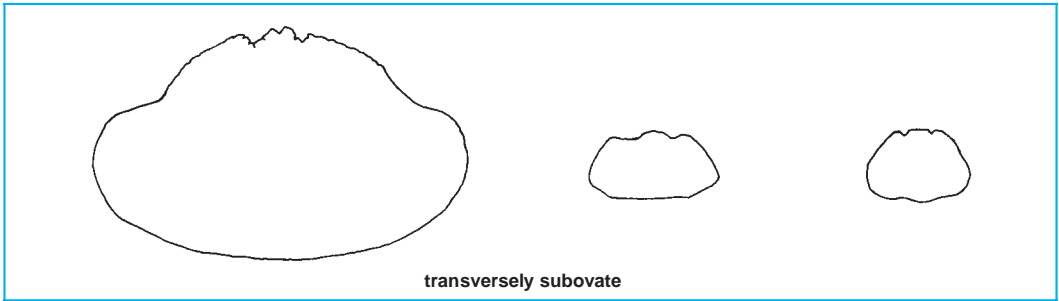
transversely ovate

Figure H



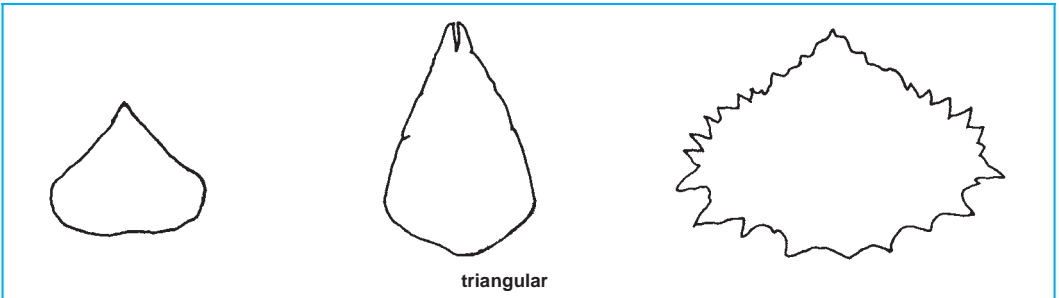
longitudinally ovate

Figure I



transversely subovate

Figure J



triangular

Figure K

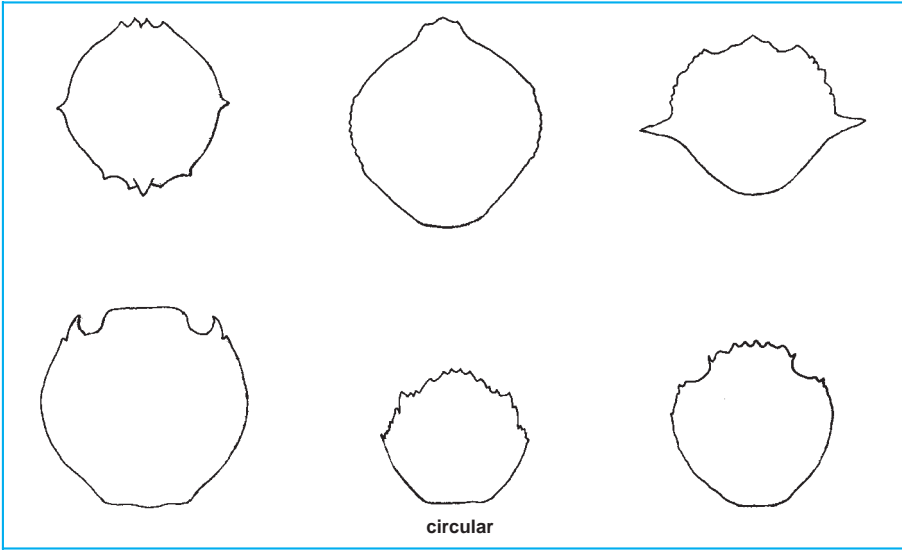


Figure L

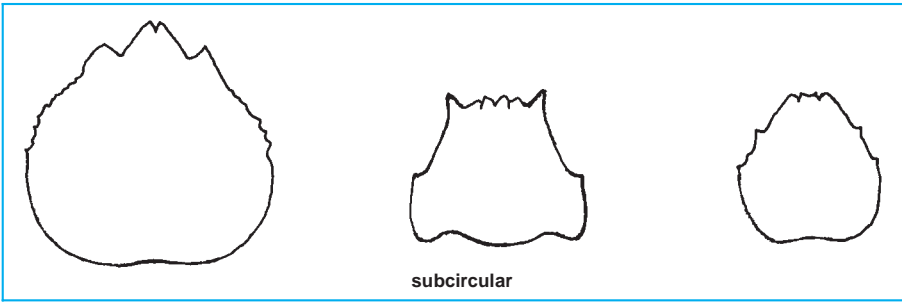


Figure M

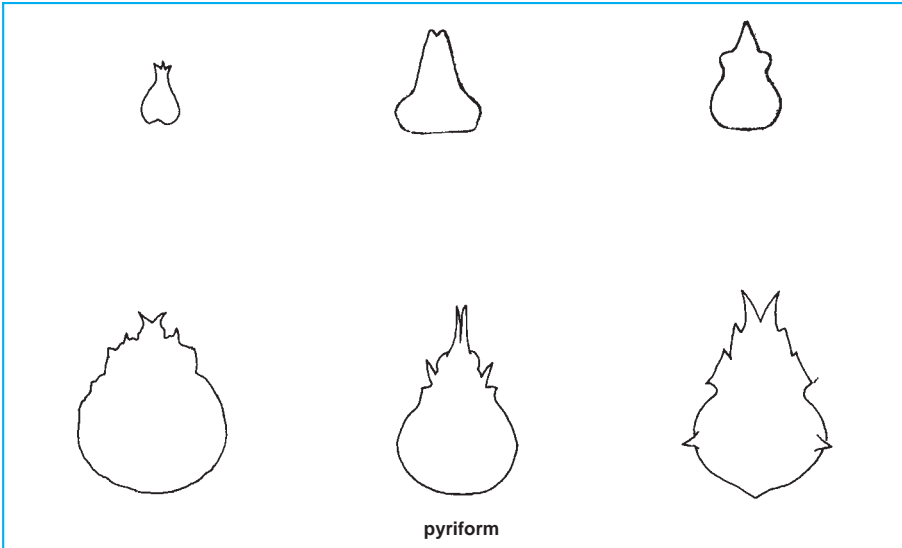
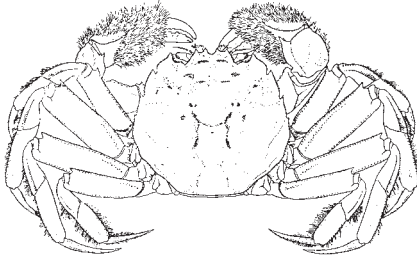


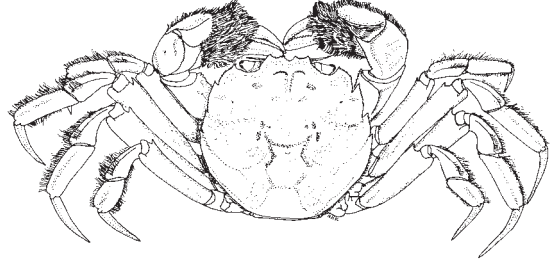
Figure N

IMPORTED CRABS OF COMMERCIAL IMPORTANCE

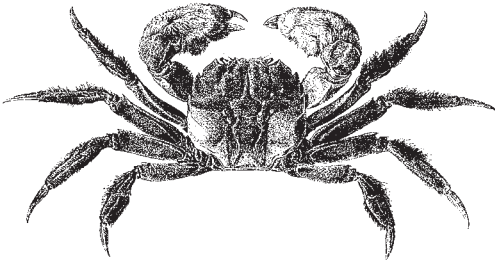
Several species of non-Western Central Pacific crabs are regularly imported into the area, notably to Singapore, Malaysia, and Thailand. They command very high market values and are popular not only among locals but also the relatively large expatriate community (especially Japanese) in these countries. In most cases, they are brought in alive for better value and for the live-seafood restaurant trade. Therefore, one would probably frequently encounter these species in markets or retailers. The main species imported are "Chinese mitten or hairy crabs" (*Eriocheir sinensis*, *E. hepuensis*), "Japanese mitten crab" (*E. japonicus*), "giant Tasmanian crab" (*Pseudocarcinus gigas*), "snow crab" (*Chionoecetes opilio* and *C. japonicus*), "queen crab" (*Erimacrus isenbeckii*), and "Alaskan king crab" (*Paralithodes camtschaticus*).



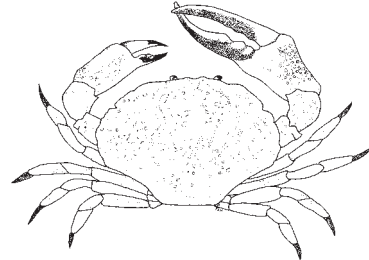
Eriocheir sinensis
(from Shen, 1932)



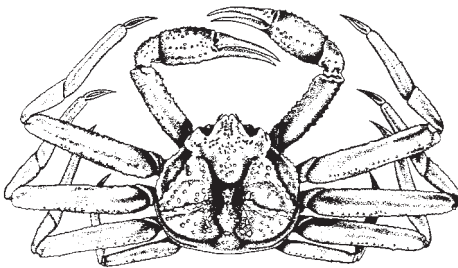
Eriocheir hepuensis



Eriocheir japonicus
(from De Haan, 1833)



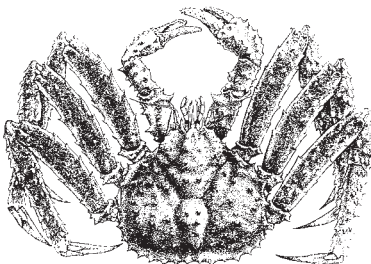
Pseudocarcinus gigas



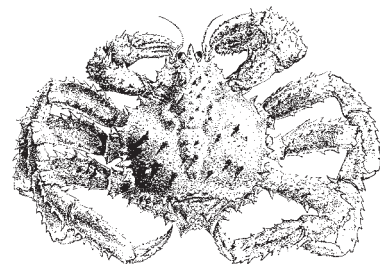
Chionoecetes opilio
(after Kobayakowa, 1955)



Erimacrus isenbeckii
(after Kobayakowa, 1955)



Paralithodes camtschaticus (male)



Paralithodes camtschaticus (female)

(after Kobayakowa, 1955)

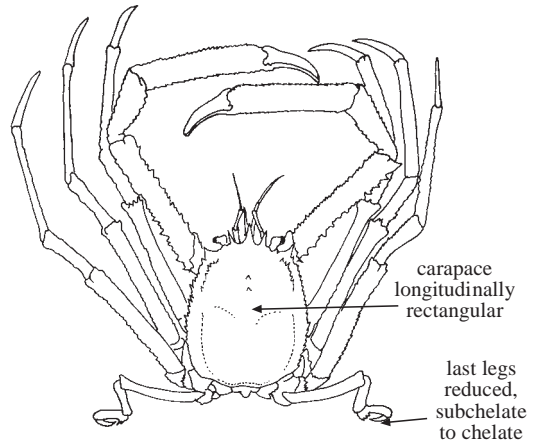
GUIDE TO FAMILIES OF INTEREST TO FISHERIES OCCURRING IN THE AREA

HOMOLIDAE

Page 1083

Deep-water carrier crabs

Carapace longitudinally rectangular; dorsal surface granulose to spinose; front narrow, usually with 3 long horn-like projections (rostra). Male chelipeds long. Last pair of legs inserted obliquely on carapace and directed upwards, reduced, subchelate to chelate. All male abdominal segments distinct, movable.

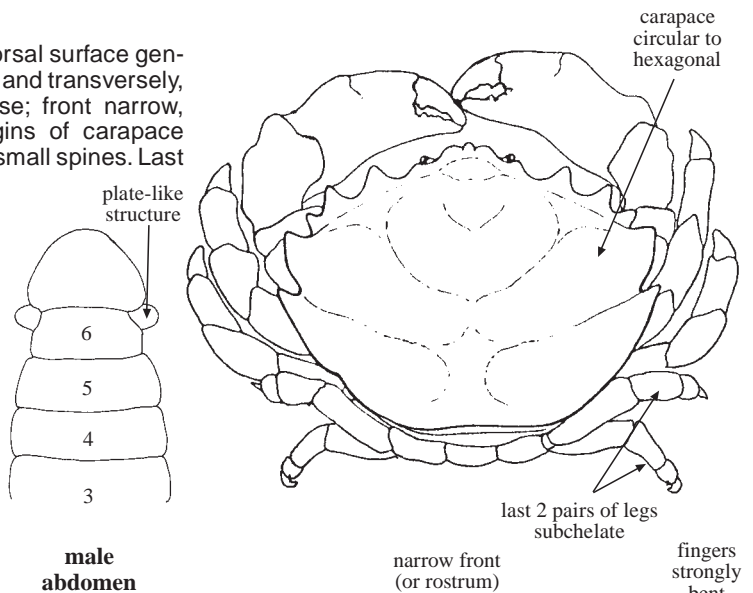


DROMIIDAE

Page 1085

Sponge crabs

Carapace circular to hexagonal; dorsal surface gently to strongly convex longitudinally and transversely, smooth or granular, usually setose; front narrow, usually entire; anterolateral margins of carapace strongly convex, unarmed, or with small spines. Last 2 pairs of legs inserted obliquely on carapace and directed upwards, strongly reduced, subchelate, modified to carry sponges or tunicates on back of carapace. All male abdominal segments distinct, movable; a small platelet-like structure usually intercalated between edges of sixth abdominal segment and telson. Male first gonopod stout, simple; male second gonopod long, usually subequal or longer than length of male first gonopod. Male and female genital openings sternal.

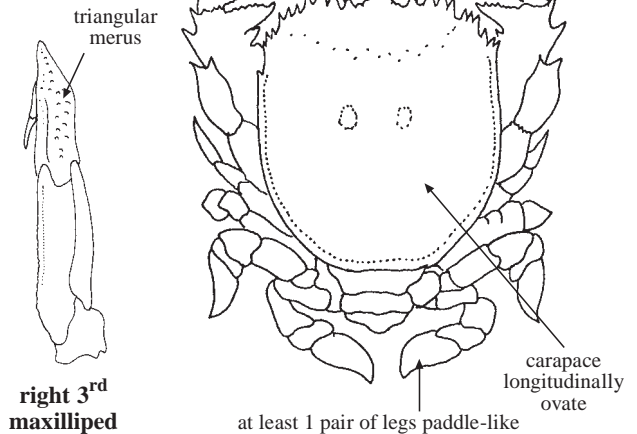


RANINIDAE

Page 1089

Spanner crabs

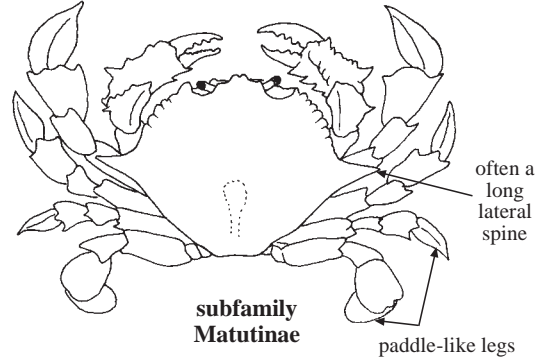
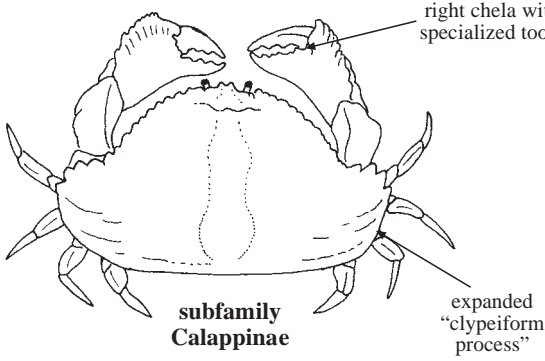
Carapace longitudinally ovate; dorsal surface strongly granulose or squamose to smooth; front triangular, narrow. Third maxillipeds very narrow, merus distinctly triangular. Eystalks long, longer than front. Fingers of chela strongly bent; at least 1 pair of legs with last 2 or 3 segments paddle-like. Thoracic sternum very narrow, especially sternites 5 to 7. All male abdominal segments distinct, movable.



CALAPPIDAE

Box and moon crabs

Carapace circular, ovate to transversely ovate and subovate, sides of carapace may be expanded to form a clypeiform process (= expanded posterior edge). Merus of third maxillipeds distinctly triangular; opening for afferent respiratory current at base of chela, no canal present along sides of buccal cavern even when third maxillipeds pushed aside. Larger chela may have specialized cutting tooth for cutting gastropod shells. Propodus and dactylus of legs may be paddle-like. Male abdominal segments 3 to 5 completely fused; male genital openings always coxal.



XANTHIDAE

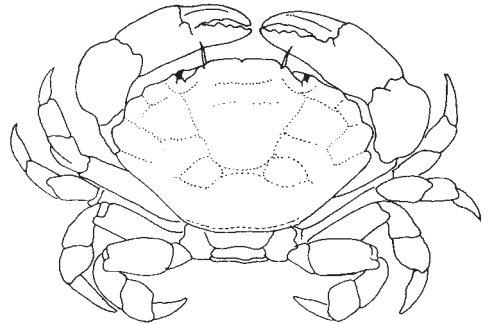
Stone and mud crabs

Carapace hexagonal, transversely hexagonal to transversely ovate, sometimes circular; dorsal surface usually ridged or granulose; frontal margin usually notched medially; usually 2 to 6 spines, teeth and/or lobes on each anterolateral margin. Longitudinal ridges which define efferent respiratory current usually absent or strong only on posterior part of endostome, ridges not visible on anterior part of endostome when mouthparts pushed aside. Fingers of chela may be spoon-tipped. Legs varying in structure; propodus and dactylus may show a special dactylo-propodal articulation. Male abdominal segments 3 to 5 immovable, fused completely or incompletely. Male first gonopod slender, slightly sinuous; male second gonopod very short, less than 1/4 the length of male first gonopod.

segments 3-5 fused (completely or incompletely)



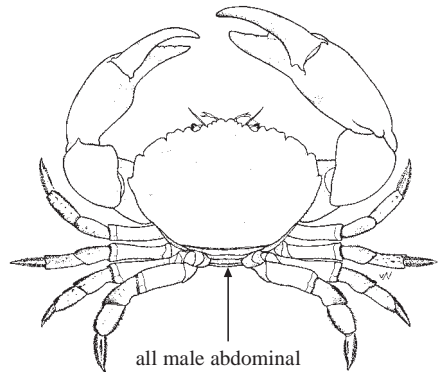
male abdomen



ERIPHIIDAE

Stone and mud crabs

Carapace hexagonal, transversely rectangular to transversely ovate; dorsal surface ridged or granulose; frontal margin notched medially; 4 teeth and/or lobes on each anterolateral margin. Legs normal. Longitudinal ridges which define efferent respiratory current well developed along entire endostome, ridges visible on anterior part of endostome when mouthparts pushed aside. All male abdominal segments distinct, movable. Male first gonopod stout, almost straight or gently curved; male second gonopod elongate, longer or subequal in length to male first gonopod.



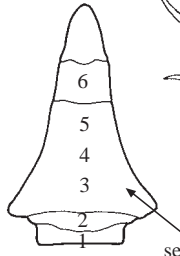
all male abdominal segments freely movable

CARPILIIDAE

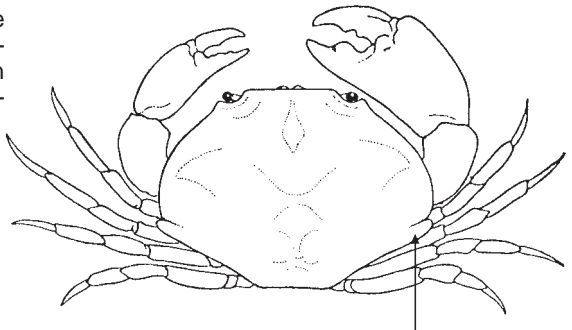
Page 1110

Reef crabs

Carapace transversely ovate; dorsal surface smooth, distinctly convex longitudinally and transversely; front entire; a single low, small tooth on each anterolateral margin. Legs simple. Longitudinal ridges which define efferent respiratory current usually absent or strongly developed on posterior part of endostome only; ridges not clearly visible on anterior part of endostome when mouthparts pushed aside. Male abdominal segments 3 to 5 immovable, completely fused. Male first gonopod stout, almost straight or gently curved; male second gonopod elongate, longer or subequal in length to male first gonopod.



male
abdomen



anterolateral margin
with a single tooth

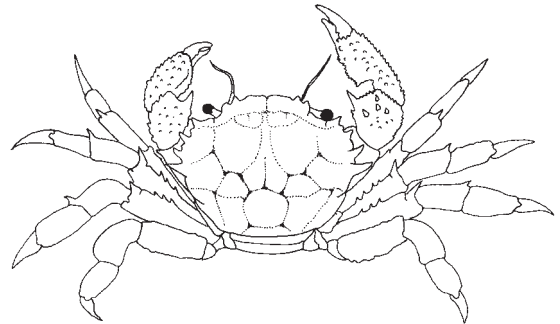
segments 3-5
completely
fused

PILUMNIDAE

Page 1112

Hairy crabs

Carapace hexagonal, transversely rectangular or transversely ovate; dorsal surface convex, smooth to granulated; frontal margin entire to multilobate; usually 1 to 4 teeth or lobes on each anterolateral margin. Longitudinal ridges defining efferent respiratory current usually well developed along entire endostome, ridges visible on anterior part of endostome when mouthparts pushed aside. Legs normal. Male abdominal segments 3 to 5 freely movable. Male first gonopod slender, S-shaped, distal part simple; male second gonopod very short, sigmoid.



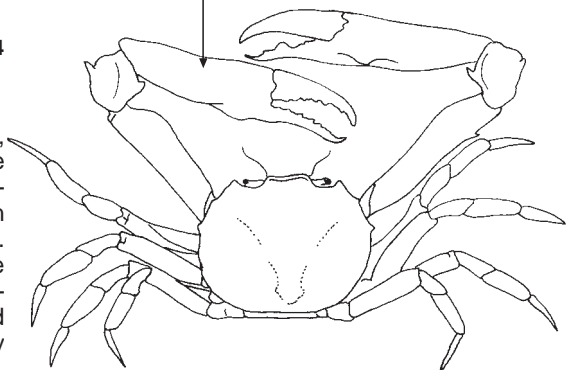
male chelipeds elongate

GONEPLACIDAE

Page 1114

Rhomboid crabs

Carapace hexagonal, transversely rectangular, trapezoidal, or transversely ovate; dorsal surface convex, usually smooth; frontal margin usually entire, sometimes multilobate; anterolateral margin usually armed with 1 to 4 teeth or lobes, or entire. Male abdominal segments 3 to 5 distinct, movable or fused and immovable. Male first gonopod moderately stout, gently curved or sinuous; male second gonopod relatively short to elongate, but usually shorter than male first gonopod.

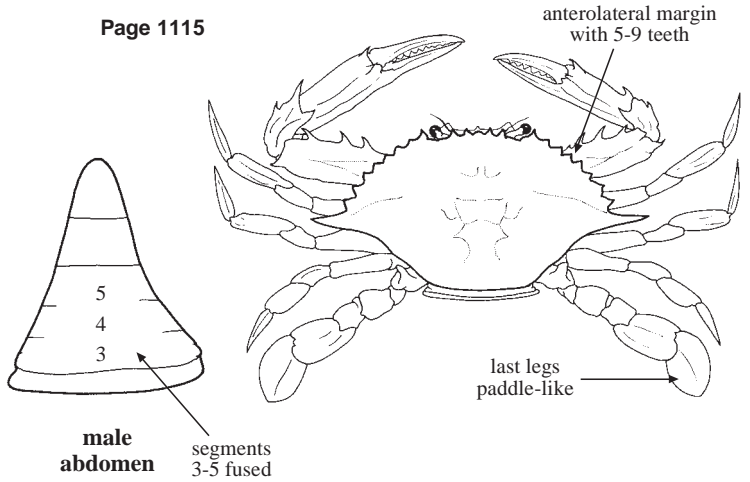


PORTUNIDAE

Page 1115

Swimming crabs

Carapace hexagonal, transversely ovate to transversely hexagonal, sometimes circular; dorsal surface relatively flat to gently convex, usually ridged or granulose; front broad, its margin usually multidentate; usually 5 to 9 teeth on each anterolateral margin of carapace; posterolateral margins usually distinctly converging. Legs laterally flattened to varying degrees, last 2 segments of last pair paddle-like. Male abdominal segments 3 to 5 completely fused, immovable.

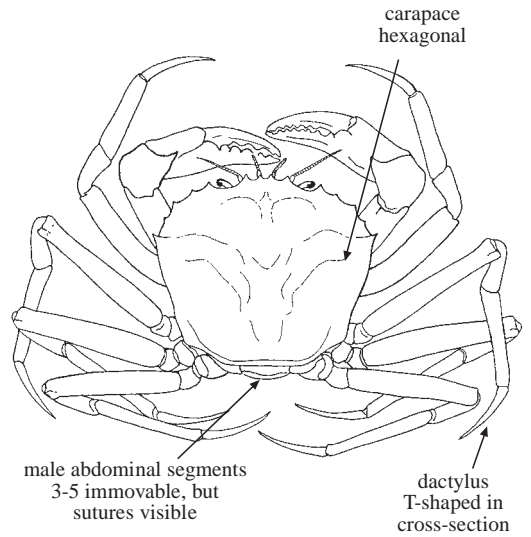


GERYONIDAE

Page 1132

Golden crabs

Carapace hexagonal; dorsal surface relatively smooth to granular; frontal margin with 4 teeth; anterolateral margins distinctly convex, each with 3 to 5 low, sometimes indistinct teeth. Dactylus of walking legs T-shaped in cross-section. Male abdominal segments 3 to 5 fused, functionally immovable, but sutures still visible.

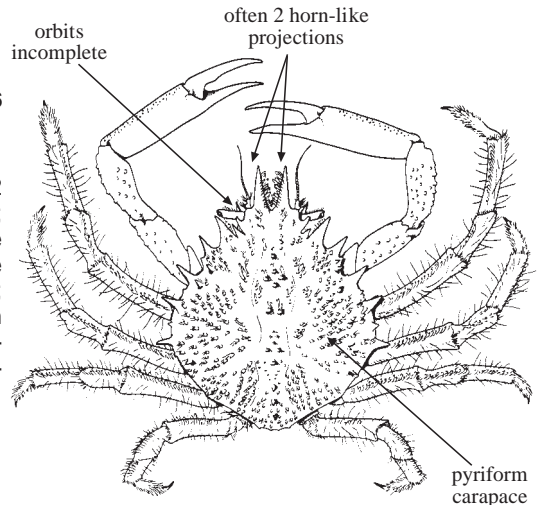


MAJIDAE

Page 1136

Spider crabs

Carapace pyriform, circular to subovate, anterior 1/2 to 1/3 usually distinctly narrower than posterior part; dorsal surface gently convex, spinulose, granulose and/or ridged; front narrow, often with 2 long horn-like projections (rostra); orbits poorly developed to absent; anterolateral margins of carapace often armed with well-developed spines. Legs spinulose and/or granulose, often with stiff setae. All male abdominal segments usually freely movable in most species.

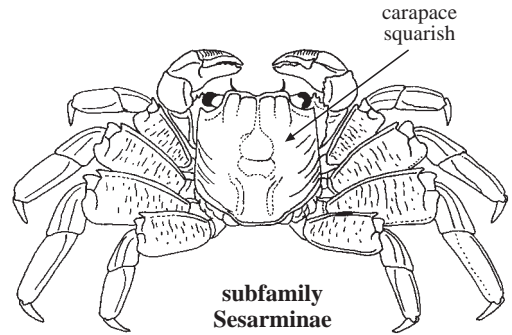
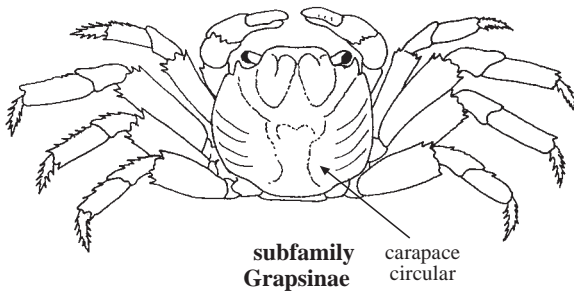


GRAPSIDAE

Page 1138

Sally-light-foots, vinegar crabs, and paddler crabs

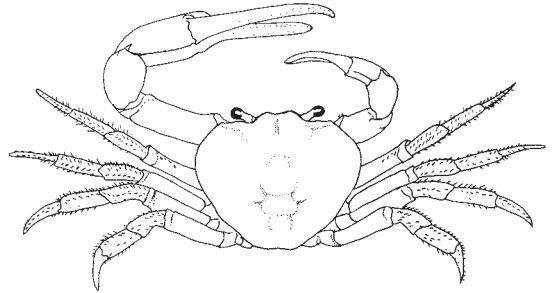
Carapace squarish, transversely rectangular, trapezoidal or circular; dorsal surface flat to gently convex, with low oblique or transverse ridges; front much broader than orbits; orbits occupying almost entire anterior border (excluding front); antero- and posterolateral margins of carapace usually not clearly demarcated, lateral margins appearing almost straight or gently convex, usually armed with 1 or 2 teeth anteriorly. Rhomboidal gap usually present between third maxillipeds; mandibles often exposed. Dactylus of legs with distinct spines. Male abdominal segments 3 to 5 freely movable in most species.

**GECARCINIDAE**

Page 1147

Land crabs

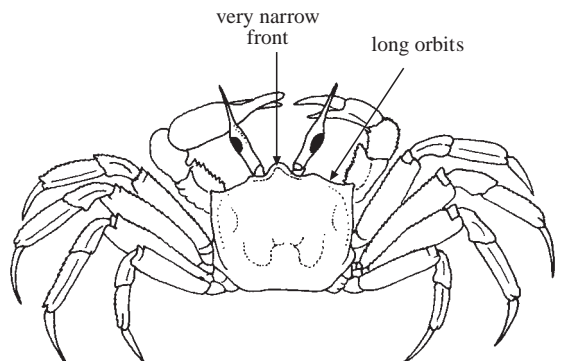
Carapace circular to transversely ovate; dorsal surface smooth, strongly convex longitudinally and transversely; frontal margin entire; anterolateral margins unarmed or each with a single tooth; rhomboidal gap present between the third maxillipeds. Legs stout, dactylus longitudinally ridged, often with dense, stiff setae, margins with spines. All male abdominal segments distinct, movable.

**OCYPODIDAE**

Page 1152

Ghost crabs

Carapace squarish, transversely rectangular, trapezoidal or transversely ovate; dorsal surface gently convex, usually smooth or with grooves; frontal margin entire, relatively narrow; orbits broad, occupying almost entire anterior border (excluding the front), antero- and posterolateral margins of carapace usually not clearly demarcated, lateral margins appearing almost straight or gently convex, lateral margins unarmed. Eystalks long, longer than width of orbit. No rhomboidal gap between third maxillipeds. Dactylus of legs with numerous stiff setae. Ventral surface of abdomen or base of legs may have tufts of fine setae. All male abdominal segments distinct, movable.

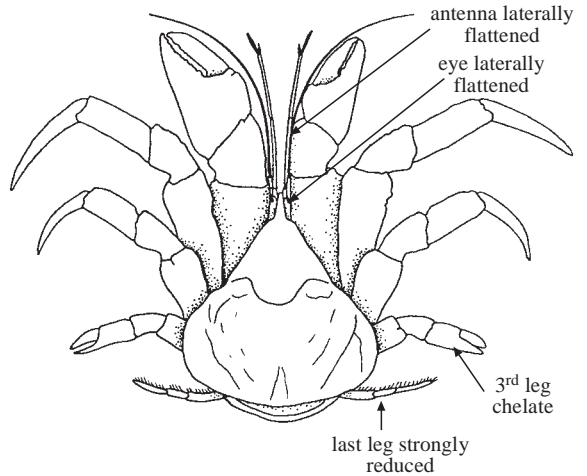


COENOBITIDAE

Page 1154

Land hermit crabs and coconut crabs

Carapace relatively well calcified; eyestalk laterally flattened; eyes usually held subparallel to each other. Antennae laterally flattened. Coxae of third maxillipeds close to each other, without distinct gap between them. Chelipeds short, stocky, equal or unequal; when unequal, left chela larger. First 2 pairs of walking legs well developed, last 2 pairs reduced, third legs chelate. Abdomen bilaterally asymmetrical, not clearly divided into segments. Either hermit crabs or distinctly crab-like animals with abdomen tucked under carapace; uropods modified into a "rasp" used for clinging interior of gastropod shells (except in *Birgus latro*).



KEY TO THE FAMILIES OF BRACHYURAN CRABS

Note: the following key covers all marine families of brachyuran crabs recognized in this work, most of which have been reported from the Western Central Pacific. The 5 families which so far are known only from other regions of the world have been included in the anticipation that some of them may be recorded in the future from the area. Wherever possible, external and easily viewed characters are utilized, and in most cases, no smaller structures have been chosen, such as male gonopods and structures of male and female genitalia (which are very important in crab classification). Due to the diversity in some families (e.g. Xanthidae and Goneplacidae), not all their members can be identified to the family level with this key, although it should work for the majority of species encountered. There are also a number of unusual species, the familial classification of which is still contentious. For a more comprehensive key, see Sakai (1976) and Dai and Yang (1991). For the identification of some more difficult species, the only safe way is to send the sample(s) to an expert of decapod taxonomy.

- 1a. Only 3 pairs of legs visible, fourth pair absent (Fig. 1) **Hexapodidae**
- 1b. Four pairs of legs visible → 2
- 2a. Basal segment of eyestalk much longer than terminal article, from dorsal view, eyestalk appears to be 2-segmented (Figs 2a and 3) . . . **Latreillidae**
- 2b. Basal segment of eyestalk much shorter than terminal article, from dorsal view, eyestalk appears to be unsegmented (Fig. 2b) → 3

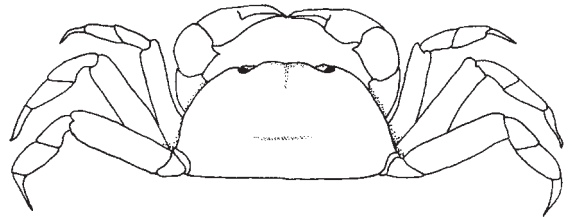


Fig. 1 Hexapodidae

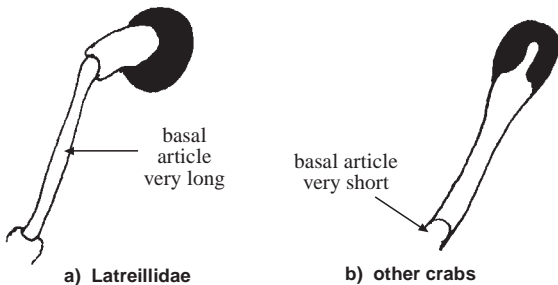


Fig. 2 eyestalk

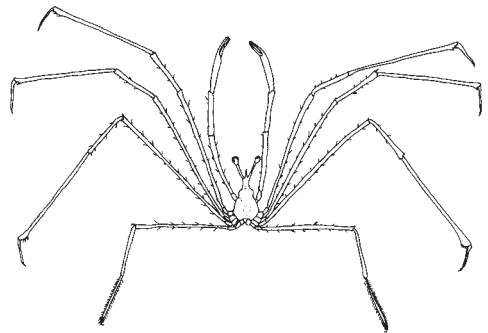


Fig. 3 Latreillidae

- 3a. Fourth (last) last pair of legs distinctly subchelate to chelate (Fig. 4a-f) or strongly reduced to just 3 articles, inserted obliquely on carapace and directed upwards → 4
- 3b. Fourth (last) last pair of legs normal in structure or reduced in size but not subchelate or chelate (Fig. 4g) and never reduced to just 3 articles, inserted laterally on carapace and directed laterally → 10

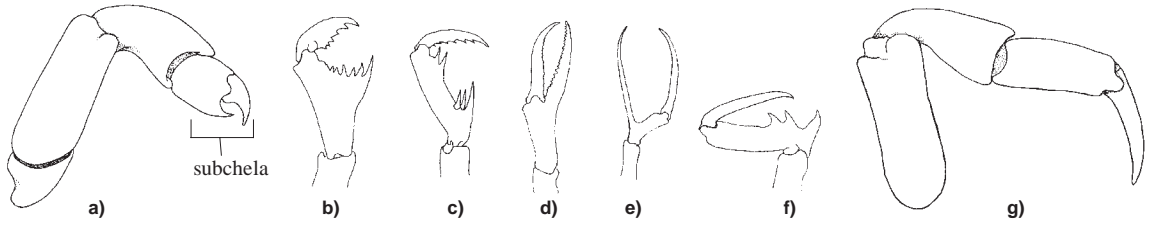


Fig. 4 last leg: (a-f) various types of subchelate to chelate conditions of propodus and dactylus; (g) normal leg

- 4a. Merus of third maxilliped distinctly triangular in shape (Fig. 5a) → 5
- 4b. Merus of third maxilliped quadrate to subquadrate, never clearly triangular in shape (Fig. 5b, c). → 7

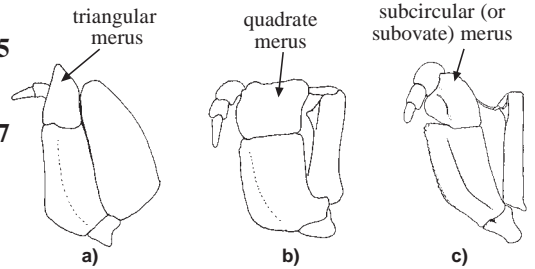


Fig. 5 third maxilliped

- 5a. Third maxillipeds not covering a large anterior part of buccal cavern which is normally filled by the exposed second maxillipeds (Fig. 6a); crab carries inanimate objects (e.g. shells and leaves) or sea anemones (Fig. 7) . . . **Dorippidae**
- 5b. Third maxillipeds covering or almost completely covering anterior part of buccal cavern, second maxillipeds always covered and not exposed (Fig. 6b); crab usually carries pieces of inanimate objects (e.g. dead shells and sticks) when alive → 6

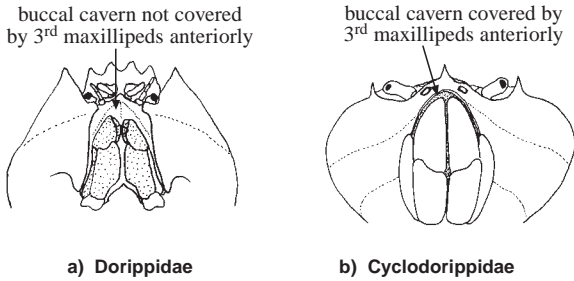


Fig. 6 mouth field

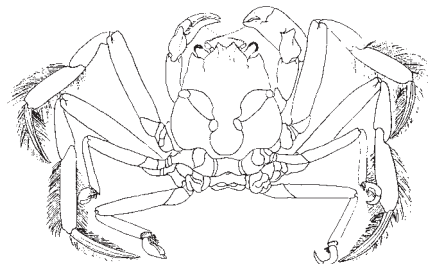


Fig. 7 Dorippidae (after Shen, 1932)

- 6a. Carapace hexagonal to subovate (Fig. 9); orbits distinct; exopod of third maxilliped usually without flagellum (Fig. 8a). **Cyclodorippidae**
- 6b. Carapace rectangular to squarish (Fig. 10); orbits absent; exopod of third maxilliped with distinct flagellum (Fig. 8b) **Cymonomidae**

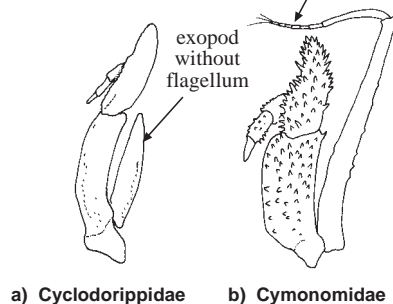


Fig. 8 third maxilliped

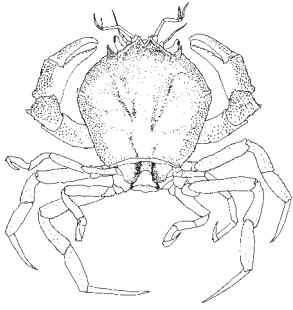


Fig. 9 Cyclodorippidae

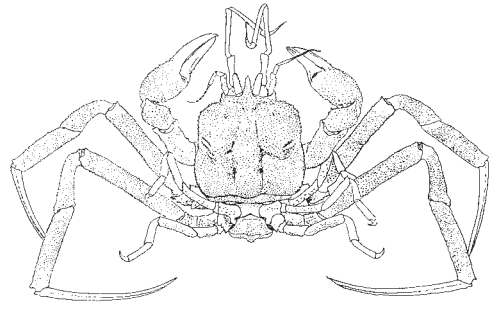


Fig. 10 Cymonomidae

- 7a. Carapace pyriform (pear-shaped) (Fig. 12); orbits incomplete; carapace, chelipeds, and legs often with hooked setae; vulvae of adult female on thoracic sternum (Fig. 11a) **Majidae** (in part) (p. 1136)
- 7b. Carapace shape not as above; orbits usually complete; carapace, chelipeds, and legs without hooked setae; vulvae of adult female on coxae of third legs (Fig. 11b) → 8

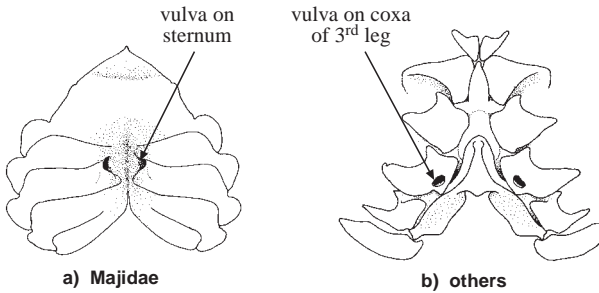


Fig. 11 position of female vulvae on ventral side of body (abdomen omitted)

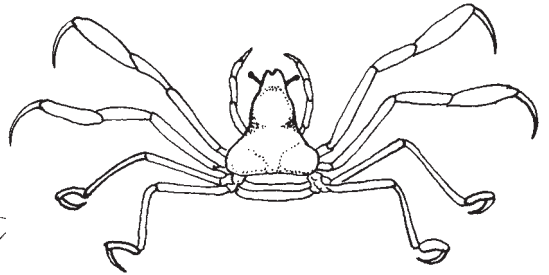


Fig. 12 Majidae

- 8a. Carapace longitudinally rectangular, dorsal surface glabrous or with scattered stiff setae; only fourth pair of legs with dactylus and propodus subchelate to chelate (Fig. 13) **Homolidae** (p. 1083)
- 8b. Carapace longitudinally ovate, circular or hexagonal, dorsal surface usually with dense, soft setae; both third and fourth legs with dactylus and propodus subchelate to chelate; carries sponges and sea anemones when alive → 9

- 9a. Carapace circular to hexagonal; a small platelet-like structure usually intercalated between edges of sixth abdominal segment and telson (Fig. 14a); crab carries sponges, tunicates, and bivalve shells (Fig. 15) **Dromiidae** (p. 1085)
- 9b. Carapace longitudinally ovate; no platelet-like structure intercalated between edges of sixth abdominal segment and telson (Fig. 14b); crab believed to carry sponges or related objects (Fig. 16) **Homolodromiidae**

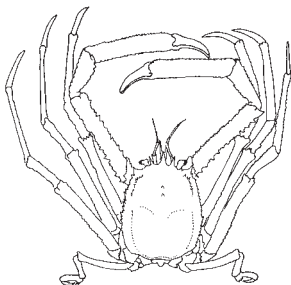


Fig. 13 Homolidae

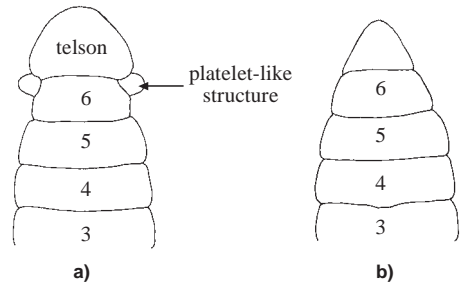


Fig. 14 male abdomen

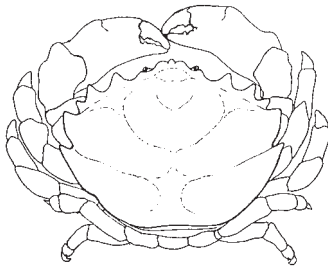


Fig. 15 Dromiidae

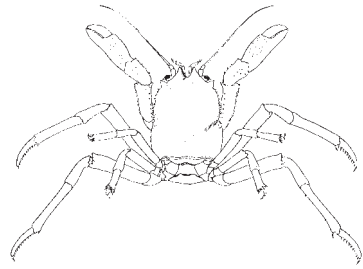


Fig. 16 Homolodromiidae (after Alcock and Anderson, 1899)

- 10a. Merus of third maxilliped distinctly triangular in shape (Fig. 17a) → 11
- 10b. Merus of third maxilliped quadrate to ovoid, never distinctly triangular in shape (Fig. 17b) → 14
- 11a. Carapace longitudinally ovate; sternum very narrow, thoracic sternites 5 to 7 very narrow (Fig. 18a); fingers of chela strongly bent (Fig. 19) **Raninidae** (p. 1089)
- 11b. Carapace shape not as above; sternum normal, thoracic sternites 5 to 7 not strongly narrowed (Fig. 18b); fingers of chela not strongly bent → 12

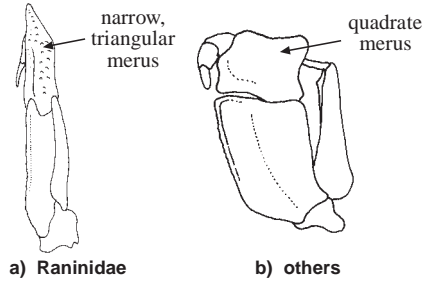


Fig. 17 third maxilliped

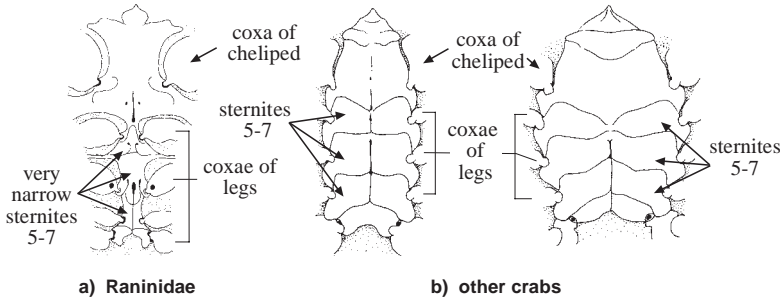


Fig. 18 thoracic sternum (ventral side of body, between legs)

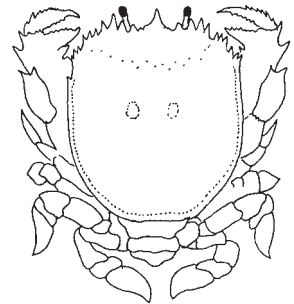


Fig. 19 Raninidae

- 12a. Carapace subcircular with strong teeth on lateral margins; only dactylus of fourth leg paddle-like (Fig. 21); vulvae of adult female exposed, not covered by abdomen (Fig. 20a) **Orithyiidae** (family not recorded from the area so far)
- 12b. Carapace either of differing shape, or, if subcircular, never with strong teeth on lateral margins; dactylus of fourth leg normal and styliform, or, if paddle-like, all other dactyli of legs are also similarly structured; vulvae of adult female always covered by abdomen (Fig. 20b) → 13

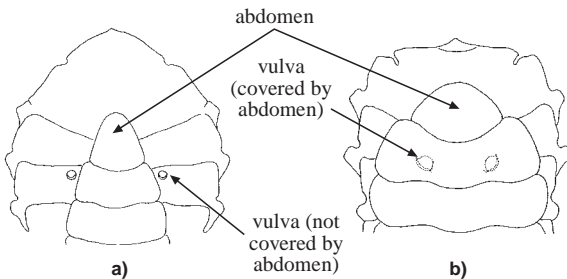


Fig. 20 position of female vulvae

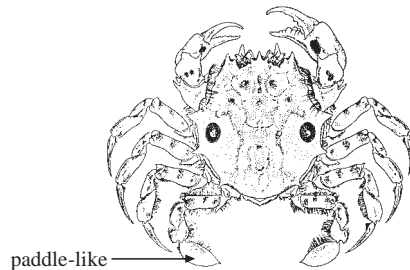


Fig. 21 Orithyiidae (after Shen, 1932)

- 13a. Opening for afferent respiratory current below orbits, adjacent to endostome, with distinct canal present along sides of buccal cavern (Fig. 22a) when third maxillipeds pushed aside; sides of carapace never expanded to form a clypeiform process (= expanded posterior edge); larger chela never with specialized cutting tooth; legs never paddle-like (Fig. 23) **Leucosiidae**
- 13b. Opening for afferent respiratory current at base of chela, no canal present along sides of buccal cavern even when third maxillipeds pushed aside (Fig. 22b); sides of carapace may be expanded to form a clypeiform process; larger chela may have a specialized cutting tooth (Fig. 24); propodus and dactylus of legs may be paddle-like (Fig. 25) **Calappidae** (p. 1091)

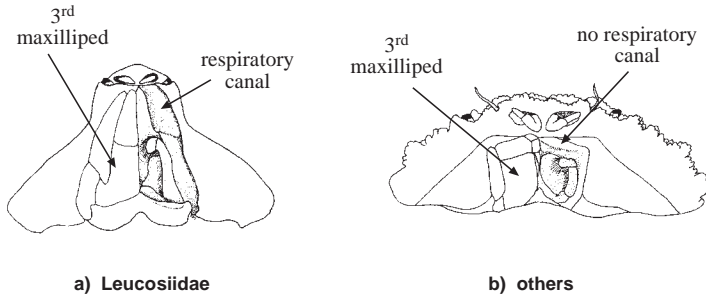


Fig. 22 presence or absence of respiratory canal

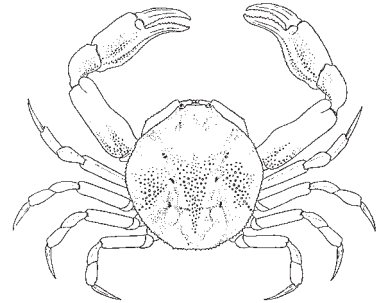


Fig. 23 Leucosiidae (after Shen, 1932)

