



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



Volume 2. Cephalopods, crustaceans, holothurians and sharks



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FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES

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

VOLUME 2

**Cephalopods, crustaceans, holothurians and sharks**

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with the support of the

South Pacific Forum Fisheries Agency (FFA)

and the

Norwegian Agency for International Development (NORAD)

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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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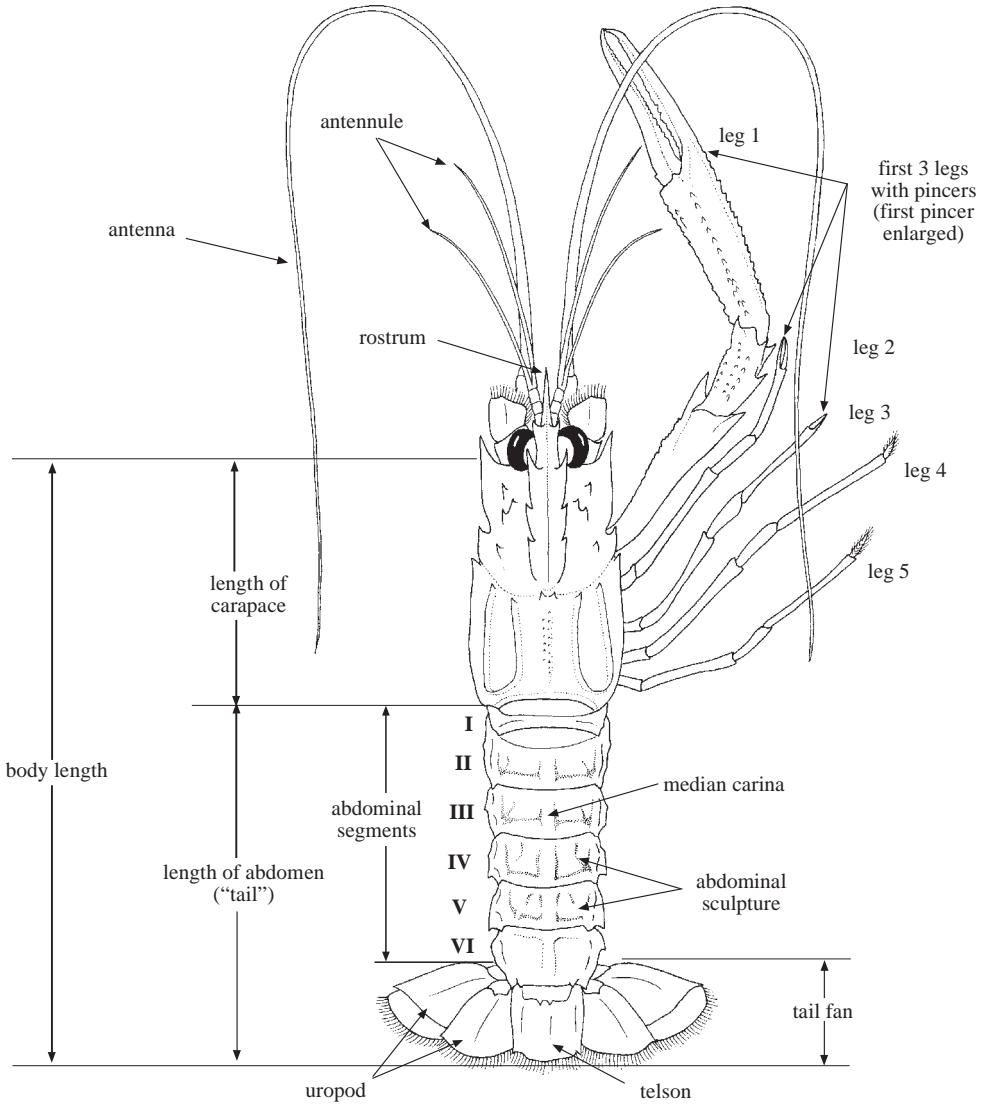
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# LOBSTERS