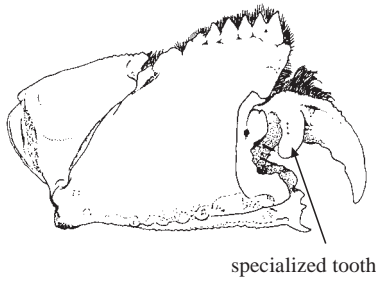
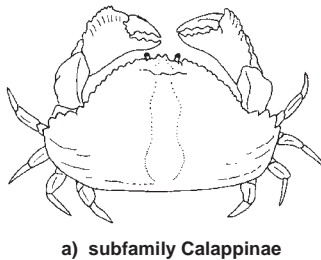
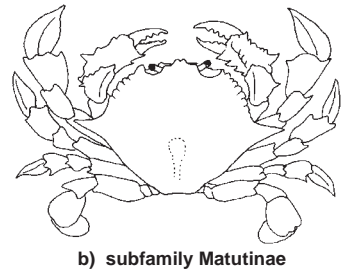


Fig. 24 right chela (Calappidae)



a) subfamily Calappinae



b) subfamily Matutinae

Fig. 25 Calappidae

- 14a. A small platelet-like structure always intercalated present between edges of sixth abdominal segment and telson (Fig. 26a); fourth leg strongly reduced, present only as a short appendage (only partially subchelate in 1 Atlantic species); no known carrying behaviour (Fig. 27) **Dynomenidae**
- 14b. No platelet-like structure intercalated between edges of sixth abdominal segment and telson (Fig. 26b); fourth leg reduced but always distinct, with most segments slender, relatively long → 15

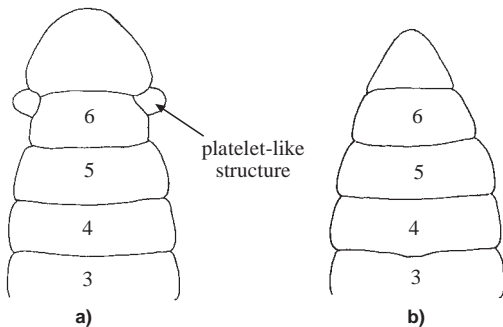


Fig. 26 male abdomen

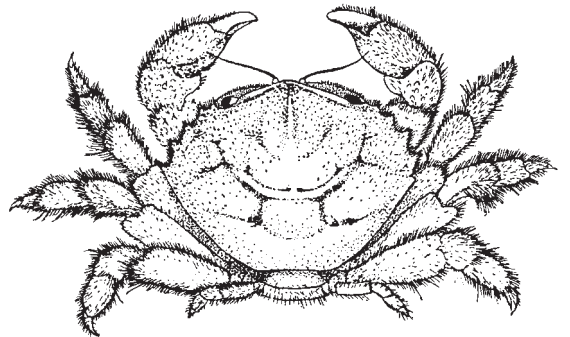


Fig. 27 Dynomenidae

- 15a. Fourth leg strongly reduced compared to other legs (Fig. 28a) → 16
- 15b. Fourth leg subequal to other legs, or if smaller, not greatly reduced in size compared to third leg (Fig. 28b) → 17

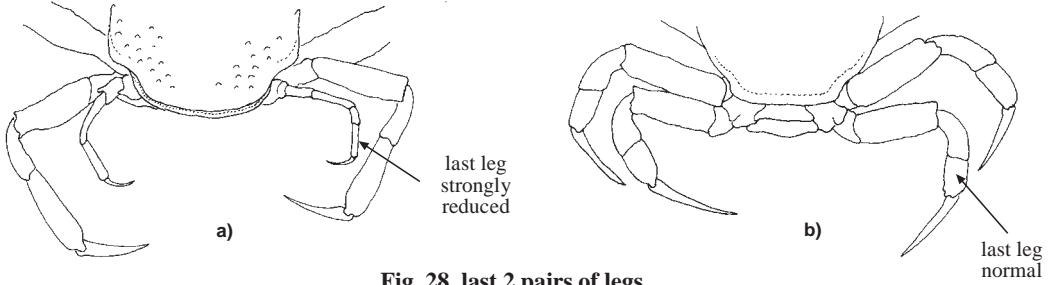


Fig. 28 last 2 pairs of legs

- 16a. Carapace circular; dorsal surface granulated; fourth leg reduced but normal in structure, dactylus curved, tapering to a sharp point (Fig. 29) **Palicidae**
- 16b. Carapace hexagonal, dorsal surface usually with 1 or 2 distinct transverse ridges; fourth pair of legs very slender, almost filament-like, often appearing feather-like, dactylus straight, with rounded tip (Figs 30 and 31) **Retroplumidae**

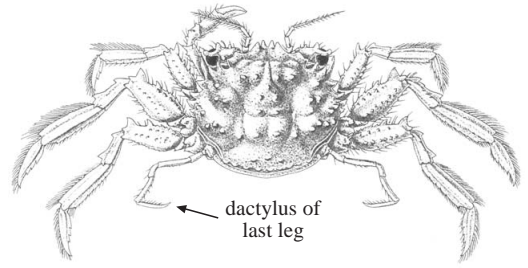


Fig. 29 Palicidae (from Alcock and Anderson, 1899)

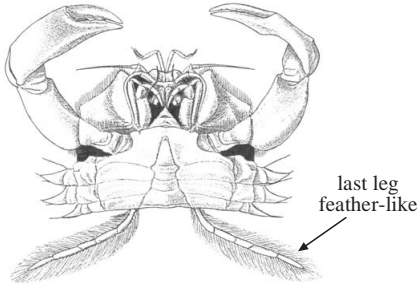


Fig. 30 Retroplumidae (ventral view) (from Alcock and Anderson, 1899)

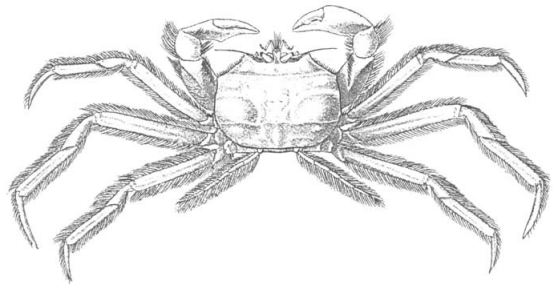


Fig. 31 Retroplumidae (dorsal view) (from Alcock and Anderson, 1899)

- 17a. Carapace longitudinally rectangular (Fig. 33); female genital opening on coxa of third walking leg (Fig. 32a) **Poupiniidae**
- 17b. Carapace not longitudinally rectangular; female genital opening on sternum (Fig. 32b) → 18

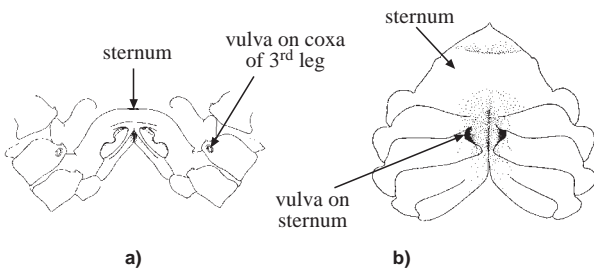


Fig. 32 position of female vulvae

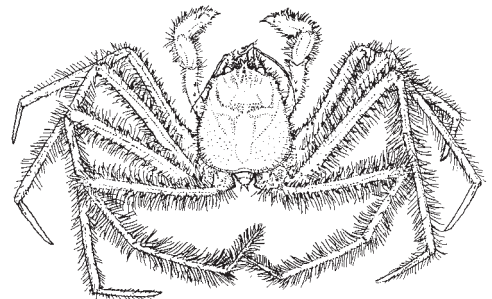


Fig. 33 Poupiniidae

- 18a. Antennae (excluding basal segment) strongly reduced (Figs 34a and 35) **Belliidae**
- 18b. Antennae (excluding basal segment) normal, with distinct flagellum (Fig. 34b, c). → 19

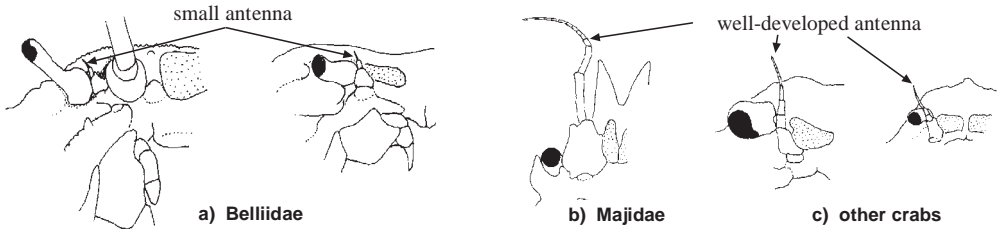


Fig. 34 front and antenna

- 19a. Fossae (sockets) for antennulae squarish to longer than broad, antennulae fold longitudinally or almost so (Fig. 36a, b) → 20
- 19b. Fossae for antennulae broader than long, antennulae fold transversely or obliquely (Fig. 36c, d) → 27

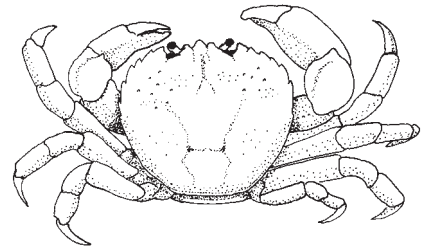


Fig. 35 Belliidae

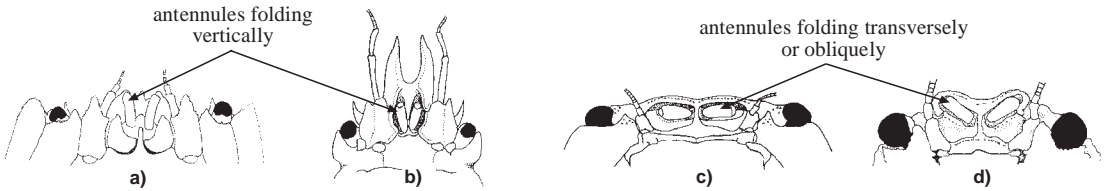


Fig. 36 anteriormost part of body (ventral view)

- 20a. Carapace pyriform, subpyriform, triangular, circular, or subcircular; orbits incomplete to absent (Fig. 37a) → 21
- 20b. Carapace longitudinally and transversely ovate, hexagonal, circular, or subcircular; orbits complete (Fig. 37b) → 22

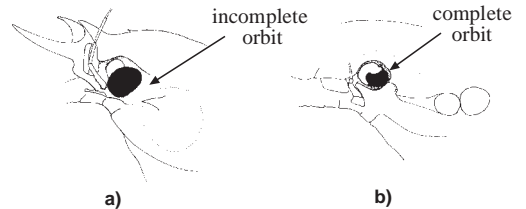


Fig. 37 orbits

- 21a. Carapace well calcified, dorsal surface gently to strongly convex, almost always covered with spines or granules (Fig. 40); hooked setae often present; abdomen usually with 6 segments and a telson (Fig. 38a) (rarely 5 segments and a telson); male genital openings coxal (i.e. situated at basis of coxae of fourth legs, Fig. 39a) **Majidae** (in part) (p. 1136)
- 21b. Carapace poorly calcified, soft, dorsal surface flat to almost flat, never covered with spines or granules (Fig. 41); hooked setae absent; abdomen always with only 5 segments and a telson (Fig. 38b) (or fewer segments, some completely fused); male genital openings sternal (Fig. 39b) **Hymenosomatidae**

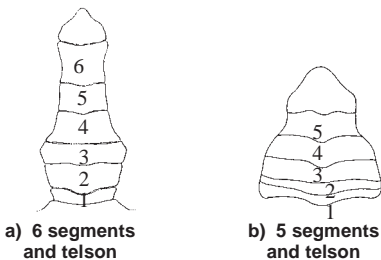


Fig. 38 abdomen

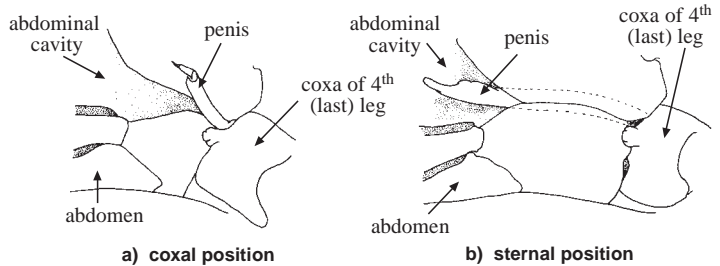


Fig. 39 position of male genital opening

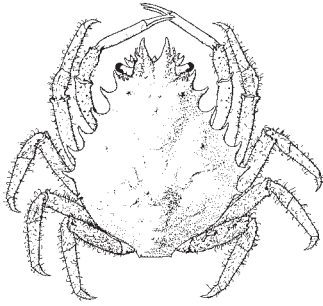


Fig. 40 Majidae

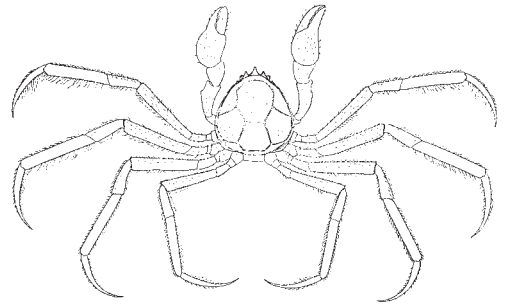


Fig. 41 Hymenosomatidae
(after Shen, 1932)

- 22a. Antennal flagellum distinctly setose (Fig. 42a) → 23
- 22b. Antennal flagellum slightly setose to glabrous (Fig. 42b) → 26
- 23a. Front entire, without teeth or lobes; anterolateral and posterolateral margins of carapace lined with dense, long setae forming distinct fringe (Fig. 43) **Thiidae**
(family not recorded from the area so far)
- 23b. Front with teeth or lobes; anterolateral and posterolateral margins of carapace with relatively dense setae, but not forming distinct fringe → 24
- 24a. Antennae very long, longer than or as long as carapace length, strongly setose (Fig. 44). . **Corystidae**
- 24b. Antennae short, much shorter than carapace length, not strongly setose. → 25

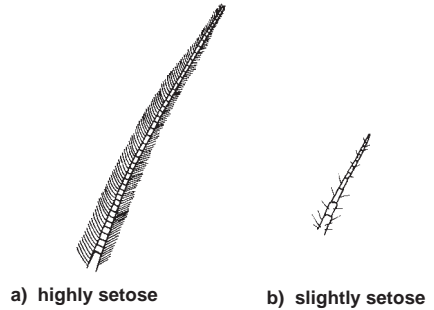


Fig. 42 antennal flagellum

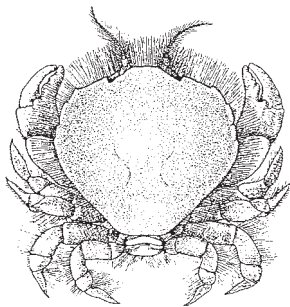


Fig. 43 Thiidae
(after Christiansen, 1969)

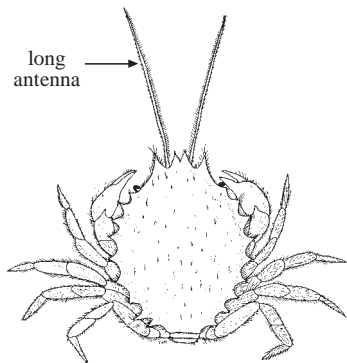


Fig. 44 Corystidae

- 25a. Carapace usually rounded to longitudinally ovate; vulvae of adult female completely covered by abdomen (Figs 45a and 46) **Atelecyliidae**
- 25b. Carapace squarish to hexagonal; vulvae of adult female exposed, not covered by abdomen (Figs 45b and 47) **Cheiragonidae**
(family not recorded from the area so far)

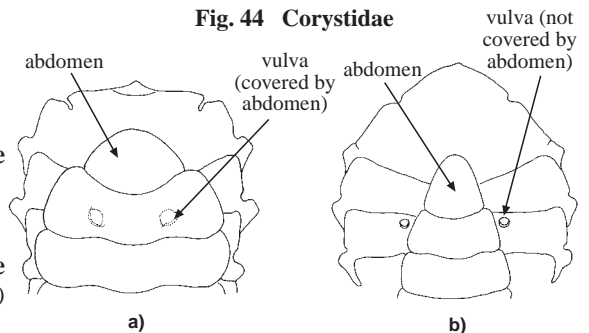


Fig. 45 position of female vulvae

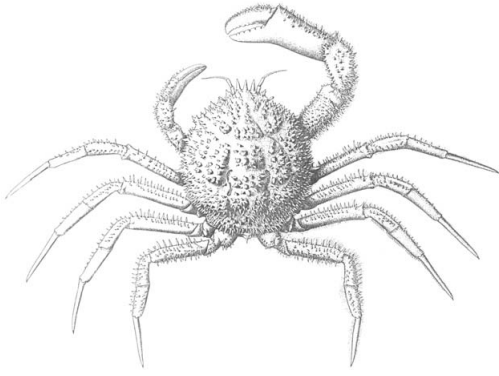


Fig. 46 Ateleyclidae
(after Alcock and Anderson, 1899)

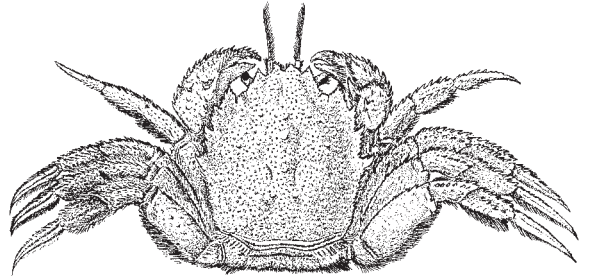


Fig. 47 Cheiragonidae
(after Sakai, 1976)

26a. Carapace hexagonal, its width and length subequal; front broad compared to maximum carapace width; anterolateral margins of carapace weakly convex, each with 4 or 5 well-developed teeth (Fig. 48) **Pirimelidae**
(family not recorded from the area so far)

26b. Carapace transversely ovate; front narrow compared to maximum carapace width; anterolateral margins of carapace strongly convex, each usually with well-defined teeth or lobes (Fig. 49) **Cancridae**

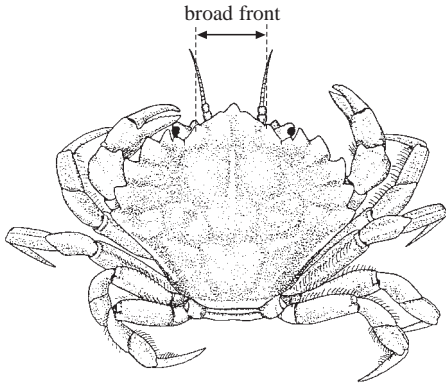


Fig. 48 Pirimelidae
(after Christiansen, 1969)

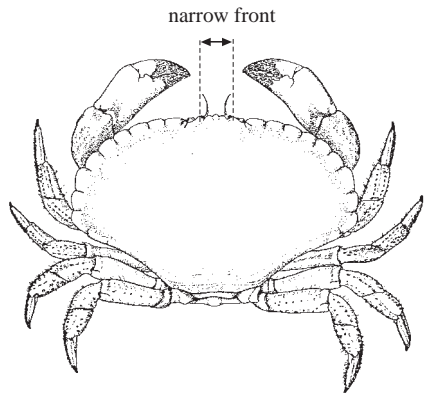
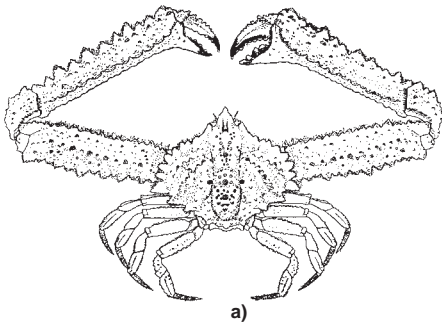


Fig. 49 Cancridae
(after Christiansen, 1969)

27a. Carapace triangular or hexagonal; front triangular, forked or spiniform; chelipeds usually stout, very elongate (Fig. 50) **Parthenopidae**

27b. Carapace shape not as above; front usually truncate or multidentate; chelipeds usually stout to slender, relatively short; if chelipeds long, usually slender → **28**



(after Shen, 1932)

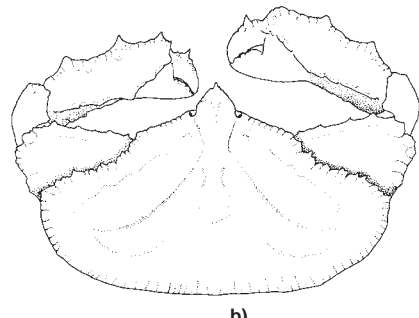


Fig. 50 Parthenopidae

- 28a.** Merus of third maxilliped strongly reduced compared to ischium and other segments (Fig. 51a), sometimes completely fused with ischium (Fig. 51b); male genital openings always sternal (Fig. 52a); males always much smaller than females; parasites on hard corals, or symbionts on molluscs, echinoderms or worms → **29**
- 28b.** Merus of third maxilliped well developed, usually quadrate in shape (Fig. 51c); male genital openings usually coxal (i.e. situated at basis of coxae of fourth legs, Fig. 52b), occasionally sternal; males not much smaller, subequal or larger in size to females; free-living crabs, not parasites of hard corals, not symbionts on molluscs or worms → **30**

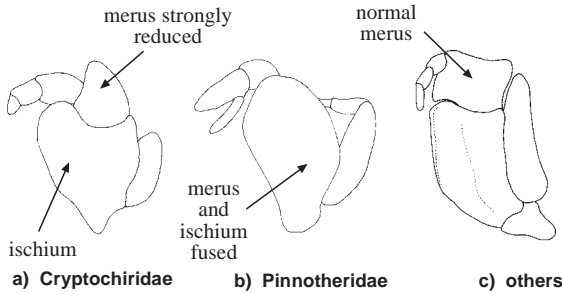


Fig. 51 third maxilliped

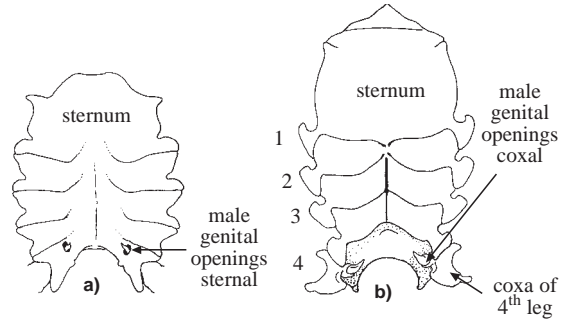


Fig. 52 position of male genital opening

29a. Carapace longitudinally ovate to longitudinally rectangular; dorsal surface of carapace usually with small spines or tubercles; merus of third maxilliped always separated from ischium, dactylus terminally attached to propodus; dactylus of legs strongly hooked; parasites on hard corals (Fig. 53) **Cryptochiridae**

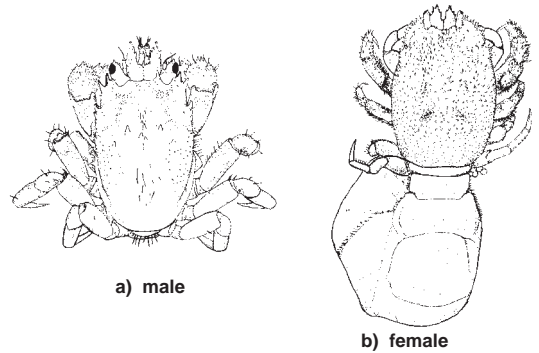


Fig. 53 Cryptochiridae

(after Takeda and Tamura, 1980)

29b. Carapace circular to transversely ovate; dorsal surface of carapace smooth; merus of third maxilliped may be fused with ischium; dactylus usually subterminally to basally attached to propodus with palp often appearing bifurcated; dactylus of legs weak, not strongly hooked; parasitic or commensal on molluscs or worms (Fig. 54) . . **Pinnotheridae**

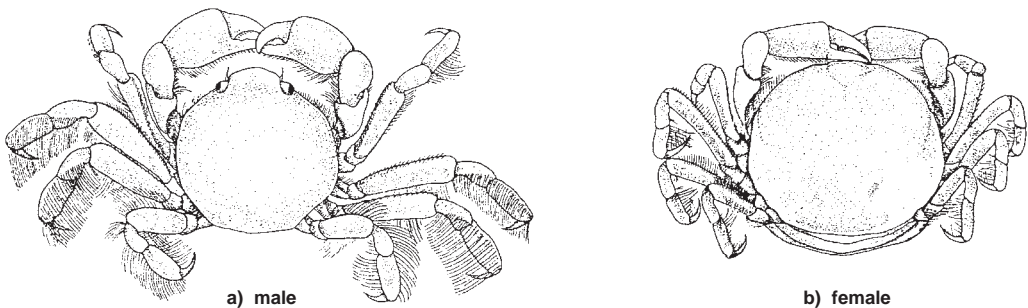


Fig. 54 Pinnotheridae

(after Christiansen, 1969)

- 30a. Last pair of legs with dactylus flattened, paddle-like (Fig. 55a) (with the exception of a few mud-dwelling and obligate coral-symbionts) (Fig. 56) **Portunidae** (p. 1115)
- 30b. Last pair of legs with normal dactylus (Fig. 55b) → **31**
- 31a. Distinct rhomboidal gap between third maxillipeds; mandibles usually visible when mouthparts closed (Fig. 57a) → **32**
- 31b. No distinct rhomboidal gap between third maxillipeds (Fig. 57b); mandibles never visible when mouthparts closed. → **33**

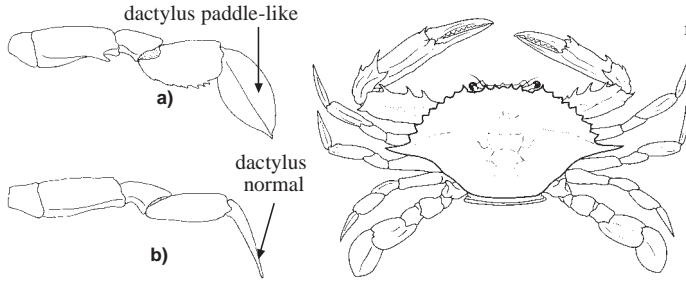


Fig. 55 fourth leg

Fig. 56 Portunidae

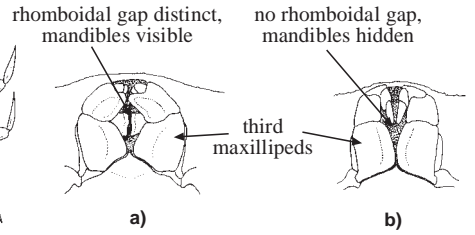


Fig. 57 third maxillipeds

- 32a. Carapace transversely ovate to circular, dorsal surface usually very smooth, rounded; land crabs (Fig. 58) **Gecarcinidae** (p. 1147)
- 32b. Carapace squarish, transversely rectangular, trapezoidal or circular, dorsal surface rough, rugose or setose (Fig. 59) **Grapsidae** (in part) (p. 1138)

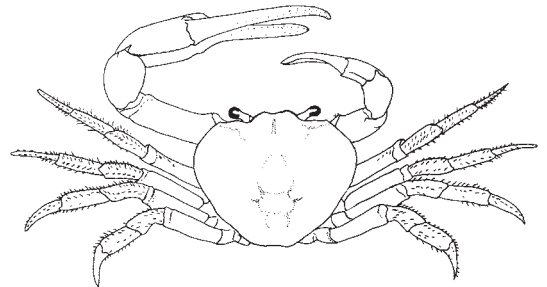
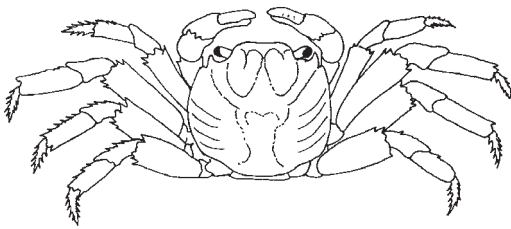
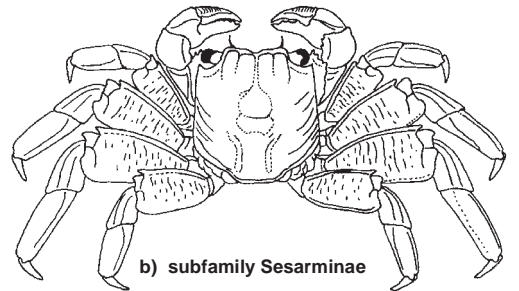


Fig. 58 Gecarcinidae



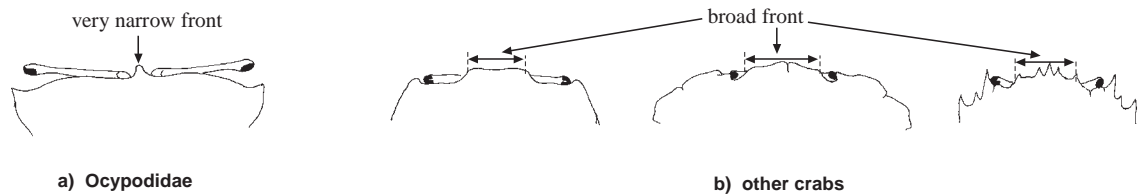
a) subfamily Grapsinae



b) subfamily Sesarminae

Fig. 59 Grapsidae

- 33a. Front simple, triangular, very narrow compared to broader carapace (Fig. 60a) → **34**
- 33b. Front truncate, multilobate or multidentate, relatively broad compared to transverse carapace (Fig. 60b) → **35**



a) Ocypodidae

b) other crabs

Fig. 60 anterior part of carapace (dorsal view)

- 34a. Orbits long, eyes elongate; terrestrial to semiterrestrial crabs (Fig. 61) **Ocypodidae** (p. 1152)
- 34b. Orbits absent, eyes relatively short; semiterrestrial crabs (Fig. 62) **Mictyridae**

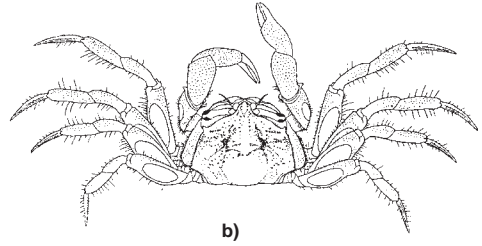
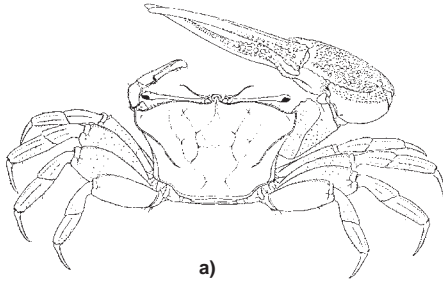


Fig. 61 Ocypodidae
(after Shen, 1932)

- 35a. Cross-section of dactylus of walking leg T-shaped (Figs 63 and 64). **Geryonidae** (p. 1132)
- 35b. Cross-section of dactylus of walking leg not T-shaped, usually quadrate to ovate (Fig. 63b) → 36

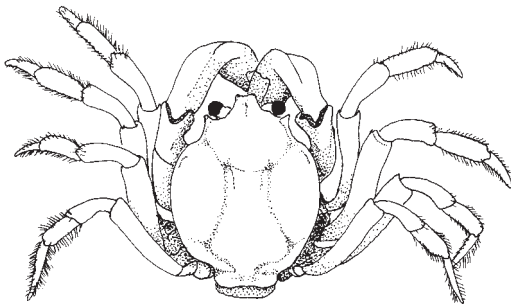


Fig. 62 Mictyridae

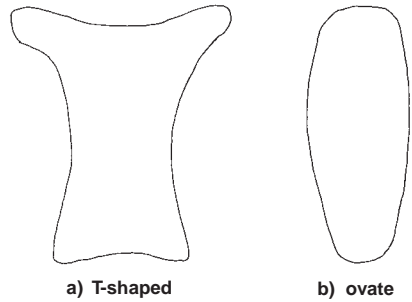


Fig. 63 cross-section of dactylus of walking leg

- 36a. Male abdominal segments 2 and 3 always immovable, completely to incompletely fused (Fig. 65a); male first gonopods strongly bent (Fig. 66a); small semiterrestrial crabs usually associated with estuarine habitats and mangroves (Fig. 67) **Camptandriidae**
- 36b. Male abdominal segments 2 and 3 always movable, never fused (Fig. 65b); male first gonopods normal (Fig. 66b); aquatic to semiterrestrial crabs → 37

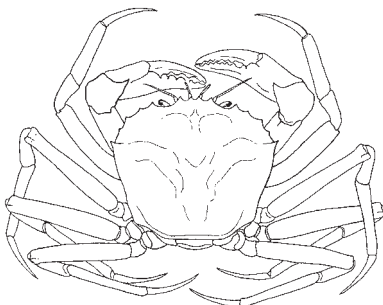


Fig. 64 Geryonidae

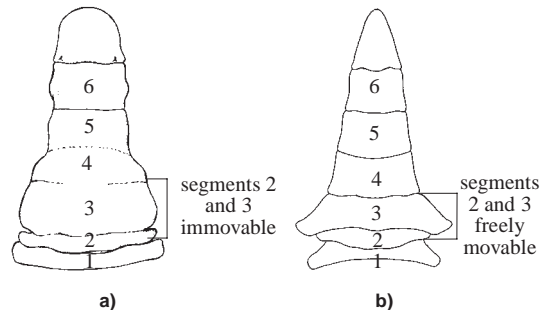


Fig. 65 abdomen

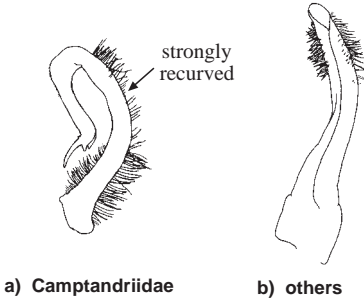


Fig. 66 male first gonopod

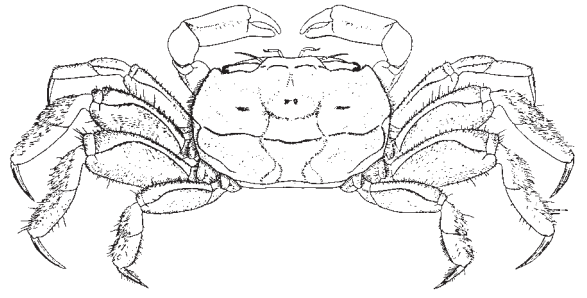


Fig. 67 Camptandriidae (after Shen, 1932)

- 37a. Carapace squarish to longitudinally rectangular, posterolateral margins subparallel, dorsal surface flat or gently convex; free-living intertidal, estuarine, or fresh-water crabs (Fig. 68) **Grapsidae** (in part) (p. 1138)
- 37b. Carapace shape not as above; dorsal surface usually convex; posterolateral margins gently to strongly converging; sublittoral to deep-water crabs → 38
- 38a. Legs with special dactylo-propodal articulation (formed by a rounded, submedian extension of the lateral margin of the propodus, sliding underneath a projecting button on the subproximal edge of the dactylus; Fig. 69a) → 39
- 38b. Legs without special articulation between propodus and dactylus (Fig. 69b) → 41

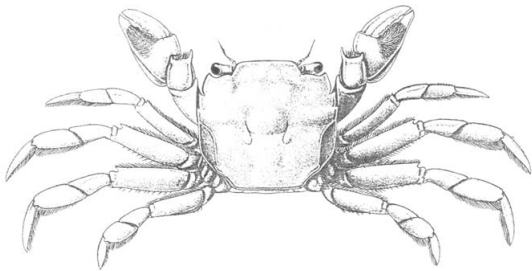


Fig. 68 Grapsidae (subfamily Varuninae) (from Alcock and Anderson, 1899)

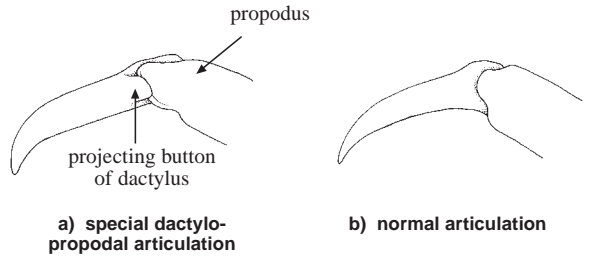


Fig. 69 distal end of walking leg

- 39a. Fingers of chelipeds distinctly spoon-tipped (Fig. 70a); male abdominal segments 3 to 5 always immovable, completely fused although sutures may be partially visible (Figs 71a and 72) **Xanthidae** (in part) (p. 1098)
- 39b. Fingers of chelipeds with sharp tip, not distinctly spoon-tipped (Fig. 70b); male abdominal segments 3 to 5 freely movable (Fig. 71b) or fused → 40

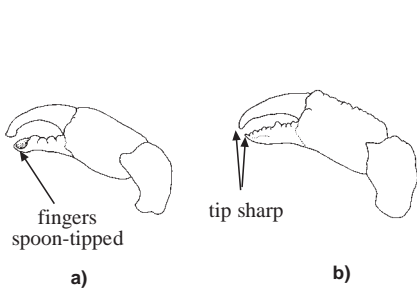


Fig. 70 pincer

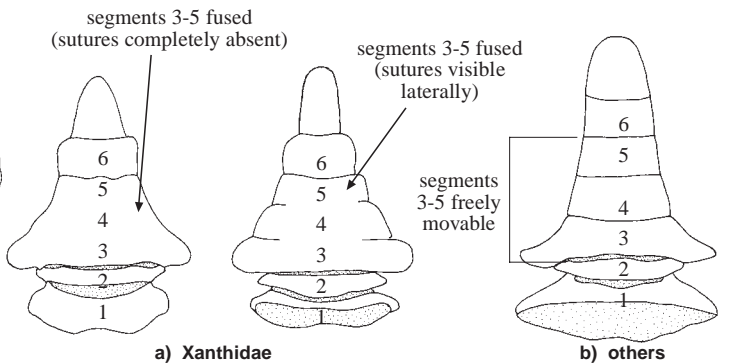


Fig. 71 abdomen

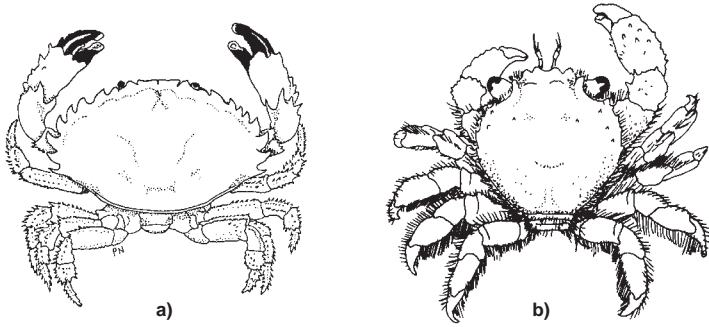


Fig. 72 Xanthidae

- 40a.** Male first gonopod very slender, S-shaped (Fig. 73a); male second gonopod very short, sigmoid (very short, stout, comma-shaped) less than 1/4 the length of male first gonopod (Fig. 74b); internal and external commensals of echinoderms (Fig. 75) . . . **Eumedonidae**
- 40b.** Male first gonopod moderately stout, slightly sinuous to almost straight (Fig. 73b); male second gonopod short but not sigmoid, always longer than 1/4 the length of male first gonopod (Fig. 74b); commensals on corals (Fig. 76) . . . **Trapeziidae**

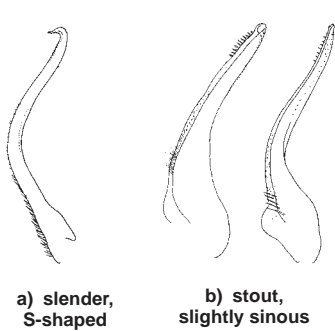


Fig. 73 male first gonopod

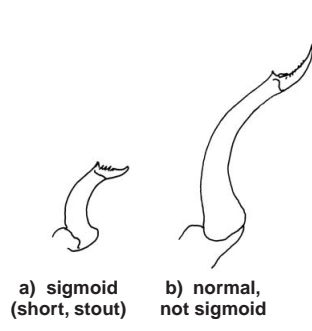


Fig. 74 male second gonopod

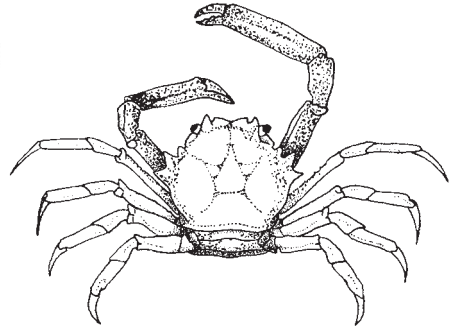


Fig. 75 Eumedonidae

- 41a.** Male abdominal segments 3 to 5 distinct, movable (Fig. 77a); regions on carapace usually poorly defined . . . → **42**
- 41b.** Male abdominal segments 3 to 5 fused, immovable, although sutures may be partially visible (Fig. 77b, c); regions on carapace usually well defined. . . → **46**

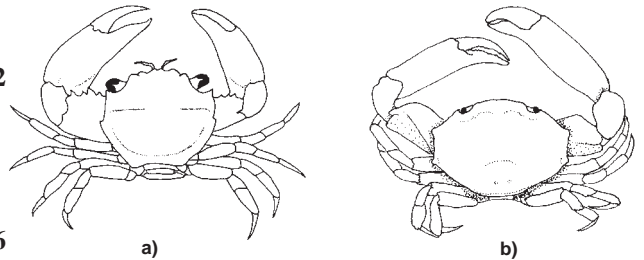


Fig. 76 Trapeziidae

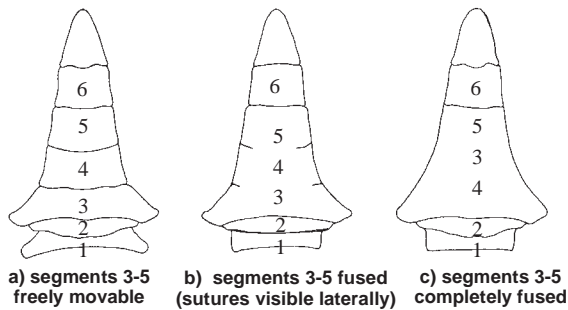


Fig. 77 male abdomen

- 42a. Longitudinal ridges which define efferent respiratory current absent, or strong only on posterior part of endostome, ridges not clearly visible on anterior part of endostome when mouthparts pushed aside (Fig. 78a, b); carapace and legs never spinose → 43
- 42b. Longitudinal ridges which define efferent respiratory current well developed along entire endostome, ridges visible on anterior part of endostome when mouthparts pushed aside (Fig. 78c); or carapace and legs strongly spinose → 44

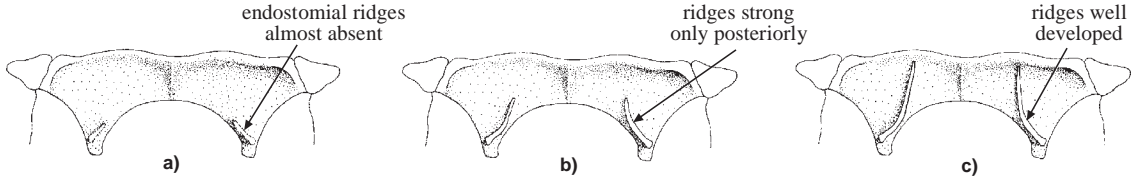


Fig. 78 endostome (= part of the "mouth field")

- 43a. Carapace transversely ovate; endopodite of first maxilliped usually with distinct lobe on inner angle (Fig. 79a); deep-water crabs, associated with hydrothermal vents (Fig. 80) **Bythograeidae**
- 43b. Carapace hexagonal; endopodite of first maxilliped with small lobe or without small lobe on inner angle (Fig. 79b); mainly shallow-water crabs, if in deep waters, not known to be associated with hydrothermal vents (Fig. 81) **Platyxanthidae**
(family not recorded from the area so far)

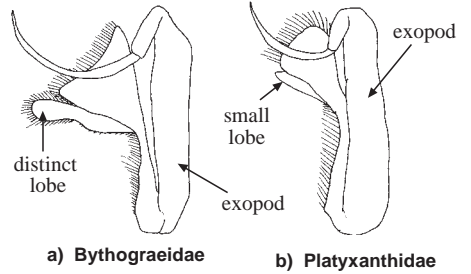


Fig. 79 first maxilliped

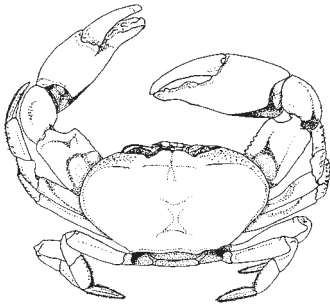


Fig. 80 Bythograeidae

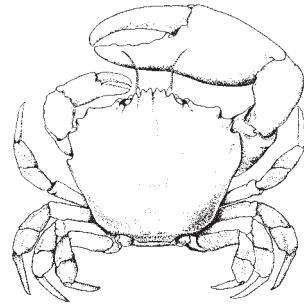


Fig. 81 Platyxanthidae

- 44a. Male first gonopod stout, straight (Fig. 82a); male second gonopod very elongate, subequal in length to, or longer than, male first gonopod (Figs 83a, b and 84) **Eriphiidae** (p. 1103)
- 44b. Male first gonopod slender to stout, slightly sinuous to almost straight (Fig. 82b); male second gonopod distinctly shorter than length of male first gonopod (Fig. 83c). → 45

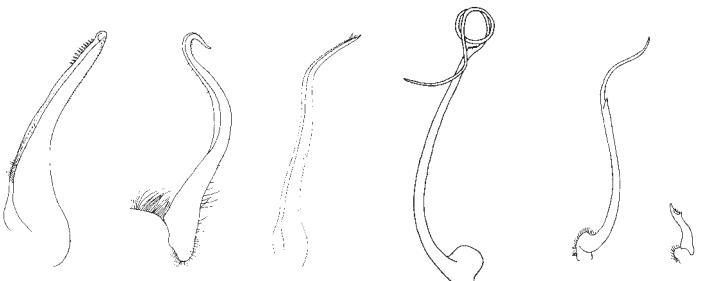


Fig. 82 male first gonopod

Fig. 83 male second gonopod

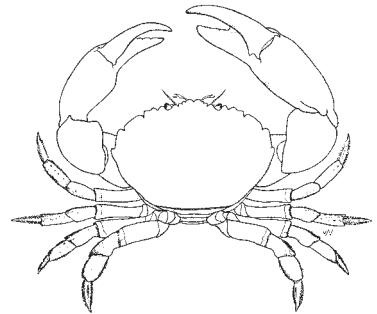


Fig. 84 Eriphiidae

45a. Male first gonopod slender, distinctly S-shaped to almost straight (Fig. 85a); male second gonopod sigmoid (very short, stout, comma-shaped) (Figs 86a and 87) **Pilumnidae** (p. 1112)

45b. Male first gonopod moderately stout, slightly sinuous (Fig. 85b); male second gonopod about 1/3 to 1/2 the length of male first gonopod (Figs 86b and 88) . **Goneplacidae** (in part) (p. 1114)

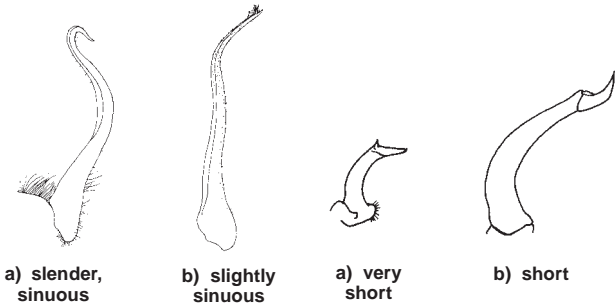


Fig. 85 male first gonopod Fig. 86 male second gonopod

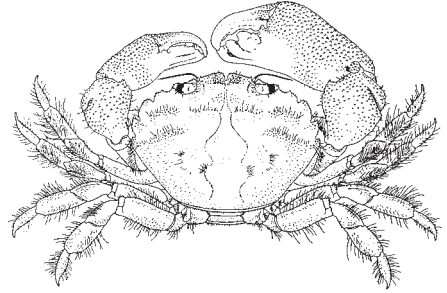


Fig. 87 **Pilumnidae**

(after Shen, 1932)

46a. Anterolateral margins entire, only 1 rounded lateral tooth present on each margin (Fig. 89) **Carpiliidae** (p. 1110)

46b. Anterolateral margins multidentate or multilobate → 47

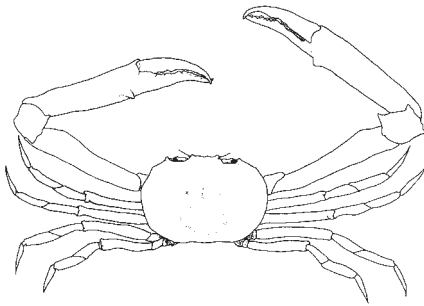


Fig. 88 **Goneplacidae**

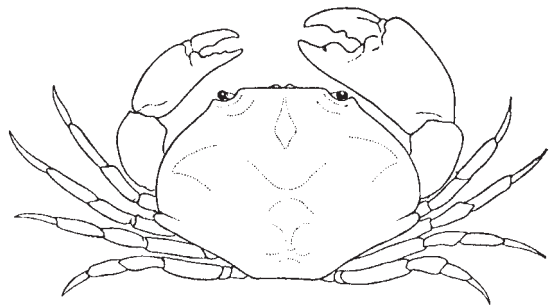


Fig. 89 **Carpiliidae**

47a. Carapace usually transversely rectangular, subcircular, sometimes transversely ovate; male second gonopod usually 0.3 times the length, to subequal length, of male first gonopod (Figs 90a and 91) **Goneplacidae** (in part)

47b. Carapace usually hexagonal or transversely ovate; male second first gonopod short, subequal to, or less than, 0.3 times the length of male first gonopod but not distinctly sigmoid (stout, comma-shaped) (Fig. 90b) → 48

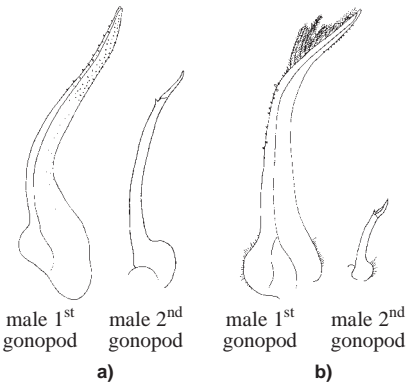


Fig. 90 relative length of male first and second gonopods

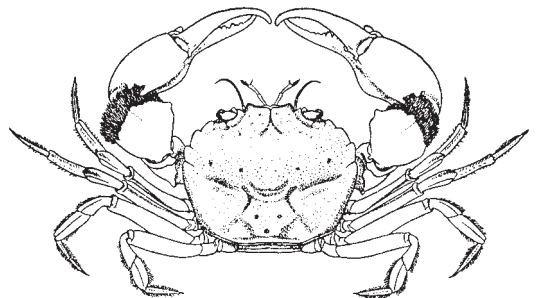
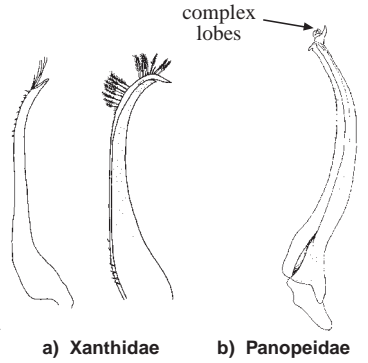


Fig. 91 **Goneplacidae**

(after Shen, 1932)

- 48a. Male first gonopods very slender, usually S-shaped, tip relatively simple, often with long setae subdistally and distally (Figs 92 and 93) **Xanthidae** (in part) (p. 1097)
- 48b. Male first gonopods moderately stout, sometimes slightly sinuous, tip usually with numerous complex folds (Figs 92b and 94) **Panopeidae**



a) Xanthidae b) Panopeidae

Fig. 92 male first gonopods

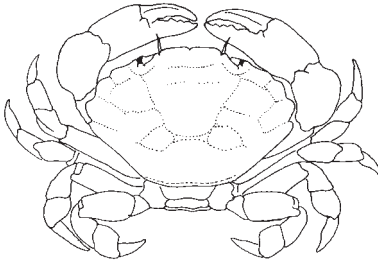


Fig. 93 Xanthidae

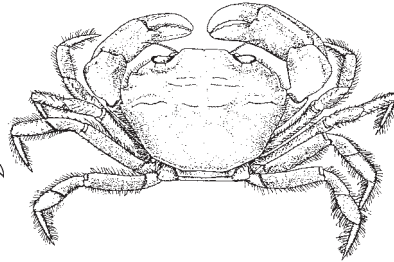


Fig. 94 Panopeidae
(after Christiansen, 1969)

KEY TO THE FAMILIES OF CRAB-LIKE ANOMURA

Notes: the following key covers all marine families of crab-like anomuran crabs recognized here, most of which (except the Lomidae) have been reported from the Western Central Pacific. The key uses, wherever possible, external and easily viewed characters. Due to the diversity in some families, however, not all their members can be identified to the family level with this key, although it should work for the majority of species encountered. A specialist should be consulted for the more difficult species. For further useful information on crab-like anomurans and allies see De Man (1928), Miyake (1982), Macpherson (1988), McLaughlin (1997), and Baba (1988).

- 1a. Carapace usually longitudinally ovate; dactyli of second to fourth legs curved, laterally flattened (Fig. 95a-c); burrowing crabs → 2
- 1b. Carapace usually not longitudinally ovate; dactyli of second to fourth legs normal, not laterally flattened, usually non-burrowing crabs → 3
- 2a. Carapace dorsoventrally flattened; first leg subchelate, with pincer-like structure (Fig. 96) **Albuneidae**
- 2b. Carapace subcylindrical in cross-section; first leg simple, not subchelate (Fig. 97) . . . **Hippidae**

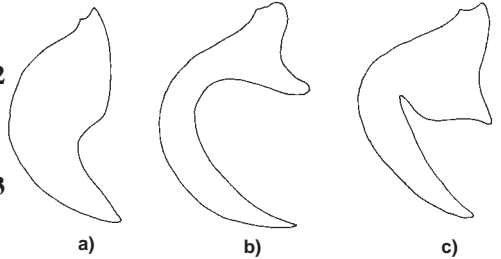


Fig. 95 dactylus of legs 2-4

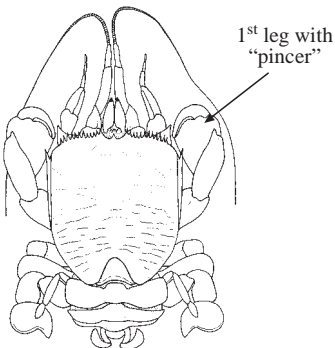


Fig. 96 Albuneidae

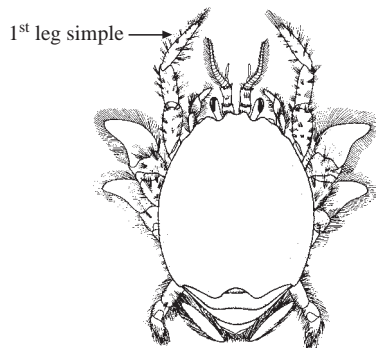


Fig. 97 Hippidae

- 3a. Uropods usually structurally modified into a "rasp" (Fig. 98a) and used for clinging onto interior of gastropod shells or hollow wood or underside of bivalve shells, at least in early crab stages → 4
- 3b. Uropods (may be absent) not modified for clinging purposes, no "rasp" present (Fig. 98b); crabs not associated with hollow or concave objects even in early crab stages → 9

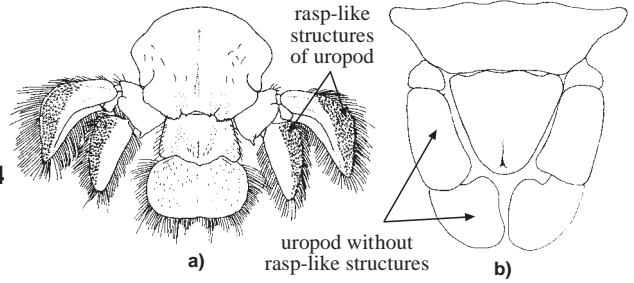


Fig. 98 posterior portion of body (dorsal view)

- 4a. Abdomen bilaterally symmetrical, clearly divided into segments, usually well calcified even at early crab stages, pleurites (side plates) distinct; shrimp- to lobster-like appearance, abdomen not tucked under carapace (Fig. 99) **Pylochelidae**
- 4b. Abdomen usually bilaterally asymmetrical, not clearly divided into segments, usually weakly calcified or membranous, at least in early crab stages, pleurites (side plates) absent; typical hermit crabs or distinctly crab-like with abdomen tucked under the carapace → 5

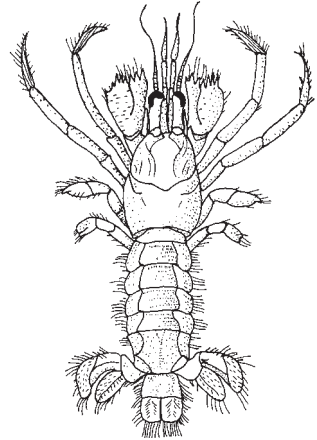


Fig. 99 Pylochelidae

- 5a. Coxae of third maxillipeds close to each other, no distinct gap between them (Fig. 100a); chelipeds equal or unequal, when unequal, left chela larger → 6
- 5b. Coxae of third maxillipeds distinctly separated from each other, wide gap between them (Fig. 100b); chelipeds unequal, with right chela larger → 7
- 6a. Eyestalk laterally flattened (Fig. 101a); eyes usually held subparallel to each other (Fig. 102a); antennae laterally flattened, short; completely terrestrial crabs (Fig. 103). **Coenobitidae** (p. 1154)
- 6b. Eyestalk circular to subcircular in cross-section, not laterally flattened (Fig. 101b); eyes held obliquely to each other (Fig. 102b); antennae long, subcylindrical in cross-section; completely aquatic crabs (Fig. 104). **Diogenidae**

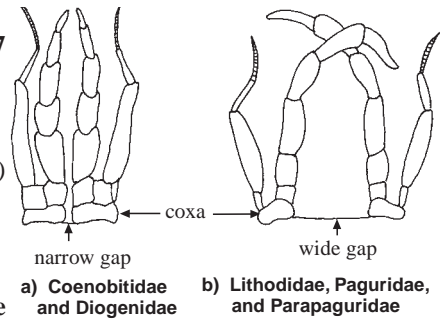


Fig. 100 third maxillipeds

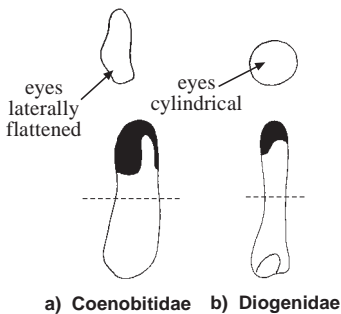


Fig. 101 eye in dorsal view

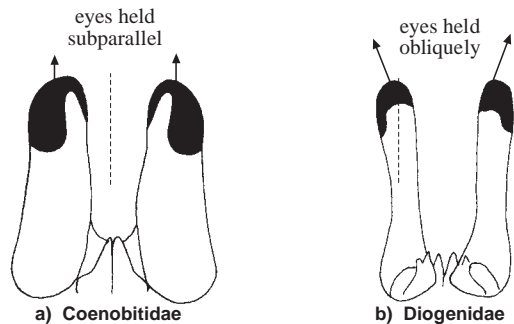
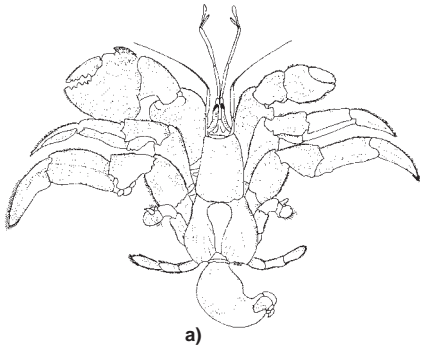
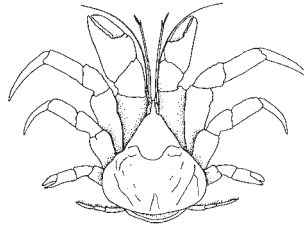


Fig. 102 relative position of eyes (dorsal view)



a)



b)

Fig. 103 Coenobitidae

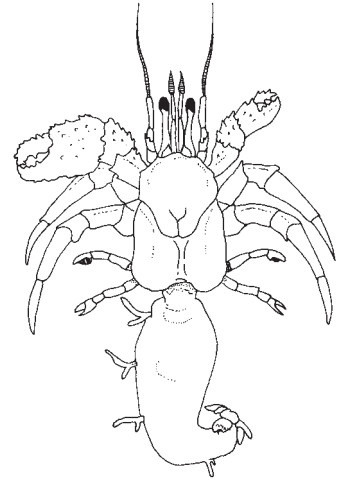


Fig. 104 Diogenidae

7a. Adults distinctly crab-like; carapace well calcified in adults, often with numerous strong granules or spines; rostrum spiniform, distinct; second to fourth legs distinct, fifth pair strongly reduced, inserted into branchial chamber (Fig. 105) **Lithodidae**

7b. Adults typical hermit crabs; carapace weakly calcified in adults, rarely with granules or spines; rostrum weak to indiscernible; second to third legs distinct, fourth and fifth pair strongly reduced, but not inserted into branchial chamber → **8**

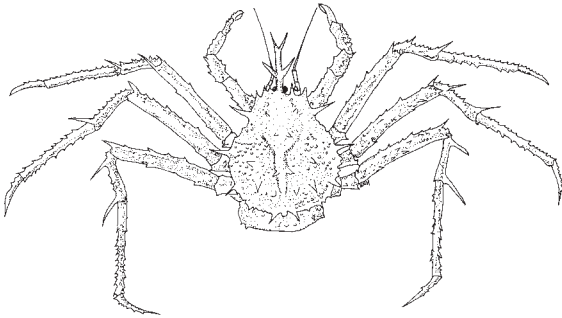


Fig. 105 Lithodidae

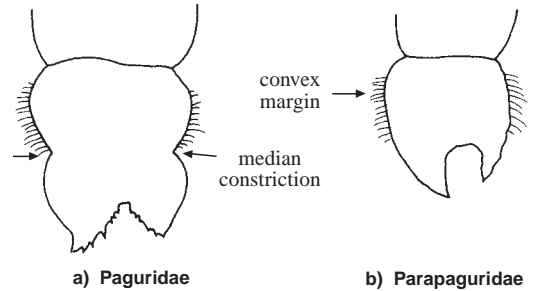


Fig. 106 sixth segment and telson (dorsal view)

8a. First maxilliped with distinct flagellum; telson usually with median constriction, lateral margins with median cleft (Fig. 106a); mostly shallow water with some deep-water species (Fig. 107) **Paguridae**

8b. First maxilliped without flagellum; telson without median constriction, lateral margins entire (Fig. 106b); deep-water species (Fig. 108) **Parapaguridae**

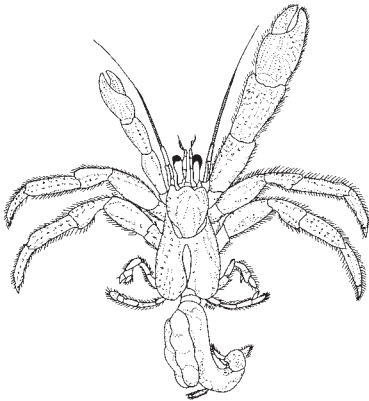


Fig. 107 Paguridae

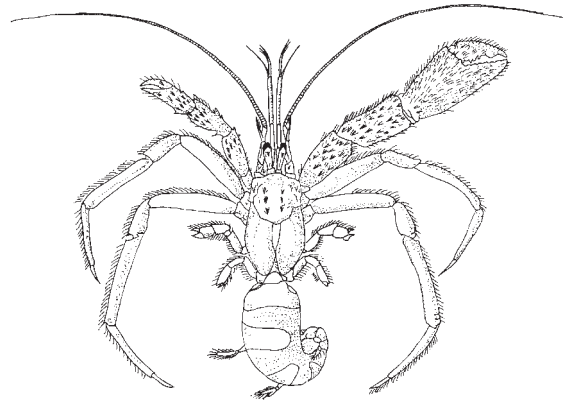


Fig. 108 Parapaguridae

- 9a. No tail fan (telson and uropods) present; eye peduncles broad and flat, cornea inserted laterally on peduncle (Fig. 109) **Lomidae**
(family not recorded from the area so far)
- 9b. Distinct tail fan (telson and uropods) present; eye peduncles normal; cornea inserted terminally on peduncle → 10
- 10a. Carapace circular, subcircular to longitudinally ovate; rostrum short to absent; most of abdomen tucked underneath carapace (Fig. 110) **Porcellanidae**
- 10b. Carapace longitudinally rectangular to longitudinally ovate, rarely circular; rostrum distinct; most of abdomen not tucked underneath carapace → 11

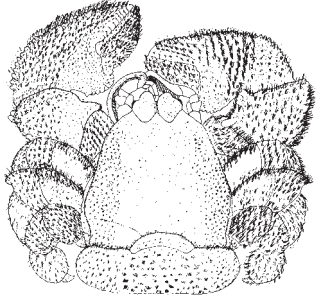


Fig. 109 Lomidae

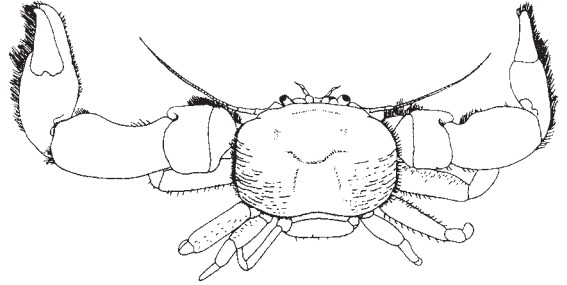
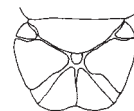


Fig. 110 Porcellanidae

- 11a. Antennular peduncle with 4 movable articles; telson divided into 2 or more smaller plates (Figs 111a and 112) **Galatheidae**
- 11b. Antennular peduncle with 5 movable articles; telson entire, not divided into smaller plates (Figs 111b and 113) **Chirostyliidae**



a) divided into 2 or more small plates



b) not divided into small plates

Fig. 111 telson (dorsal view)

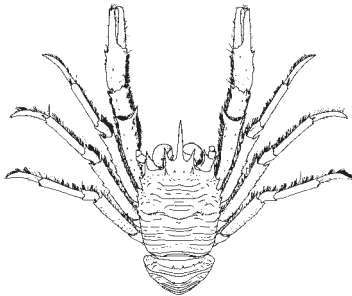


Fig. 112 Galatheidae

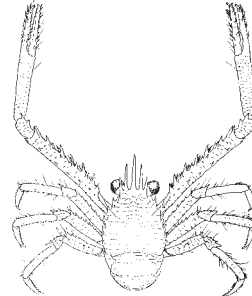


Fig. 113 Chirostyliidae

LIST OF FAMILIES OF MARINE BRACHYURA AND CRAB-LIKE ANOMURA PRESENTLY RECOGNIZED

Note: the following list also includes 5 families of Brachyura and a single family of anomuran crab which have not been recorded yet from the Western Central Pacific. They are included in the list and above keys since it is likely that some of these families may be discovered in the future in the area. These families are marked in the list by an asterisk (*).

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

- Infraorder BRACHYURA** Latreille, 1803
- ATELECYLIDAE Ortmann, 1893
- BELLIIDAE Dana, 1852 (= Acanthocyclus Dana, 1852)
- BYTHOGRAEIDAE Williams, 1980
- CALAPPIDAE De Haan, 1833
- CAMPTANDRIIDAE Stimpson, 1858
- CANCRIDAE Latreille, 1803 (= Trichoceridae Dana, 1852)

- * CHEIRAGONIDAE Ortmann, 1893 (= Telmessidae Guinot, 1977)
- ☞ CARPILIIDAE Ortmann, 1893
- CORYSTIDAE Samouelle, 1819 (= Nautilocorystidae Ortmann, 1893; Euryalidae Rathbun, 1930)
- CRYPTOCHIRIDAE Paulson, 1875 (= Hapalocarcinidae Calman, 1900)
- CYCLODORIPPIDAE Ortmann, 1892 (= Tymolidae Alcock, 1896)
- CYMONOMIDAE Bouvier, 1898
- DORIPPIDAE MacLeay, 1838
- ☞ DROMIIDAE De Haan, 1833
- DYNOMENIDAE Ortmann, 1892
- ☞ ERIPHIIDAE MacLeay, 1838 (= Menippidae Ortmann, 1893; Oziidae Dana, 1851)
- EUMEDONIDAE Dana, 1852
- HEXAPODIDAE Miers, 1886
- ☞ HOMOLIDAE De Haan, 1839 (= Thelxiopeidae Rathbun, 1937)
- HOMOLODROMIIDAE Alcock, 1899
- HYMENOSOMATIDAE MacLeay, 1838
- ☞ GECARCINIDAE MacLeay, 1838
- ☞ GERYONIDAE Colosi, 1923
- ☞ GONEPLACIDAE MacLeay, 1838
- ☞ GRAPSIDAE MacLeay, 1838
- LATREILLIDAE Stimpson, 1858
- LEUCOSIIDAE Samouelle, 1819
- ☞ MAJIDAE Samouelle, 1819 (= Inachidae MacLeay, 1838; Epialtidae MacLeay, 1838; Blastidae Stebbing, 1902; Mamaiidae Stebbing, 1902)
- MICTYRIDAE Dana, 1852
- ☞ OCYPODIDAE Rafinesque, 1815
- * ORTHIYIIDAE Dana, 1852
- PALICIDAE Bouvier, 1897 (= Cymopoliidae Faxon, 1895)
- PANOPEIDAE Ortmann, 1893
- PARTHENOPIDAE MacLeay, 1838 (= Mimilambridae Williams, 1979)
- ☞ PILUMNIDAE Samouelle, 1819
- PINNOTHERIDAE De Haan, 1833
- * PIRIMELIDAE Alcock, 1899
- * PLATYXANTHIDAE Guinot, 1977
- ☞ PORTUNIDAE Rafinesque, 1815 (= Megalopidae Haworth, 1825; Carcinidae MacLeay, 1838; Xaividae Berg, 1900)
- POUPINIIDAE Guinot, 1993
- ☞ RANINIDAE De Haan, 1839
- RETROPLUMIDAE Gill, 1894
- * THIIDAE Dana, 1852
- TRAPEZIIDAE Miers, 1886
- ☞ XANTHIDAE MacLeay, 1838
- Infraorder ANOMURA** H. Milne Edwards, 1832 (crab-like families listed only)
- ALBUNEIDAE Stimpson, 1858
- CHIROSTYLIDAE Ortmann, 1892
- ☞ COENOBITIDAE Dana, 1851
- DIOGENIDAE Ortmann, 1892
- GALATHEIDAE Samouelle, 1819
- HIPPIDAE Latreille, 1825
- LITHODIDAE Samouelle, 1819
- PAGURIDAE Latreille, 1803
- PARAPAGURIDAE Smith, 1882
- PORCELLANIDAE Haworth, 1825
- PYLOCHELIDAE Bate, 1888 (= Pomatochelidae Stebbing, 1914)
- * LOMIDAE Bouvier, 1895

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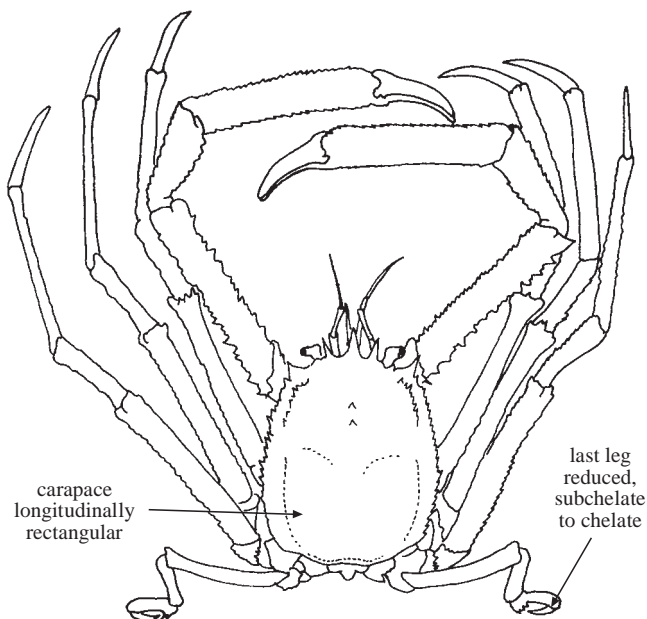
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Infraorder BRACHYURA

HOMOLIDAE

Deep-water carrier crabs

Diagnostic characters: Carapace longitudinally rectangular; dorsal surface granulose to spinose; front narrow, usually with 3 long horn-like projections (rostra). Male chelipeds long. Last (fourth) pair of legs inserted obliquely on carapace and directed upwards, reduced, subchelate to chelate, modified to carry sponges. All male abdominal segments distinct, movable.



Habitat, biology, and fisheries: Benthic deep-water crabs, usually occurring in depths below 200 m. Most species are of minor commercial value, being either too small or only occasionally caught. Only the large *Paromola japonica* and *P. macrochira* have some fishery value. *P. macrochira*, however, is known only from Japanese and Taiwanese waters, but not from the Western Central Pacific.

Similar families occurring in the area

The only other crab families which have the last (fourth) pair of legs modified to carry objects are the Dromiidae (sponge crabs), Homolodromiidae (deep-water sponge crabs), Latreillidae (spindle crabs), Cymonomidae and Cyclodorippidae (deep-water porter crabs) and Dorippidae (porter crabs); some Majidae (spider crabs) also have a similar structure. All these families, however, differ markedly in body shape (not longitudinally rectangular/subrectangular) from the Homolidae and none of them include species of commercial interest.

Poupiniidae (deep-water hedgehog crabs, non-commercial): in body shape, these recently discovered deep-water crabs are most similar to the Homolidae, but poupiniids have the fourth (last) walking leg unmodified (not subchelate or chelate).

References

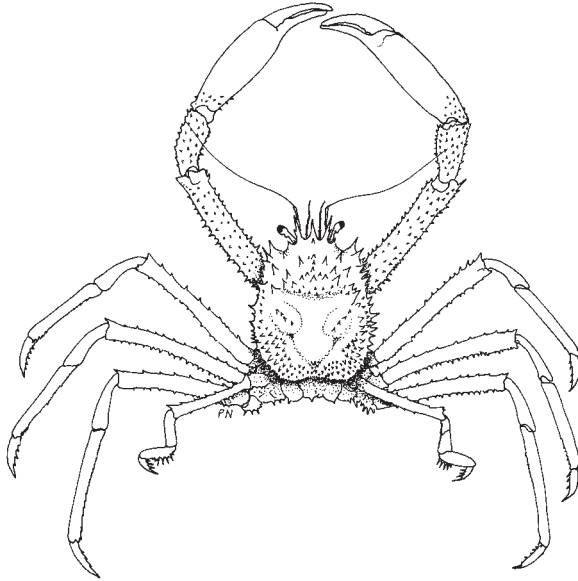
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A single species of interest to fisheries occurring in the area.

Paromola japonica Parisi, 1915

Frequent synonyms / misidentifications: *Latreillopsis hawaiiensis* Edmondson, 1932 / *Paromola macrochira* Sakai, 1961.

FAO name: En - Japanese deepwater carrier crab.



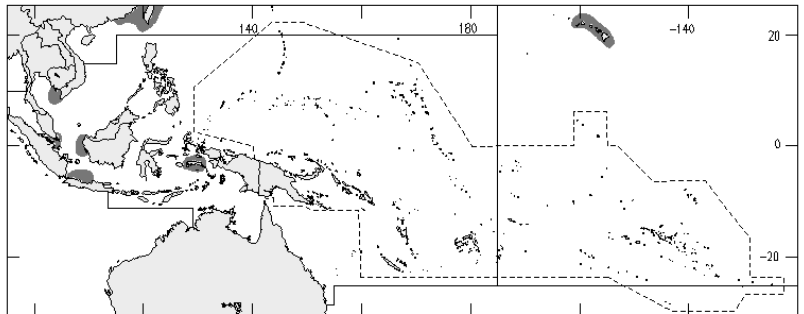
Diagnostic characters: Carapace rectangular, longer than broad, surface granular; lateral margins granular to spiniform; frontal margin (rostrum) with 3 spiniform projections. Last pair of legs short, with dactylus and propodus subchelate, modified for carrying objects. **Colour:** light to reddish brown overall.

Size: Maximum carapace length 18 cm (males).

Habitat, biology, and fisheries: A deep-water crab, found in depths from 150 to 250 m. No targeted fisheries are known for this species. Taken as incidental catch by benthic trawls and occasionally by traps. Commands low prices when sold in markets.

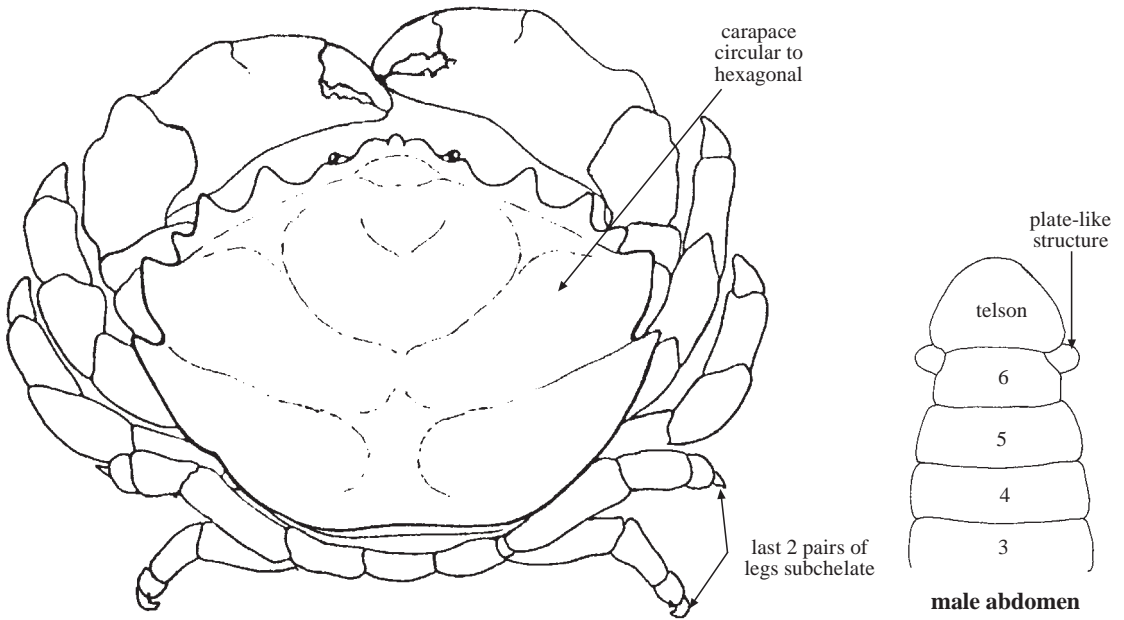
Distribution: West Pacific, including Southeast Asia and Hawaii.

Remarks: The only other species that *Paromola japonica* might be confused with is *P. macrochira* which is also taken incidentally by trawls and traps, but so far known only from Japanese and Taiwanese waters. *P. japonica* is easily distinguished from *P. macrochira* by the more spiniform lateral margins of carapace and the basal antennal segment bearing several sharp tubercles (absent in *P. macrochira*).



DROMIIDAE**Sponge crabs**

Diagnostic characters: Carapace circular to hexagonal; dorsal surface gently to strongly convex longitudinally and transversely, smooth or granular, usually setose; front narrow, usually entire; anterolateral margins of carapace strongly convex, unarmed, or with small spines. Anterior 2 pairs of legs normal; **last 2 pairs of legs inserted obliquely on carapace and directed upwards, strongly reduced, subchelate**, modified to carry sponges or tunicates on back of carapace. All male abdominal segments distinct, movable; **a small platelet-like structure usually intercalated between edges of sixth abdominal segment and telson**. Male first gonopod stout, simple; male second gonopod long, usually subequal or longer than length of male first gonopod. **Male and female genital openings sternal**.



Habitat, biology, and fisheries: Benthic crabs, with most species occurring in or near reefs or on soft-substrate bottoms. Omnivorous and known to feed on sea stars (Asteroidea). Best known for their habit of carrying sponges and colonial tunicates on their backs for camouflage. Only of minor commercial importance, as most species are too small to have any food value. Large members of the genera *Dromia* and *Lauridromia* are occasionally collected by trawls or traps and are sold in local markets.

Similar families occurring in the area

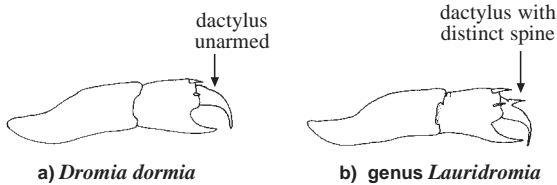
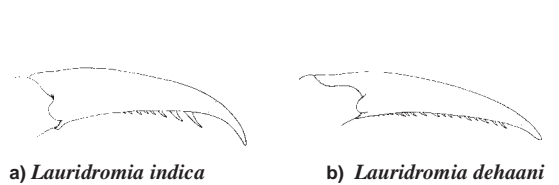
The only other crab families which have their last 2 pairs of legs turned upwards and adapted for carrying objects are the Homolodromiidae, Cymonomidae, Cyclodorippidae, and Dorippidae.


Homolodromiids (non-commercial): closest to the dromiids in general body shape, but dromiids are generally more rounded to quadrate in shape, and only dromiids possess a pair of intercalated platelet-like structures between the abdominal segments 6 and the telson.




Cymonomidae, Cyclodorippidae, and Dorippidae (all non-commercial): carapace much more rounded and flatter; legs proportionately much longer; merus of third maxillipeds triangular in shape (distinctly rectangular in dromiids).

Key to species of interest to fisheries occurring in the area

- 1a.** Dactylus of fourth leg without spine on outer margin (Fig. 1a) *Dromia dormia*
1b. Dactylus of fourth leg with distinct spine on outer margin (Fig. 1b) → 2
- 2a.** Carapace wider than long, surfaces with soft pubescence; 6 teeth on each anterolateral margin; 4 to 8 spines on inner margins of dactyli of first 2 pairs of legs (Fig. 2a)
 *Lauridromia indica*
- 2b.** Carapace as wide as long, surfaces with coarse pubescence; 4 teeth on each anterolateral margin; 16 to 20 spines on inner margins of dactyli of first 2 pairs of legs (Fig. 2b)
 *Lauridromia dehaani*

**Fig. 1** fourth leg**Fig. 2** dactylus of first 2 legs**List of species of interest to fisheries occurring in the area**

The symbol  is given when species accounts are included.

-  *Dromia dormia* (Linnaeus, 1763)
 *Lauridromia dehaani* (Rathbun, 1923)
 *Lauridromia indica* (Gray, 1831)

References

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Dromia dormia (Linnaeus, 1763)

Frequent synonyms / misidentifications: *Cancer dormitator* Herbst, 1790; *Dromia rumphii* Weber, 1795; *D. hirsutissima* Dana, 1852 / None.

FAO name: En - Common sponge crab.

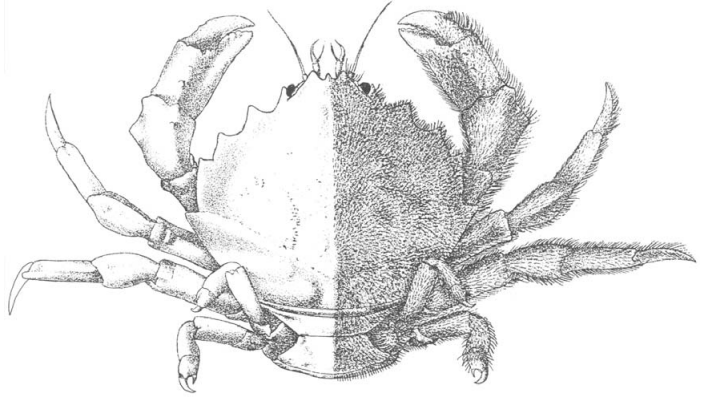
Diagnostic characters: Carapace rounded, as wide as or slightly wider than long; surfaces convex, with dense pubescence; 5 anterolateral teeth, median ones largest. No spine present on outer margin of dactylus of last walking leg. **Colour:** light brown overall with pink fingers.

Size: Maximum carapace width 20 cm (males) and 12 cm (females).

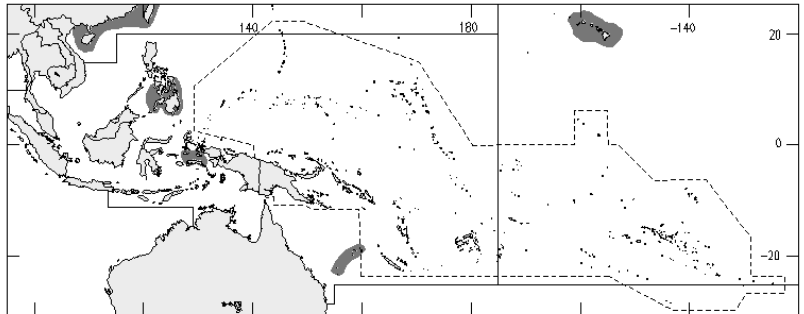
Habitat, biology, and fisheries: Prefers moderately shallow waters with rocky-muddy substrates, at depths from 5 to 50 m; sometimes found near reefs. Occasionally appears in markets in parts of eastern Indonesia and Philippines. Caught incidentally in nets, fish or crab traps, and sometimes by benthic trawls.

Distribution: Southern Philippines, Ambon, southern China, New Caledonia, and Hawaii.

Remarks: Only 3 species of *Dromia* are known to occur in the Indo-West Pacific, and *D. dormia* is one of the largest representatives. It is the only Indo-West Pacific species of *Dromia* with all the 5 anterolateral teeth well developed and large.



(from Alcock, 1901)



Lauridromia indica (Gray, 1831)

Frequent synonyms / misidentifications: *Dromia orientalis* Miers, 1880; *Dromidiopsis cranioides* (De Man, 1888) / None.

FAO name: En - Cannonball sponge crab.

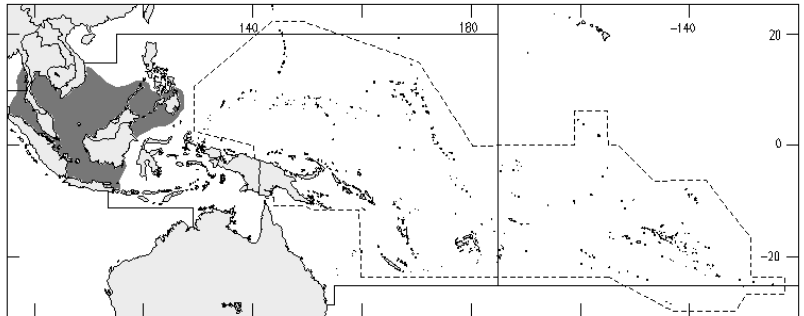
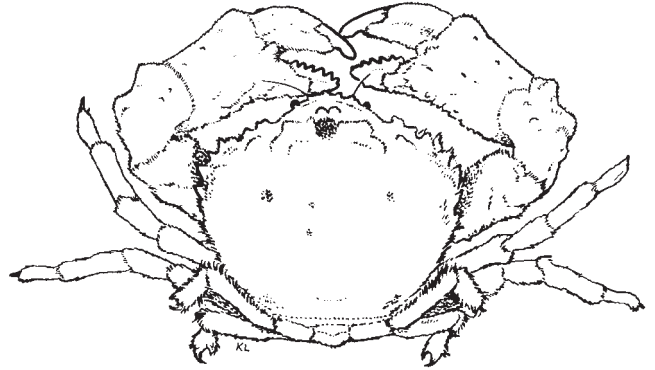
Diagnostic characters: Carapace rounded, much wider than long; surfaces convex, with dense pubescence; 6 anterolateral teeth. Spine present on outer margin of dactylus of last walking leg. **Colour:** light brown with bright pink fingers.

Size: Maximum carapace width 8 cm (males) and 7 cm (females).

Habitat, biology, and fisheries: In muddy substrates from depths of 10 to 60 m. A relatively common species, caught incidentally by trawlers and benthic nets in various parts of Southeast Asia, sometimes in very large numbers. No targeted fisheries are known for this species, which has a minor commercial value due to the poor quality of its flesh.

Distribution: Thailand, Malaysia, Singapore, northern Borneo, and southern Philippines.

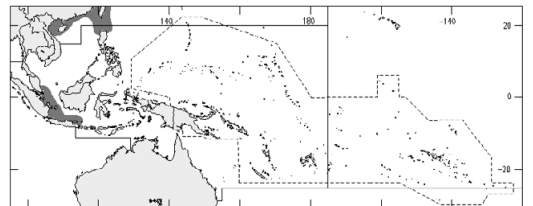
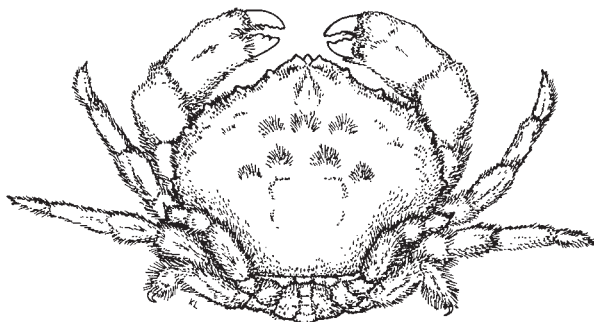
Remarks: Only 3 species of this Indo-West Pacific genus are known. *Lauridromia indica* can easily be distinguished from other species of the genus by its proportionately wider carapace with relatively soft pubescence and by having 6 teeth on each anterolateral margin.



Lauridromia dehaani (Rathbun, 1923)

En - Japanese sponge crab.

Maximum carapace width 10 cm (males) and 8 cm (females). On mud or sandy-muddy substrates from depths of 50 to 150 m. Locally consumed by some rural communities, rarely sold in markets. Japan, Taiwan Province of China, China, Hong Kong, Java, India, and Gulf of Aden.



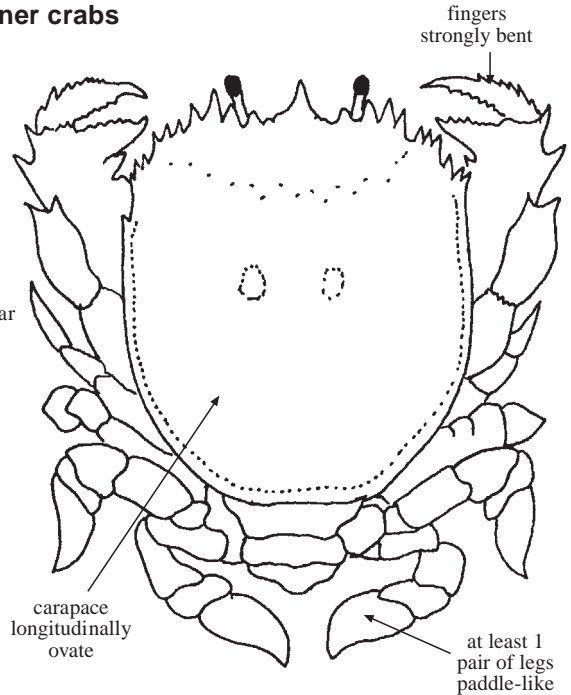
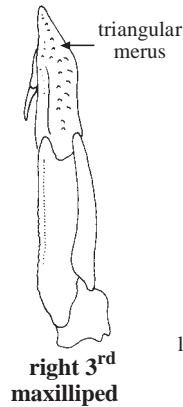
RANINIDAE

Spanner crabs

Diagnostic characters: Carapace longitudinally ovate; dorsal surface strongly granulose or squamose to smooth; front triangular, narrow. **Third maxillipeds very narrow, merus distinctly triangular.** Eyestalks long, longer than front. At least one pair of legs with last 2 or 3 segments paddle-like. **Thoracic sternum very narrow, especially sternites 5 to 7.** All male abdominal segments distinct, movable.

Habitat, biology, and fisheries:

Spanner crabs burrow in soft substrates and tend to occur in moderately shallower waters. They are absent or rare in continental shelf waters and prefer more saline waters. They feed on a variety of worms and soft-shelled molluscs. Most species are moderately small and are not often encountered. A single species, *Ranina ranina*, is large and abundant enough to be fished commercially.

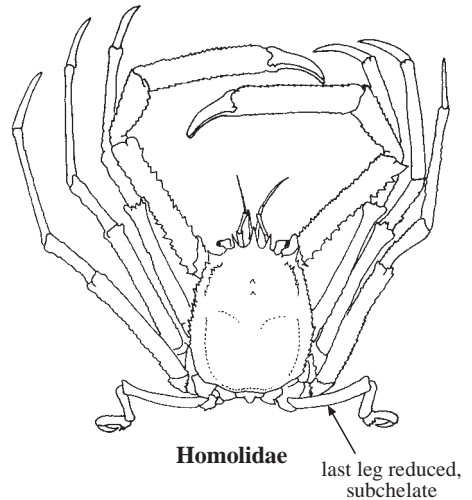


Similar families occurring in the area

The combination of a longitudinally ovate, elongate carapace with its very narrow thoracic sternum, and the narrow third maxillipeds with a triangular merus easily distinguish raninids from other crab families. The following 2 families look superficially similar to the Raninidae:

Homolidae: carapace similarly longitudinally elongate, but subcylindrical in shape; last pair of legs reduced, subchelate, turned upwards and adapted for carrying objects.

Corystidae (non-commercial): many species similar in body shape, but have broader and more rectangular mouthparts, a broader thoracic sternum, and never have any of their legs paddle-like and possess a pair of very long and highly setose antennae.



References

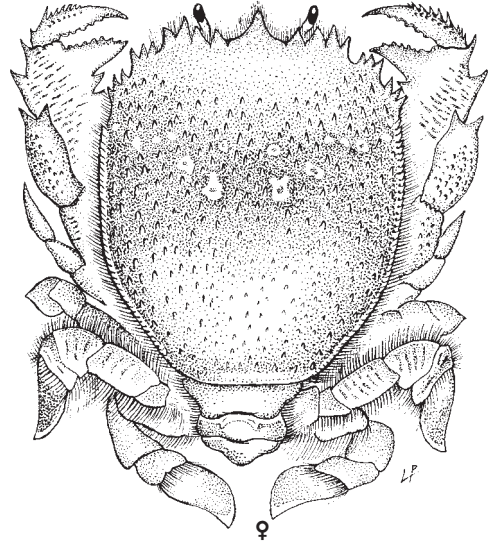
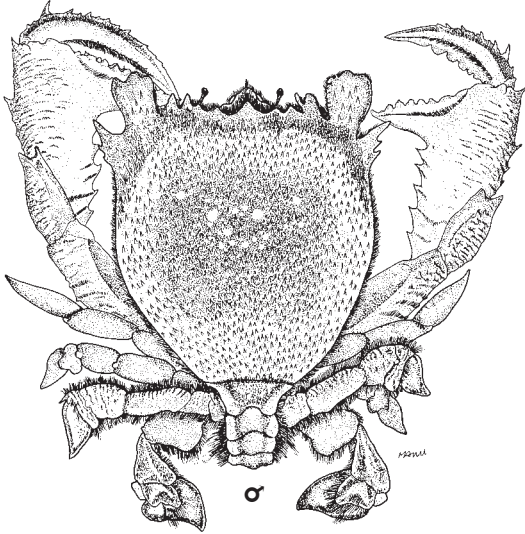
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A single species of interest to fisheries occurring in the area.

Ranina ranina (Linnaeus, 1758)

Frequent synonyms / misidentifications: *Ranina dentata* H. Milne Edwards, 1837 / None.

FAO name: En - Spanner crab.

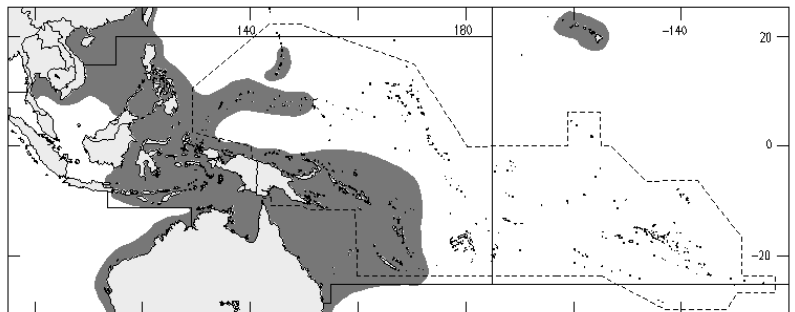


Diagnostic characters: Carapace very elongate, much longer than broad; anterior part much broader than narrow, posterior part waist-like. Abdomen clearly visible from dorsal view. Chelae greatly outsized in males; chelae and legs laterally flattened, spade-like. **Colour:** orange to red overall.

Size: Maximum carapace length 15 cm (males) and 12 cm (females); weight up to 900 g (males) and 400 g (females).

Habitat, biology, and fisheries: Mainly in more oceanic waters, but also in intertidal waters, to depths of more than 100 m, with preference for open sandy areas. Harvested throughout its range, taken by trawls, dredges, baited tangle nets, and bottom nets. A widely exploited species in the Philippines, eastern Indonesia, East Asia, and eastern and northern Australia. The fishery for *Ranina ranina* in Australia has grown substantially in the 1980s and is probably one of the largest for this species, with almost 700 t landed in Queensland and New South Wales from 1989 to 1990. Large specimens command very high prices, especially in live-seafood markets. Prices in Australia amount to about US\$2 to US\$3 per kg, while live specimens in Hong Kong (China) and Taiwan Province of China are sold for US\$5 to US\$10 per kg. The fishery for this species is managed in Australia but not elsewhere.

Distribution: Indo-West Pacific, including Australia, Guam, New Caledonia, and Hawaii.

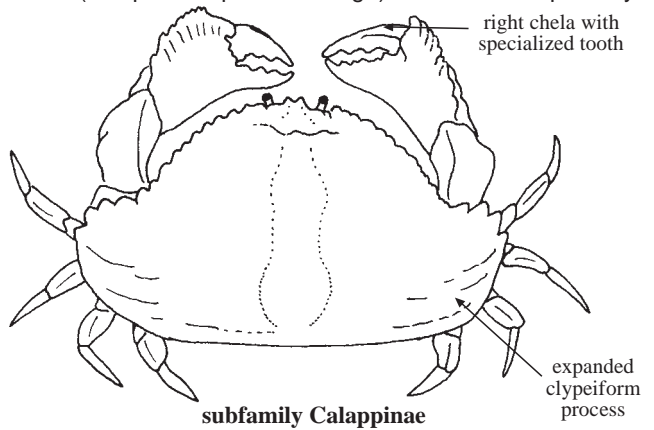
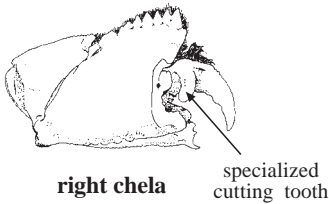


CALAPPIDAE

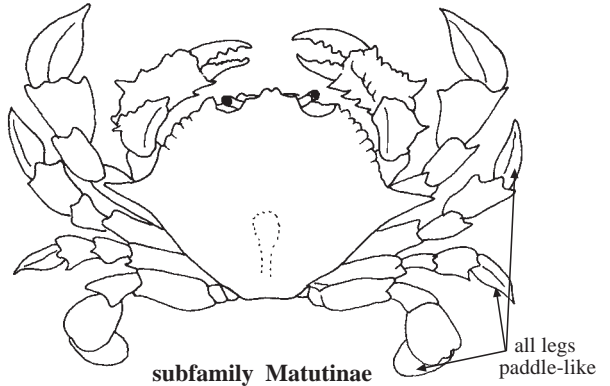
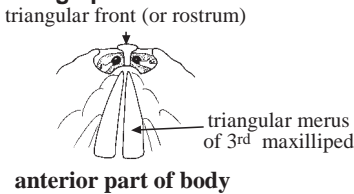
Box and moon crabs

Diagnostic characters (principal family characters): Carapace circular or ovate to transversely ovate or subovate; frontal margin triangular, narrow. **Merus of third maxillipeds distinctly triangular.** **Opening for afferent respiratory current at base of chela, no canal present along sides of buccal cavern** (even when third maxillipeds pushed aside). **Male abdominal segments 3 to 5 completely fused; male genital openings always coxal.**

Subfamily Calappinae (box crabs): **carapace circular or subcircular to transversely ovate or subovate**; dorsal surface strongly convex longitudinally and transversely, smooth to granular, and ridged; anterolateral margins armed with numerous small teeth and lobes, **posterolateral parts of carapace sometimes strongly expanded to form a clypeiform structure** (= expanded posterior edge) which at least partially conceals the legs. Chelae laterally flattened, dorsal margin with high, multidentate crest, **right (larger) chela with special tooth on base of pollex** for peeling gastropods, left chela with forceps-like fingers. Legs smooth, laterally flattened to varying degrees but never paddle-like.