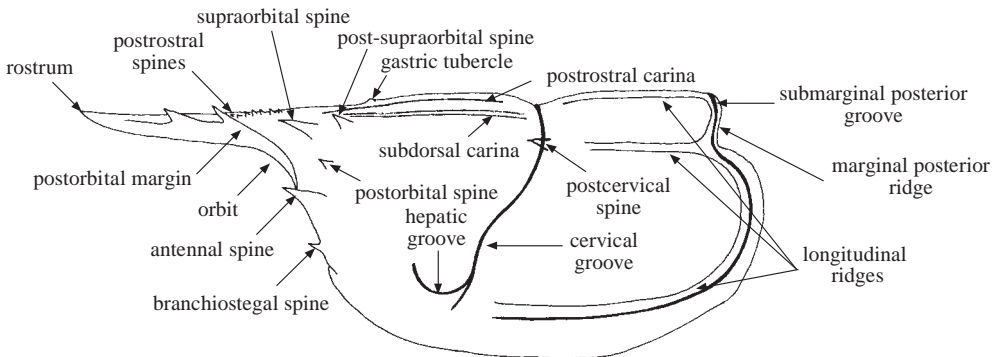
by T.Y. Chan



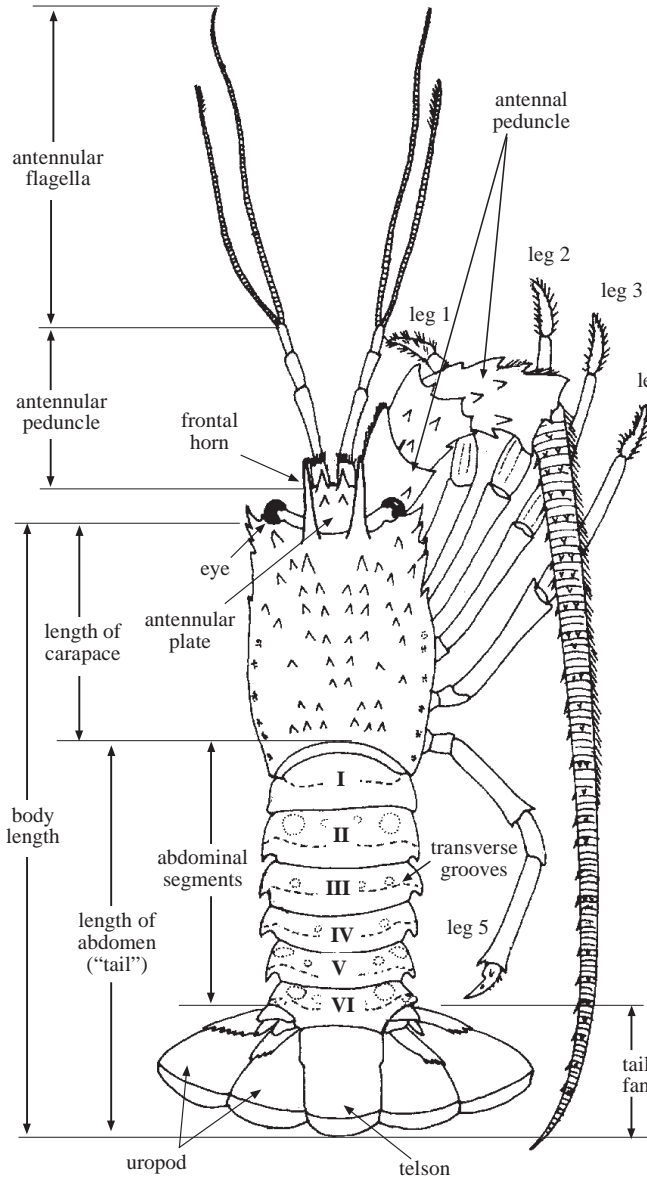
### TECHNICAL TERMS AND MEASUREMENTS



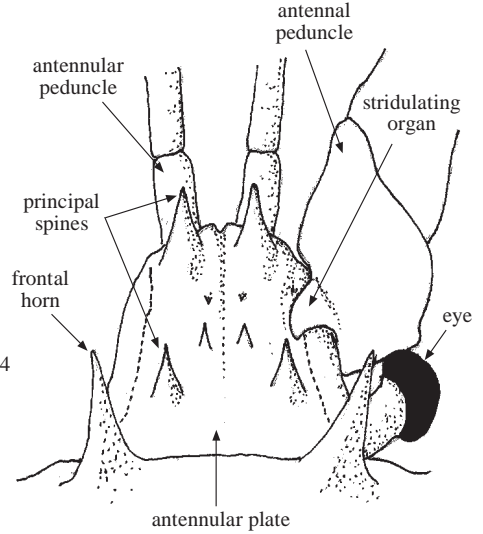
general shape (dorsal view) of a true lobster (*Metanephros* spp.)