Subfamily Matutinae (moon crabs): **carapace circular to ovate**; dorsal surface usually almost smooth to granulose; junction of antero- and posterolateral margins well developed, often with long spine. **Legs distinctly flattened laterally, last 2 segments of all legs paddle-like.**

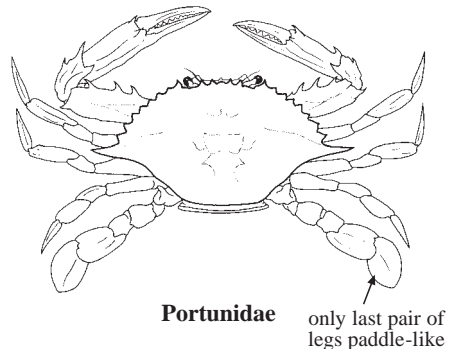


Habitat, biology, and fisheries: Burrowing crabs on soft and mud substrates. Most species of minor commercial importance, with only *Calappa lophos*, *C. philargius*, and *Ashtoret lunaris* being more commonly seen in markets.

Similar families occurring in the area

Portunidae: may be confused with members of the Matutinae (also with paddle-like legs and often long lateral spines), but can be readily distinguished by the following combination of characters: carapace hexagonal, transversely ovate to transversely hexagonal; only the last pair of legs paddle-like; meri of third maxillipeds quadrate.

Dorippidae (non-commercial): also with triangular meri of the third maxillipeds, but differ by having the last 2 pairs of legs small, inserted obliquely on carapace and directed upwards for carrying objects; sides of the carapace never expanded into a clypeiform process; chelae relatively delicate, never with specialized teeth for opening mollusc shells.



Leucosiidae (non-commercial): small, pea-like crabs, also possess triangular meri of the third maxillipeds, but differ by having the opening for afferent respiratory current located below the orbits, adjacent to the endostome; a distinct canal present along sides of buccal cavern when third maxillipeds are pushed aside; sides of carapace never expanded into a clypeiform process; chelae usually delicate, never with specialized teeth for opening mollusc shells; legs never paddle-like.

Key to the subfamilies of Calappidae

- 1a. Dactylus of legs normal, not paddle-like; right (larger) chela with specialized cutting tooth (Fig. 1a); posterolateral part of carapace often strongly expanded to form a clypeiform structure (= expanded posterior edge) which covers legs (Fig. 2) **Calappinae**
- 1b. Dactylus of legs paddle-like; larger chela normal, without specialized cutting tooth (Fig. 1b); carapace round, lateral spine very strong; posterolateral part of carapace never expanded; propodus and dactylus of all legs paddle-like (Fig. 3) **Matutinae**

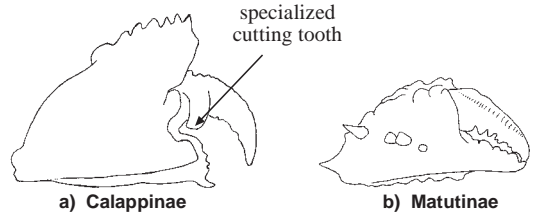


Fig. 1 right chela

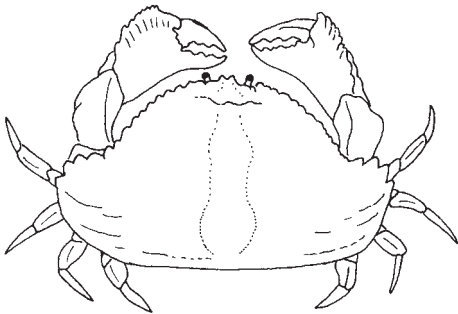


Fig. 2 Calappinae

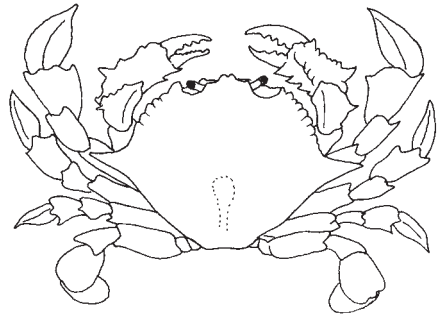
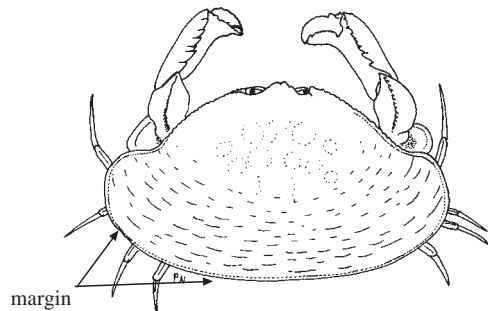


Fig. 3 Matutinae

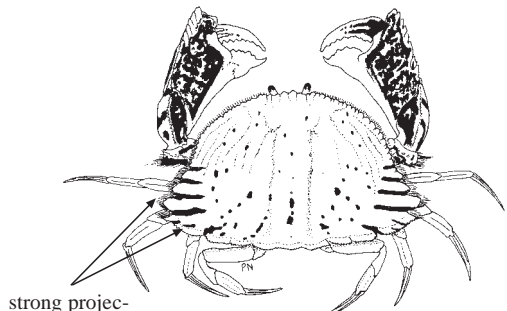
Key to food species of Calappinae occurring in the area

- 1a. Clypeiform part (= expanded posterior edge) of carapace with margin smooth, entire, not armed with spines or teeth (Fig. 4) **Calappa calappa**
- 1b. Clypeiform part of carapace with margin armed with spines or teeth → 2
- 2a. Lateral part of clypeiform part (= expanded posterior edge) of carapace with strong, transverse, outwardly pointing projections; carapace with purple lines on lateral regions, purple spots on median and posterior regions in life (Fig. 5) **Calappa lophos**
- 2b. Lateral part of clypeiform part of carapace with dentate margin, colour pattern of life specimens not as above → 3



margin smooth, unarmed

Fig. 4 Calappa calappa



strong projections

Fig. 5 Calappa lophos

- 3a. Entire posterior margin of carapace and clypeiform part (= expanded posterior edge) armed with strong teeth; large purple spot on palm and carpus of cheliped, and around each orbit in life (Fig. 6) *Calappa philargius*
- 3b. Only anterior edge of clypeiform part of carapace gently denticulate; life colour a uniform yellowish grey to grey (Fig. 7) *Calappa hepatica*



Fig. 6 *Calappa philargius*

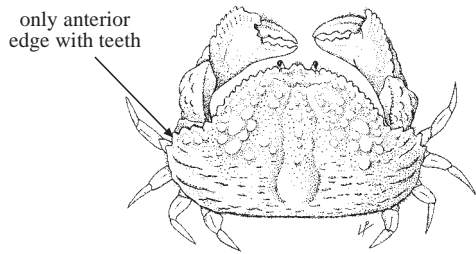


Fig. 7 *Calappa hepatica*

Key to food species of Matutinae occurring in the area

- 1a. Outer surface of palm with ridge subparallel to ventral margin (Fig. 8a) *Ashtoret lunaris*
- 1b. Outer surface of palm with oblique ridge (Fig. 8b) → 2
- 2a. Carapace surface with pattern of fine red lines forming mesh-like pattern; ventral margin of palm entire (Fig. 9) *Matuta planipes*
- 2b. Carapace surface with numerous small spots; ventral margin of palm serrated (Fig. 10) *Matuta victor*

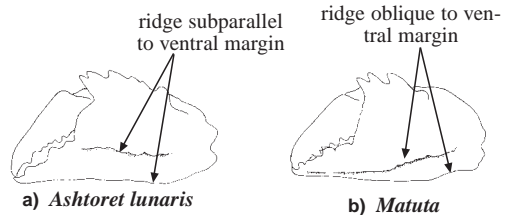


Fig. 8 chela

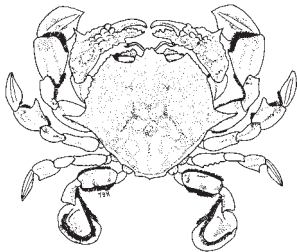


Fig. 9 *Matuta planipes*

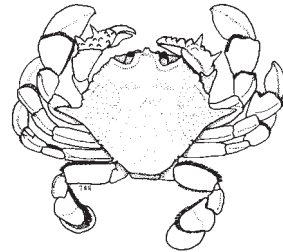






Fig. 10 *Matuta victor*




List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

Subfamily CALLAPINAE

-  *Calappa calappa* (Linnaeus, 1758)
-  *Calappa hepatica* (Linnaeus, 1758)
-  *Calappa lophos* (Herbst, 1785)
-  *Calappa philargius* (Linnaeus, 1758)

Subfamily MATUTINAE

-  *Ashtoret lunaris* (Forsskål, 1775)
-  *Matuta planipes* Fabricius, 1798
-  *Matuta victor* (Fabricius, 1781)

References

Chen, H.L. 1993. The Calappidae (Crustacea: Brachyura) of Chinese waters. In *The marine biology of the South China Sea*, by E.B. Morton, pp. 675-704.

Galil, B.S. 1997. Crustacea Decapoda: A revision of the Indo-Pacific species of the genus *Calappa* Weber, 1795 (Calappidae). In *Résultats des Campagnes MUSORSTOM*, Vol. 18, edited by A. Crosnier. *Mém. Mus. natn. Hist. nat.*, 176:271-335.

Ihle, J.E.W. 1918. Die Decapoda Brachyura der Siboga-Expedition. III. Oxystomata: Calappidae, Leucosiidae, Raninidae. *Siboga Exped. Monogr.*, 39b(2):159-322.

Calappa lophos (Herbst, 1785)

Frequent synonyms / misidentifications: *Calappa guerini* Brito Capello, 1871 / None.

FAO name: En - Common box crab.

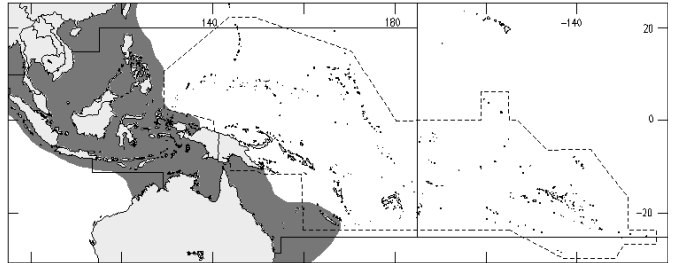
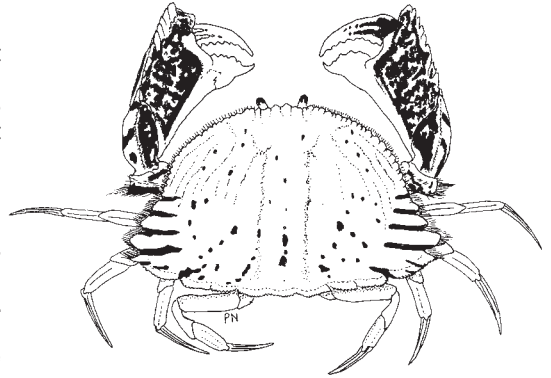
Diagnostic characters: Clypeiform posterolateral part of carapace with strong lateral projections. **Colour:** ground colour yellowish beige to yellow; posterior 1/3 of carapace with distinct red spots, posterolateral part with transverse red stripes; outer surface of cheliped with red streaks and spots.

Size: Maximum carapace width 10 cm.

Habitat, biology, and fisheries: In sandy-muddy areas from depths of 10 to 100 m. Irregularly sold in markets, like most of the larger species of *Calappa*. They are more frequently marketed in the Philippines and East Asia, but do not command high prices. The crabs are caught mainly by trawlers, benthic nets, and sometimes in traps.

Distribution: Japan, China, Southeast Asia, and Australia; westwards to Sri Lanka.

Remarks: Aside from *Calappa lophos*, several larger species of *Calappa* are found in the area, of which only *C. philargius*, *C. hepatica*, and *C. calappa* are large and/or common enough to be sold in markets.



Matuta planipes Fabricius, 1798

Frequent synonyms / misidentifications: None / None.

FAO name: En - Flower moon crab.

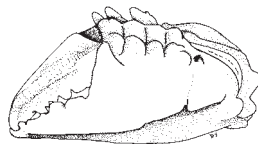
Diagnostic characters: Carapace rounded, with 2 long, well-developed lateral spines; anterolateral margins unevenly serrated. Outer surface of palm with strong oblique ridge. **Colour:** mosaic to reticulate network of maroon lines on a white background.

Size: Maximum carapace width (excluding lateral spines).

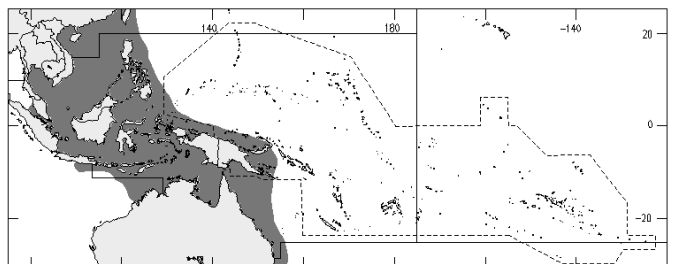
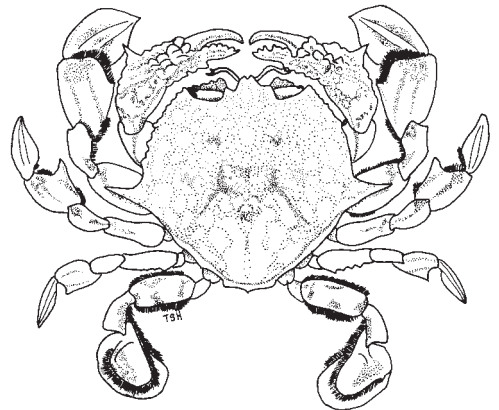
Habitat, biology, and fisheries: Mainly in soft substrates from depths of 10 to 40 m. Taken mainly as a bycatch of trawlers, but rarely caught in sufficient numbers to have significant market value. Sometimes caught in nets and consumed locally.

Distribution: China, Japan, Southeast Asia, and Australia; westwards to India.

Remarks: The coloration of this species is very distinctive and it cannot be confused with any other species in the area.



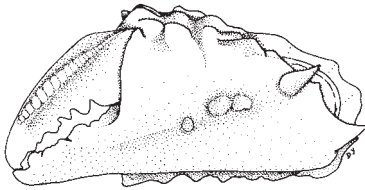
chela (outer surface)



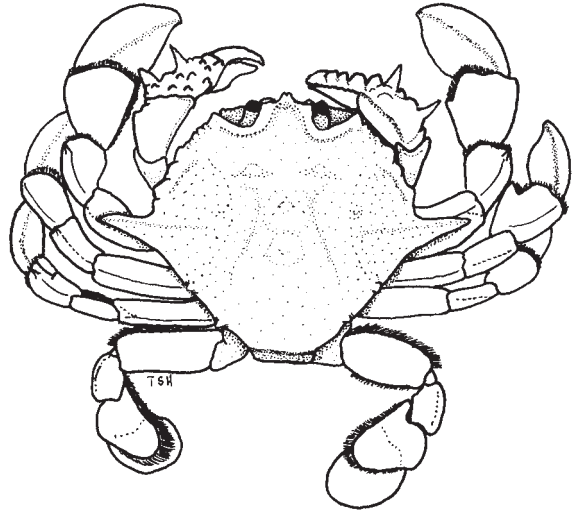
Matuta victor (Fabricius, 1781)

Frequent synonyms / misidentifications: *Matuta lunaris* Forsskål, 1775 (in part); *M. peronii* Leach, 1817; *M. lesuerii* Leach, 1817; *M. crebripunctata* Miers, 1877 / None.

FAO name: En - Common moon crab.



chela (outer surface)



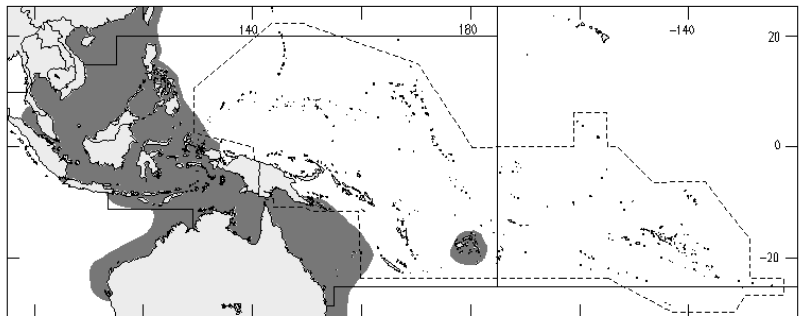
Diagnostic characters: Carapace rounded, with 2 long, well-developed lateral spines; anterolateral margins gently serrated. Outer surface of palm with low but distinct oblique ridge. **Colour:** yellowish ground colour with numerous fine black spots and several larger ones on carapace; legs and chelae bright yellow.

Size: Maximum carapace width 5 cm (excluding lateral spines).

Habitat, biology, and fisheries: Prefers sandy areas, from the intertidal zone to depths of about 20 m. Often caught by local communities in nets, by hand, or beach seines.

Distribution: Southeast Asia to the Philippines, New Caledonia, Fiji, and New Hebrides.

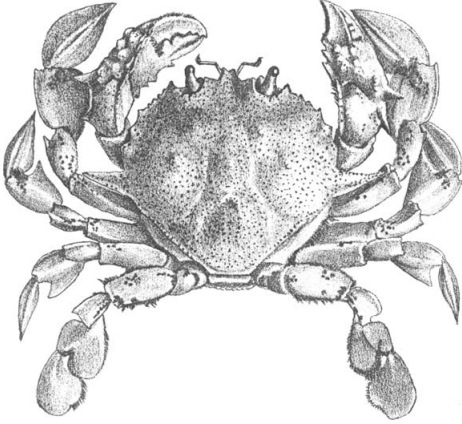
Remarks: The identity of *Matuta victor* has been badly confused with *Ashtoret lunaris* (Forsskål, 1775) and *Matuta banksii* Leach, 1817. The recent revision by Galil and Clark (1994) has shown that the type material of *Cancer lunaris* Forsskål, 1775, is mixed and *Matuta banksii* is in fact a junior synonym of *Ashtoret lunaris*. The common Indo-West Pacific species with the carapace pattern of fine black spots which has been identified at one time or another as *Matuta lunaris*, *M. victor*, or *M. banksii*, is actually either *Matuta victor* or *Ashtoret lunaris*.



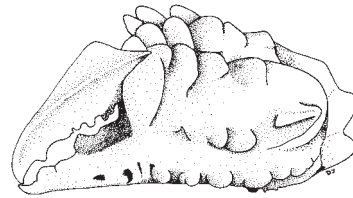
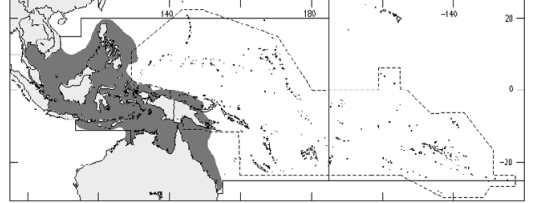
Ashtoret lunaris (Forsskål, 1775)

En - Yellow moon crab.

Maximum carapace width 5 cm. Found in sandy substrates, often near reefs or seagrass beds, from the intertidal zone to a depth of 50 m. Caught in nets for food in some parts of its range, often in good numbers. Indo-West Pacific, eastwards to Papua New Guinea and Australia.



(from Rüppell, 1830)

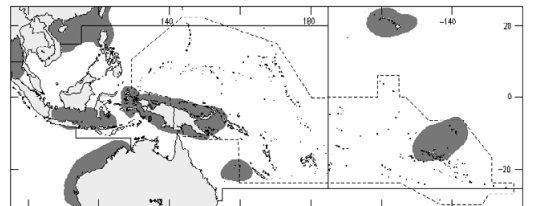
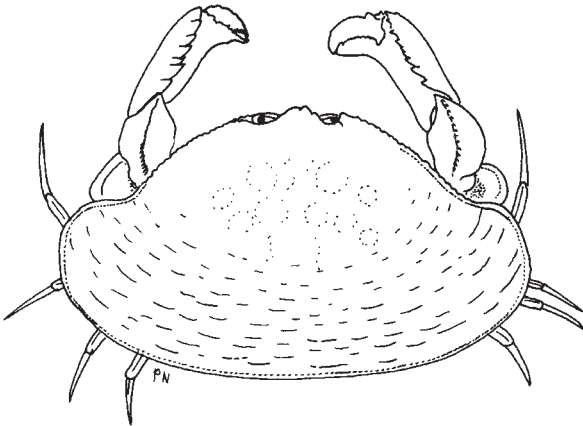


chela (outer surface)

Calappa calappa (Linnaeus, 1758)

En - Giant box crab.

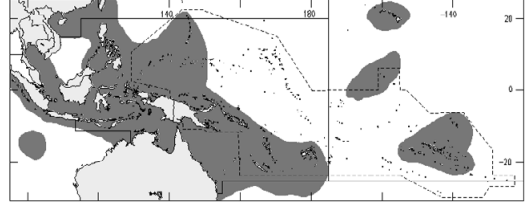
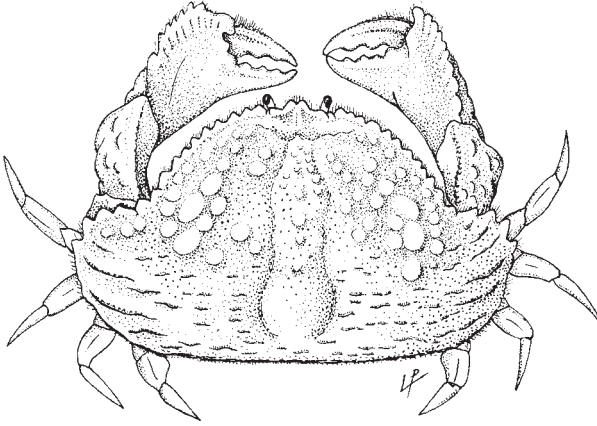
Maximum carapace width 13 cm. Two colour morphs are known: one uniform tan and the other speckled with numerous red to maroon spots. Found in rocky to shelly substrates, from depths of 10 to 50 m. Usually caught in traps or nets. Of interest to fisheries due to its large size, but nowhere common enough to have major commercial importance. Also popular as a curiosity (e.g. in Hawaii). Indo-West Pacific, including Japan, Australia, Papua New Guinea, New Caledonia, and Hawaii.



***Calappa hepatica* (Linnaeus, 1758)**

En - Reef box crab.

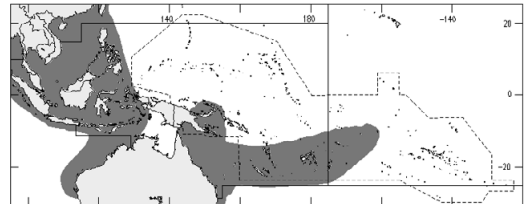
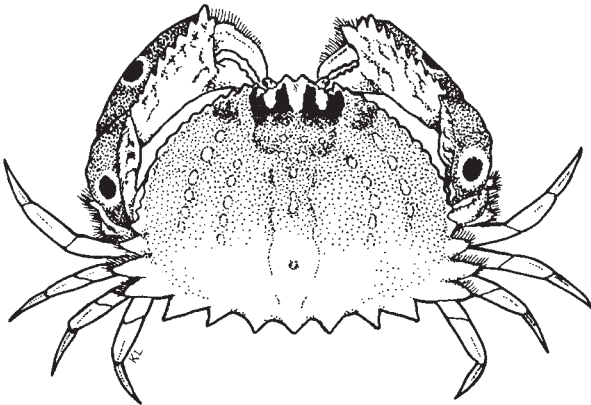
Maximum carapace width 8 cm. In sandy and shelly substrates, often in reefs and among seagrass beds, from the intertidal zone to a depth of about 100 m. Collected for food, occasionally by hand or in traps. Indo-West Pacific, reaching Australia, Hawaii, and French Polynesia.



***Calappa philargius* (Linnaeus, 1758)**

En - Spectacled box crab.

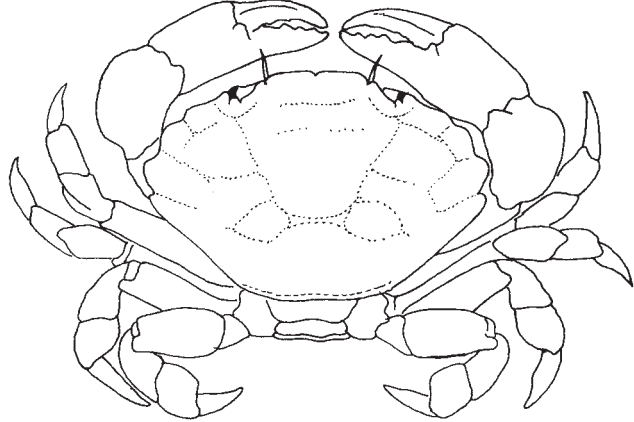
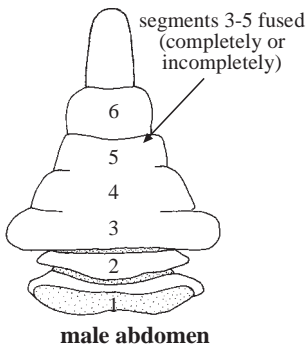
Maximum carapace width 12 cm. Prefers sandy to slightly muddy substrates at depths from 10 to 100 m. Usually collected in nets or trawls. Caught for food in many parts of its range but nowhere very important and rarely sold in markets. Indo-West Pacific, including Korea and Japan.



XANTHIDAE

Xanthid stone and mud crabs

Diagnostic characters: Carapace hexagonal, transversely hexagonal to transversely ovate, sometimes circular; dorsal surface usually ridged or granulose; frontal margin usually notched medially; usually 2 to 6 spines, teeth and/or lobes on each anterolateral margin. Longitudinal ridges which define the efferent respiratory current usually absent or strong only on posterior part of endostome; ridges not visible on anterior part of endostome when mouthparts pushed aside. Fingers of chela may be spoon-tipped. Legs varying in structure; propodus and dactylus with or without a special dactylo-propodal articulation, which is formed by a rounded submedian extension of the lateral margin, shaped to slide underneath a projecting button on the subproximal edge of the dactylus. **Male abdominal segments 3 to 5 immovable**, fused completely or incompletely. **Male first gonopod slender, slightly sinuous**; distal part relatively simple, without complex folds, long setae usually present distally or subdistally; **male second gonopod very short**, less than 1/4 the length of male first gonopod.

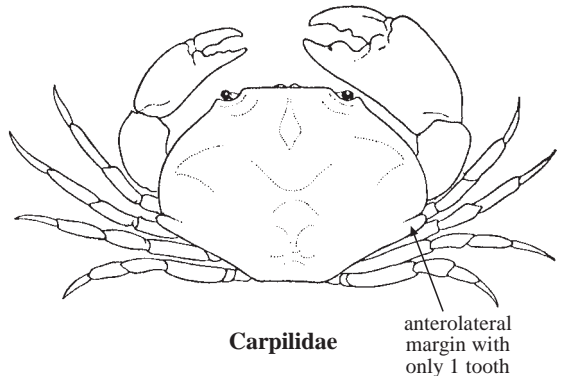
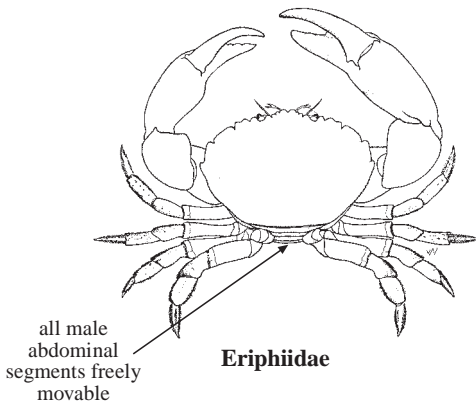


Habitat, biology, and fisheries: Benthic crabs with diverse habits. Most species of minor or no commercial importance. A single species of *Atergatopsis* ("egg crabs") and 4 of the reef species of *Etisus* ("spooner crabs") are of interest to fisheries in the area. **It is important to note here that several species of xanthids are highly poisonous**, particularly *Zosimus aeneus*, *Lophozozymus pictor*, and *Atergatis floridus*, and their consumption has caused a number of human deaths (see General Remarks).

Similar families occurring in the area

The Xanthidae is a very diverse group and can easily be confused with a number of families. Particularly difficult to distinguish are the Eriphiidae (likewise called "stone and mud crabs") and Carpiliidae (reef crabs), both of which were previously included in the Xanthidae.

Carpiliidae, Eriphiidae: adult males can be distinguished from xanthids by having the male first gonopods stout and cylindrical (rather than slender and sinuous), and the male second gonopods very slender, longer than the male first gonopod (rather than very short). Male eriphiids can also be distinguished from xanthids by having all the male abdominal segments freely movable, with the sutures clearly visible (versus male abdominal segments 3 to 5 completely fused, with sutures not discernible).



Key to species of interest to fisheries occurring in the area

- 1a. Anterolateral margins almost entire except for a weak lateral tooth (Fig. 1) *Atergatopsis signatus*
- 1b. Anterolateral margins multidentate to multispinate → 2
- 2a. Anterolateral margins each with first 2 teeth lobiform, not spine-tipped; adult chelipeds elongate; margins of legs unarmed (Fig. 2) *Etisus laevimanus*
- 2b. Anterolateral margins with teeth distinct, sharp; adult chelipeds normal; margins of legs armed with sharp granules or spines → 3

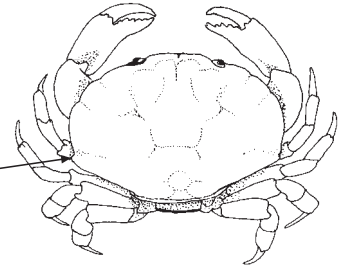


Fig. 1 *Atergatopsis signatus*

- 3a. Anterolateral margins each with 8 strong, equal-sized teeth which curve distinctly forward (Fig. 3) *Etisus utilis*
- 3b. Anterolateral margins each with 6 strong, equal-sized triangular teeth which do not curve distinctly forward, often with 4 to 5 smaller teeth between them (Figs 4 and 5) → 4

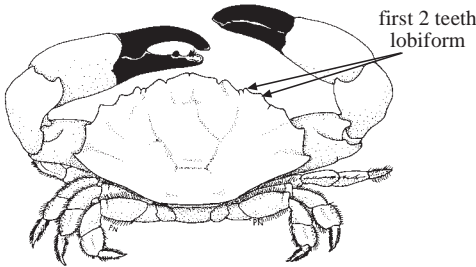


Fig. 2 *Etisus laevimanus*

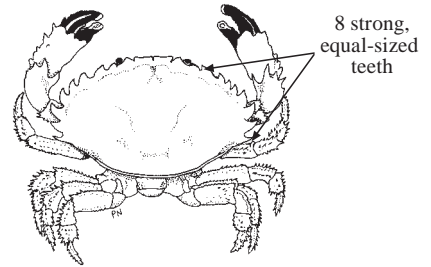


Fig. 3 *Etisus utilis*

- 4a. Frontal lobes separated by narrow groove; carpus of cheliped with 1 spine on inner margin (Fig. 4) *Etisus dentatus*
- 4b. Frontal lobes separated by shallow, broad, V-shaped sulcus (cleft); carpus of cheliped with 2 spines on inner margin (Fig. 5) *Etisus splendidus*

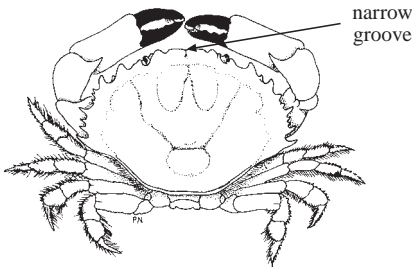


Fig. 4 *Etisus dentatus*

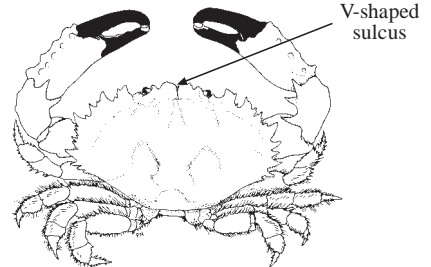







Fig. 5 *Etisus splendidus*

List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

-  *Atergatopsis signatus* (Adams and White, 1848)
-  *Etisus dentatus* (Herbst, 1785)
-  *Etisus laevimanus* Randall, 1840
-  *Etisus splendidus* Rathbun, 1906
-  *Etisus utilis* Jacquinot, 1852

References

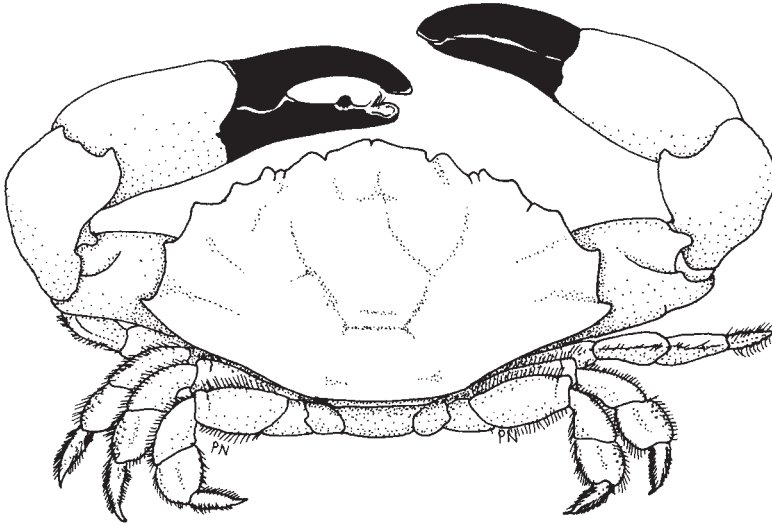
Alcock, A., 1898. Materials for a carcinological fauna of India. No. 3. The Brachyura Cyclometopa. Part I. The family Xanthidae. *J. Asiat. Soc. Bengal*, 67(2), No. 1:67-233.

Serène, R. 1984. Crustacés Décapodes Brachyours de l'Océan Indien occidental et de la Mer Rouge. Xanthoidea: Xanthidae et Trapeziidae. Addendume Carpiidae et Menippidae - A. Crosnier. *Faune Tropicale (ORSTOM)*, 24:1-400.

Etisus laevimanus Randall, 1840

Frequent synonyms / misidentifications: *Etisus macrodactylus* Bianconi, 1851; *E. convexus* Stimpson, 1858; *E. maculatus* Heller, 1861 / None.

FAO name: En - Smooth spooner.



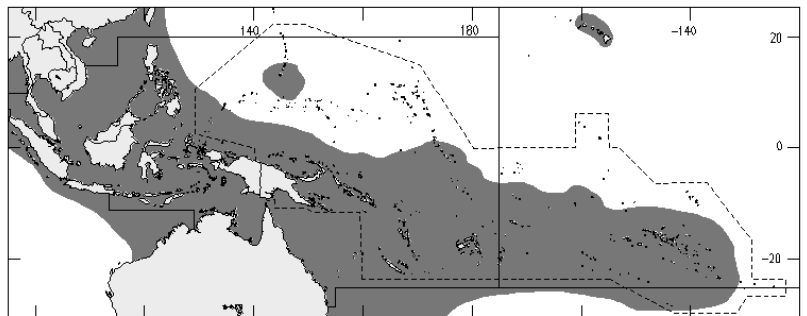
Diagnostic characters: Carapace distinctly broader than long, surfaces very smooth; anterolateral margin with 5 lobiform teeth (first 2 teeth never spine-tipped). Chelae very long in adults, reaching or almost reaching maximum width of carapace. **Colour:** quite variable, from dark grey to reddish brown, often with a patchwork of grey and dark brown.

Size: Maximum carapace width 8 cm.

Habitat, biology, and fisheries: Inhabits reefs from the intertidal zone to a depth of about 20 m. Caught incidentally on reefs, using nets and fish traps; also collected by hand in some parts of its range. Of low market value, although it may be very common in certain regions, especially on disturbed reef flats.

Distribution: Indo-West Pacific, reaching eastwards to Guam, Hawaii, and French Polynesia.

Remarks: One of the most distinctive members of the genus because of its very broad and smooth carapace with lobiform anterolateral margins, and the elongate chelipeds.



***Etisus splendidus* Rathbun, 1906**

Frequent synonyms / misidentifications: None / *Etisus utilis* Jacquinot, 1852; *E. dentatus* (Herbst, 1785).

FAO name: En - Splendid spooner.

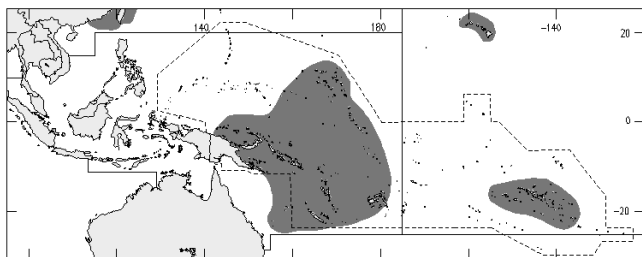
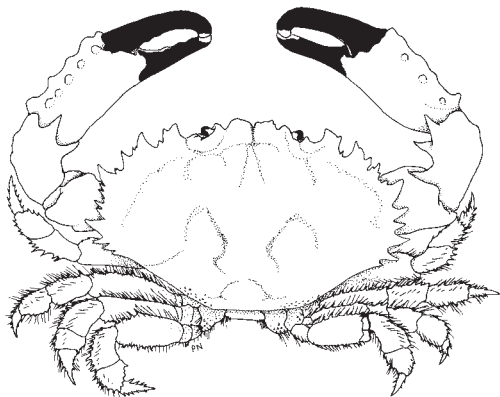
Diagnostic characters: Carapace ovate, surfaces smooth; 8 large teeth on each anterolateral margin (often with smaller denticles between them); front divided into 2 distinct lobes, separated by distinct V-shaped cleft. Carpus of cheliped with 2 spines on inner margin. **Colour:** red to reddish brown overall.

Size: Maximum carapace width 15 cm.

Habitat, biology, and fisheries: A coral reef crab. Never collected in large numbers, but prized when caught, because of its large size. Often caught in benthic nets and fish traps, or by hand in intertidal reef areas.

Distribution: Indo-West Pacific, eastwards to Hawaii and French Polynesia, but not yet known from Southeast Asia.

Remarks: There are 2 species in the area similar to *Etisus splendidus* in size and general morphology, namely *E. utilis* and *E. dentatus* (see species accounts below). *E. utilis* is easily recognized by its 8 anterolateral teeth which are curved forwards and dorsoventrally flattened, whereas *E. dentatus* can be distinguished by the distinct sinus between the 2 frontal lobes being very narrow and the carpus of the cheliped possessing only 1 spine on the inner margin.

***Etisus utilis* Jacquinot, 1852**

Frequent synonyms / misidentifications: None / *Etisus splendidus* Rathbun, 1906; *E. dentatus* (Herbst, 1785).

FAO name: En - Sawedged spooner.

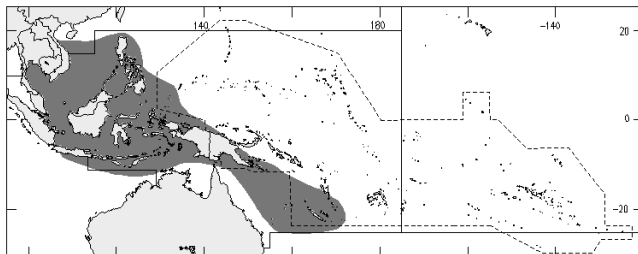
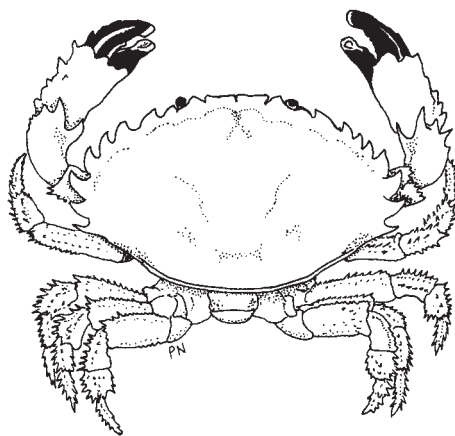
Diagnostic characters: Carapace ovate, surfaces smooth; 8 large teeth on each anterolateral margin (often with smaller denticles between them); front divided into 2 distinctly truncate lobes, separated by narrow fissure. Carpus of cheliped with 2 large spines on inner margin. **Colour:** reddish brown overall; tips of dactylus of legs red.

Size: Maximum carapace width 15 cm.

Habitat, biology, and fisheries: A coral reef crab. Caught by hand, in benthic nets, and fish traps. Often collected for food, although rarely in large numbers. There is some evidence that this species may be temporarily mildly poisonous in some parts of its range.

Distribution: Indo-West Pacific, reaching eastwards to New Caledonia.

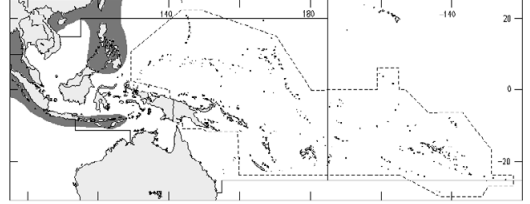
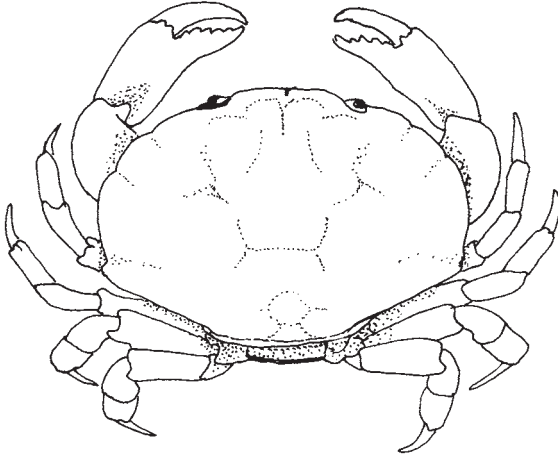
Remarks: See *Etisus splendidus*.



Atergatopsis signatus (Adams and White, 1848)

En - Giant egg crab.

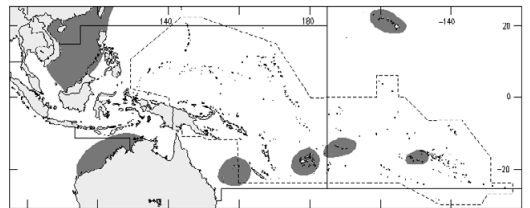
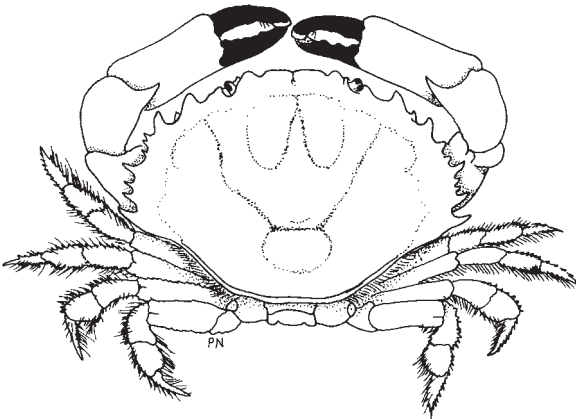
Maximum carapace width 12 cm. Inhabits reefs from the intertidal zone to a depth of 25 m. Occasionally collected by hand or in traps because of its large size, but not a common species and therefore only locally of importance. Indo-West Pacific to Japan.



Etisus dentatus (Herbst, 1785)

En - Spiny spooner.

Maximum carapace width 12 cm. In reefs or among rocky substrates, from the intertidal zone to a depth of 20 m. Occasionally collected by hand or in traps, but nowhere of significant importance. Indo-West Pacific, eastwards to Tahiti and Hawaii, but not recorded from most of Southeast Asia.



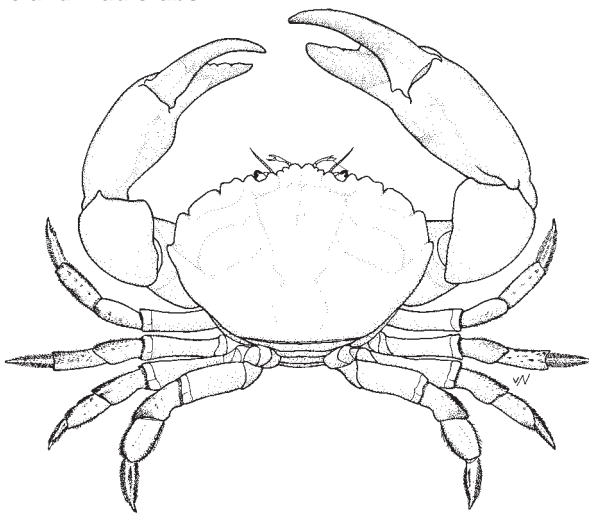
ERIPHIIDAE

(= Menippidae, Oziidae)

Eriphiid stone and mud crabs

Diagnostic characters: Carapace hexagonal, transversely rectangular to transversely ovate; dorsal surfaces ridged or granu-lose; frontal margin notched medially; 4 teeth and/or lobes on each anterolateral margin. Legs normal. Longitudinal ridges which define efferent respiratory current well developed along entire endostome, ridges visible on anterior part of endostome when mouthparts pushed aside. **All male abdominal segments distinct, movable. Male first gonopod stout, almost straight or gently curved; male second gonopod elongate,** longer or subequal in length to male first gonopod.

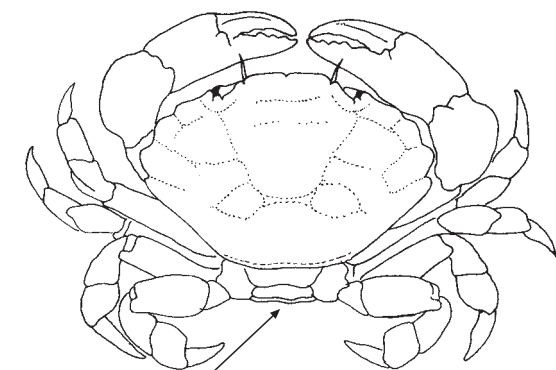
Habitat, biology, and fisheries:^{1/} Benthic crabs. Most eriphiids are only of minor importance to fisheries. The more commonly collected species in the area are *Myomenippe hardwickii*, *Menippe rumphii*, and *Hypothalassia armata*.

**Similar families occurring in the area**

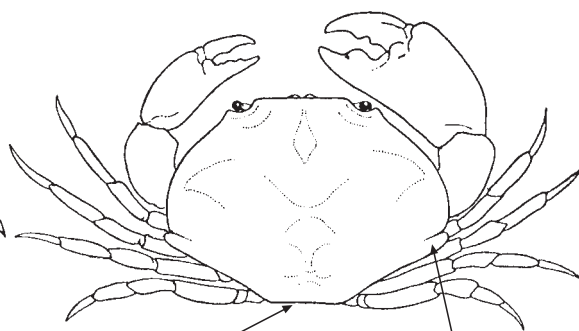
The Eriphiidae can easily be confused with the Xanthidae (likewise called "stone and mud crabs") and Carpiliidae. These 3 groups were previously classified together in the Xanthidae.

Xanthidae: adult males can be distinguished from eriphiids by having abdominal segments 3 to 5 fused and immovable (versus all segments freely movable), the male first gonopods slender and sinuous (rather than stout, cylindrical), and the male second gonopods very short (rather than very elongate, longer than first gonopod).

Carpiliidae: can only be effectively distinguished from eriphiids by having male abdominal segments 3 to 5 immovable, completely fused, and the sutures not discernible (versus all male abdominal segments freely movable, sutures clearly visible).



Xanthidae
male abdominal segments 3-5 fused, immovable



Carpiliidae
male abdominal segments 3-5 fused, immovable
anterolateral margin with a single tooth

^{1/} The most important commercial species of this family is probably the Australian "Tasmanian giant crab", also known as the "queen crab", *Pseudocarcinus gigas* (Lamarck, 1818), which occurs just outside the boundaries of the Western Central Pacific. It grows up to 40 cm in carapace width, at a maximum weight in excess of 12 kg. Over 50 t of these giant crabs are caught annually in Australia, where it commands prices of US\$6 per kg, but it is even more expensive when exported.

Key to species of interest to fisheries occurring in the area

- 1a. Surfaces of carapace, chelipeds and legs with numerous sharp, long, slender spines (Fig. 1) *Hypothalassia armata*
- 1b. Surfaces of carapace, chelipeds and legs smooth or armed at most with low granules or tubercles → 2
- 2a. Front finely granulate; anterolateral margins with clearly defined lobes or teeth → 3
- 2b. Front multilobed or multidentate; anterolateral margins denticulate but without distinct lobes or teeth → 4
- 3a. Outer surface of palm smooth (Fig. 2) *Eriphia sebana*
- 3b. Outer surface of palm granulose (Fig. 3) *Eriphia smithii*

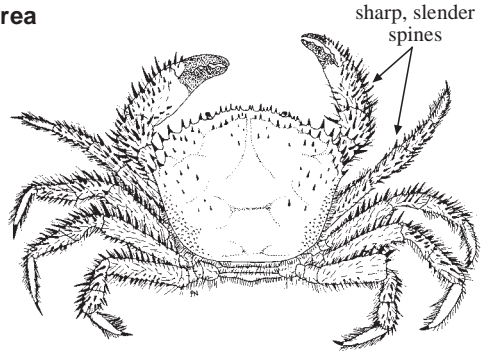


Fig. 1 *Hypothalassia armata*

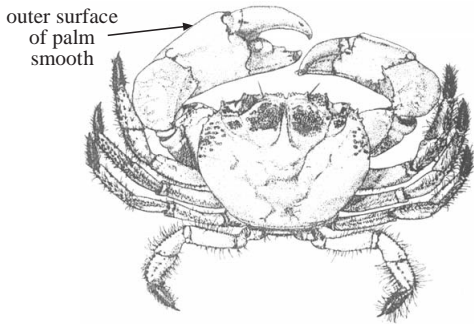


Fig. 2 *Eriphia sebana*
(after Garth and Alcalá, 1977)

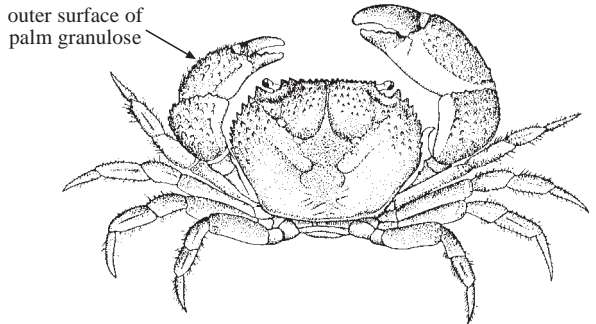


Fig. 3 *Eriphia smithii*

- 4a. Anterolateral teeth not crested (Fig. 4a); base of movable finger of larger chela with large, gently curved tooth (Fig. 5a) → 5
- 4b. Anterolateral teeth crested (Fig. 4b); base of movable finger of larger chela with large molariform tooth (Fig. 5b) → 7

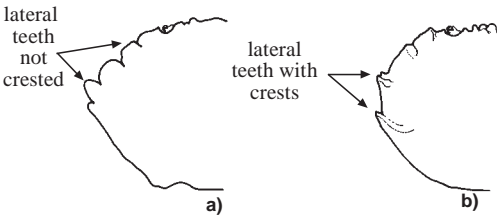


Fig. 4 anterolateral margin of carapace

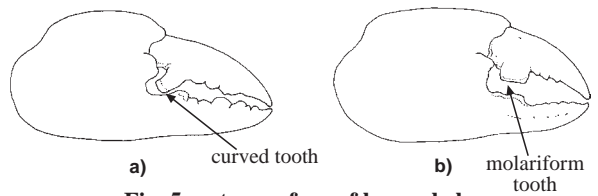


Fig. 5 outer surface of large chela

- 5a. Palm of smaller chela slender; fingers slender, forceps-like; palm and fingers either subequal in length, or fingers longer (Fig. 6a) *Epixanthus dentatus*

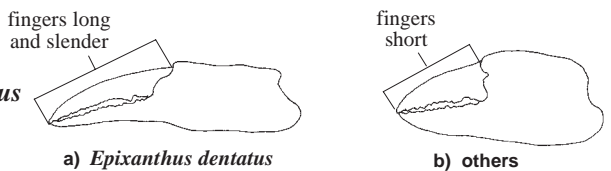


Fig. 6 outer surface of small chela

- 5b. Palm of smaller chela moderately stout; fingers not forceps-like; palm and fingers either subequal in length, or (usually) fingers shorter (Fig. 6b) → 6

- 6a. Dorsal surface of carapace smooth or with numerous small, shallow pits (Fig. 7) . . . *Ozius guttatus*
- 6b. Dorsal surface of carapace with numerous small but distinct rounded granules (Fig. 8)
 *Ozius tuberculosus*

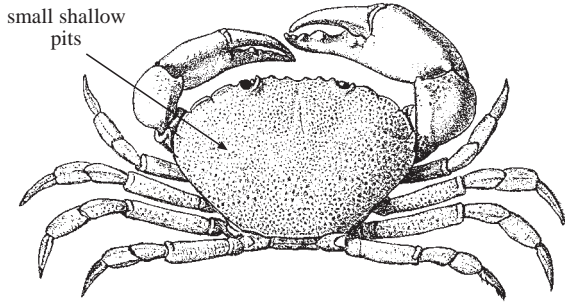


Fig. 7 *Ozius guttatus*
(from A. Milne Edwards, 1873)

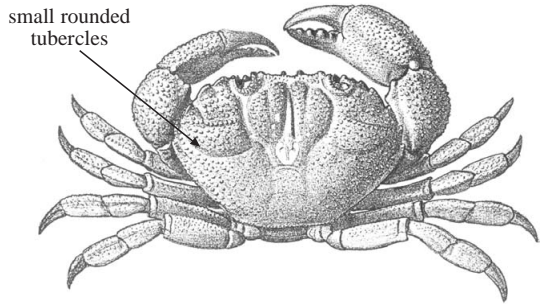


Fig. 8 *Ozius tuberculosus*
(from A. Milne Edwards, 1873)

- 7a. Dorsal surface of carapace and chelipeds granulate (Fig. 9) *Myomenippe hardwickii*
- 7b. Dorsal surface of carapace and chelipeds smooth → 8
- 8a. Basis-ischium and merus of cheliped movable, with suture demarcating them still distinct (Fig. 10a); reddish brown in life; non-mangrove species *Menippe rumphii*
- 8b. Basis-ischium and merus of cheliped fused, immovable, with suture demarcating them partially to almost completely reduced (Fig. 10b); dirty-brown in life; usually mangrove species *Myomenippe fornasinii*

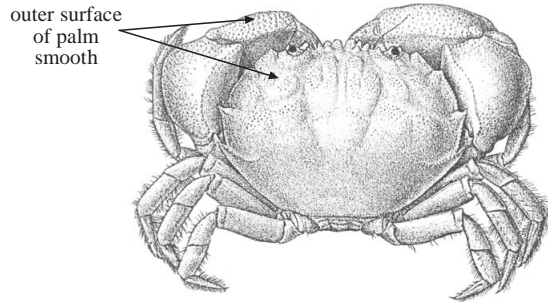


Fig. 9 *Myomenippe hardwickii*
(from De Man, 1887)

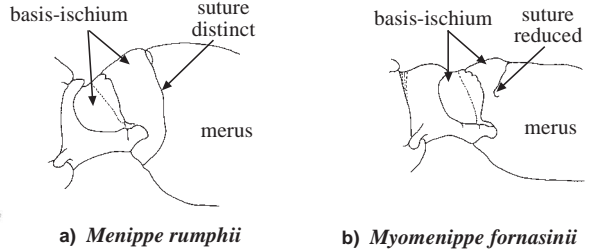












Fig. 10 basis-ischium and merus of cheliped

List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

-  *Epixanthus dentatus* (White, 1847)
-  *Eriphia sebana* (Shaw and Nodder, 1803)
-  *Eriphia smithii* (MacLeay, 1838)
-  *Hypothalassia armata* (De Haan, 1835)
-  *Menippe rumphii* (Fabricius, 1798)
-  *Myomenippe hardwickii* (Gray, 1831)
-  *Myomenippe fornasinii* (Bianconi, 1851)
-  *Ozius guttatus* H. Milne Edwards, 1834
-  *Ozius tuberculosus* H. Milne Edwards, 1834

References

Alcock, A. 1898. Materials for a carcinological fauna of India. No. 3. The Brachyura Cyclometopa. Part I. The family Xanthidae. *J. Asiat. Soc. Bengal*, 67(2), No. 1:67-233.

Serène, R. 1984. Crustacés Décapodes Brachyours de l’Océan Indien occidental et de la Mer Rouge. Xanthoidea: Xanthidae et Trapeziidae. Addendum Carpiidae et Menippidae - A. Crosnier. *Faune Tropicale (ORSTOM)*, 24:1-400.

***Eriphia smithii* MacLeay, 1838**

Frequent synonyms / misidentifications: None / *Eriphia sebana* (Shaw and Nodder, 1803).

FAO name: En - Rough redegied crab.

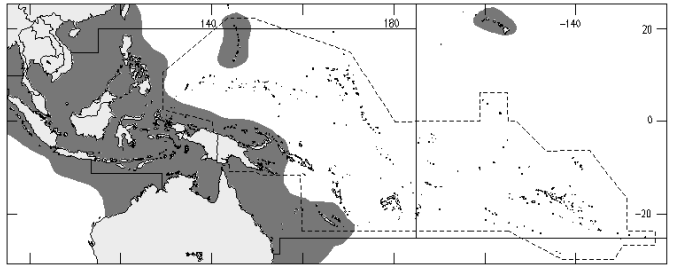
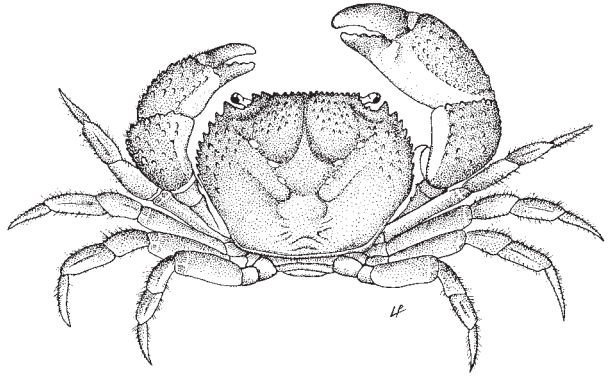
Diagnostic characters: Carapace rectangular, anterior surface granulated; anterolateral margins with numerous spines, but without distinct teeth or lobes. Base of movable finger of larger claw with large molariform tooth. **Colour:** dark reddish brown overall, with bright red eyes.

Size: Maximum carapace width 6 cm.

Habitat, biology, and fisheries: A reef species, preferring intertidal areas. Both species of *Eriphia* included here have a low fishery value and are only collected locally, although frequently, by hand during low tide periods. *Eriphia* species are said to be poisonous in some areas, but those reports could not be confirmed biochemically. It may be possible that upon feeding on poisonous molluscs or material, the crabs become toxic for a short period as well.

Distribution: Indo-West Pacific, reaching to Hawaii.

Remarks: Can only be confused with *Eriphia sebana*, which is easily distinguished by the smooth outer surface of the palm (palm covered with numerous granules in *E. smithii*). *E. sebana* also has a lighter coloured, beige-brown carapace (dark-reddish brown in *E. smithii*).



***Hypothalassia armata* (De Haan, 1835)**

Frequent synonyms / misidentifications: *Acanthodes armatus* De Haan, 1835 / None.

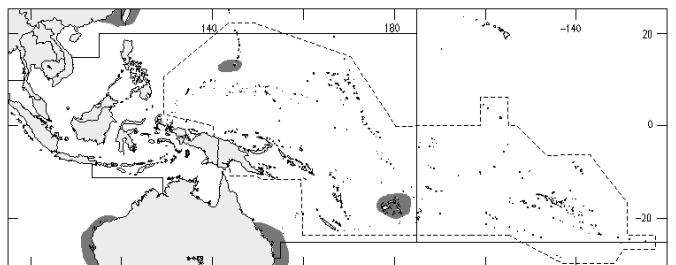
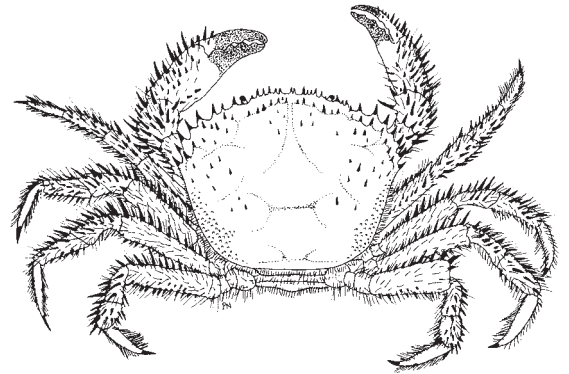
FAO name: En - Champagne crab.

Diagnostic characters: Carapace smooth; anterolateral margins with numerous very sharp spines of differing sizes. Surfaces of legs and chelae with numerous sharp, brown-black spines of differing sizes. **Colour:** carapace reddish brown to brown, especially on anterior part; spines black to brown; fingers black.

Size: Maximum carapace width 15 cm for males, females generally smaller.

Habitat, biology, and fisheries: The monotypic *Hypothalassia armata* prefers rocky and muddy substrates, at depths from 30 to 540 m. It is caught in deep-water lobster pots and sometimes in bottom trawls. Highly valuable for human consumption because of its large size and the enlarged chelae. The common name, "champagne crab", refers to its flesh, which is considered to be of a very fine quality. Occasionally marketed in Australia. Larger markets are being sought for this crab which is exported to Taiwan Province of China and Singapore, where live specimens command premium prices of up to US\$40 per kg. Outside the area, it is occasionally caught off Western Australia; sometimes also collected for food in southern Japan and Taiwan Province of China, but more frequently cleaned, dried, and mounted for the souvenir trade.

Distribution: Australia, Guam, Fiji, Taiwan Province of China, and Japan.



Menippe rumphii (Fabricius, 1798)

Frequent synonyms / misidentifications: None / *Myomenippe hardwickii* (Gray, 1831).

FAO name: En - Maroon stone crab.

Diagnostic characters: Carapace ovate, smooth, regions well defined; 4 broad lobiform teeth on each antero-lateral margin. Eyes red in life. A large molariform tooth at base of movable finger of larger chela. **Colour:** carapace and appendages reddish brown to pinkish brown and maroon in adults; young crabs maroon to reddish brown, longitudinally striped with white.

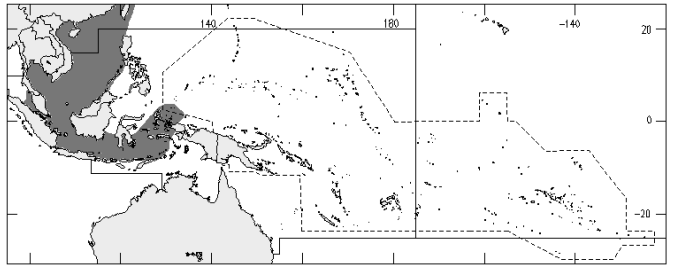
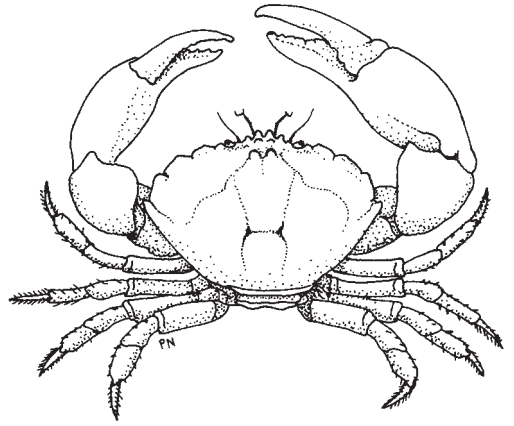
Size: Maximum carapace width 9 cm.

Habitat, biology, and fisheries: Prefers shallow to intertidal waters, on sandy-muddy substrates, usually under rocks.

Menippe rumphii is occasionally fished for food, collected by hand or with nets and fish traps. There are no targeted fisheries for this species, although it can be quite common in parts of the Sunda Shelf. Like *Myomenippe hardwickii*, usually only the chelae are retained for sale.

Distribution: Malaysia, Singapore, Indonesia Thailand, southern China and Taiwan Province of China.

Remarks: Can only be confused with *Myomenippe hardwickii*, which is easily distinguished by the dull brown coloration, green eyes, and rougher carapace surface.

***Myomenippe hardwickii*** (Gray, 1831)

Frequent synonyms / misidentifications: *Menippe granulosa* De Man, 1888; *Myomenippe granulosa* (Gray, 1831) / *Menippe rumphii* (Fabricius, 1798); *Myomenippe fornasinii* (Bianconi, 1851).

FAO name: En - Mangrove stone crab.

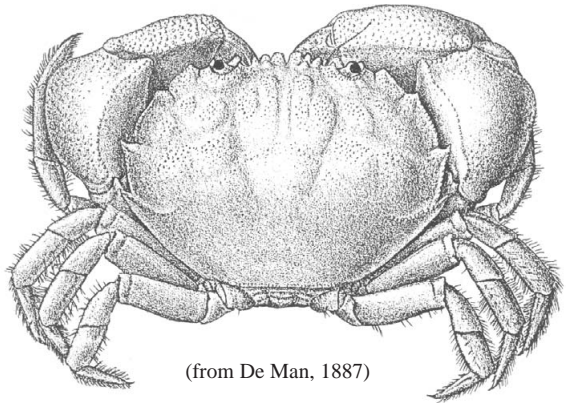
Diagnostic characters: Carapace ovate, covered with numerous very small granules; regions well defined; 4 broad lobiform teeth on each antero-lateral margin. Eyes green in life. A large molariform tooth at base of movable finger of larger chela. **Colour:** carapace dirty-brown overall; eyes green, fingers black.

Size: Maximum carapace width 10 cm.

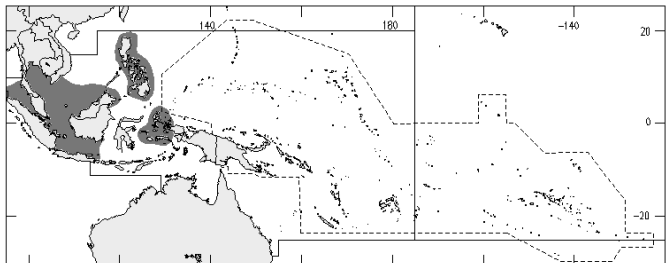
Habitat, biology, and fisheries: Essentially a shallow-water to intertidal mangrove species, preferring rocky areas, or areas densely covered by bivalves, such as *Perna* spp. Caught using fish traps, drift nets, and also taken by hand. An abundant species, caught in large quantities for its massive chelae, but no targeted fisheries are known. Similar to practice in the Americas with certain crab species, the chelae are frequently broken off and the animal is thrown back into the water.

Distribution: Throughout Southeast Asia, reaching the Philippines.

Remarks: Can be confused with *Myomenippe fornasinii* and *Menippe rumphii*, but these 2 species have much smoother carapace and cheliped surfaces (not granulate as seen in *Myomenippe hardwickii*). *Menippe rumphii* additionally differs by its reddish brown coloration and its red eyes.



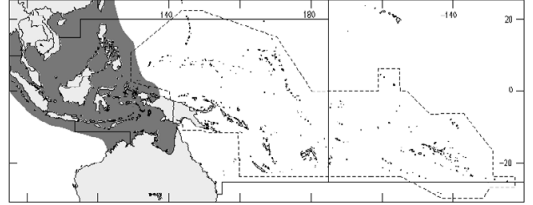
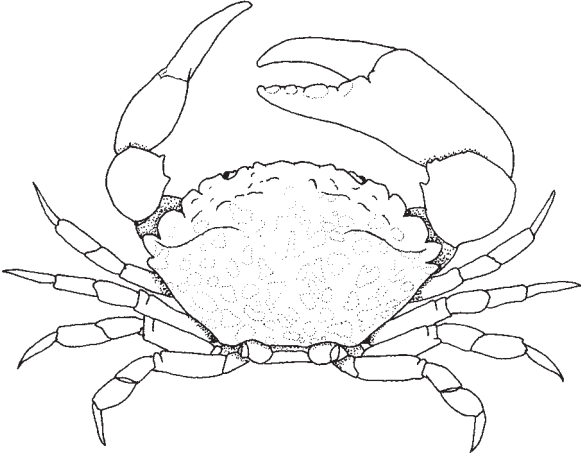
(from De Man, 1887)



***Epixanthus dentatus* (White, 1847)**

En - Longfingered peeler crab.

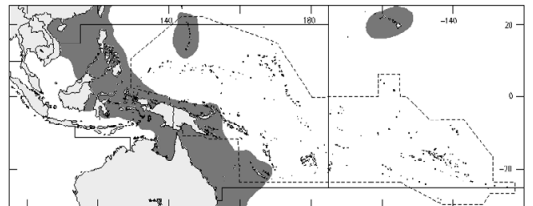
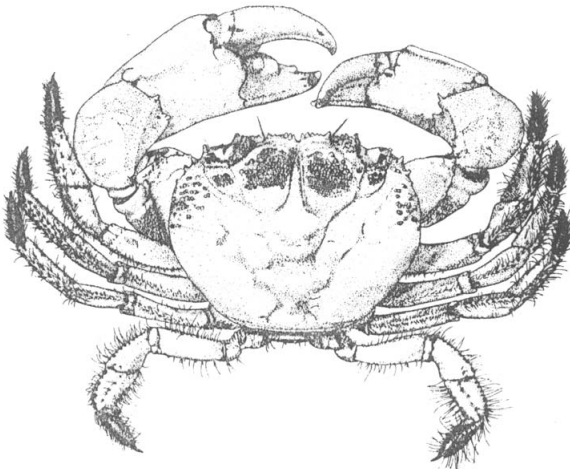
Maximum carapace width 7 cm. Mainly along mangroves, usually under rocks or timber. A moderately large species, quite common in many areas and therefore very likely collected for food by local populations. Indo-West Pacific in distribution, southwards reaching northern Australia.



***Eriphia sebana* (Shaw and Nodder, 1803)**

En - Smooth redeyed crab.

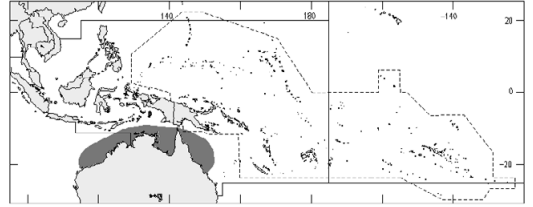
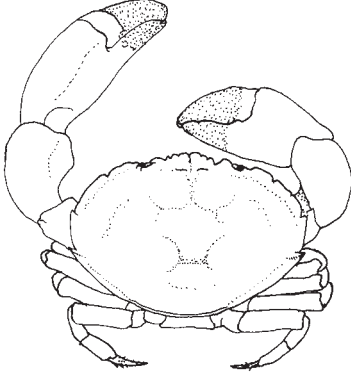
Maximum carapace width 8 cm. A rocky-shore or reef-dwelling species. Occasionally collected for food, but never in large numbers. There have been reports that this species is occasionally mildly poisonous in some parts of its range (see also *E. smithii*). Throughout Indo-West Pacific, including Hawaii and various parts of Southeast Asia.



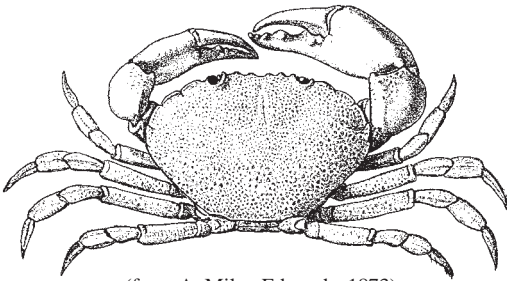
(from Garth and Alcalá, 1977)

Myomenippe fornasinii* (Bianconi, 1851)*En** - Smooth stone crab.

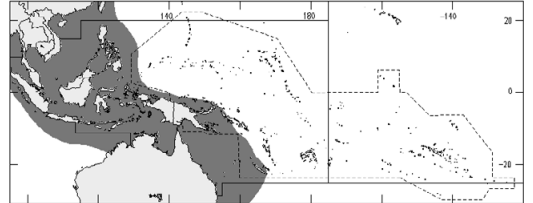
Maximum carapace width 9 cm. A littoral species, with preference for rocky shores with muddy-sand bottoms, commonly found under rocks and timber, and in crevices in mangroves. Probably occasionally collected for food by local populations for its large size. Occurs in parts of the Indian Ocean and northern Australia.

***Ozius guttatus* H. Milne Edwards, 1834****En** - Spottedbelly rock crab.

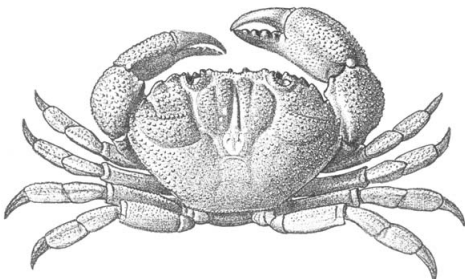
Maximum carapace width 9 cm. Along rocky shores in intertidal to shallow subtidal waters, sometimes in estuaries, usually hiding in crevices. Occasionally collected by hand for human consumption. Indo-West Pacific, from the Indian Ocean to Southeast Asia, Japan, and New Caledonia.



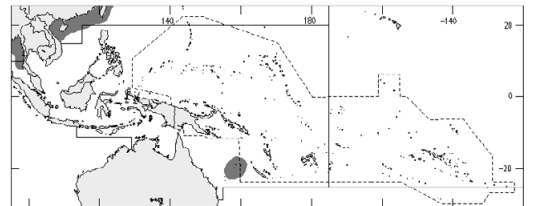
(from A. Milne Edwards, 1873)

***Ozius tuberculatus* H. Milne Edwards, 1834****En** - Beaded rock crab.

Maximum carapace width 9 cm. Usually along rocky shores in intertidal to shallow subtidal waters. Occasionally collected by hand or traps for human consumption. Indo-West Pacific, known from Mauritius and southern India to Southeast Asia, China, Japan, and New Caledonia.



(from A. Milne Edwards, 1873)

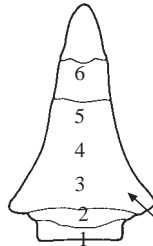


CARPILIIDAE

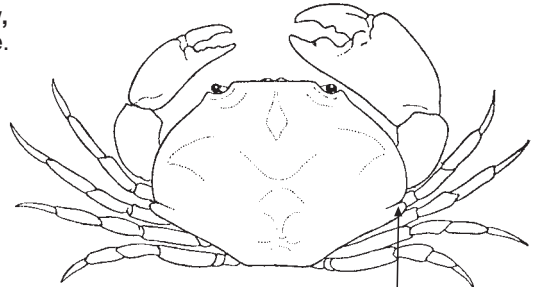
Reef crabs

Diagnostic characters: Carapace transversely **ovate**; dorsal surface smooth, distinctly convex longitudinally and transversely; front entire; **a single low, small tooth on each anterolateral margin of carapace.**

Legs simple. Longitudinal ridges which define efferent respiratory current usually absent or strongly developed on posterior part of endostome only; ridges not clearly visible on anterior part of endostome when mouthparts pushed aside. **Male abdominal segments 3 to 5 immovable, completely fused.** **Male first gonopod stout, almost straight or gently curved; male second gonopod elongate,** longer or subequal in length to male first gonopod.



male abdomen



segments 3-5 completely fused

anterolateral margin with a single tooth

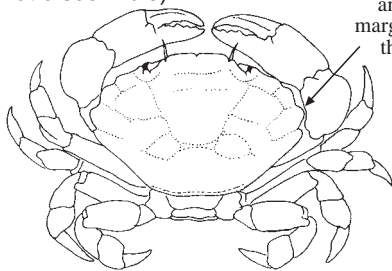
Habitat, biology, and fisheries: Benthic reef crabs. A single genus of Carpiliidae, *Carpilius* (with only 2 species in the Pacific), has fishery value. Both Pacific species of *Carpilius*, *C. maculatus* and *C. convexus*, are occasionally collected for food.

Similar families occurring in the area

Only the Xanthidae and Eriphiidae (both families known as “stone and mud crabs”) can easily be confused with carpiliids. These 3 taxa were all previously classified in a single family (Xanthidae).

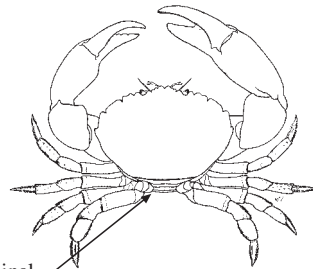
Xanthidae: can be distinguished from carpiliids by the shape of the male first gonopods, which are slender and sinuous (rather than stout, cylindrical), and the male second gonopods, which are very short (rather than very elongate, longer than first gonopod).

Eriphiidae: can only be effectively distinguished from carpiliids by having all the male abdominal segments freely movable, with the sutures clearly visible (versus male abdominal segments 3 to 5 completely fused, sutures not discernible).



Xanthidae

anterolateral margin with more than 1 tooth



all male abdominal segments freely movable

Eriphiidae

Key to species of interest to fisheries occurring in the area

- 1a. Cream to pink ground colour in life, carapace with 9 large violet to maroon spots *Carpilius maculatus*
- 1b. Uniform red to reddish brown colour in life *Carpilius convexus*

List of species of interest to fisheries occurring in the area

The symbol is given when species accounts are included.

- Carpilius convexus* (Forsskål, 1775)
- Carpilius maculatus* (Linnaeus, 1758)

References

Alcock, A. 1898. Materials for a carcinological fauna of India. No. 3. The Brachyura Cyclometopa. Part I. The family Xanthidae. *J. Asiat. Soc. Bengal*, 67(2), No. 1:67-233.

Serène, R. 1984. Crustacés Décapodes Brachyours de l’Océan Indien occidental et de la Mer Rouge. Xanthoidea: Xanthidae et Trapeziidae. Addendum Carpiliidae et Menippidae - A. Crosnier. *Faune Tropicale (ORSTOM)*, 24:1-400.

Carpilius convexus (Forsskål, 1775)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Red reef crab.

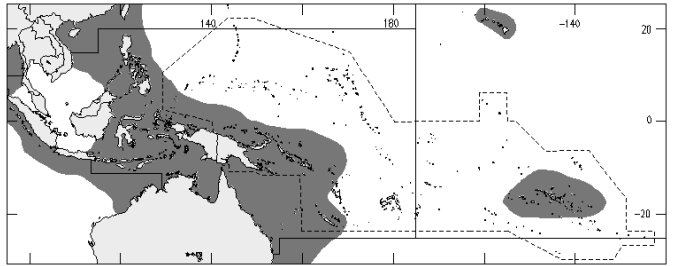
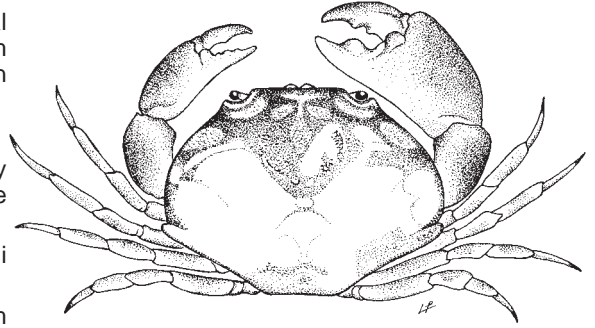
Diagnostic characters: Carapace ovate; dorsal surface very smooth and convex. **Colour:** uniform red to reddish brown, with irregular dark brown patches on the dorsal surface of carapace.

Size: Maximum carapace width 15 cm.

Habitat, biology, and fisheries: A reef crab. Biology and fisheries similar to *Carpilius maculatus* (see below).

Distribution: Indo-West Pacific, reaching Hawaii and French Polynesia.

Remarks: *C. convexus* is easily distinguished from *C. maculatus* by its distinct coloration which remains even after preservation.

***Carpilius maculatus*** (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Spotted reef crab.

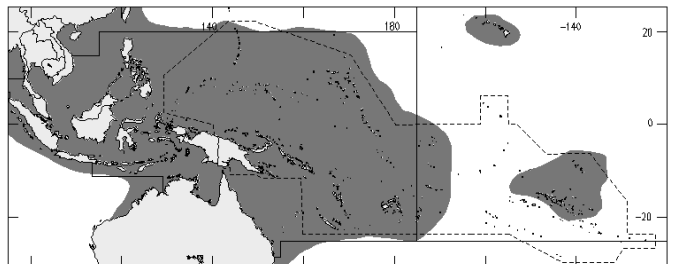
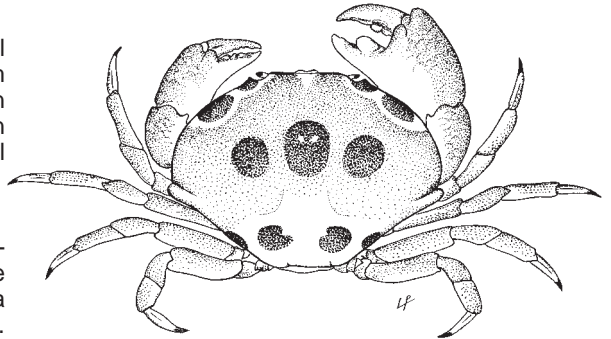
Diagnostic characters: Carapace ovate; dorsal surface very smooth and convex. **Colour:** cream to pink ground colour, with 9 large violet to maroon spots on dorsal surface of carapace: 3 on median region, 2 on posterior region, 2 on anterolateral region, and 2 around the orbits.

Size: Maximum carapace width 18 cm.

Habitat, biology, and fisheries: A reef crab. Collected extensively for food, although never in large quantities. Frequently seen in markets of East Asia and parts of Indonesia, but only in small numbers. Usually collected by hand or with baited traps. There have been reports that this species is poisonous, but this could not be confirmed by biochemical tests. It is possible that after feeding on poisonous molluscs, the crabs become toxic for a short period as well.

Distribution: Indo-West Pacific, reaching Hawaii and French Polynesia.

Remarks: The only other species of *Carpilius* in the area is *C. convexus*, which can easily be distinguished by its very different coloration.



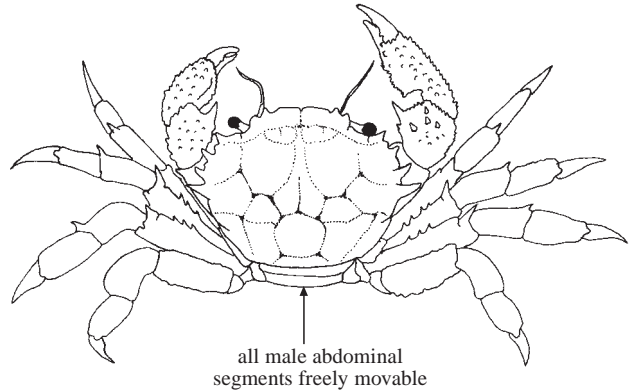
PILUMNIDAE

Hairy crabs

Diagnostic characters: Carapace hexagonal, transversely rectangular or transversely ovate; dorsal surface convex, smooth to granulated; frontal margin entire to multilobate; usually 1 to 4 teeth or lobes on each anterolateral margin. **Longitudinal ridges defining efferent respiratory current usually well developed along entire endostome**, ridges visible on anterior part of endostome when mouthparts pushed aside. Legs normal. **Male abdominal segments 3 to 5 freely movable. Male first gonopod slender, usually S-shaped, distal part simple; male second gonopod very short, sigmoid.**

Habitat, biology, and fisheries: Benthic crabs with diverse habits. Most species in this family are of no commercial value. The moderately large-sized *Galene bispinosa* has minor economic importance.

Remarks: Despite their common name, "hairy crabs", many pilumnids (including *Galene bispinosa*) are actually not very setose (or "hairy").



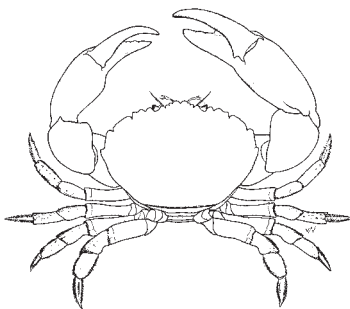
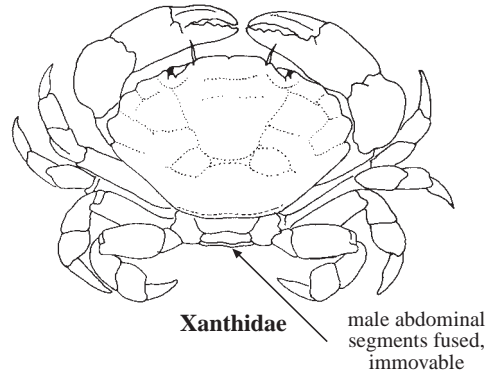
Similar families occurring in the area

The Pilumnidae is a very diverse group and its taxonomy remains unsettled. As their general (usually hexagonal) carapace shape is similar to those of xanthids, eriphiids, and goneplacids, the safest way to identify a pilumnid species is to examine the male abdomen and gonopods. All pilumnids share very similar male abdominal, male pleopodal, and larval characters.

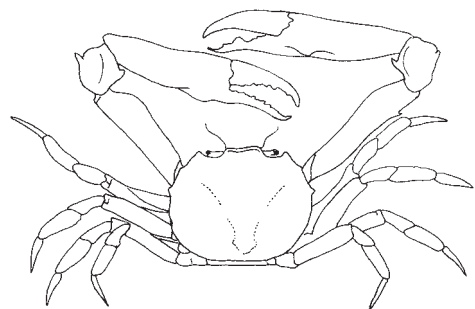
Xanthidae: male abdominal segments 3 to 5 fused (instead of freely movable).

Eriphiidae: male first gonopods stout (rather than slender and sinuous); male second gonopods long (rather than very short).

Goneplacidae: generally have stouter male first gonopods and/or proportionately longer male second gonopods; some species with male abdominal segments 3 to 5 fused.



Eriphiidae



Goneplacidae

References

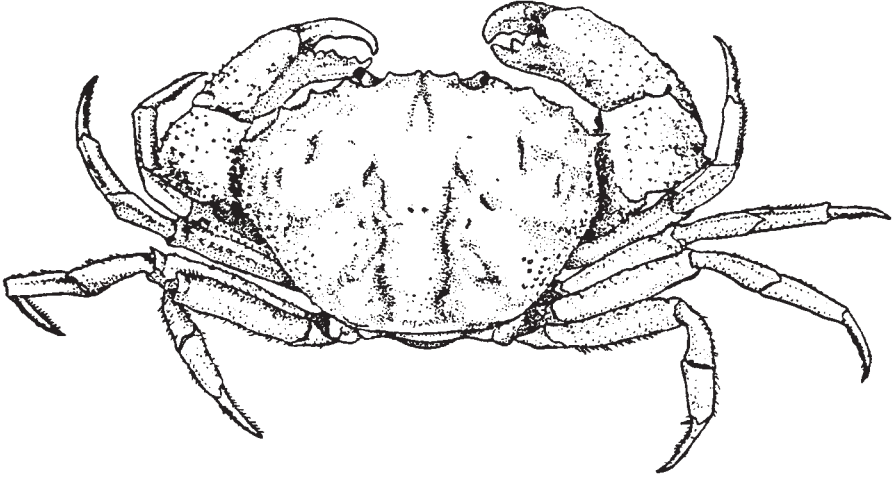
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- Ng, P.K.L. 1987. The Indo-Pacific Pilumnidae II. A revision of the genus *Rhizopa* Stimpson, 1858 and the status of the Rhizopinae Stimpson, 1858 (Crustacea: Decapoda: Brachyura). *Indo-Malayan Zoology*, 4(1):69-111.

A single species of interest to fisheries occurring in the area.

Galene bispinosa (Herbst, 1783)

Frequent synonyms / misidentifications: *Podopilumnus fittoni* M'Coy, 1849; *Gecarcinus trispinosus* Desmarest, 1822; *Galene granulosa* Miers, 1884 / None.

FAO name: En - Square-shelled crab.

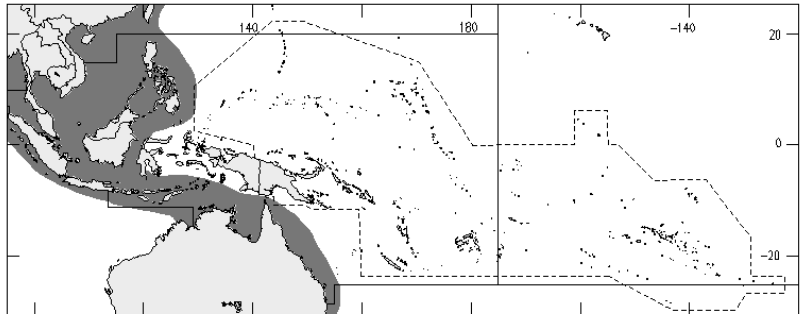


Diagnostic characters: Carapace subpentagonal, dorsal surface gently convex, lateral regions with numerous small, rounded granules; 2 or 3 distinct conical teeth on each lateral margin (2 teeth always distinct). Chelipeds stout, surfaces finely granulated. **Colour:** tan to purplish tan.

Size: Maximum carapace width 8 cm.

Habitat, biology, and fisheries: In shallower waters, down to depths of about 100 m, living on muddy substrates. Caught mainly by bottom trawls, often in large quantities. Of low fishery value, although very abundant in some areas. Only occasionally seen in markets and sold for low prices. Fished mainly in Thailand and various parts of Indonesia.

Distribution: India and Southeast Asia to Australia and Japan.

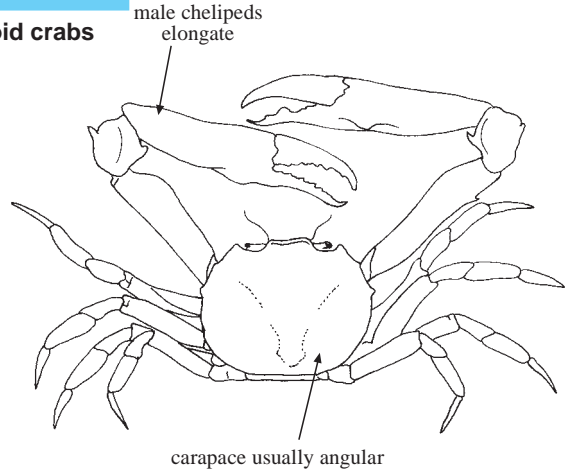


GONEPLACIDAE

Rhomboid crabs

Diagnostic characters: Carapace hexagonal, transversely rectangular, trapezoidal, or transversely ovate; dorsal surface convex, usually smooth; frontal margin usually entire, sometimes multilobate; anterolateral margin usually armed with 1 to 4 teeth or lobes, or entire. **Male abdominal segments 3 to 5 distinct, movable or fused and immovable. Male first gonopod moderately stout, gently curved or sinuous; male second gonopod relatively short to elongate, but usually shorter than male first gonopod.**

Habitat, biology, and fisheries: Benthic crabs with diverse habits. Most species in this family are of little or no commercial value. The relatively common and large *Carcinoplax longimanus* has a minor importance to fisheries in the Western Central Pacific.



Similar families occurring in the area

The Goneplacidae is doubtless a very heterogeneous group. Obviously, the genera included here were assigned to this family due to lacking evidence to place them into any others of the known families. Although the angular carapace of most goneplacids readily separates them from species of other families, a clear definition of the Goneplacidae is not known. Accordingly, any comparisons with outside taxa are very difficult and must be done on a genus by genus basis. *Carcinoplax*, the only genus in the area that includes an edible species, resembles in general body shape some species of Xanthidae, Eriphiidae, and Carpiliidae.

Xanthidae, Eriphiidae, and Carpiliidae: compared to species of these families, in *Carcinoplax*, the carapace is clearly more ovate in shape and the adult male chelipeds are extremely elongated. In addition, the male second gonopods of *Carcinoplax* are intermediate in relative length between xanthids (very short, as in pilumnids) and eriphiids (very long).

References

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- Tesch, J.J. 1918. The Decapoda Brachyura of the Siboga Expedition. II. Goneplacidae and Pinnotheridae. *Siboga Exped. Monogr.*, 39c(1):149-295.

A single species of interest to fisheries occurring in the area.

Carcinoplax longimanus (De Haan, 1833)

Frequent synonyms / misidentifications: *Carcinoplax longimanus japonicus* Doflein, 1904; *Carcinoplax longimanus typicus* Doflein, 1904 / None.

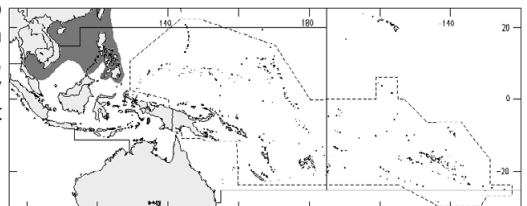
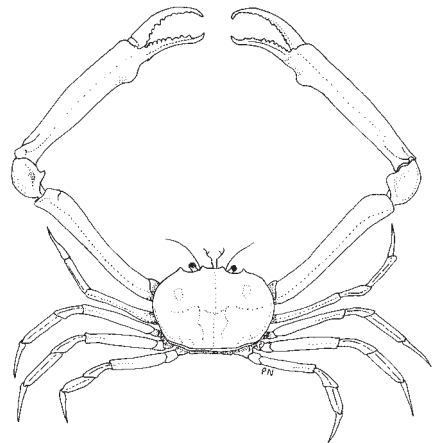
FAO name: En - Long-armed crab.

Diagnostic characters: Carapace ovoid; dorsal surface convex and smooth; lateral margin with 3 strong teeth in juveniles, becoming small to almost indiscernible in adults. Male chelipeds very elongate. **Colour:** red to pink overall.

Size: Maximum carapace width 8 cm.

Habitat, biology, and fisheries: On muddy substrates, most commonly found in deeper waters from depths of 100 to 800 m. Fished mainly in southern Japan and southern China. Taken incidentally in major fishery operations, mainly by bottom trawls and often in large numbers. Only larger specimens are sold, but have a low value in most markets.

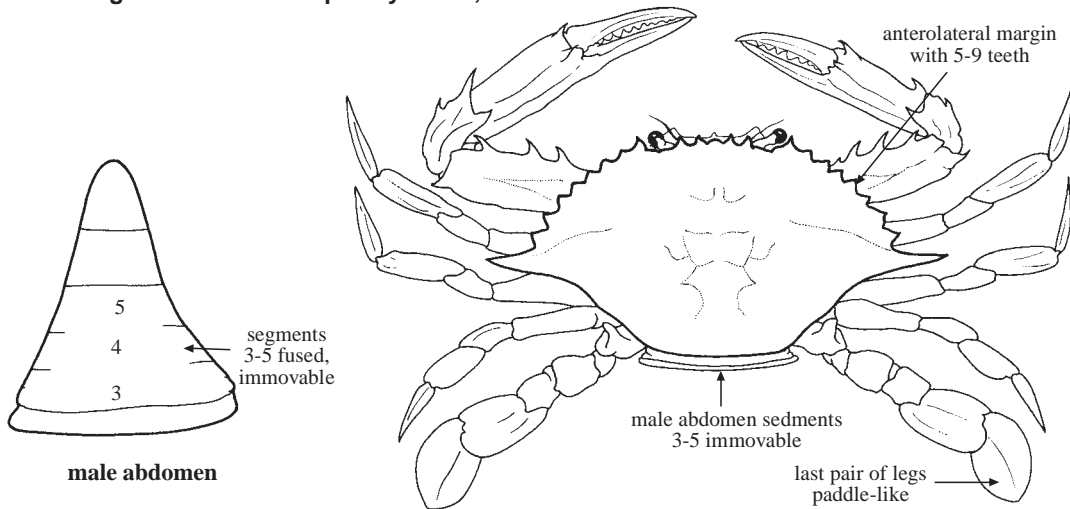
Distribution: Japan, Taiwan Province of China, China, Philippines, and Thailand.



PORTUNIDAE

Swimming crabs

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



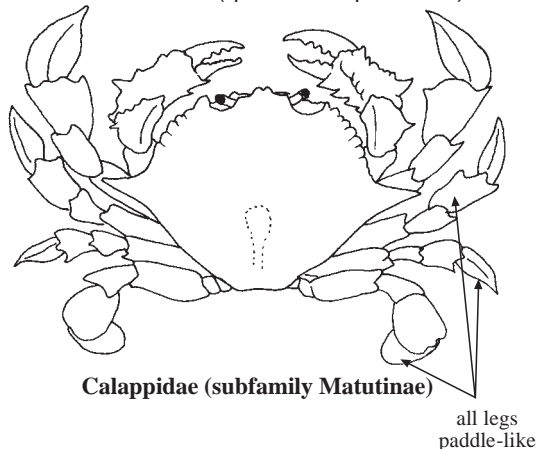
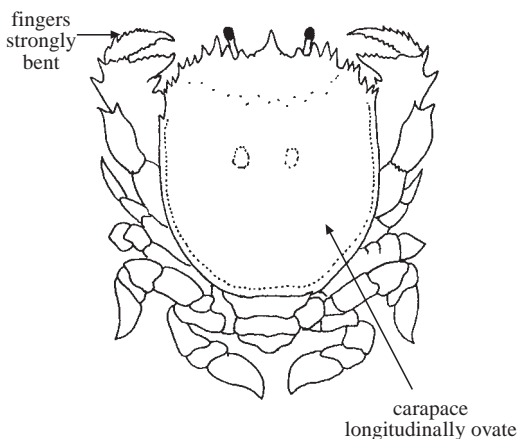
Habitat, biology, and fisheries: Benthic to semipelagic crabs with diverse habits. Many species of great fishery value, notably *Scylla serrata*, *Portunus pelagicus*, *P. sanguinolentus*, *P. trituberculatus*, and *Charybdis feriatus*.

Similar families occurring in the area

Portunids may be confused with spanner crabs (Raninidae) and moon crabs (Calappidae: Matutinae), which also possess paddle-like legs. They can be separated from portunids as follows:

Raninidae: carapace usually longitudinally ovate; sternum very narrow; fingers of chela strongly bent; meri of third maxillipeds triangular (quadrate in portunids).

Calappidae (subfamily Matutinae): carapace circular to subcircular; at least last 3 pairs of legs paddle-like, (not only the last pair); meri of third maxillipeds triangular in cross-section (quadrate in portunids).