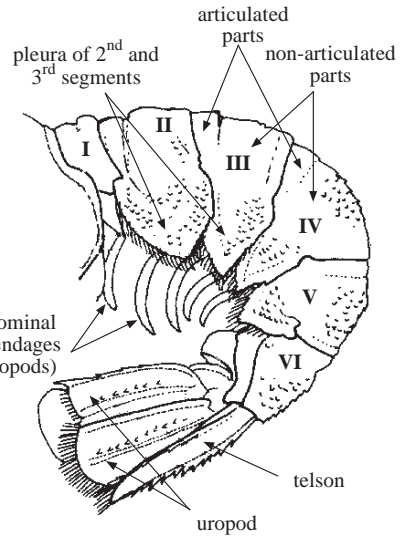
carapace of a true lobster (lateral view)



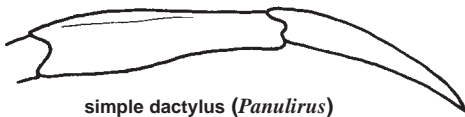
**general shape (dorsal view) of a spiny lobster**  
(*Panulirus* spp.: no rostrum, no pincers)



**antennular somite of a spiny lobster**  
(left antenna and eye omitted)



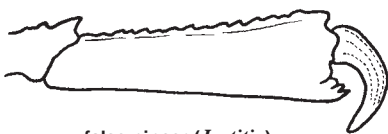
**tail (abdomen) in lateral view**



**simple dactylus (*Panulirus*)**



**true pincer (*Metanephrops*)**



**false pincer (*Justitia*)**

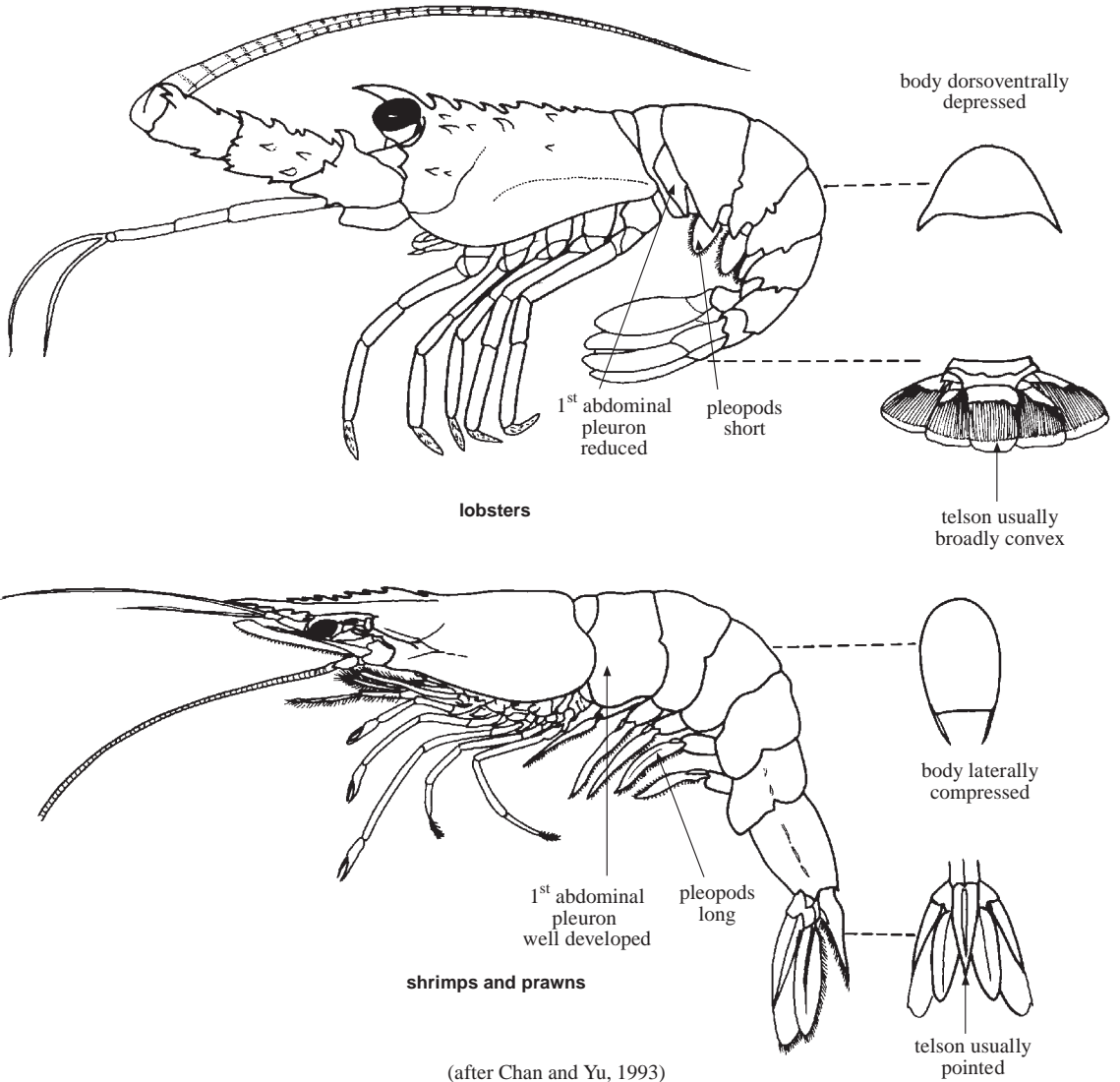


**false pincer (*Enoplometopus*)**

**types of terminal segments of legs**

### GENERAL REMARKS

Lobsters are generally large-sized crustaceans with a body length (measured dorsally from the orbital margin to the end of the tail, excluding the rostrum and any of the appendages) from a few to more than 60 cm. Like shrimps and prawns, lobsters have a well-developed and extended abdomen or "tail". In addition to their usually thicker shell, lobsters generally differ from shrimps and prawns by having the body more dorsoventrally depressed (particularly at posterior abdominal segments), the pleopods (i.e. legs of the abdomen) less developed, the thoracic sternum wide and distinct, the first abdominal pleuron considerably more reduced than the posterior pleura, and the posterior margin of the telson usually broadly convex or truncate. Certain other lobster-like crustaceans, such as the "squat lobsters" (Galatheoidea), "mud lobsters" (Thalassinidea: Thalassinidae), "mud shrimps" (Thalassinidea: Upogebiidae), and "ghost shrimps" (Thalassinidea: Callinassidae) are taxonomically not "true" lobsters. These groups are of no or only very minor importance to fisheries in the Western Central Pacific and therefore not included in this field guide.



conspicuous morphological differences between lobsters and shrimps