Raninidae

Calappidae (subfamily Matutinae)

all legs paddle-like

Key to species of interest to fisheries occurring in the area

- 1a. Carapace with 2 anterolateral teeth; eyes very long, reaching lateral edge of carapace (Fig. 1) *Podophthalmus vigil*
- 1b. Carapace with more than 2 anterolateral teeth; eyes normal in size → 2
- 2a. Carapace rounded; ventral surface of palm with stridulatory (sound-producing) ridges (Fig. 2a) *Ovalipes punctatus*
- 2b. Carapace transversely ovate; palm without any stridulatory (sound-producing) ridges (Fig. 2b) → 3

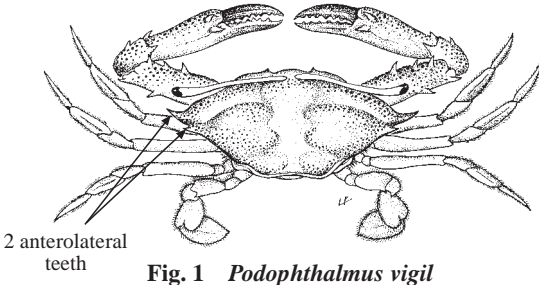


Fig. 1 *Podophthalmus vigil*

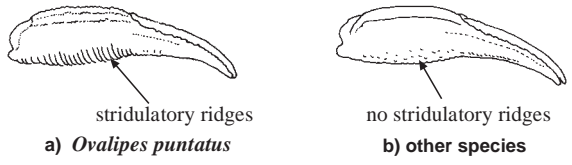


Fig. 2 chela in ventral view

- 3a. Five to 7 teeth on each anterolateral margin (Fig. 3a-c) → 4
- 3b. Nine teeth on each anterolateral margin (Fig. 3d) → 12

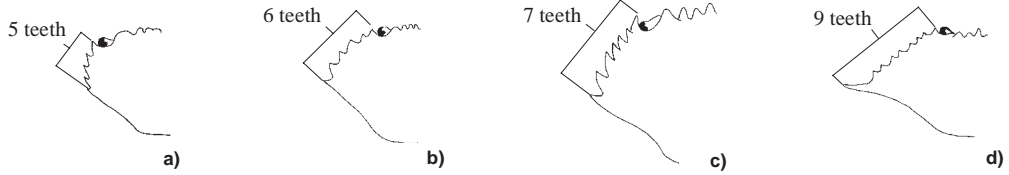


Fig. 3 lateral margin of carapace (dorsal view)

- 4a. Width of fronto-orbital border not much less than greatest width of carapace; 5 teeth on each anterolateral margin (first tooth sometimes with accessory denticle) (Fig. 4a) → 5
- 4b. Width of fronto-orbital border distinctly less than greatest width of carapace; 6 or 7 teeth on each anterolateral margin (Fig. 4b) → 6

- 5a. Basal antennal segment with a smooth or granulated ridge (Fig. 5a) *Thalamita crenata*
- 5b. Basal antennal segment with several sharp spines (Fig. 5b) *Thalamita spinimana*

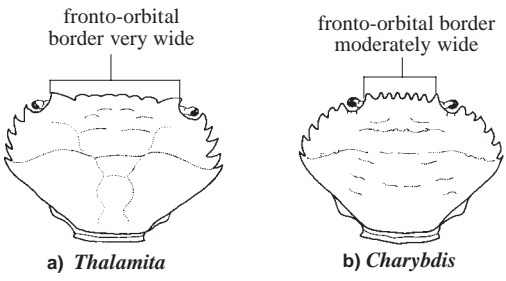


Fig. 4 carapace (dorsal view)

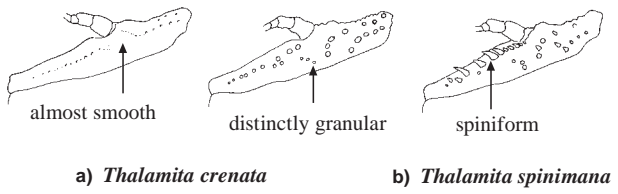
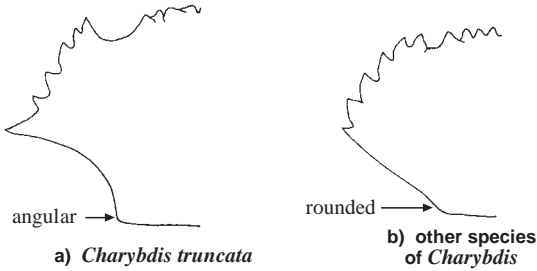


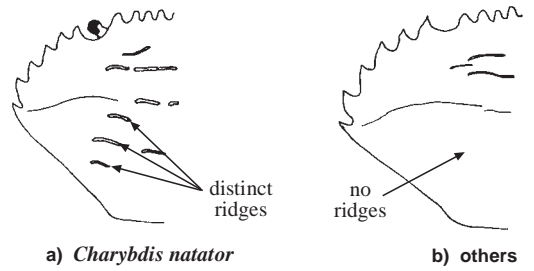
Fig. 5 basal antennal segment

- 6a. Posterior border of carapace forming an angular junction with posterolateral border (Fig. 6a); merus of cheliped without distal spine on posterior border *Charybdis truncata*
- 6b. Posterior border of carapace forming a curve with posterolateral border (Fig. 6b); merus of cheliped with distal spine on posterior border → 7
- 7a. Carapace with distinct ridges or granular patches behind level of last pair of anterolateral teeth (Fig. 7a) *Charybdis natator*
- 7b. Carapace without distinct ridges or granular patches behind level of last pair of anterolateral teeth (Fig. 7b) → 8



a) *Charybdis truncata* b) other species of *Charybdis*

Fig. 6 left side of carapace (dorsal view)

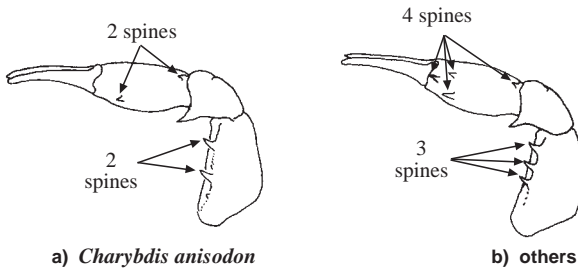


a) *Charybdis natator* b) others

Fig. 7 left side of carapace (dorsal view)

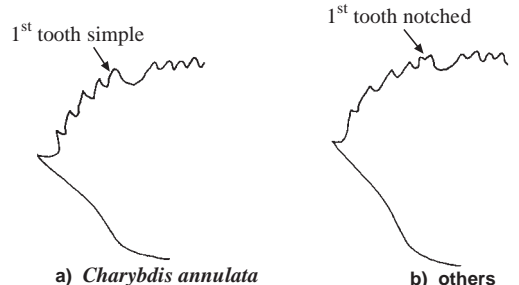
- 8a. Merus of cheliped with 2 spines on anterior border; palm with 2 spines on upper surface (Fig. 8a) *Charybdis anisodon*
- 8b. Merus of cheliped with 3 or 4 spines on anterior border; palm with more than 2 spines on upper surface (Fig. 8b) → 9

- 9a. First anterolateral tooth not truncate or notched (Fig. 9a) *Charybdis annulata*
- 9b. First anterolateral tooth truncate or notched (Fig. 9b) → 10



a) *Charybdis anisodon* b) others

Fig. 8 right cheliped (dorsal view)



a) *Charybdis annulata* b) others

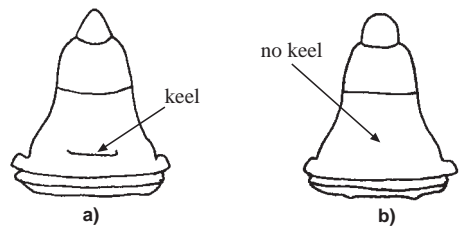
Fig. 9 lateral margin of carapace (dorsal view)

- 10a. Palm of cheliped with 4 spines on upper surface (Fig. 10a); male abdominal segment 4 keeled (Fig. 11a) *Charybdis feriatius*
- 10b. Palm of cheliped with 5 spines on upper surface (Fig. 10b); male abdominal segment 4 not keeled (Fig. 11b) → 11



a) b)

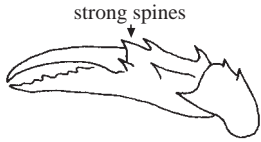
Fig. 10 right cheliped (dorsal view)



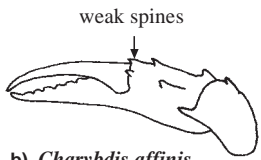
a) b)

Fig. 11 male abdomen

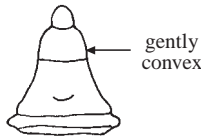
- 11a. Palm with well-developed spines (Fig. 12a); male abdominal segment 6 with convex lateral borders (Fig. 13a); last anterolateral tooth smallest and spiniform, not projecting beyond preceding tooth (Fig. 14a) *Charybdis japonica*
- 11b. Palm with poorly developed spines (Fig. 12b); male abdominal segment 6 with lateral borders parallel in proximal half (Fig. 13b); last anterolateral tooth elongate, projecting laterally beyond preceding tooth (Fig. 14b) *Charybdis affinis*
- 12a. Last anterolateral tooth subequal in size to others (Fig. 15a) → 13
- 12b. Last anterolateral tooth at least 2 times larger than others (Fig. 15b) → 16



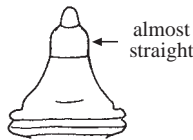
a) *Charybdis japonica*



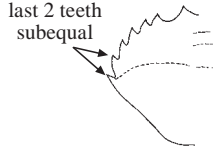
b) *Charybdis affinis*



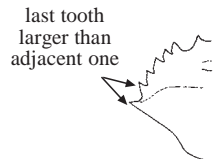
a) *Charybdis japonica*



b) *Charybdis affinis*



a) *Charybdis japonica*



b) *Charybdis affinis*



a) *Scylla*



b) *Portunus*

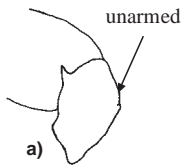
Fig. 12 right cheliped

Fig. 13 male abdomen

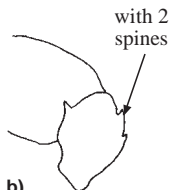
Fig. 14 anterolateral teeth

Fig. 15 anterolateral teeth

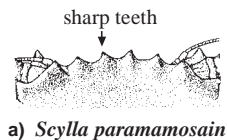
- 13a. Carpus of cheliped with only 1 low to very low granule on outer surface, never spiniform (Fig. 16a); colour of palm usually with at least some patches of orange or yellow in life → 14
- 13b. Carpus of cheliped with 2 distinct spiniform or sharp granules or spines on outer surface (Fig. 16b); colour of palm in life green to purple → 15
- 14a. Frontal margin usually with sharp teeth (Fig. 17a); palm usually with distinct, sharp spines (Fig. 18a) *Scylla paramamosain*
- 14b. Frontal margin usually with rounded teeth (Fig. 17b); palm usually with reduced, blunt spines (Fig. 18b) *Scylla olivacea*
- 15a. Frontal margin usually with rounded teeth (Fig. 19a); sharp granules on palm and carpus never spiniform; colour in life: carapace usually very dark green to black, outer surface of palm purple and never with marbled pattern, last legs marbled only in males *Scylla tranquebarica*
- 15b. Frontal margin usually with sharp teeth (Fig. 19b); sharp granules on palm and carpus often spiniform; colour in life: carapace usually green to olive-green, outer surface of palm green and often with marbled pattern, last legs marbled both in males and females *Scylla serrata*



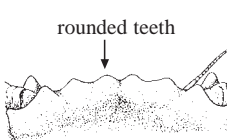
a)



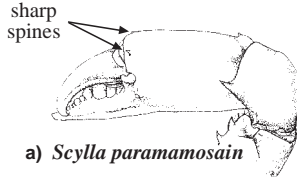
b)



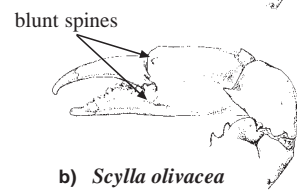
a) *Scylla paramamosain*



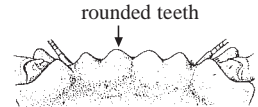
b) *Scylla olivacea*



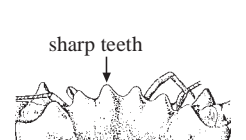
a) *Scylla paramamosain*



b) *Scylla olivacea*



a) *Scylla tranquebarica*



b) *Scylla serrata*

Fig. 16 carpus of cheliped

Fig. 17 frontal margin of carapace (dorsal view)

Fig. 18 right cheliped

Fig. 19 frontal margin of carapace (dorsal view)

- 16a. Carapace with 3 purple to red spots on posterior half (Fig. 20) . . . *Portunus sanguinolentus*
- 16b. Carapace marbled or with uniform coloration → 17
- 17a. Front with 4 teeth (Fig. 21a); inner margin of merus of cheliped with 3 spines (Fig. 22a) *Portunus pelagicus*
- 17b. Front with 3 teeth (Fig. 21b); inner margin of merus of cheliped with 4 spines (Fig. 22b) *Portunus trituberculatus*

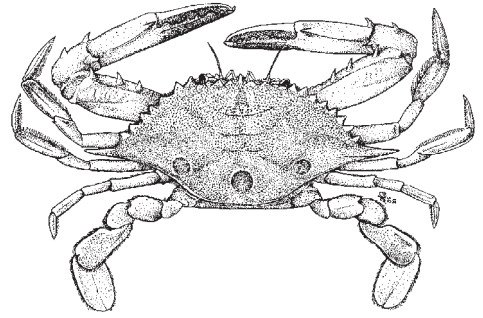


Fig. 20 *Portunus sanguinolentus*



Fig. 21 frontal margin of carapace (dorsal view)

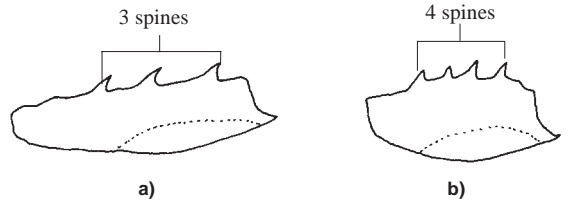


Fig. 22 merus of cheliped (inner margin)

List of species of interest to fisheries occurring in the area

The symbol is given when species accounts are included.

- Charybdis affinis* Dana, 1852
- Charybdis anisodon* (De Haan, 1850)
- Charybdis annulata* (Fabricius, 1798)
- Charybdis feriatus* (Linnaeus, 1758)
- Charybdis japonica* (A. Milne Edwards, 1861)
- Charybdis natator* (Herbst, 1794)
- Charybdis truncata* (Fabricius, 1798)
- Ovalipes punctatus* (De Haan, 1833)
- Podophthalmus vigil* (Fabricius, 1798)
- Portunus pelagicus* (Linnaeus, 1758)
- Portunus sanguinolentus* (Herbst, 1783)
- Portunus trituberculatus* (Miers, 1876)
- Scylla olivacea* (Herbst, 1796)
- Scylla serrata* (Forsskål, 1775)
- Scylla paramamosain* Estampodor, 1949
- Scylla tranquebarica* (Fabricius, 1798)
- Thalamita crenata* (Latreille, 1829)
- Thalamita spinimana* (Dana, 1852)

References

Keenan, C.P., P.J.F. Davie, and D.L. Mann. 1998. A revision of the genus *Scylla* De Haan (Crustacea: Decapoda: Brachyura: Portunidae). *Raffles Bull. Zool.*, 46(1):in press.

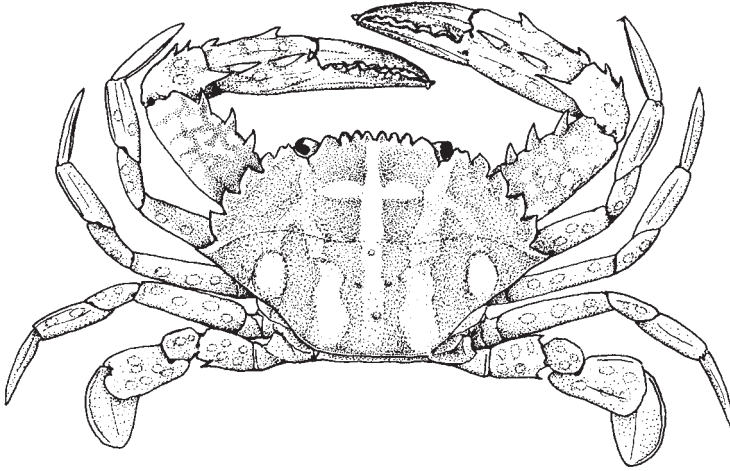
Leene, J.E. 1938. The Decapoda Brachyura of the Siboga Expedition. VII. Brachygnatha: Portunidae. *Siboga Exped. Monogr.*, 39c(131):1-156.

Stephenson, W. 1972. An annotated check list and key to the Indo-West Pacific swimming crabs (Crustacea: Decapoda: Portunidae). *Royal Society of New Zealand Bulletin*, 10:1-64.

Charybdis feriatus (Linnaeus, 1758)

Frequent synonyms / misidentifications: *Charybdis crucifer* (Fabricius, 1792); *C. cruciata* (Herbst, 1794) / None.

FAO name: En - Crucifix crab.



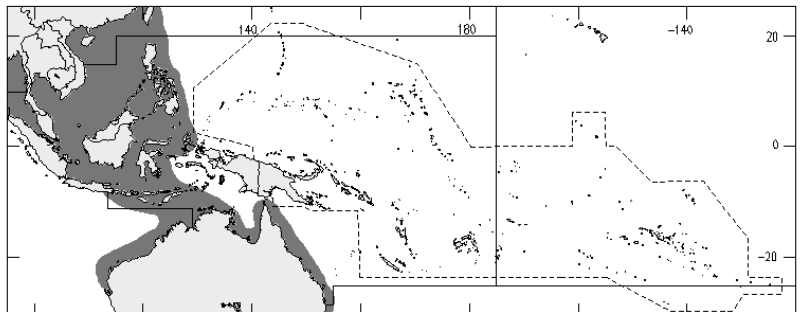
Diagnostic characters: Carapace ovate; 5 distinct teeth on each anterolateral margin. **Colour:** distinctive pattern of longitudinal stripes of maroon and white, usually with distinct white cross on median part of gastric region; legs and pincers with numerous scattered white spots.

Size: Maximum carapace width 20 cm.

Habitat, biology, and fisheries: Prefers sandy to sandy-muddy substrates, at depths from 30 to 60 m. Collected mainly by bottom trawls, sometimes by traps and nets. The commercially most important species of *Charybdis*. Like *Portunus* spp., *Charybdis feriatus* is more delicate than *Scylla*, and is frequently sold frozen. The lucrative and booming live-seafood market, however, is seeing the increased use of aquaria to keep these species alive. The crucifix crab is especially important in markets in East Asia where it commands substantially higher premium prices than *Portunus* spp., being sold for US\$8 to US\$15 per kg.

Distribution: Widely distributed in the Indo-West Pacific, reaching Japan and Australia.

Remarks: There are several species of *Charybdis* in the area which are also occasionally fished and infrequently appear in markets. These include *C. affinis* Dana, 1852, *C. acuta* (A. Milne Edwards, 1869), *C. anisodon* (De Haan, 1850), *C. annulata* (Fabricius, 1798), *C. natator* (Herbst, 1789) and *C. truncata* (Fabricius, 1798). They are all easily distinguished by carapace and cheliped armature features.



Charybdis japonica (A. Milne Edwards, 1861)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Japanese swimming crab.

Diagnostic characters: Carapace without transverse ridges behind last anterolateral tooth; frontal teeth acutely triangular; anterolateral teeth all acutely triangular. Posterior border of propodus of legs serrated. Palm with 5 sharp spines, longitudinal ridges on palm granulated.

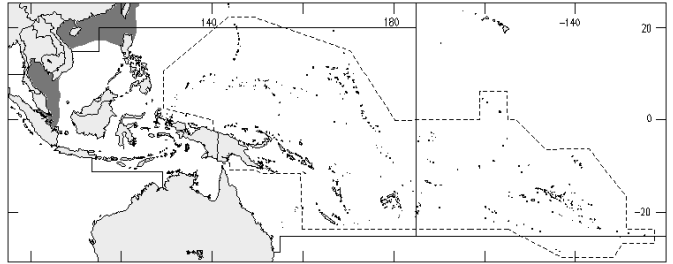
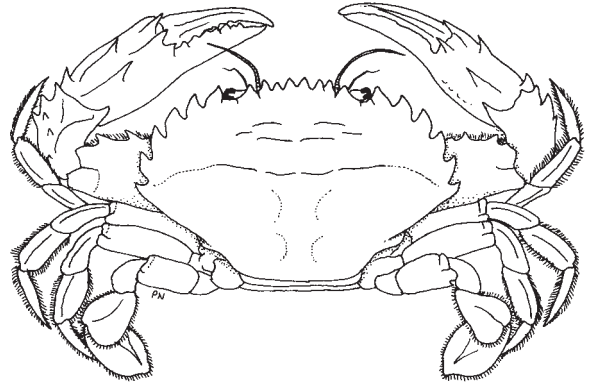
Colour: carapace white with large greyish patches, tips of anterolateral teeth reddish brown; fingers red and white.

Size: Maximum carapace width 7 cm.

Habitat, biology, and fisheries: Occurs just off-shore on muddy, sandy, or stony substrates. Taken mainly by trawlers or in nets as incidental catch. Although locally common, there is no sustained fishery for this species. Fished mainly in Japanese and Chinese waters.

Distribution: Japan, China, Taiwan Province of China, Thailand, and Malaysia.

Remarks: See *Charybdis feriatus*. The above characters and coloration of *C. japonica* readily distinguish it from all other species of *Charybdis*.



Charybdis natator (Herbst, 1789)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Ridged swimming crab.

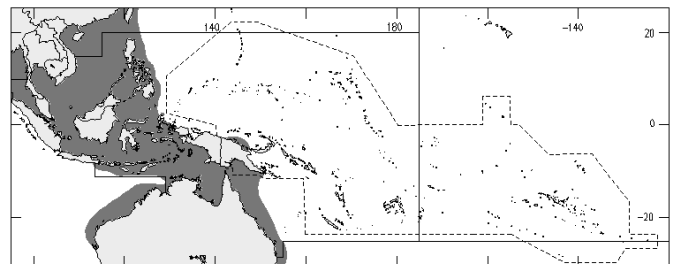
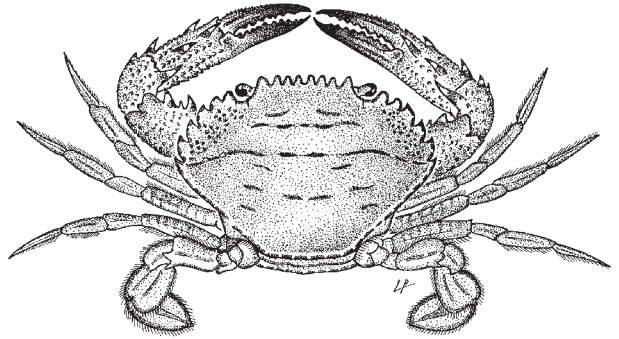
Diagnostic characters: Carapace with densely covered with very short pubescence which is absent on several distinct transverse granulated ridges in anterior half. **Colour:** orangish red overall, with ridges on carapace and legs dark reddish brown.

Size: Maximum carapace width 17 cm.

Habitat, biology, and fisheries: Near or in rocky-sandy substrates, sometimes near reefs, from depths of 5 to 40 m. *Charybdis natator* is caught incidentally by trawlers, and has some commercial value because of its large size.

Distribution: China, Taiwan Province of China, Philippines, Thailand, Indonesia, Malaysia, Singapore, and Australia.

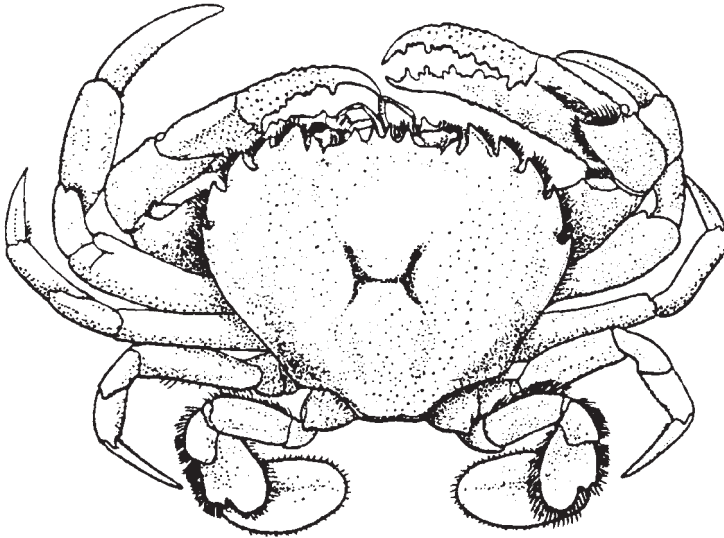
Remarks: See *Charybdis feriatus*.



Ovalipes punctatus (De Haan, 1833)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Sand crab.



(after Shen and Dai, 1964)

Diagnostic characters: Carapace rounded, surfaces finely granular, appearing almost smooth; 4 well-developed teeth on each anterolateral margin; stridulatory ridges present on ventral surface of palm.

Colour: carapace reddish brown to maroon, margins lighter coloured, with scattered dirty-white and darker spots, white gastric depression, margins lighter coloured; dactylus of fourth walking leg bluish purple.

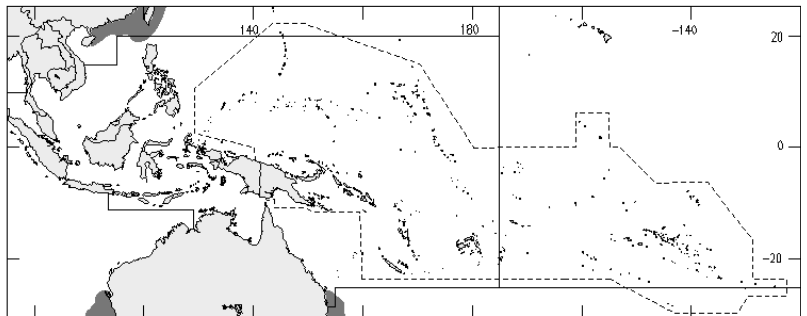
Size: Maximum carapace width 9.5 cm.

Habitat, biology, and fisheries: Found from depths of 30 to 50 m. Caught mainly by trawls or dredges, and fished intensively in southern Japan, Taiwan Province of China, and China (mainly off southern China and Japan). Usually, only the chelae are sold in markets, where they command premium prices.

Distribution: Throughout the northern and southern hemispheres in the Pacific. In the area, it occurs in the northern part of the South China Sea and in Queensland (Australia).

Remarks: Several species of *Ovalipes* of minor commercial importance are known, notably *O. australiensis* Stephenson and Mees, 1968, from Australia, which, however, does not occur in the Western Central Pacific. It can easily be

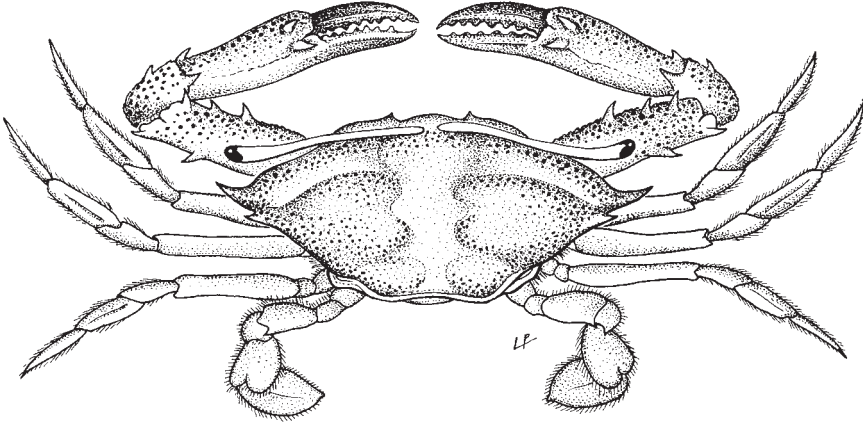
separated from *O. punctatus* by the condition of the carapace surface (finely granular in *O. punctatus*, but coarsely granular in *O. australiensis*). In addition, *O. australiensis* has 2 large, clear pigmented ovate spots on the posterolateral region (absent in *O. punctatus*).



Podophthalmus vigil (Fabricius, 1798)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Sentinel crab.



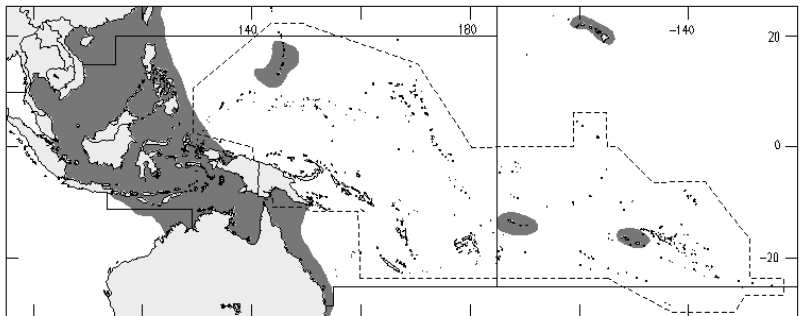
Diagnostic characters: Carapace distinctly broader than long; anterior margin much broader than posterior margin, with posterolateral margins converging strongly towards narrow posterior carapace margin; orbits very broad. Eyes very long, reaching to or extending beyond edge of carapace. **Colour:**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

Size: Maximum carapace width 15 cm.

Habitat, biology, and fisheries: On sandy to muddy substrates in offshore waters. Occasionally caught by offshore trawlers, although rarely in large numbers. When marketed, it commands prices similar to those for *Portunus pelagicus*.

Distribution: Indo-West Pacific.

Remarks: Three species of *Podophthalmus* are known. *P. vigil* is the only large species that shows the colour pattern described above, and the only species of the genus with commercial value.



Portunus pelagicus (Linnaeus, 1758)

SCD

Frequent synonyms / misidentifications: *Portunus mauritanus* Ward, 1942 / *Portunus trituberculatus* (Miers, 1876).

FAO name: En - Flower crab.



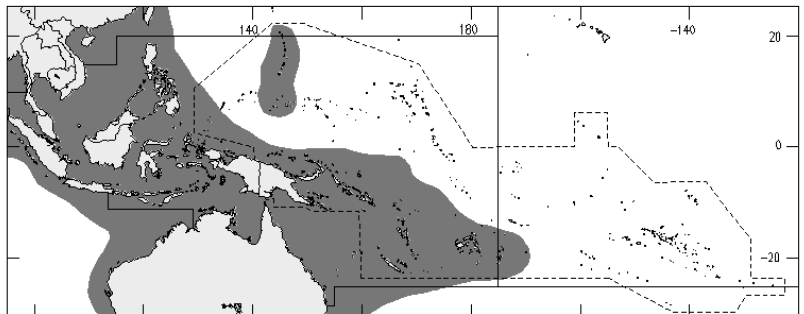
Diagnostic characters: Carapace rough to granulose, regions discernible; front with 4 acutely triangular teeth; 9 teeth on each anterolateral margin, the last tooth 2 to 4 times larger than preceding teeth. Chelae elongate in males; larger chela with conical tooth at base of fingers; pollex ridged. **Colour:**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

Size: Maximum carapace width 20 cm for males (including lateral teeth).

Habitat, biology, and fisheries: Prefers sandy to sandy-muddy substrates in shallow waters down to a depth of 50 m, including areas near reefs, mangroves, and in seagrass and algal beds. Juveniles tend to occur in shallow intertidal areas. The crabs mature at about 1 year. Collected mainly by artisanal traps, trawls, beach seines, cylindrical wire traps, folding traps, pots, hop nets, drop nets, and sunken crab gill nets. In shallow waters, beach seines, rakes, and dab nets are used. Although sold for lower prices than *Scylla*, crabs of *Portunus* are taken in much larger quantities. They are caught in enormous numbers for sale in local markets (frozen or fresh) and for the crab-flesh canning industry. Many species of *Portunus* are commercially collected in the area. Among the 3 more frequently collected species included here, *P. pelagicus* is most widely sold in markets in Southeast Asia, including the Philippines. The market price varies from US\$3 to US\$5 per kg for fresh crabs, and from about US\$5 to US\$8 for live crabs. The fisheries for this species is well managed in Australia. From 1990 to 1995, the reported yearly catch of *P. pelagicus* from the Western Central Pacific (Australia, Indonesia, and Thailand) ranged from around 36 700 to 48 000 t (FAO Yearbook of Fishery Statistics).

Distribution: Throughout Indo-West Pacific.

Remarks: May be confused with *P. trituberculatus*, which resembles a large stocky female of *P. pelagicus*. *P. trituberculatus*, however, can easily be distinguished by having only 3 frontal teeth (4 teeth in *P. pelagicus*), and by the presence of 4 spines on the inner margin of the chelipedal merus (only 3 spines in *P. pelagicus*).



Portunus sanguinolentus (Herbst, 1783)

Frequent synonyms / misidentifications:
None / None.

FAO name: En - Three-spot swimming crab.

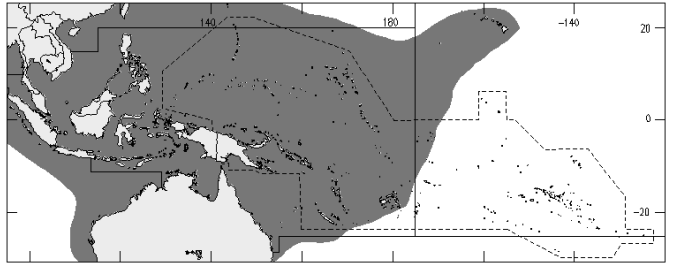
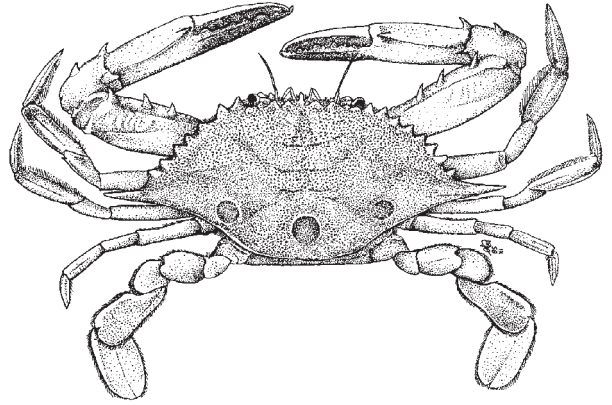
Diagnostic characters: Carapace finely granu-
lose, regions just discernible; 9 teeth on each
anterolateral margin, the last tooth 2 to 3 times
larger than preceding teeth. Chelae elongated in
males; larger chela with conical tooth at base of
fingers; pollex ridged. **Colour:** olive to dark
green, with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

Size: Maximum carapace width 20 cm.

Habitat, biology, and fisheries: Occurs
on sandy to sandy-muddy substrates, from
the intertidal zone (especially juveniles) to
depths of 30 m. Collected mainly by nets or
seines. This species is less common than
Portunus pelagicus, and appears only oc-
casionally in markets. It is priced similarly to,
or for slightly lower prices as, *P. pela-
gicus*.

Distribution: Indo-West Pacific.

Remarks: This species can be easily sepa-
rated from all other *Portunus* species by its
very distinctive colour markings.

***Portunus trituberculatus*** (Miers, 1876)

Frequent synonyms / misidentifications:
None / *Portunus pelagicus* (Linnaeus, 1758).

FAO name: En - Horse crab.

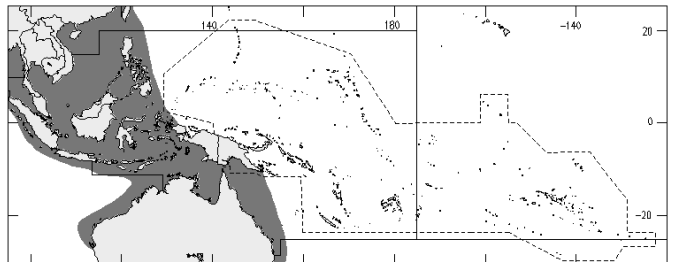
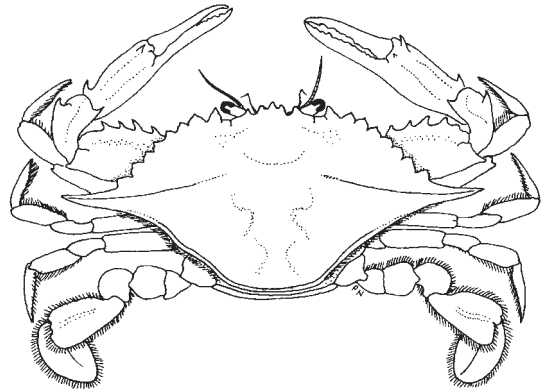
Diagnostic characters: Carapace rough to
granulose, regions discernible; front with 3
acutely triangular teeth; 9 teeth on each antero-
lateral margin, the last tooth much larger than
preceding teeth. Larger chela with conical tooth
at base of fingers; pollex ridged. **Colour:**
carapace dull green to brown.

Size: Maximum carapace width 15 cm (males).

Habitat, biology, and fisheries: Prefers sandy to
sandy-muddy substrates in shallow waters, up to
depths of 50 m. Caught mainly by trawls. A com-
mercially very important species in Japan and
collected in large numbers in some areas.

Distribution: Indo-West Pacific.

Remarks: This species is perhaps closest
to *Portunus pelagicus* in its general appear-
ance, resembling a large stocky female of
that species. *P. pelagicus*, however, is eas-
ily distinguished by having 4 frontal teeth
(only 3 teeth in *P. trituberculatus*) and by
the presence of 3 spines on the inner mar-
gin of the chelipedal merus (4 spines in *P.
trituberculatus*).



Scylla serrata (Forsskål, 1775)

MUD

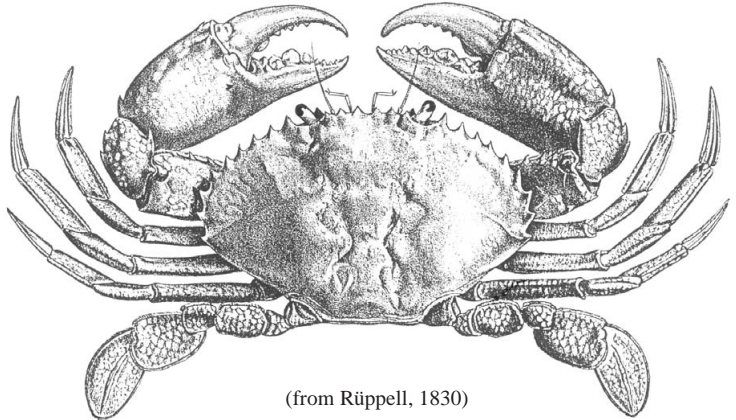
Frequent synonyms / misidentifications: *Acheolus crassimanus* MacLeay, 1838; *Scylla serrata* var. *oceanica* Dana, 1852 / see **Remarks**.

FAO name: En - Giant mud crab.

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

Colour: carapace green to almost black; legs may be marbled.

Size: Maximum carapace width between 25 and 28 cm (males); maximum weight between 2 and 3 kg.



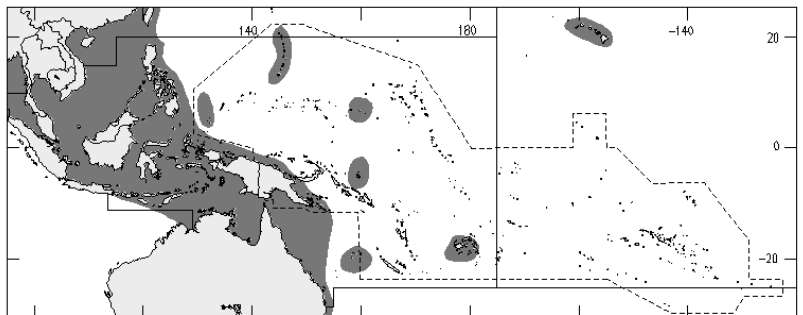
(from Rüppell, 1830)

Habitat, biology, and fisheries: *Scylla serrata* prefers more oceanic waters, usually found just offshore on soft muddy bottoms. Crabs can be caught up to 50 km offshore as they migrate there to spawn. The other 3 species of *Scylla* included here prefer mangroves in continental shelves with less saline waters. All species of *Scylla* dig deep burrows in mangroves and soft substrates in shallow or intertidal waters. Species of *Scylla* are collected mainly using trawls, traps, baited wire mesh pots, hooking, and by hand throughout their ranges. From 1990 to 1995, the reported yearly catch of *Scylla serrata* from the Western Central Pacific ranged from around 6 150 to 18 600 t (FAO Yearbook of Fishery Statistics). It must be pointed out, however, that these figures cover all 4 species of *Scylla* recognized here (see remarks on that problem below). Species of *Scylla* are almost always marketed alive. At present, the main markets are Taiwan Province of China, Hong Kong (China), and Singapore, where large crabs (so-called "meat crabs") and females with ripe ovaries ("roe crabs") command premium prices. For both kinds of crabs, current demand still far exceeds the supply. They are always sold for high prices, ranging from US\$5 to US\$10 per kg. "Roe crabs" can even cost 25 to 50% more. In Australia, they are sold for an average price of US\$6 per kg. Currently, the largest exporters of mud crabs in Asia are Indonesia, Sri Lanka, India, and Bangladesh, with the markets in Myanmar, Viet Nam, and Pakistan picking up rapidly. *S. serrata* and *S. olivacea* are also the main food species in Australia. There is no clear management for the 4 species of *Scylla* in Southeast and East Asia. In Australia, the fishery for *S. serrata* and *S. olivacea* is quite intense (700 t collected between 1989 to 1990, mainly from Queensland with over 400 t) but is reasonably well managed. There have been attempts to culture the crabs in captivity, but none of the closed-cycle enterprises have gone commercial. Many *Scylla* crab farms rely on the tide to bring megalopae or late zoeae into ponds, where the crabs grow out. Alternatively, many farms in Southeast Asia keep smaller or freshly moulted crabs (so-called "water crabs" because of the consistency of their flesh) caught from natural stocks to grow them out or add on more flesh. Similarly, female crabs of all 4 species are kept until their ovaries are full to improve their market prices.

Distribution: All 4 species of *Scylla* apparently have a wide Indo-West Pacific distribution. *Scylla serrata*, has been introduced to Hawaii from Samoa 55 years ago, and has become established there.

Remarks: The taxonomy of the genus *Scylla* has been terribly confused and is still difficult. While generally a single, supposedly widely distributed species is recognized, namely

S. serrata, it is now known that the genus includes 4 species. Recent research in Australia (Keenan et al., 1998) has clearly shown, using morphological, DNA, and allozyme data, that there are 4 species of *Scylla*.



The differences in allozyme and mtDNA are substantial, but the morphological features which separate the 4 species are rather subtle and sometimes difficult to recognize in smaller specimens. The distal parts of the male gonopods are also slightly but distinctly different (unpublished data). Given that all 4 species of *Scylla* are marketed throughout their range by the extensive export market, the existing catch figures and fishery management practices currently applied to a single species (*S. serrata*) obviously have to be revised.

The very large species depicted above (often called the “Sri Lanka crab” in South, Southeast and East Asia) is the “real” *Scylla serrata* and has a wide distribution, with preference for more saline waters. It varies from green to almost black, has a smooth carapace with distinct transverse ridges, deep H-shaped gastric groove, relatively broad frontal lobes, all of which are more or less in line with each other, broad anterolateral teeth which project obliquely outwards, and has very well-developed spines on the outer surface of the chelipedal carpus and palm.

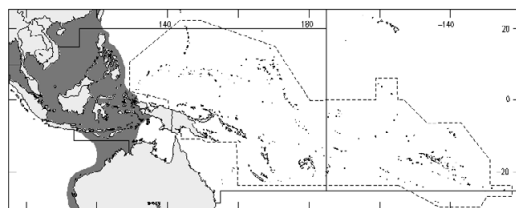
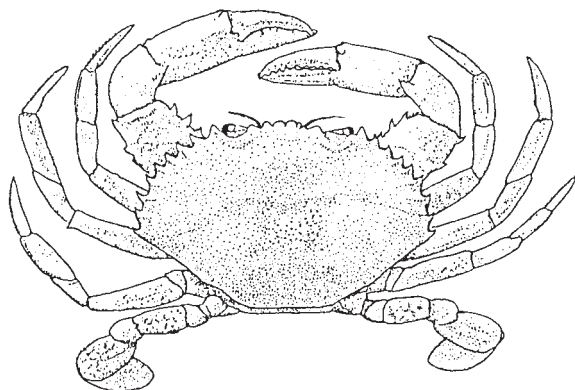
Two of the species are smaller and more closely associated with mangroves than the real *S. serrata*, and occur more or less in the same region, but generally prefer less saline conditions and are more common in continental shelf waters. *S. serrata* is not known to occur inside the Sunda Shelf, but it is the only species of *Scylla* known from the Red Sea. *Scylla olivacea* (Herbst, 1796) is usually brownish to brownish green in colour (sometimes orangish). It has a smoother, more evenly convex carapace with very low transverse ridges, a shallow H-shaped gastric groove, the median pair of the frontal lobes more rounded and projecting slightly forwards of the lateral ones, the anterolateral teeth gently curving anteriorly, giving the carapace a less transverse appearance. It also has very low spines on both the outer surface of the chelipedal carpus and the dorsal surface of palm. (See abbreviated species account below). The second mangrove species, *Scylla tranquebarica* (Fabricius, 1798) (= *Lupa lobifrons* H. Milne Edwards, 1834) varies from brown to almost black in coloration, and has very well-developed spines on the outer surfaces of the chelipedal carpus and the palm (as seen in *S. serrata*). It differs from *S. serrata*, however, by having the frontal teeth more acutely triangular, the median pair projecting slightly forwards of the lateral pair, and the anterolateral teeth gently curving anteriorly, giving the carapace a less transverse appearance. (See abbreviated species account below).

The fourth *Scylla* species, *Scylla paramamosain* Estampador, 1949, seems to prefer areas which are more rocky or near reefs, although it is also known from estuarine ponds and mangrove forests. It seems to be intermediate between *S. serrata* and *S. olivacea* both in morphology and coloration but can usually be distinguished by the form of its frontal margin and cheliped armature (see key). (See abbreviated species account below).

Scylla olivacea (Herbst, 1796)

En - Orange mud crab.

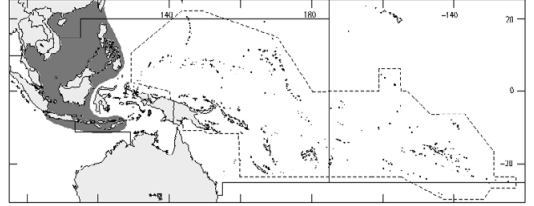
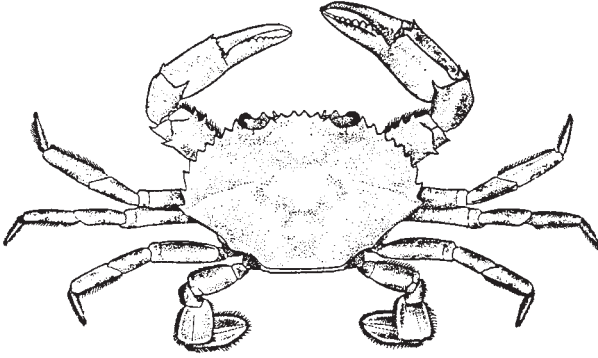
Maximum carapace width 18 cm (males). Carapace brownish to brownish green in colour (sometimes orangish), palm orange to yellow. Inhabits mangroves. Collected in large numbers and probably the most common species of *Scylla* to be found in many markets in Sundaic Southeast Asia and Thailand. Known so far from the continental waters of the Sunda Shelf and various parts of the East Pacific. (See species account of *S. serrata* for further information).



Scylla paramamosain Estampador, 1949

En - Green mud crab.

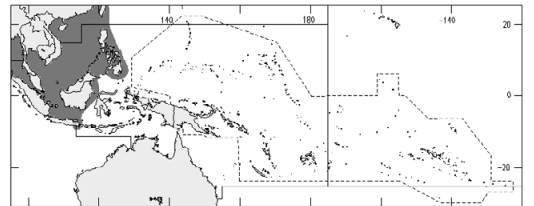
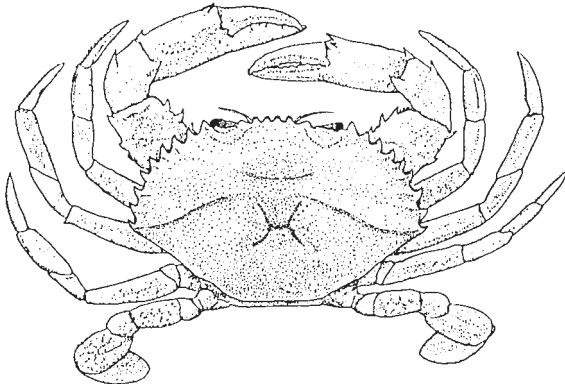
Maximum carapace width 20 cm (males), commonly between 15 and 18 cm; weight up to 2 kg. Carapace usually green to light green, palm green to greenish blue with lower surface and base of fingers usually pale yellow to yellowish orange. Rock areas, near reef, and mangroves. Common in northern parts of South China Sea and parts of Java, but less so elsewhere. Shelf species. (See species account of *S. serrata* for further information).



Scylla tranquebarica (Fabricius, 1798)

En - Purple mud crab.

Maximum carapace width 20 cm (males); weight up to 2 kg. Carapace green to almost black, palm purple. Mainly in mangroves (down to sublittoral parts) and collected in large numbers. This is probably the second most common species seen in Sundaic Southeast Asian markets, but less common in Thailand and the Philippines. Known from various parts of the Indo-West Pacific, including shelf waters. (See species account of *S. serrata* for further information).



Thalamita crenata (Latreille, 1829)

Frequent synonyms / misidentifications: None / None.

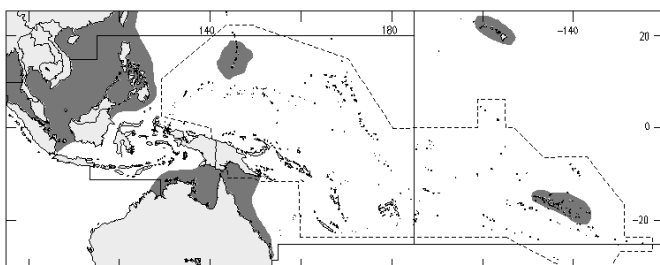
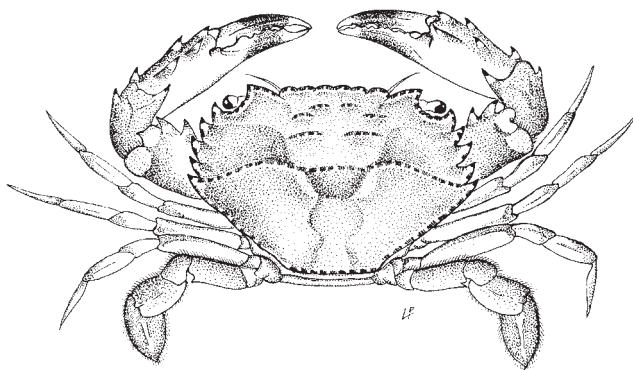
FAO name: En - Crenate swimming crab.

Diagnostic characters: Surface of carapace smooth, ridges low but distinct; front with 6 equal-sized, rounded lobes. **Colour:** dark to olive green overall.

Size: Maximum carapace width 8 cm.

Habitat, biology, and fisheries: One of the most distinctive species of the genus, and one of the few found in shallow non-reef habitats with soft substrates. Prefers areas near mangroves or with muddy-rocky substrates. Frequently collected by traps, trawlers, seines, and nets. Fished mainly in Southeast and East Asian countries. Although it can be very common in some areas, *T. crenata* has a low value in markets as it grows smaller than other, more commercial portunids found in the area.

Distribution: China, Indonesia, Malaysia, Singapore, Australia, Tuamotu, Tonga, French Polynesia, and Hawaii.

***Thalamita spinimana*** (Dana, 1852)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Spiny claw swimming crab.

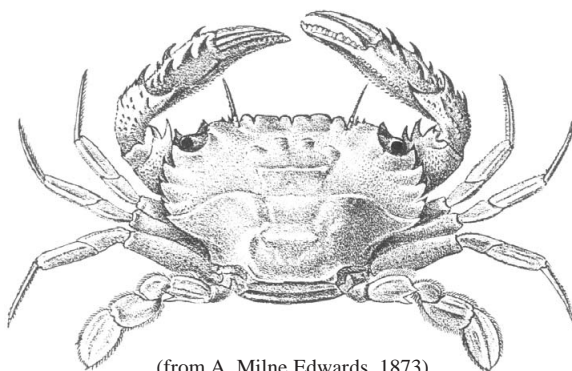
Diagnostic characters: Surface of carapace smooth, sometimes with low pubescence; ridges distinct; front with 6 lobes, median 4 lobes truncate, lateral 2 lobes rounded. **Colour:** usually bright red overall, but sometimes green, or with a mixture of red and green.

Size: Maximum carapace width 12 cm.

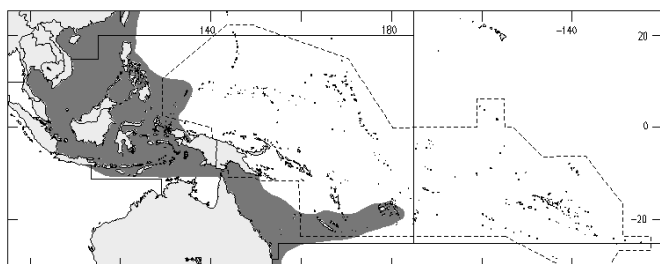
Habitat, biology, and fisheries: Occasionally collected for food throughout its range, caught by traps and nets. It is sold for comparatively low prices in markets.

Distribution: West Pacific.

Remarks: A large number of coral reef species of *Thalamita* are found in the area. Most of these, however, are of small size and have no economic value. *T. spinimana* is one of the more common larger species in the genus, easily distinguished by its spinose palm and the bright red coloration.



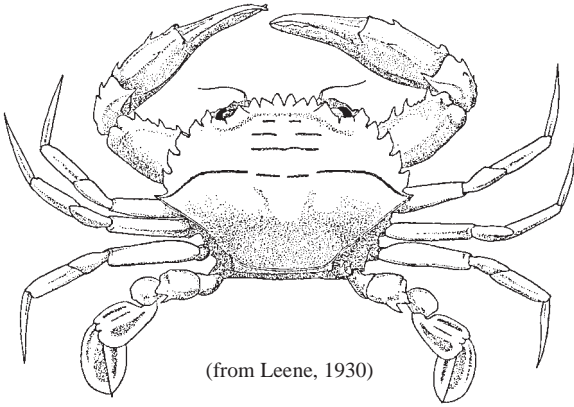
(from A. Milne Edwards, 1873)



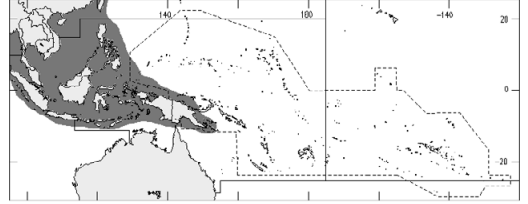
***Charybdis affinis* Dana, 1852**

En - Smoothshelled swimming crab.

Maximum carapace width 6 cm. Prefers sandy to muddy substrates in subtidal waters. Fished sporadically and occasionally seen in local markets where it is sold for low prices, due to its small size. China and Japan to various parts of India and Southeast Asia.



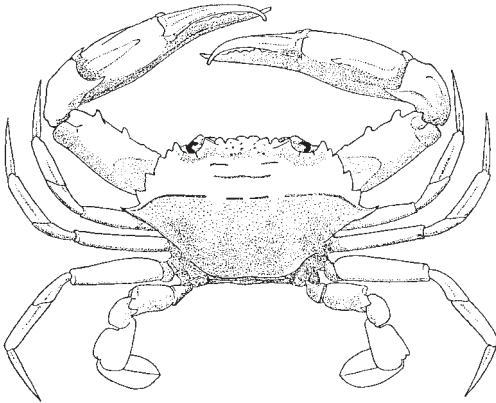
(from Leene, 1930)



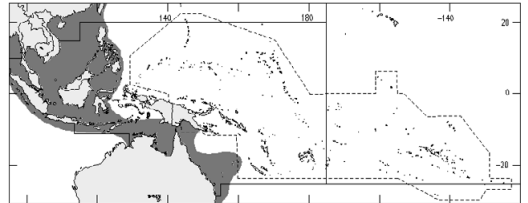
***Charybdis anisodon* (De Haan, 1850)**

En - Twospined arm swimming crab.

Maximum carapace width 8 cm. Prefers muddy substrates at depths to 15 m. Occasionally collected by trawls and sold in local markets for its moderately large size. Indo-West Pacific in distribution, reaching Hawaii.

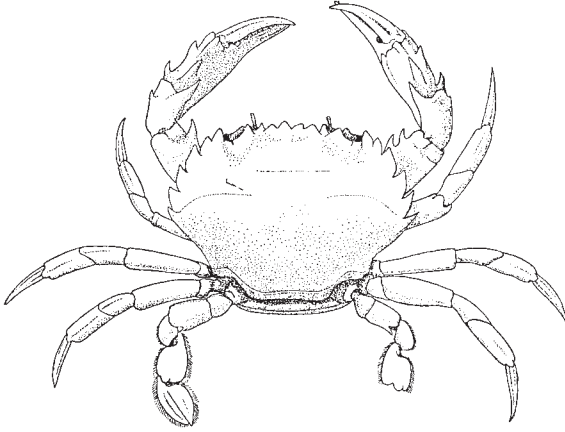


(from Leene, 1930)

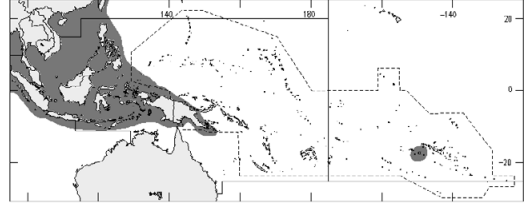


Charybdis annulata (Fabricius, 1798)**En** - Banded-legged swimming crab.

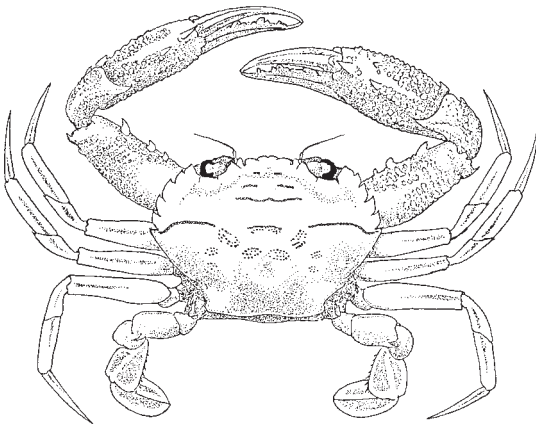
Maximum carapace width 7 cm. Shows distinctive broad blue and white bands on the legs when alive. Prefers rocky areas and reefs, from the intertidal zone to a depth of about 20 m. Occasionally collected for food, but never abundant enough to be commercially important. Indo-West Pacific, from South Africa to Southeast Asia, Japan, and Tahiti.



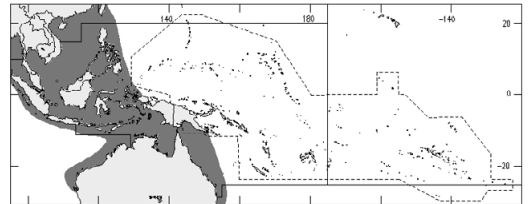
(from Leene, 1930)

***Charybdis truncata*** (Fabricius, 1798)**En** - Blunt-toothed crab.

Maximum carapace width 5 cm. Prefers muddy bottoms at depths from 10 to 100 m. Locally abundant in some areas and obtained by trawls. Not commonly sold in markets. Indo-West Pacific, reaching Japan and Australia.



(from Leene, 1930)



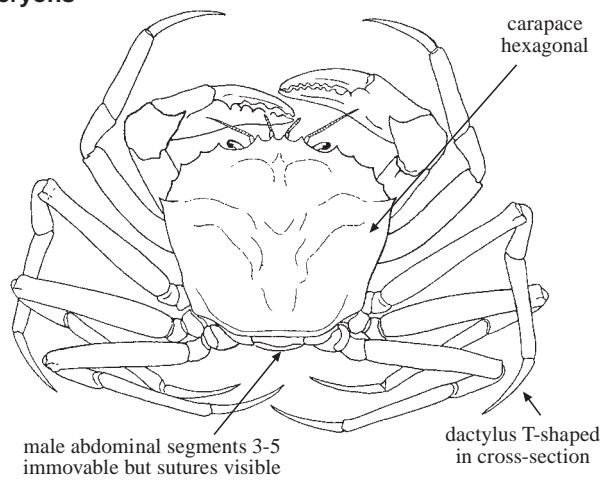
GERYONIDAE

Geryons

Diagnostic characters: Carapace hexagonal; dorsal surface relatively smooth to granular; frontal margin with 4 teeth; anterolateral margins distinctly convex, each with 3 to 5 low, sometimes indistinct teeth. Dactylus of walking legs T-shaped in cross-section. Male abdominal segments 3 to 5 fused, functionally immovable, but sutures still visible.

Habitat, biology, and fisheries: These are deep-sea crabs, normally occurring in depths below 100 m. Taken incidentally by trawls and traps. Crabs of the genus Chaceon are represented by numerous species of interest to fisheries. Although not all these species are harvested in large numbers, the fishery potential of geryons is quite great. The most widely exploited species is the Atlantic C. maritae. Five species of Chaceon are known from the Western Central Pacific so far. The more important species in the area are C. granulatus and C. bicolor. Further new species can be expected when more deep-water areas are sampled.

Remarks: The golden crabs or geryons (genus Chaceon) are a very distinctive taxonomic group. However, the composition of the family is still not settled and some genera which have been assigned to the Geryonidae should probably be transferred to the Goneplacidae instead. The known species of Chaceon can easily be separated into 2 groups: among the species occurring in the area, C. bicolor, C. australis, and C. poupini belong to the group in which the dactylus of walking legs is not laterally flattened, and the height at midlength is greater than, or subequal to, the width at midlength.1/ Only 2 species in the area, namely C. granulatus and C. karubar, belong to the other group, in which the dactylus of legs is laterally flattened, and the height at midlength is less than the width at midlength.



Similar families occurring in the area

Members of the genus Chaceon can only be confused with some members of the Goneplacidae which also have a squarish carapace (the only commercial species of Goneplacidae in the area, Carcinoplax longimanus, has an ovoid carapace). In addition, the large size of geryons (usually exceeding 14 cm carapace width), the relatively long legs, the T-shaped cross-section of the dactylus of walking legs, and their occurrence in deep waters (deeper than 200 m), easily separates them from the goneplacids (no geryons are known from shallow waters).

Key to species of Chaceon occurring in the area

- 1a. Dorsal surface of carapace smooth to gently rugose, not granulose; branchial and posterolateral regions not swollen; dorsoventrally flattened, height at midlength 0.8 times or less than width at midlength → 2
- 1b. Dorsal surface of carapace granulose; branchial and posterolateral regions raised; dactylus of legs laterally flattened, height at midlength subequal to or greater than width at midlength (0.9 times and more). → 4
- 2a. Merus of walking leg unarmed, without distinct dorsal distal spine or tooth (Fig. 1) *Chaceon poupini*
- 2b. Merus of walking leg with dorsal distal spine or tooth. → 3

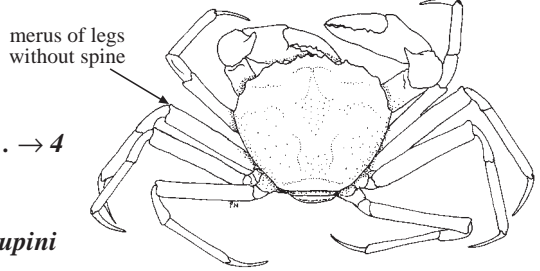


Fig. 1 Chaceon poupini

1/ Three other species belonging to the same group have been reported from other places in the Pacific: Chaceon yaldwyni Manning, Dawson, and Webber, 1989 (New Zealand), C. imperialis Manning, 1992 (Emperor Seamount Chain), and C. manningi Ng, Lee, and Yu, 1994 (Tung-Sa Islands, South China Sea).

- 3a.** Anterolateral margin of adults with spiniform teeth (Fig. 2). *Chaceon australis*
3b. Anterolateral margins of adults with low, lobiform teeth (Fig. 3) *Chaceon bicolor*

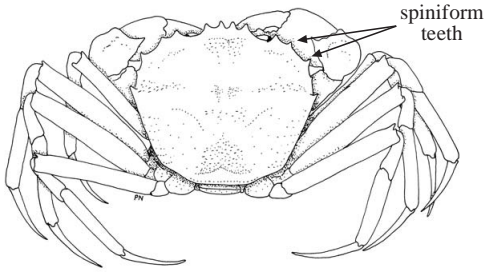


Fig. 2 *Chaceon australis*

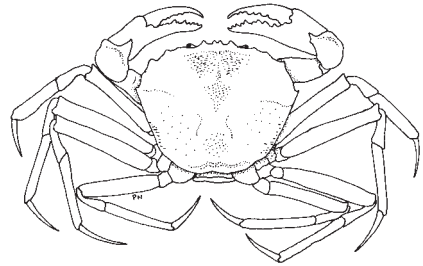


Fig. 3 *Chaceon bicolor*

- 4a.** Outer surface of chelipedal carpus with spine or projection on outer surface; merus of legs with distinct dorsal distal spine or tooth (Fig. 4) *Chaceon karubar*
4b. Outer surface of chelipedal carpus unarmed; merus of legs unarmed, without distinct dorsal distal spine or tooth (Fig. 5) *Chaceon granulatus*

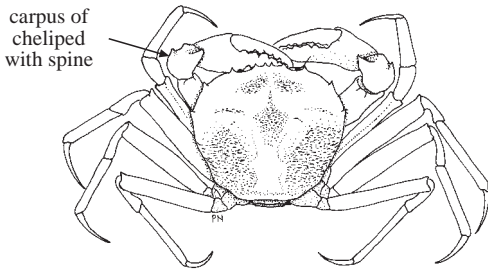


Fig. 4 *Chaceon karubar*

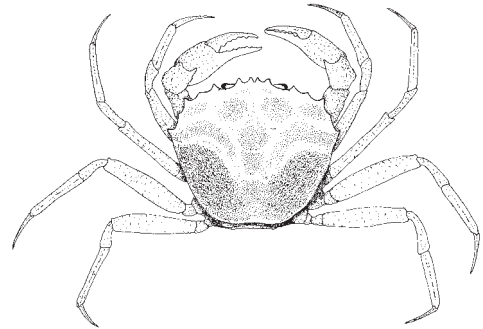







Fig. 5 *Chaceon granulatus*

List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

-  *Chaceon australis* Manning, 1993
-  *Chaceon bicolor* Manning and Holthuis, 1989
-  *Chaceon granulatus* (Sakai, 1978)
-  *Chaceon karubar* Manning, 1993
-  *Chaceon poupini* Manning, 1992

References

Manning, R.B. and L.B. Holthuis. 1981. West African Brachyuran Crabs (Crustacea: Decapoda). *Smithson. Contrib. Zool.*, 306:1-379.

Manning, R.B. and L.B. Holthuis. 1989. Two new genera and nine new species of geryonid crabs (Crustacea: Decapoda: Geryonidae). *Proc. Biol. Soc. Wash.*, 102:50-77.

Ng, P.K.L. and R.B. Manning. 1998. A new deepwater crab from the Palau Islands, Micronesia (Decapoda: Brachyura: Geryonidae). *Proc. Biol. Soc. Wash.*, 111:in press.

Chaceon bicolor Manning and Holthuis, 1989

Frequent synonyms / misidentifications: None / None.

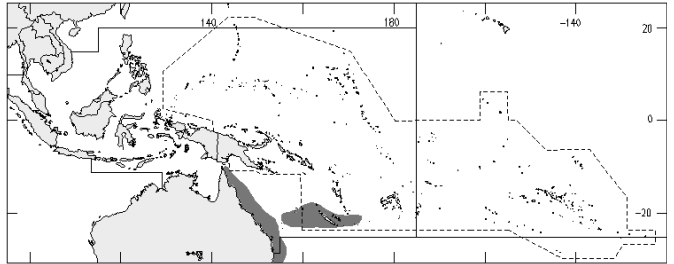
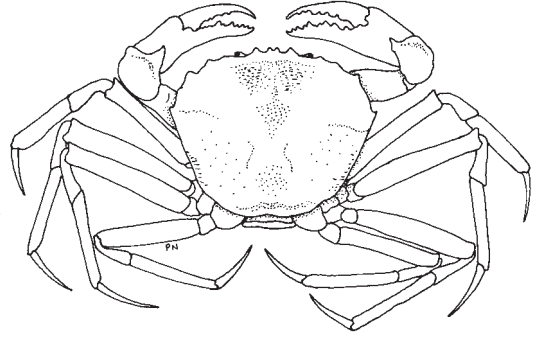
FAO name: En - Pacific golden crab.

Diagnostic characters: Carapace hexagonal; dorsal surface not inflated; anterolateral teeth low. Merus of legs long, slender. Dactylus of legs not laterally flattened, height at midlength greater than or subequal to width at midlength. **Colour:** reddish tan to purplish black (anterior half of carapace may be differently coloured than posterior half), sometimes cream-white throughout.

Size: Maximum carapace width 18 cm (males) and 15 cm (females).

Habitat, biology, and fisheries: Like most of the known species of the genus, *Chaceon bicolor* lives on muddy substrates in deeper waters at depths between 200 and 1 600 m, and apparently burrows sometimes into the sediment. Occasionally caught throughout its range, especially in Australia. Taken in bottom trawls and lobster pots, and is believed to be commercially valuable in the future, being supposedly quite abundant in some areas.

Distribution: New Caledonia, northwest and eastern Australia, and Loyalty Islands.

***Chaceon granulatus*** (Sakai, 1978)

Frequent synonyms / misidentifications: None / *Chaceon affinis* (A. Milne Edwards and Bouvier, 1894).

FAO name: En - Japanese golden crab.

Diagnostic characters: Carapace hexagonal; dorsal surface (especially branchial regions) distinctly inflated; anterolateral teeth low in adults. Merus of legs long, slender, with dorsal subdistal tooth; dactylus of legs laterally flattened, height at midlength less than width at midlength. **Colour:** uniform tan to cream colour overall.

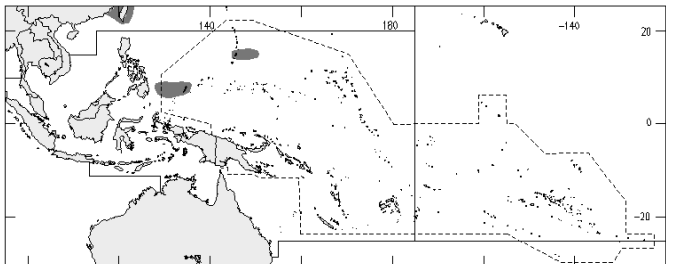
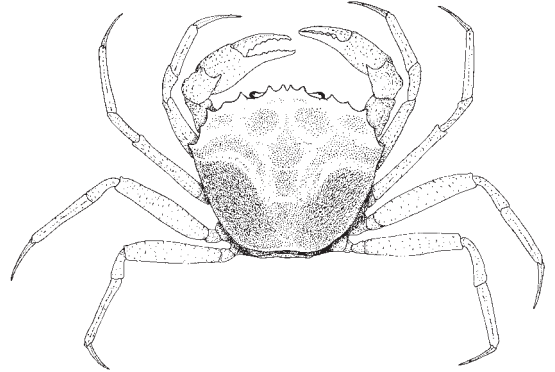
Size: Maximum carapace width 30 cm.

Habitat, biology, and fisheries: On soft substrates in deep waters from 300 to 1 500 m. Caught on a regular basis in Japan, but never in large numbers. When it does appear in markets, it commands high prices (up to US\$60 to US\$80 for a fresh crab of 20 cm width). Also caught for sale in Palau.

Distribution: Japan, China, Taiwan Province of China, and Palau.

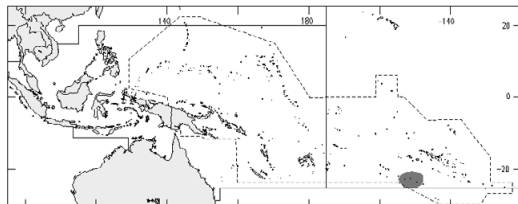
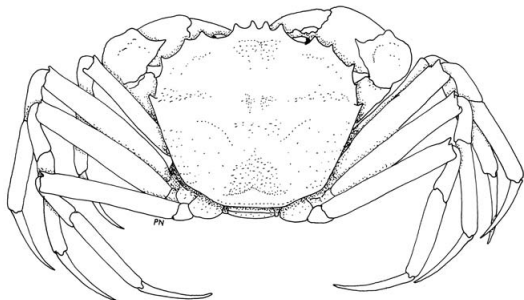
Remarks: Only 3 Pacific species of *Chaceon*, *C. granulatus*, *C. karubar*, and *C. manningi* belong to the group in which the dactylus of legs is laterally flattened, and the height at midlength is less than the width at midlength. Specimens from Saipan and Palau which have been identified with *C. granulatus* possibly belong to separate species, but studies on these are still ongoing.

For the moment, crabs from these 2 islands are tentatively identified as *C. granulatus*. The Palau specimens were recently recognized as belonging to a new species.

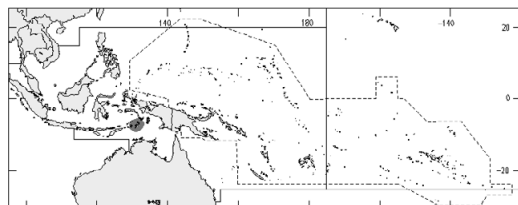
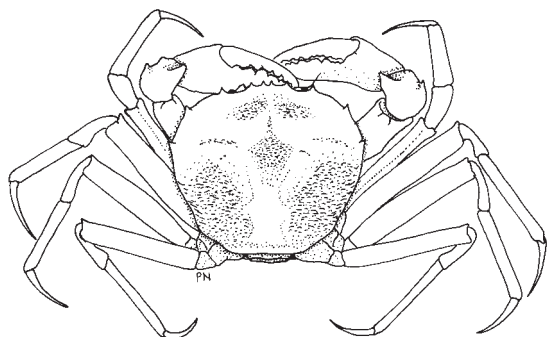


Chaceon australis* Manning, 1993*En** - Austral golden crab.

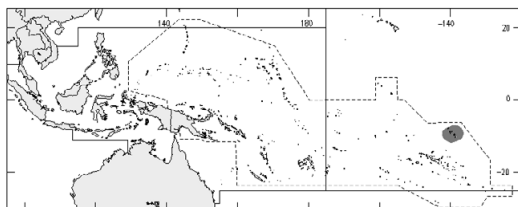
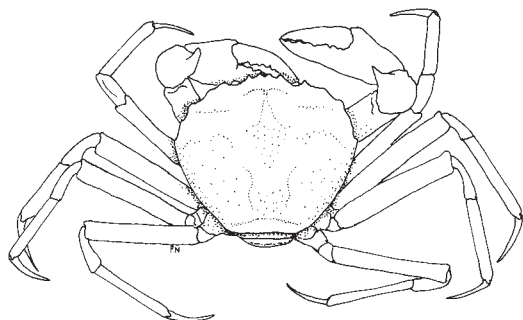
Maximum carapace width 10 cm. Carapace pink and tan in life. Occurs in deeper waters at depths of about 900 m. Not collected commercially for food so far, but has good fishery potential with the future development of deep-water fisheries, due to its large size. Known only from the Austral Islands.

***Chaceon karubar* Manning, 1993****En** - Indonesian golden crab.

Maximum carapace width 19 cm. In deeper waters at depths of about 550 m. Not collected commercially for food so far, but has a good fishery potential because of its large size. Known only from the Tanimbar Islands in Indonesia.

***Chaceon poupini* Manning, 1992****En** - Polynesian golden crab.

Maximum carapace width 14 cm. Colour uniform red in life. Occurs in deeper waters at depths from 600 to 1 000 m. Not collected commercially for food so far, but has a good fishery potential because of its large size. Known only from the Marquesas Islands.

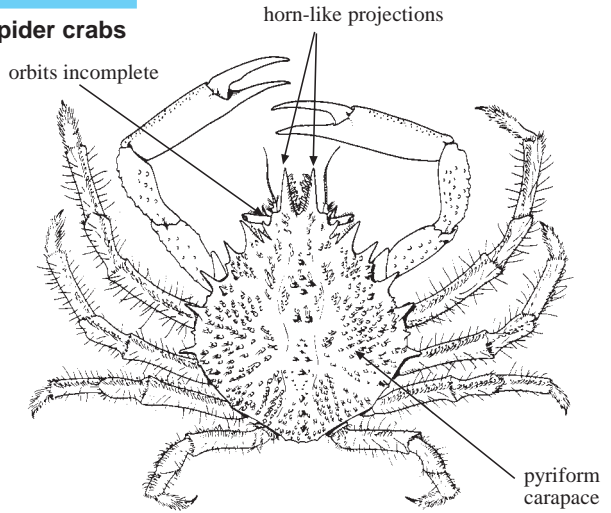


MAJIDAE

Spider crabs

Diagnostic characters: Carapace pyriform (pear-shaped), circular to sub-ovate, anterior 1/2 to 1/3 usually distinctly narrower than posterior part; dorsal surface gently convex, spinulose, granulose, and/or ridged; front narrow, often with 2 long horn-like projections (rostra); **orbits poorly developed to absent**; anterolateral margins of carapace often armed with well-developed spines. Legs spinulose and/or granulose, often with stiff setae. All male abdominal segments usually freely movable in most species.

Habitat, biology, and fisheries:^{1/} Benthic crabs. Most species of minor or no importance to fisheries, with only the larger species of *Schizophrys* being occasionally collected in the Western Central Pacific.



Similar families occurring in the area

None. The generally pyriform (pear-like) shape of many majids easily distinguishes them from other families. Their orbits are usually poorly demarcated to incomplete and this feature is often quite diagnostic. In addition, many species have hook-like setae on their bodies and appendages with which they use to attach various materials for camouflage.

The Hymenosomatidae (crown crabs, non-commercial) closely resemble many majids, but are easily distinguished by their very small size (small species at 2 mm adult carapace width, being contenders with the pinnotherids for the smallest crabs in the world), the absence of hook-like setae, and having only 5 abdominal segments (excluding the telson).

Key to species of interest to fisheries occurring in the area

- 1a. Two accessory spines at base of each rostral horn (Fig. 1a) . . .
 *Schizophrys dama*
- 1b. One accessory spine at base of each rostral horn (Fig. 1b) . . .
 *Schizophrys aspera*

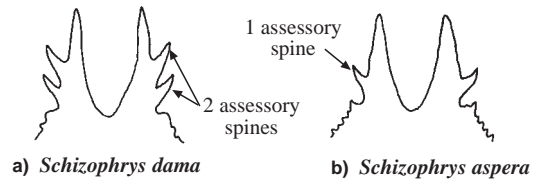


Fig. 1 rostral horn (dorsal view)

List of species of interest to fisheries occurring in the area

The symbol is given when species accounts are included.

- Schizophrys aspera* (H. Milne Edwards, 1834)
Schizophrys dama (Herbst, 1804)

References

- Griffin, D.J.G. 1966. A review of the Australian majid spider crabs (Crustacea, Brachyura). *Australian Zoologist*, 13:259-298.
- Griffin, D.J.G. and H.A. Tranter. 1986. The Decapoda Brachyura of the Siboga Expedition. VII. Majidae. *Siboga Exped. Monogr.*, 39c(4):1-335.

^{1/} The most important majids in fisheries are the large crabs of the genus *Chionoecetes* which occur in cold northern waters only. Near the area, the "Japanese giant spider crab" (*Macrocheira kaempferi*), known only from Japan and Taiwan Province of China, is occasionally collected for food. This is the largest crab in the world, reaching a carapace width of 30 cm and with legs spanning 2.5 m from tip to tip. The only other majid crab of fishery importance near the area is the southern spider crab (*Jacquinotia edwardsii*) from New Zealand, with several tonnes a month being landed.

Schizophrys aspera (H. Milne Edwards, 1834)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Common decorator crab.

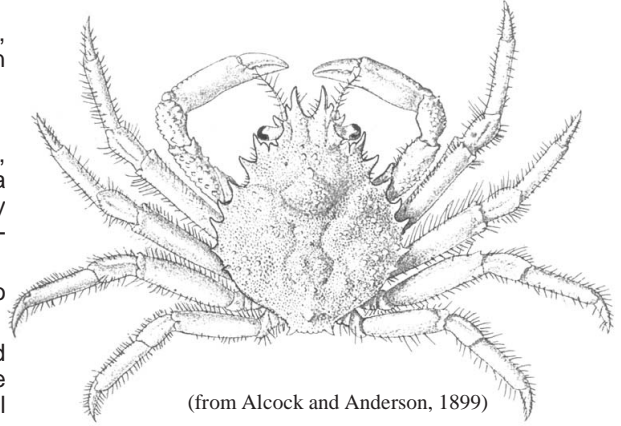
Diagnostic characters: Carapace pear-shaped, with 2 pronounced rostral horns. **Colour:** brown overall.

Size: Maximum carapace width 6 cm.

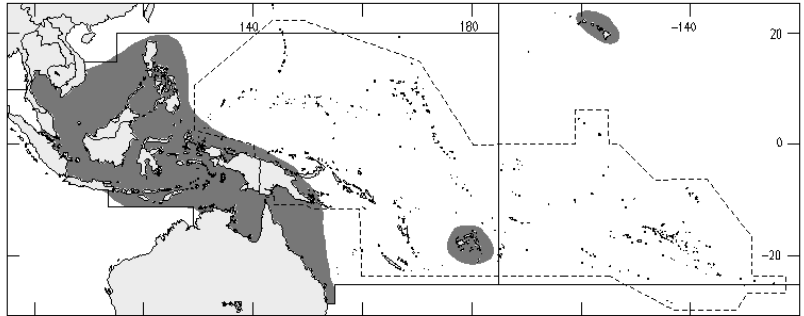
Habitat, biology, and fisheries: Found on rocks, especially near reefs, from intertidal areas to a depth of 40 m. Usually caught incidentally by hand, sometimes in crab pots. Only of local commercial importance.

Distribution: Indo-West Pacific, eastwards to Hawaii.

Remarks: *Schizophrys aspera* can be confused with *S. dama*, which is easily distinguished by the 2 accessory spines near the base of each rostral horns (only 1 spine in *S. aspera*).



(from Alcock and Anderson, 1899)



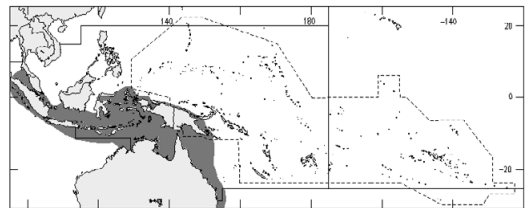
Schizophrys dama (Herbst, 1804)

En - Pronghorn decorator crab.

Maximum carapace width 6 cm. A subtidal coral reef species, occasionally invades rocky and sandy areas. Collected incidentally by hand or with nets, but nowhere commercially important. Southeast Asia to New Guinea and Australia.



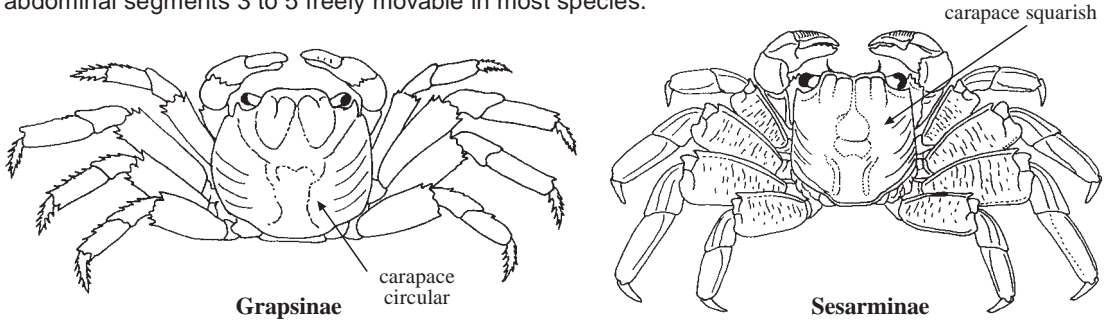
(from Alcock and Anderson, 1899)



GRAPSIDAE

Sally-light-foots, vinegar crabs, and paddler crabs

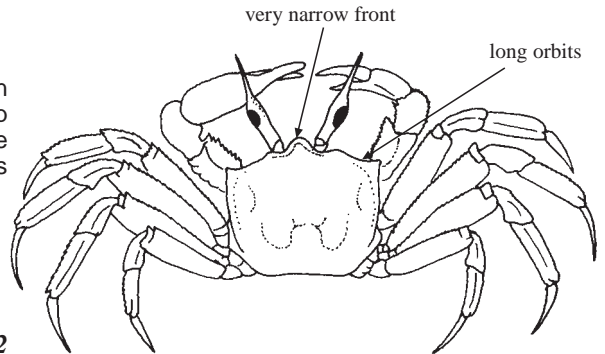
Diagnostic characters: Carapace squarish, transversely rectangular, trapezoidal, or circular; dorsal surface flat to gently convex, with low oblique or transverse ridges; front much broader than orbits; orbits occupying almost entire anterior border (excluding front); antero- and posterolateral margins of carapace usually not clearly demarcated, lateral margins appearing almost straight or gently convex, usually armed with 1 or 2 teeth anteriorly, sometimes unarmed. **Rhomboidal gap usually present between third maxillipeds**, often with mandibles exposed. Dactylus of legs with distinct spines. Male abdominal segments 3 to 5 freely movable in most species.



Habitat, biology, and fisheries: Swimming, climbing, or terrestrial crabs, with the majority of species occurring in intertidal areas or semiterrestrial habitats. Many also occur in estuarine waters and a few species live exclusively in fresh water. Most species are of minor commercial importance, with species of the genera *Episesarma* and *Varuna* being most often collected for food.^{1/}

Similar families occurring in the area

Ocypodidae: with a much narrower frontal margin of the carapace; always lack a rhomboidal gap between their third maxillipeds; crabs walk on the tip of dactyli of legs, not on the sides of dactyli (as seen in grapsids).



Key to the subfamilies of Grapsidae

- 1a. No distinct rhomboidal gap between third maxillipeds (Fig. 1a) → 2
- 1b. Distinct rhomboidal gap between third maxillipeds (Fig. 1b) → 3

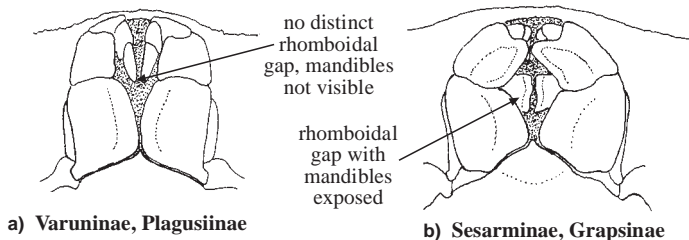


Fig. 1 third maxillipeds

^{1/} The most important grapsids commercially are the “mitten crabs” of the genus *Eriocheir* (Varuninae) from China, Taiwan Province of China, Japan, and Korea (see Guo et al., 1997). Costing up to US\$ 20 each, these relatively large grapsids are netted in enormous numbers when they migrate from fresh waters to the sea to spawn. They are much sought after for their ripe ovaries.

- 2a. Carapace squarish; frontal margin entire, without lobes or teeth; third maxilliped with broad exopod and long flagellum (Fig. 2a); male abdomen with all segments movable (Fig. 3a) **Varuninae**
- 2b. Carapace circular; third maxilliped with slender exopod and no flagellum (Fig. 2b); male abdomen with segments 3 to 6 immovable, with suture between segments 3 and 4 still evident (Fig. 3b) **Plagusiinae**

(a single species of interest to fisheries, *Plagusia tuberculata*, occurring in the area)

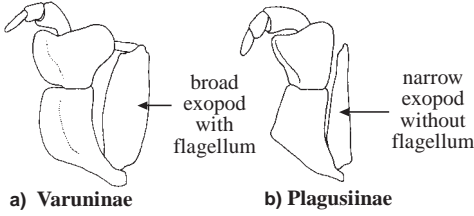


Fig. 2 third maxilliped

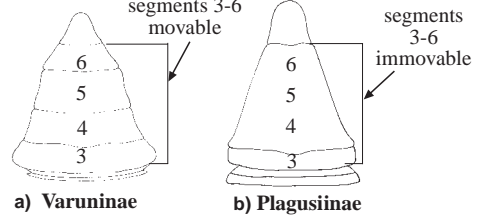


Fig. 3 male abdomen

- 3a. Merus and ischium of third maxillipeds with ridge (Fig. 4a); pterygostomial region with network-like (reticulated) pattern of very short, stiff setae (Fig. 5a); carapace usually squarish **Sesarminae**
- 3b. Merus and ischium of third maxillipeds without hairy oblique ridge (Fig. 4b); pterygostomial region may be setose but no network-like pattern discernible (Fig. 5b); carapace usually circular **Grapsinae**

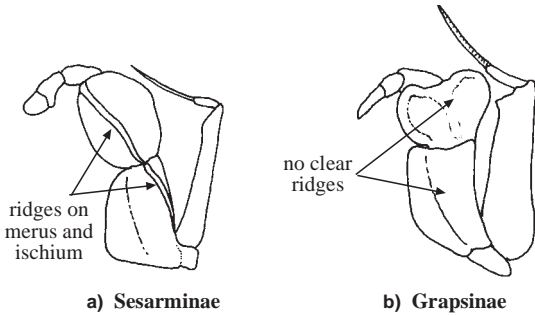


Fig. 4 third maxilliped

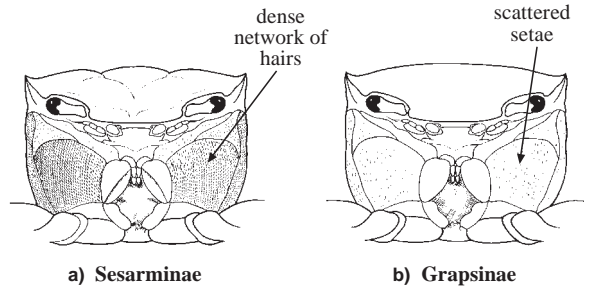


Fig. 5 body in frontal view

Key to food species of Grapsinae occurring in the area

- 1a. Front gently deflexed, margin weakly serrated (Fig. 6a); inner angle of carpus of cheliped with acutely triangular spine (Fig. 7a); pectinated fingertips of chela longitudinally broad (Fig. 8a); adult male sixth abdominal segment shorter than fifth segment (Fig. 9a) ***Grapsus albolineatus***
- 1b. Front strongly deflexed and appears almost vertical from frontal view, margin serrated (Fig. 6b); inner angle of carpus of cheliped with subtruncate base (Fig. 7b); pectinated fingertips of chela longitudinally narrow (Fig. 8b); adult male sixth abdominal segment distinctly longer than or subequal in length to fifth segment (Fig. 9b) ***Grapsus tenuicrustatus***

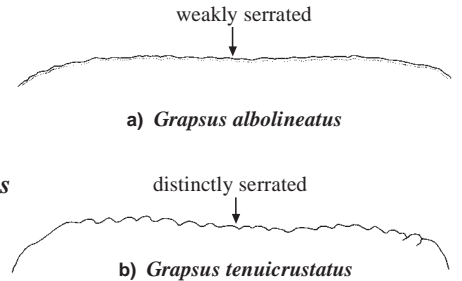


Fig. 6 frontal margin of carapace

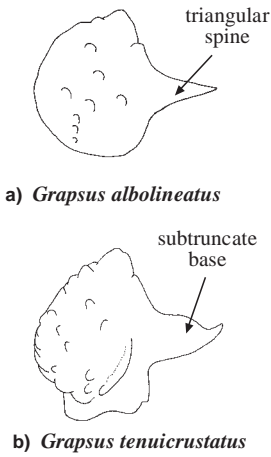


Fig. 7 carpus of cheliped

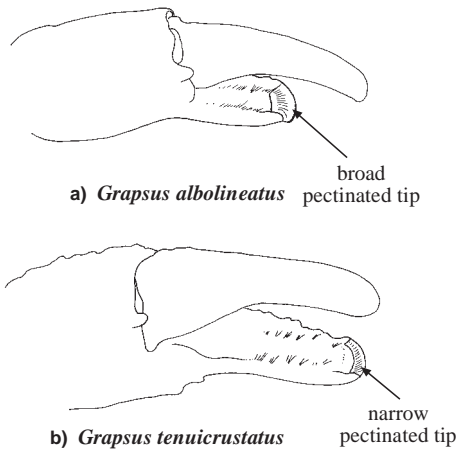


Fig. 8 chela

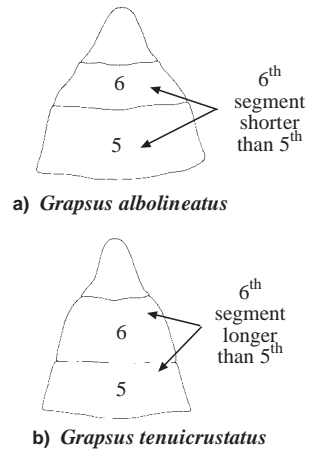


Fig. 9 male abdomen

Key to food species of Sesarminae occurring in the area

- 1a. Tubercles on dorsal margin of dactylus of chela numbering 64 to 76 (Fig. 10a); male first gonopod with broad, truncate pectinated tip (Fig. 11a); most of outer surface of palm and proximal part of dactylus purple to reddish, dactylus white distally, pollex orangish red to pink *Episesarma chengtongense*
- 1b. Tubercles on dorsal margin of dactylus of chela numbering less than 61; male first gonopod tip not as above; outer surface of palm not coloured as above → 2
- 2a. Tubercles on dorsal margin of dactylus of chela similarly sized throughout length, numbering 40 to 50 (Fig. 10b); male first gonopod with broad, rounded pectinated tip (Fig. 11b); outer surface of palm light brown with white fingertips *Episesarma palawanense*
- 2b. Tubercles on dorsal margin of dactylus of chela increasing in size towards finger tip; male first gonopod not as above; outer surface of palm light brown with white fingertips or coloured in other ways → 3
- 3a. Outer surface of palm violet at the proximal part, distal part and fingers white; tubercles on dorsal margin of dactylus of chela 40 to 48 (Fig. 10c); male first gonopod with relatively narrow truncate pectinated tip (Fig. 11c) *Episesarma versicolor*
- 3b. Outer surface of palm uniformly red or brown; tubercles on dorsal margin of dactylus of chela 35 to 60; male first gonopod tip not as above → 4
- 4a. Tubercles on dorsal margin of dactylus of chela numbering 35 to 45 (Fig. 10d); male first gonopod with relatively broad, bent pectinated tip (Fig. 11d); outer surface of palm uniformly red to chestnut brown *Episesarma singaporense*
- 4b. Tubercles on dorsal margin of dactylus of chela numbering 40 to 60 (Fig. 10e); male first gonopod with relatively narrow, bent pectinated tip (Fig. 11e); outer surface of palm light brown with white fingertips *Episesarma mederi*

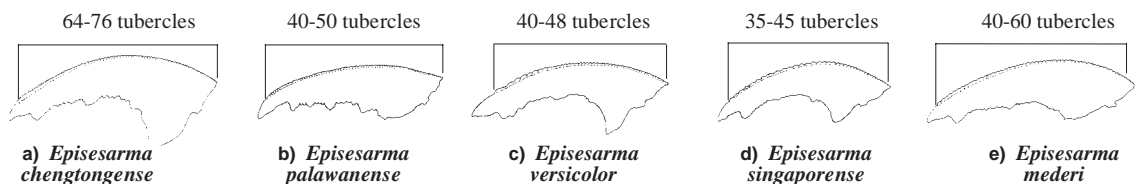


Fig. 10 dactylus of chela (lateral view)

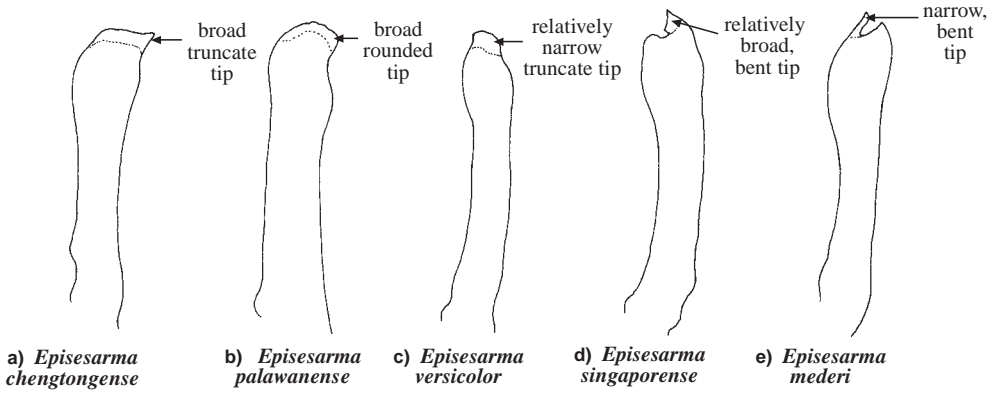


Fig. 11 male first gonopod

Key to food species of Varuninae occurring in the area

- 1a. Distal process of male first gonopod with 1 process distinctly longer than the other (Fig. 12a); occurs mainly in continental shelf waters *Varuna yui*
- 1b. Distal process of male first gonopod with both processes subequal in size (Fig. 12b); occurs mainly in areas with more oceanic waters *Varuna litterata*

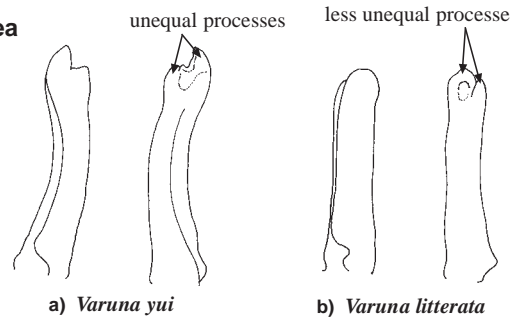


Fig. 12 male first gonopod

List of species of interest to fisheries occurring in the area

The symbol 🦀 is given when species accounts are included.

Subfamily GRAPSINAE

- 🦀 *Grapsus albolineatus* Lamarck, 1818
- 🦀 *Grapsus tenuicrustatus* (Herbst, 1783)

Subfamily PLAGUSIINAE

- 🦀 *Plagusia tuberculata* Lamarck, 1818

Subfamily SESARMINAE

- 🦀 *Episesarma mederi* (A. Milne Edwards, 1854)
- 🦀 *Episesarma chengtongense* (Serène and Soh, 1967)
- 🦀 *Episesarma palawanense* (Rathbun, 1914)
- 🦀 *Episesarma singaporense* (Tweedie, 1936)
- 🦀 *Episesarma versicolor* (Tweedie, 1940)

Subfamily VARUNINAE

- 🦀 *Varuna litterata* (Fabricius, 1798)
- 🦀 *Varuna yui* Hwang and Takeda, 1984

References

Alcock, A. 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catometopa or Grapsoidea. *J. Asiat. Soc. Bengal*, 69, pt. 2(3):279-486.

Crosnier, A. 1965. Crustacés Décapodes. Grapsidae et Ocypodidae. *Faune de Madagascar*, 18:1-143.

***Grapsus albolineatus* Lamarck, 1818**

Frequent synonyms / misidentifications: *Grapsus strigosus* (Herbst, 1799) / None.

FAO name: En - Mottled Sally-light-foot.