In the Western Central Pacific, the lobsters are represented by 8 families, 22 genera and about 89 species. Although the production of most of the species is not very large, many of them are of moderate importance to fisheries because of their large size and high market value.

Most spiny and slipper lobsters (Palinuridae and Scyllaridae, respectively), and the families Synaxidae and Enoplometopidae, inhabit shallow waters of rocky and reef bottoms or bottoms with coarse sediments. Among these, the genera *Panulirus*, *Scyllarides* and *Parribacus* are actively fished throughout the area because of their large size. On the other hand, juveniles of *Panulirus* species and the rare Enoplometopidae and Synaxidae are often highly valued in the aquarium trade. These shallow-water lobsters are mainly taken by hand while diving or by spears during night fishing, but sometimes also taken by tangle nets, lobster pots, or traps.

Most Nephropidae, Thaumastochelidae, Glypheidae, Polychelidae, a few Palinuridae, and Scyllaridae are found in deeper waters on soft bottoms with sand and/or mud. They are usually caught by trawlers. At present, only the two shallow-water genera *Ibacus* and *Thenus* (both belonging to the family Scyllaridae) are landed in larger amounts and are of moderate commercial importance. However, exploratory fishing indicates that several deep-water species of the genera *Metanephrops*, *Nephropsis*, *Acanthacaris*, *Linuparus* and *Puerulus* (the first 3 genera belonging to the family Nephropidae, while the latter 2 belong to the family Palinuridae) are large and occasionally abundant and may eventually be of commercial interest. Species of the other 3 families (Thaumastochelidae, Glypheidae, and Polychelidae) are generally rare and of no interest to fisheries in the area, and are not treated here in separate family or species accounts.

Lobsters in the Western Central Pacific are generally locally consumed and marketed fresh or live. In certain countries, such as the Philippines and Indonesia, a fair amount of lobsters are exported (live, fresh, cooked whole, or tailed).