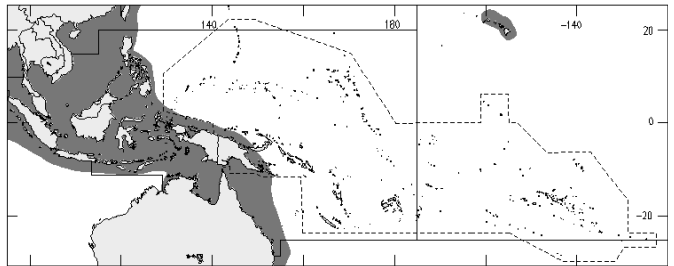
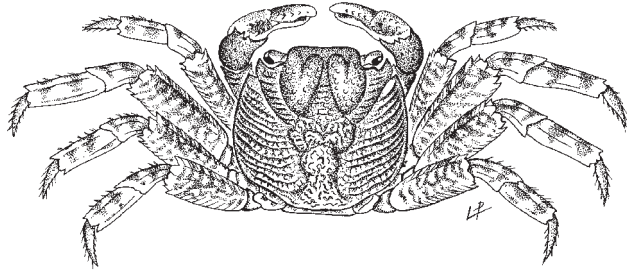
Diagnostic characters: Carapace rounded; front straight, entire; anterolateral margins rounded, each with 1 tooth; lateral regions with numerous oblique striae. Fingertips strongly spooned. **Colour:** carapace with green and white transverse markings.

Size: Maximum carapace width 5 cm.

Habitat, biology, and fisheries: Found out of the water, on rocks in the splash zone. Collected only incidentally and consumed by local residents only. Usually caught by hand or with special nets.

Distribution: Indo-West Pacific.

Remarks: Several other *Grapsus* species live in the region, but the most common are *G. albolineatus* and *G. tenuicrustatus* (see below). These 2 species, however, can easily be separated (see key).



***Grapsus tenuicrustatus* (Herbst, 1783)**

Frequent synonyms / misidentifications: None / None.

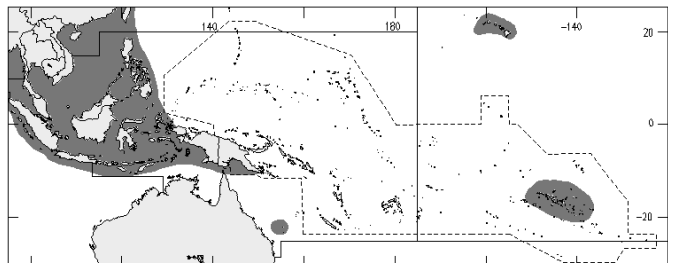
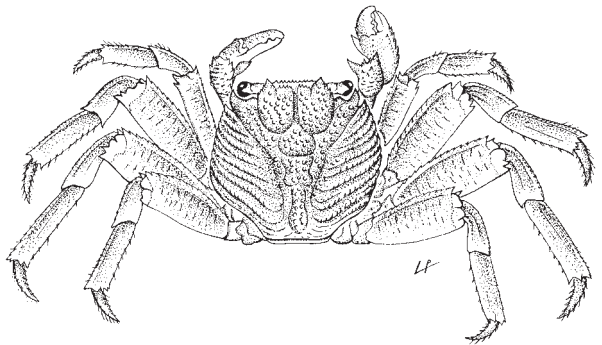
FAO name: En - Natal Sally-light-foot.

Diagnostic characters: Carapace rounded; front straight, finely serrated; anterolateral margins rounded, each with 1 tooth; lateral regions with numerous oblique striae. Fingertips slightly spooned. **Colour:** carapace with green and white transverse markings.

Size: Maximum carapace width 8 cm.

Habitat, biology, and fisheries: Found out of the water, on rocks in the splash zone. Collected only incidentally and consumed by local residents. Usually caught by hand or with special nets. Probably the most common representative of *Grapsus* among several species occurring in the area.

Distribution: Indo-West Pacific, including French Polynesia and Hawaii.



Episesarma versicolor (Tweedie, 1940)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Violet vinegar crab.

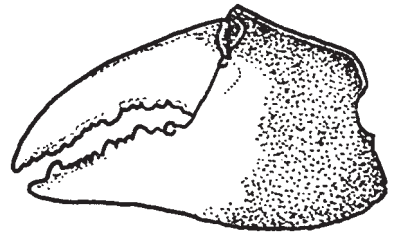
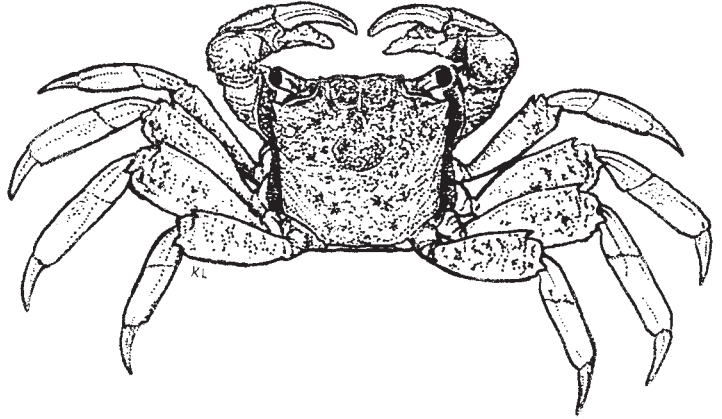
Diagnostic characters: Carapace squarish, with 1 small anterolateral tooth; dorsal surface relatively flat; regions well defined, covered with short, stiff setae. Dorsal margin of dactylar finger with numerous (40 to 48) tubercles, forming a stridulatory organ. **Colour:** carapace brown to brownish grey; outer surface of palm with proximal parts violet, distal parts and fingers white.

Size: Maximum carapace width 5 cm (for *Episesarma* spp.).

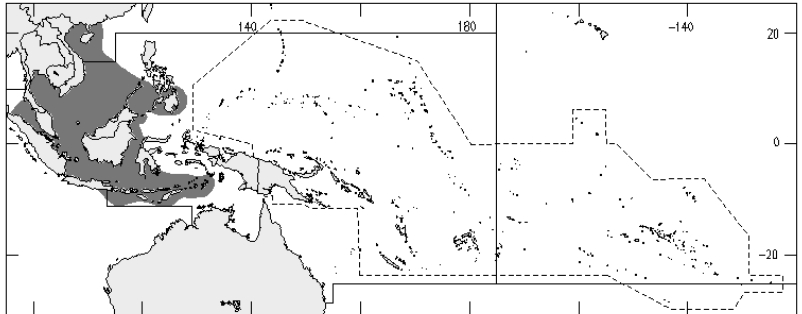
Habitat, biology, and fisheries: All members of *Episesarma* are mangrove crabs, digging burrows at the base of trees or at mud lobster (*Thalassinia*) mounds, and are predominantly herbivorous. There are several species of *Episesarma* known from Southeast Asia, all of which are harvested to varying degrees. They are collected in large numbers for food in many Southeast Asian countries and some southern Chinese communities. The crabs are collected by hand, often pickled in vinegar and/or salt solutions and are then eaten as they are with rice, or deep fried. In northern Australia, an undescribed species of *Episesarma* is eaten by the aborigines (P. Davie, pers. comm.).

Distribution: Southeast Asia and southern China.

Remarks: Four other species of *Episesarma* in Southeast Asia are large and common enough to be collected for food. These are *E. singaporense*, *E. mederi*, *E. chengtongense*, and *E. palawanense* (see abbreviated species accounts below). They are easily distinguished by various carapace and cheliped characters, and on the basis of live colours.



outer surface of chela



Varuna litterata (Fabricius, 1798)

Frequent synonyms / misidentifications: None / None.

FAO name: En - Oceanic paddler crab.

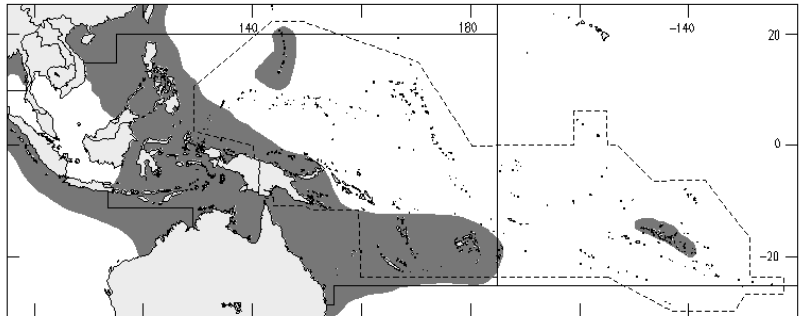
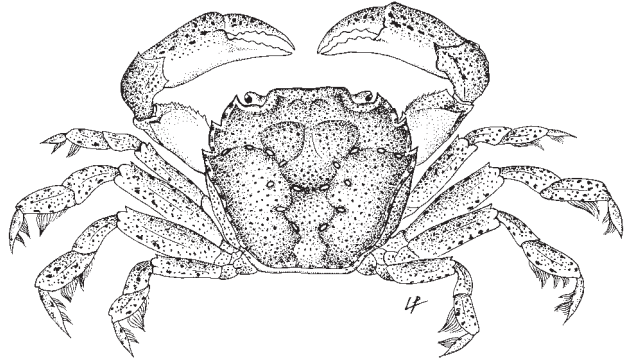
Diagnostic characters: Carapace squarish, surface smooth; front straight; anterolateral margins each with 3 very broad, low but sharp teeth. Dactylus, propodus, and carpus of legs laterally flattened, fringed with long, closely packed setae. **Colour:** light brown to brownish grey on dorsal surfaces.

Size: Maximum carapace width 5 cm (males).

Habitat, biology, and fisheries: *Varuna litterata* prefers areas faced by more oceanic waters whereas *V. yui* is only known from the continental shelf waters of Southeast Asia and neighbouring areas. Both species occur together in the Philippines. *V. litterata* and *V. yui* are generally estuarine crabs that usually prefer slow-moving or almost stagnant bodies of water. Both species, however, can be found up to 20 km from the sea in completely fresh water. Large or ovigerous specimens can be found in intertidal areas, frequently associated with floating clumps of brown algae, *Sargassum* spp. Collected in good numbers in most Southeast Asian countries for food. Usually collected by hand, but also caught by traps, seines, and fish corrals. Like *Episesarma*, the species of *Varuna* in the area are usually pickled in vinegar and/or salt solutions. They are then eaten as such or deeply fried. They are also collected for their tasty ovaries and are especially common in markets during their breeding period.

Distribution: Widely distributed in the Indo-West Pacific.

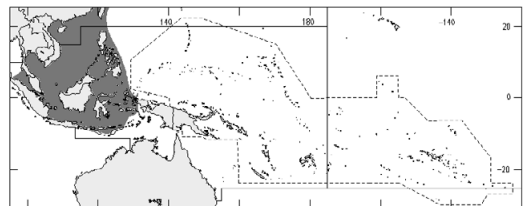
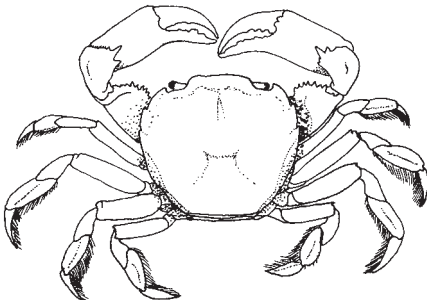
Remarks: The 2 species of *Varuna* in the area, *V. litterata* and *V. yui* (see abbreviated species account below), are very similar externally, and can only be distinguished effectively by means of their male gonopods.



Varuna yui Hwang and Takeda, 1984

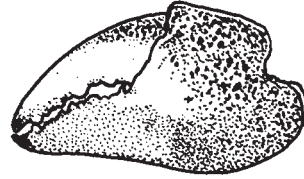
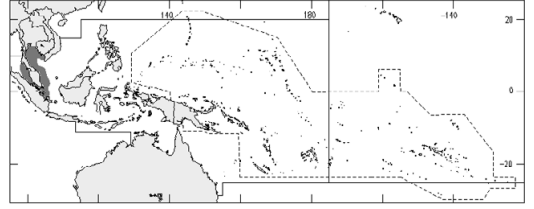
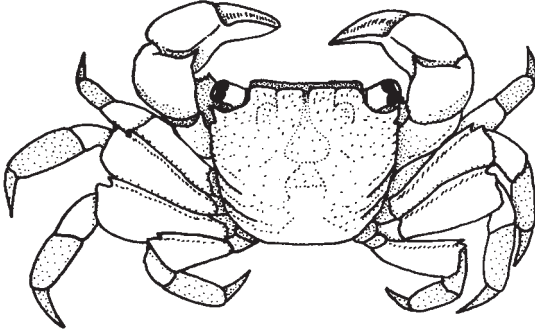
En - Sundaic paddler crab.

Maximum carapace width 5 cm. In estuarine waters up to 20 km inland in completely fresh water. Collected in large numbers in most Southeast Asian countries for local consumption. Usually collected by hand, but also caught by traps, seines, and fish corrals. In continental shelf waters of the Sunda Shelf up to southern China and Philippines, occurring together with *Varuna litterata* in the latter 2 localities. *V. yui* is the dominant species of the genus in the Sunda Shelf.



Episesarma chengtongense (Serène and Soh, 1967)**En** - Pinkfingered vinegar crab.

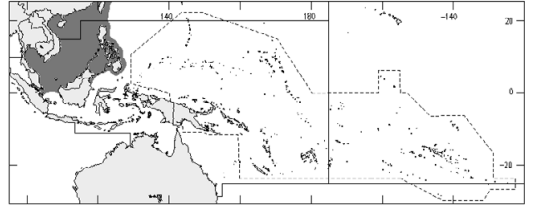
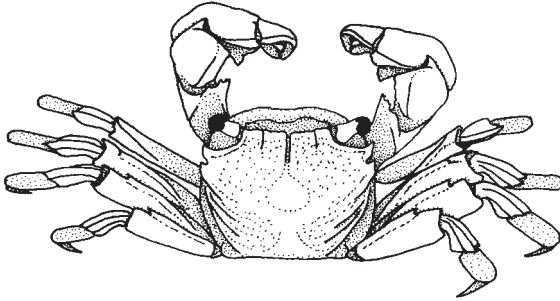
Maximum carapace width 5 cm. Found only in mangroves. Collected by hand for food, and usually sold fresh or pickled in vinegar. Occurs in southern China and various parts of Southeast Asia.



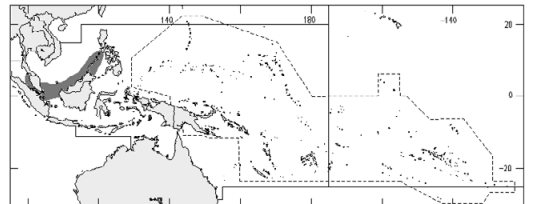
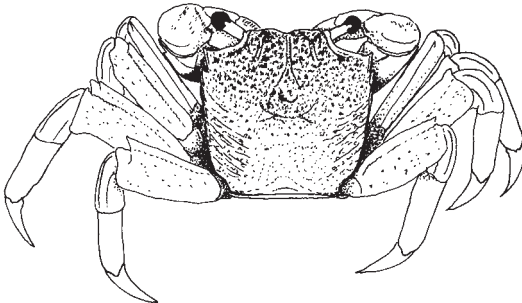
outer surface of chela

Episesarma mederi (A. Milne Edwards, 1854)**En** - Thai vinegar crab.

Maximum carapace width 4 cm. Inhabits mangroves and forested muddy habitats. Collected by hand in large numbers for food, and usually sold fresh or pickled in vinegar. Occurs in southern China and various parts of Southeast Asia.

***Episesarma palawanense*** (Rathbun, 1914)**En** - Rathbun's vinegar crab.

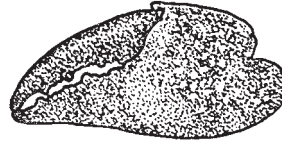
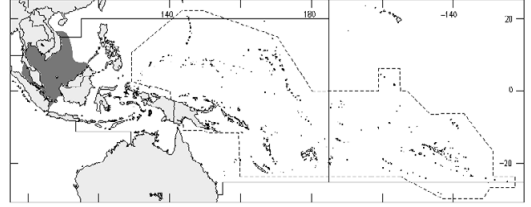
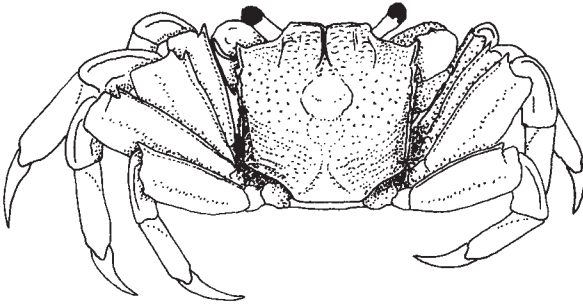
Maximum carapace width 4 cm. Inhabits mangroves. Collected by hand for food, and usually sold fresh. Occurs in various parts of Southeast Asia.



***Episesarma singaporense* (Tweedie, 1936)**

En - Singapore vinegar crab.

Maximum carapace width 4 cm. Inhabits mangroves. Collected by hand in good numbers for food, and is usually sold fresh in markets or pickled in vinegar. Occurs in parts of Southeast Asia.

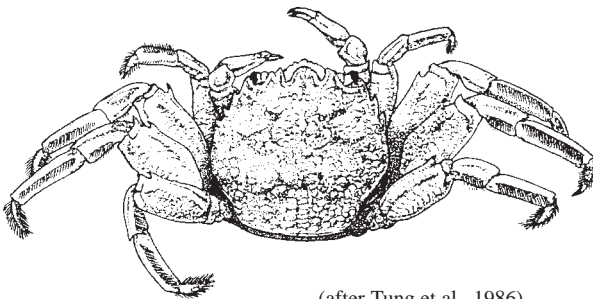


outer surface of chela

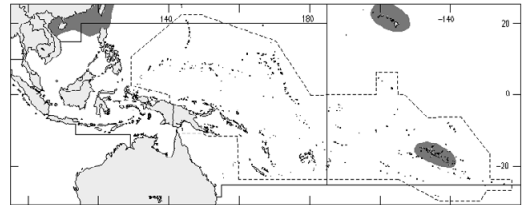
***Plagusia tuberculata* Lamarck, 1818**

En - Tuberculated Sally-light-foot.

Maximum carapace width about 4 cm. On rocks just above the splash zone. Collected by hand and traps for food in rural communities, and usually pickled in vinegar or sauce as a food supplement. Indo Pacific in distribution, reaching New Zealand, Hawaii, French Polynesia, and California in the eastern Pacific.



(after Tung et al., 1986)



GECARCINIDAE

Land crabs

Diagnostic characters: Carapace circular to transversely ovate; dorsal surface smooth, strongly convex longitudinally and transversely; frontal margin entire; anterolateral margins unarmed or each with a single tooth. Rhomboidal gap present between third maxillipeds. Legs stout, dactylus longitudinally ridged, often with dense, stiff setae, margins with spines. All male abdominal segments distinct, movable.

Habitat, biology, and fisheries: Terrestrial crabs. Although gecarcinids can be found many kilometres inland, they must return to the sea to spawn and release their planktonic larvae. The most frequently collected food species in the area is *Cardisoma carnifex*.

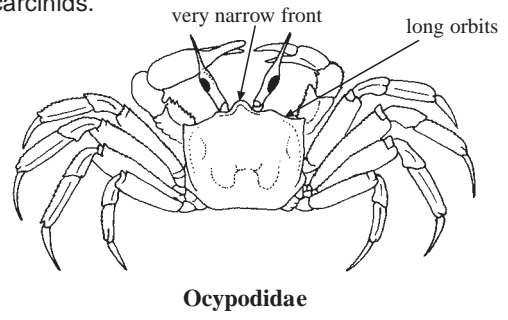
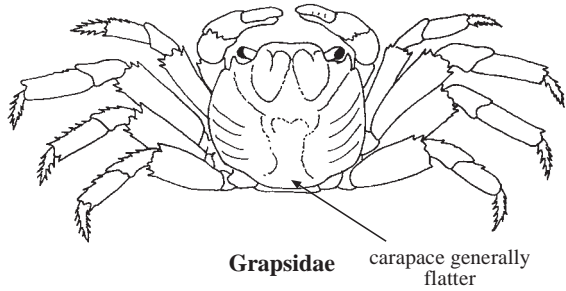
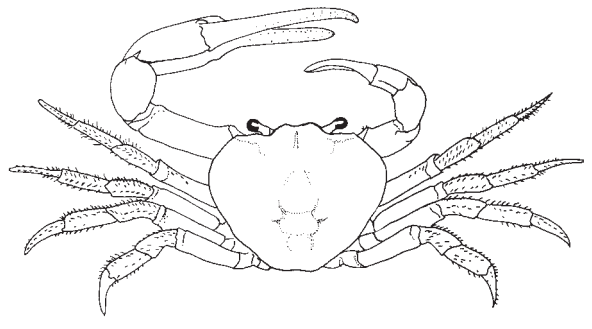
Similar families occurring in the area

The swollen carapace and terrestrial habitats of the gecarcinids make them a very distinctive group. In this respect they may be confused with several fresh-water and terrestrial genera of Gecarcinucidae, Potamidae, and Parathelphusidae (species of the latter 2 are collected for food in many parts of Southeast Asia and Indo-China).

Potamidae, Gecarcinucidae, Parathelphusidae (= Sundathelphusidae): several genera of these exclusive fresh-water families may resemble gecarcinids, but are readily distinguished by the lack of a rhomboidal gap between the third maxillipeds.

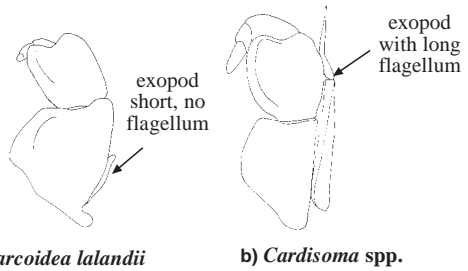
Grapsidae: also have a rhomboidal gap between the third maxillipeds, but most species possess a much flatter dorsal carapace surface compared to gecarcinids.

Ocypodidae: also have many terrestrial members, but lack a rhomboidal gap between the third maxillipeds and generally do not have as thick a shell as seen in gecarcinids.



Key to species of interest to fisheries occurring in the area

- 1a. Exopod of third maxilliped without flagellum (Fig. 1a); orbits oblique, eyes small, never reaching first anterolateral tooth (Fig. 2). *Gecarcoidea lalandii*
- 1b. Exopod of third maxilliped with long flagellum (Fig. 1b); orbits horizontal, eyes well developed, reaching to just before first anterolateral tooth. → 2



a) *Gecarcoidea lalandii* b) *Cardisoma* spp.

Fig. 1 third maxilliped

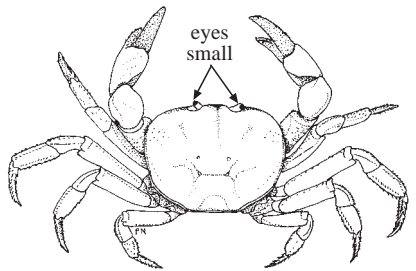


Fig. 2 *Gecarcoidea lalandii*

- 2a. Legs very long (Fig. 3) *Cardisoma longipes*
- 2b. Legs of normal length → 3
- 3a. Surface of carapace with numerous scattered flattened to rounded granules (Fig. 4)
 *Cardisoma rotundum*
- 3b. Surface of carapace smooth. → 4

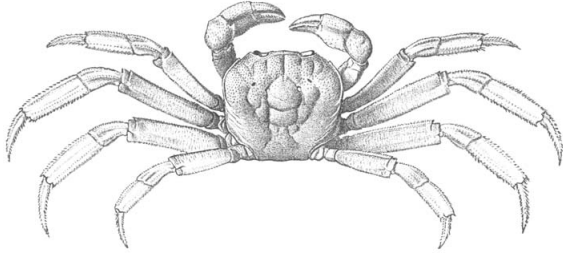


Fig. 3 *Cardisoma longipes*
 (from A. Milne Edwards, 1873)

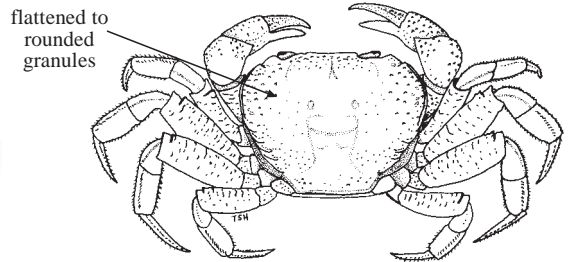


Fig. 4 *Cardisoma rotundum*

- 4a. Carapace transversely ovate; face (pterygostomial and sub-branchial regions) with large setose area which covers anterior part of the branchiostegal region; stiff setae present on merus of legs; males with 2 equally enlarged chelae; carapace bluish brown to blue coloration in life (Fig. 5) *Cardisoma hirtipes*
- 4b. Carapace circular; face (pterygostomial and sub-branchial regions) with small setose area which does not reach branchiostegal region; short (or no) setae on merus of legs; males with 1 cheliped several times size of other; carapace brown in life (Fig. 6) *Cardisoma carnifex*

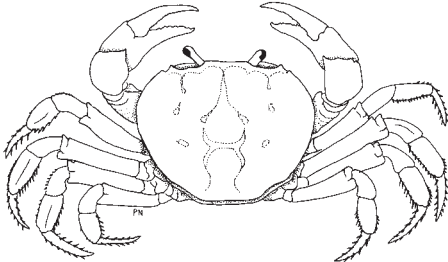


Fig. 5 *Cardisoma hirtipes*

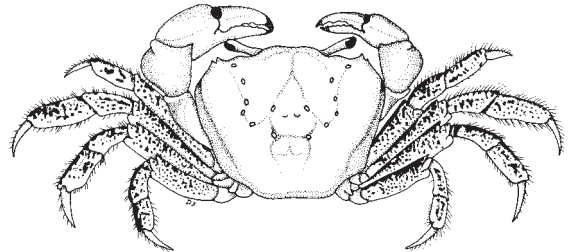







Fig. 6 *Cardisoma carnifex*

List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

-  *Cardisoma carnifex* (Herbst, 1794)
-  *Cardisoma hirtipes* Dana, 1852
-  *Cardisoma longipes* (A. Milne Edwards, 1873)
-  *Cardisoma rotundum* (Quoy and Gaimard, 1824)
-  *Gecarcoidea lalandii* (H. Milne Edwards, 1837)

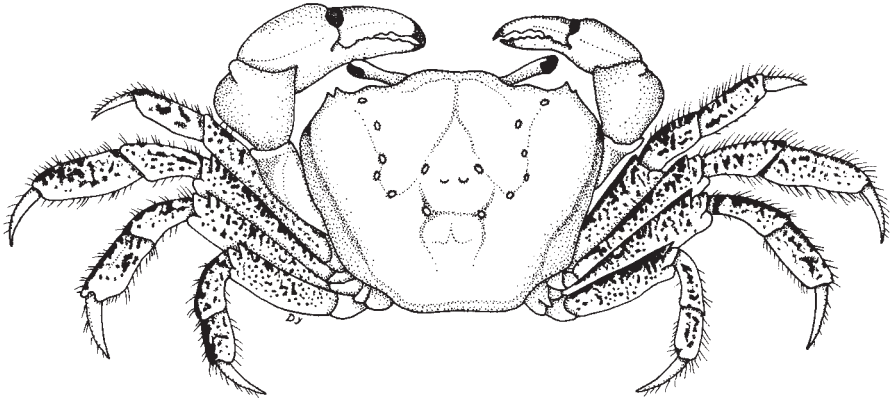
References

Burggren, W.W. and B.R. McMahon (eds). 1988. *The biology of land crabs*. Cambridge University Press, 479 p.
 Türkay, M. 1974. Die Gecarcinidae Asiens und Ozeaniens (Crustacea: Decapoda). *Senckenb. Biol.*, 55:223-259.

Cardisoma carnifex (Herbst, 1794)

Frequent synonyms / misidentifications: *Cardisoma urvillei* H. Milne Edwards, 1853; *C. obesum* Dana, 1851 / None.

FAO name: En - Brown land crab.

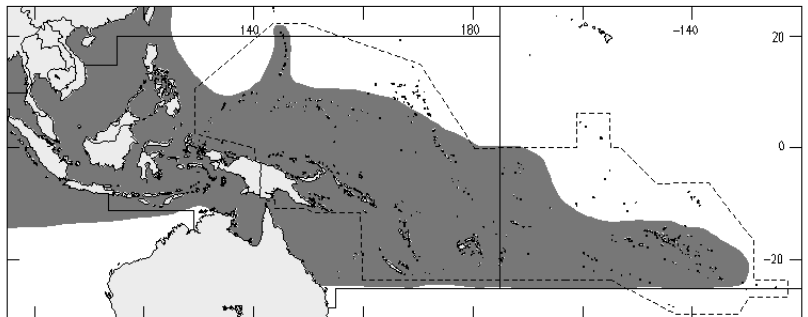


Diagnostic characters: Carapace subovate, swollen, surface smooth; setose area on pterygostomial and subbranchial regions small, not extending to branchiostegal region. Third maxilliped with well-developed flagellum on exopod, entirely covered by setae. Adult males with one chela greatly enlarged. Merus of legs not distinctly lined with stiff setae. **Colour:** brown to brownish grey.

Size: Maximum carapace width 12 cm (males).

Habitat, biology, and fisheries: In back mangroves or similar brackish-water habitats. Completely terrestrial crabs, living near the sea and excavating deep burrows. The larvae are released into the sea and return back to land upon completion of their development. *Cardisoma carnifex* is collected in substantial numbers whenever it is common, but has a comparatively low market value. It is usually caught by hand at night, or with special traps placed at the mouth of its burrow. The crabs are sold live. There have been reports that some land crabs are poisonous but this is almost certainly associated with their diet, as these herbivorous crabs sometimes consume poisonous plants. Once they are kept for short periods and their guts are empty however, they are safe for human consumption. Three other species of *Cardisoma* are found in the area, *C. hirtipes* Dana, 1852, *C. rotundum* and *C. longipes* (A. Milne Edwards, 1873) (see abbreviated species accounts below), but these are only of minor food value, being much less common than *C. carnifex*.

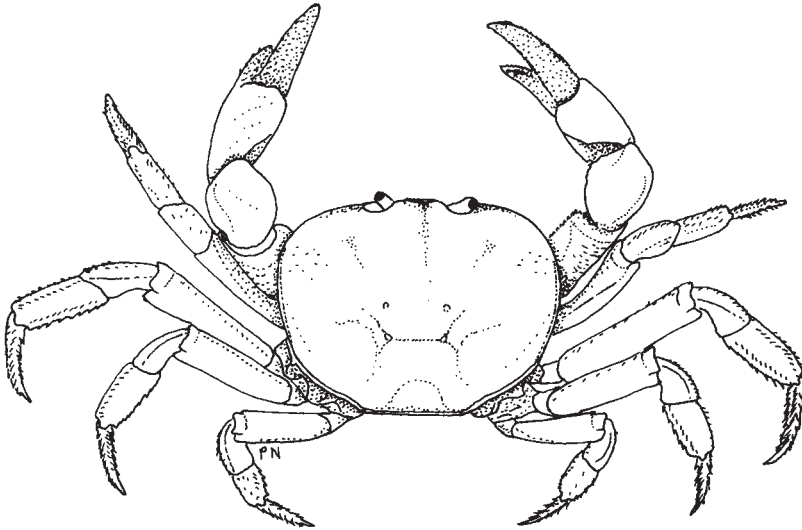
Distribution: Indo-West Pacific.



Gecarcoidea lalandii (H. Milne Edwards, 1837)

Frequent synonyms / misidentifications: *Hylaeocarcinus humei* Wood Mason, 1873; *Pelocarcinus marchei* A. Milne Edwards, 1890; *P. cailloti* A. Milne Edwards, 1890; *Limnocarcinus intermedius* De Man, 1879 / None.

FAO name: En - Purple land crab.



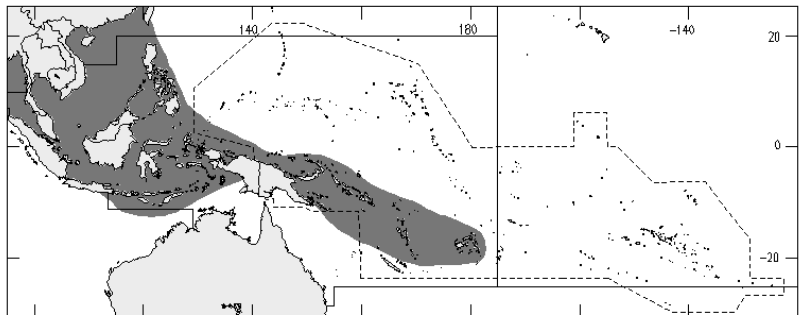
Diagnostic characters: Carapace distinctly transversely ovate, swollen, surfaces smooth; orbits relatively small, eyes slanted obliquely in adults; third maxilliped without any flagellum on exopod. **Colour:** purplish brown to purple and reddish purple.

Size: Maximum carapace width 13 cm (males).

Habitat, biology, and fisheries: Fully terrestrial, can be found many kilometres away from the sea. Normally inhabits shallow burrows or under trees and rocks in undisturbed forests in isolated islands, where they may be very common. The crabs release their larvae into the sea, which return to land upon completion of their development. *Gecarcoidea lalandii* is only occasionally collected for food, much the same as *Cardisoma carnifex*. Caught by hand or traps throughout their range, and sold live. Its market value, however, is comparatively low.

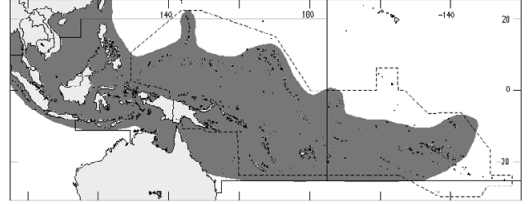
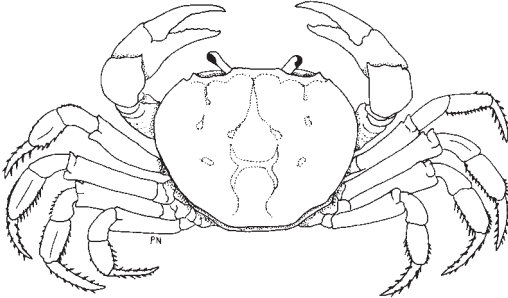
Distribution: Throughout Indo-West Pacific.

Remarks: Another species of the genus occurs in the area, *G. natalis* (Pocock, 1898), known only from Christmas and Cocos-Keeling islands. The 2 species are easily distinguished by their coloration: *G. lalandii* is purple whereas *G. natalis* is bright red.

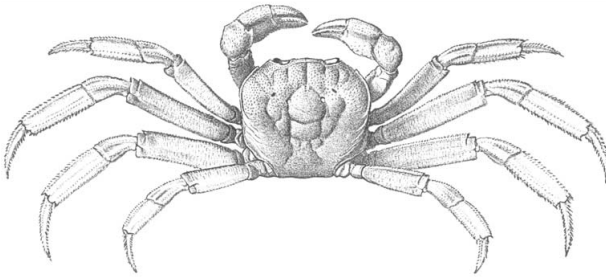


Cardisoma hirtipes* Dana, 1852*En** - Blue land crab.

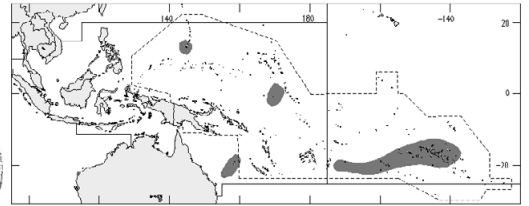
Maximum carapace width 12 cm. On more sandy areas behind beaches, usually near the sea. Occasionally collected for food by hand or traps, when common. Widely distributed in the Indo-West Pacific.

***Cardisoma longipes* (A. Milne Edwards, 1873)****En** - Longlegged land crab.

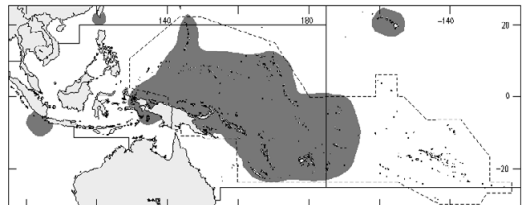
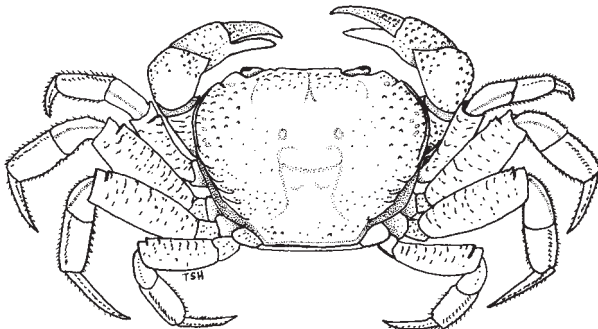
Maximum carapace width 6 cm. On small isolated islands, in caves or holes. Rarely collected for food, due to its small size and general scarcity. Guam, New Caledonia, Niue, Cook Islands, Tuamotu, Ocean Island, and Kandavu.



(from A. Milne Edwards, 1873)

***Cardisoma rotundum* (Quoy and Gaimard, 1824)****En** - Rugose land crab.

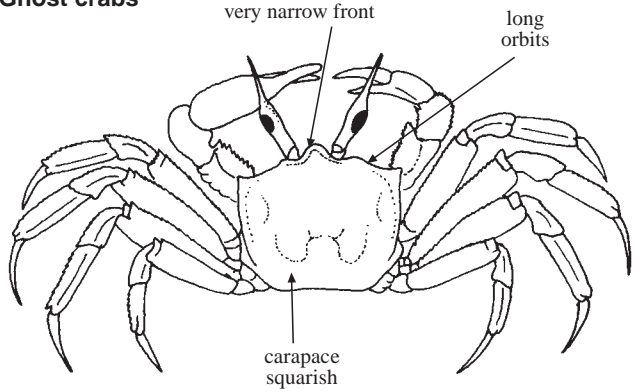
Maximum carapace width 7.5 cm. On more sandy areas adjacent to reefs. A relatively small, not common species, rarely collected for food. Occurs mainly in islands of the South Seas, reaching to southern Taiwan Province of China and southern Japan, and the eastern Indian Ocean.



OCYPODIDAE

Ghost crabs

Diagnostic characters: Carapace squarish, transversely rectangular, trapezoidal or transversely ovate; dorsal surface gently convex, usually smooth or with grooves; frontal margin entire, relatively narrow; orbits broad, occupying almost entire anterior border (excluding the front), antero- and posterolateral margins of carapace usually not clearly demarcated, lateral margins appearing almost straight or gently convex, lateral margins unarmed. **Eyestalks long, longer than width of orbit.** No rhomboidal gap between third maxillipeds. Dactylus of legs with numerous stiff setae. **Ventral surface of abdomen or base of legs may have tufts of fine setae.** All male abdominal segments distinct, movable.

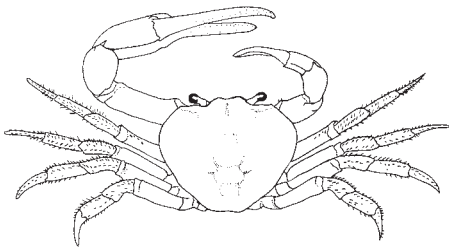


Habitat, biology, and fisheries: Terrestrial crabs. Most species are very small and are generally of minor importance to fisheries. Two larger species of *Ocypode* are occasionally caught for food, with *O. ceratophthalma* being most often collected.

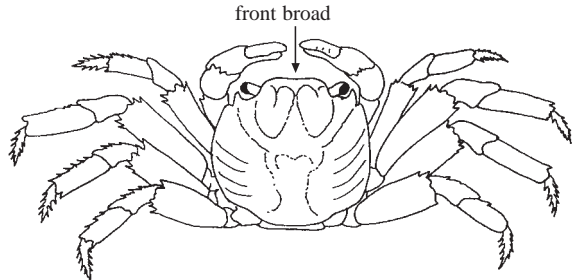
Similar families occurring in the area

Gecarcinidae: a rhomboidal gap present between third maxillipeds (no rhomboidal gap in ocypodids).

Grapsidae: a rhomboidal gap usually present between the third maxillipeds; frontal margin of carapace less narrow as in ocypodids; crabs walk on the sides of the dactyli of legs, not on the tips of the dactyli (as seen in ocypodids).



Gecarcinidae



Grapsidae

Key to species of interest to fisheries occurring in the area

- 1a. Inner surface of palm without stridulating (sound-producing) ridge (Fig. 1a); eyes rounded *Ocypode cordimanus*
- 1b. Inner surface of palm with stridulating ridge (Fig. 1b); eye with long process above tip *Ocypode ceratophthalma*

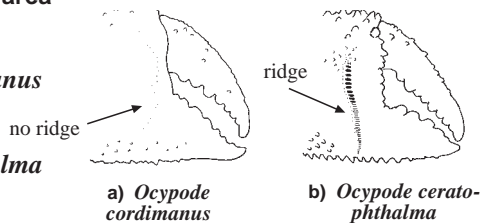



Fig. 1 distal end of cheliped (inner surface)

List of species of interest to fisheries occurring in the area

The symbol  is given when species accounts are included.

 *Ocypode ceratophthalma* (Pallas, 1872)

 *Ocypode cordimanus* Desmarest, 1825

References

Alcock, A. 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catometopa or Grapsoidea. *J. Asiat. Soc. Bengal*, 69, pt. 2 (3):270-486.

Crosnier, A. 1965. Crustacés Décapodes. Grapsidae et Ocypodidae. *Faune de Madagascar*, 18:1-143.

***Ocypode ceratophthalma* (Pallas, 1872)**

Frequent synonyms / misidentifications: None / None.

FAO name: En - Horned ghost crab.

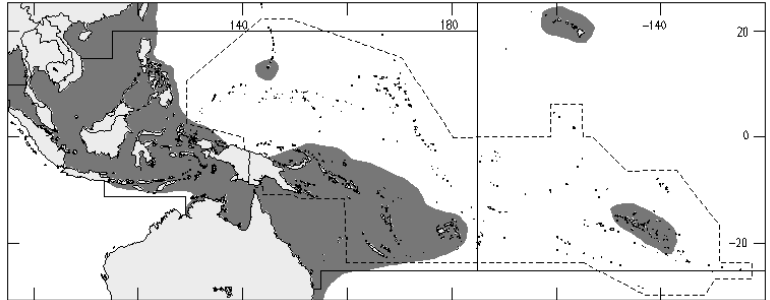
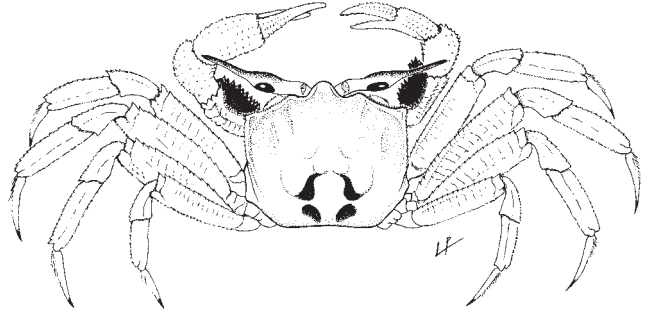
Diagnostic characters: Carapace squarish; anterolateral margins unarmed; eyes in adults with long projection above cornea; inner surface of palm with transverse stridulatory ridge. **Colour:** carapace bluish grey, with median parts brown; chelipeds and distal half of legs white.

Size: Maximum carapace width 5 cm.

Habitat, biology, and fisheries: A terrestrial species that lives in the lower part of the supralittoral zone, on sandy beaches. Excavates deep burrows. Caught mainly by hand, often at night when the crabs are more active. It is sometimes dug up. Only of local economic importance, rarely sold in markets. Usually fried for human consumption.

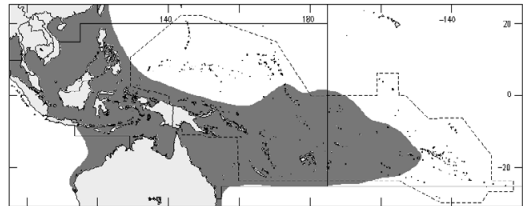
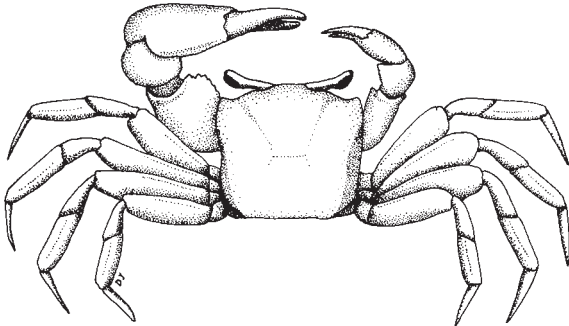
Distribution: Indo-West Pacific.

Remarks: The only other species in the area of similar size is *Ocypode cordimanus* Desmarest, 1825 (see below), readily distinguishable from *O. ceratophthalma* by lacking the "horned" eyes, lacking the stridulatory ridge on the palm, and the generally paler coloration.

***Ocypode cordimanus* Desmarest, 1825**

En - Common ghost crab.

Maximum carapace width 4.5 cm. Inhabits higher supralittoral habitats not exposed to the sea, where it digs deep burrows. Collected by hand for human consumption in some places, but rarely seen in markets. Indo-West Pacific, from South Africa to French Polynesia.

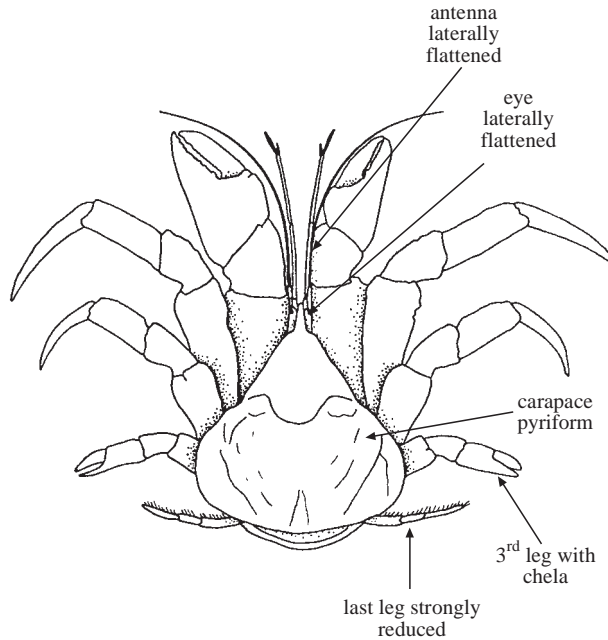


Infraorder ANOMURA

COENOBITIDAE

Land hermit crabs and coconut crabs

D diagnostic characters: Carapace relatively well calcified; eyestalk laterally flattened; eyes usually held subparallel to each other. Antennae laterally flattened. Coxae of third maxillipeds close to each other, without distinct gap between them. Chelipeds short, stocky, equal or unequal; when unequal, left chela larger. First 2 pairs walking legs, last 2 pairs reduced, chelate. Abdomen bilaterally asymmetrical, not clearly divided into segments. Either hermit crabs or distinctly crab-like animals with abdomen tucked under carapace; uropods modified into a “rasp” used for clinging interior of gastropod shells (except in adult *Birgus latro*).



Habitat, biology, and fisheries: All members of the Coenobitidae are fully terrestrial, but they must return to the sea to release their larvae. Most species live in gastropod shells. None of the species, other than the “coconut crab” *Birgus latro*, have any fishery value, although many species of land hermit crabs (genus *Coenobita*) are regularly collected for the pet trade.

Similar families occurring in the area

Only the hermit crabs of the families Diogenidae and Paguridae may be confused with coenobitids, but their habitats are exclusively aquatic, not terrestrial. In addition, the laterally flattened antennae are highly diagnostic for the Coenobitidae.

References

Brown, I. W. and D. R. Fielder (eds). 1991. *The coconut crab: aspects of Birgus latro biology and ecology in Vanuatu*. Canberra, Australian Centre for International Agricultural Research (ACIAR), Monograph Number 8:i-x, 128 p.

Miyake, S. 1965. *The Crustacea Anomura of Sagami Bay*. Tokyo, Biological Laboratory of the Imperial Household, 161 p.

A single species of interest to fisheries occurring in the area.

***Birgus latro* (Linnaeus, 1767)**

Frequent synonyms / misidentifications: None / None.

FAO name: En - Coconut crab.

Diagnostic characters: Surface of carapace with numerous scale-like ridges. Antennae laterally flattened. Eyes laterally flattened. Abdomen large, tucked underneath carapace. First 2 pairs legs; third pair of legs short, chelate; last pair of legs very small, chelate, tucked underneath the swollen abdomen; surfaces of chelipeds and legs with numerous distinct transverse ridges. **Colour:** carapace bluish grey to purplish brown.

Size: Maximum carapace length 15 cm (or 35 cm, if the outstretched chelipeds are included in the measurement); weight up to 2.5 kg.

Habitat, biology, and fisheries: *Birgus latro* is actually a highly modified, fully terrestrial hermit crab, and young crabs do in fact inhabit gastropod shells, as seen in other members of the family Coenobitidae. As they grow, they discard the shell and tuck their hardened abdomen (normally soft in hermit crabs) under their carapace. Adults are fully terrestrial and breathe by means of a special "pseudo-lung". They must, however, return to the sea to release their planktonic zoeae. The coconut crab tends to occur on small isolated islands, in areas washed by oceanic waters. It is generally a scavenger, but also has a preference for coconuts and fruits. One of its common names ("palm thief") is derived from its habit of stealing shiny objects from human habitations. *Birgus latro* is the largest known land arthropod.

The coconut crab is a very valuable species and is sold live in markets, where large specimens may command prices of up to US\$100. It has always been eaten throughout its wide Indo-West Pacific range, but its population has nowadays seen a very sharp decline where demand for the species skyrocketed in countries like Taiwan and Hong Kong. The very high price it commands in these markets has contributed to the serious decline of the species, which has been exterminated from many islands. It is now gradually becoming protected throughout much of its range. The species is collected by hand or with baited traps.

Distribution: Indo-West Pacific, reaching eastwards to French Polynesia. The only widely distributed species in the genus.