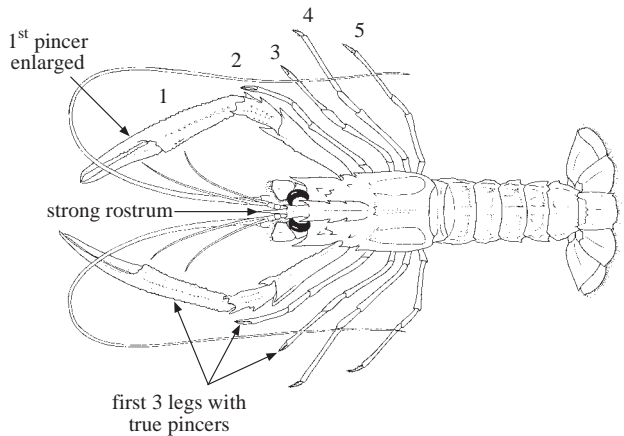
## GUIDE TO FAMILIES OCCURRING IN THE AREA

### NEPHROPIDAE

Page 982

#### True lobsters and lobsterettes

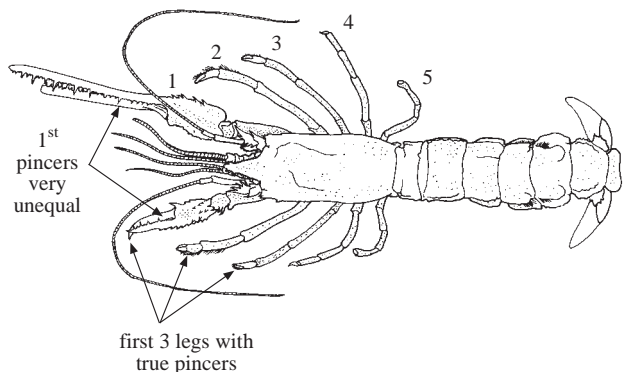
Body tubular, surfaces almost naked or covered with thick fur; rostrum well developed; antennae long and thread-like; antennal scale, if present, with inner margin unarmed and curved; first 3 pairs of legs with true pincers, first pair much larger than others; abdominal pleura ending in acute ventral tooth; tail fan entirely hardened, telson armed with fixed spines and with posterior margin broadly convex.



### THAUMASTOCHELIDAE

#### Pincer lobsters

Body slightly depressed dorsoventrally; eyes strongly reduced, cornea lacking pigmentation; rostrum well developed; antennae long and thread-like, antennal scale bearing several large teeth along inner margin; first 3 pairs of legs (occasionally also fifth legs) with true pincers, first pair large but very unequal; abdominal pleura short, quadrangular and without large ventral tooth; tail fan entirely hardened, telson quadrangular and unarmed. Only 2 deep-water species known from the area, very rare and of no interest to fisheries.

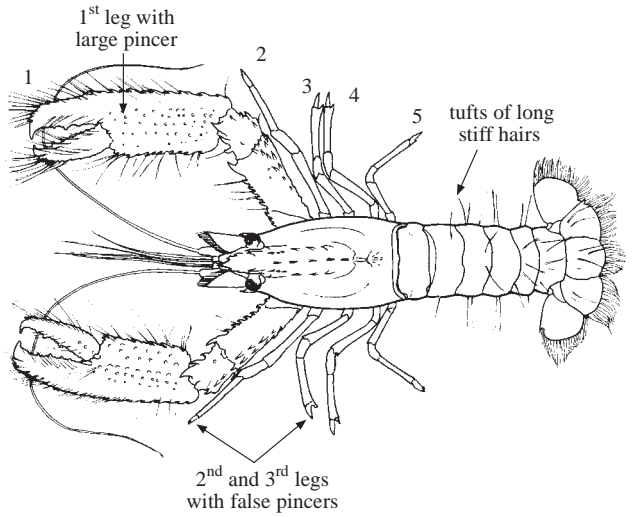


**ENOPLOMETOPIDAE**

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**Reef lobsters**

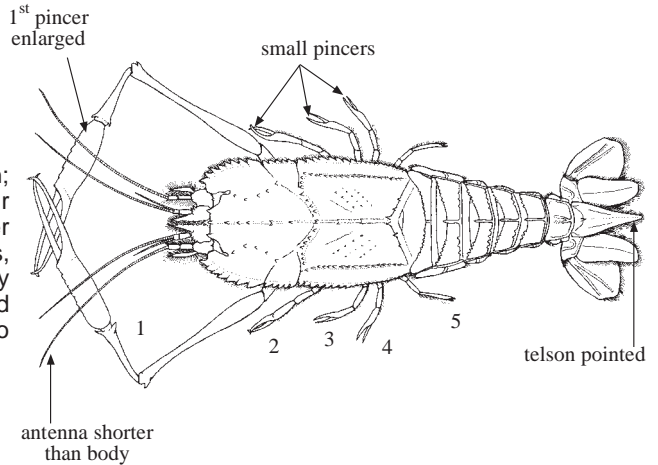
Body tubular and distributed with tufts of long stiff hairs; carapace with a well-developed rostrum; antennae long and thread-like, antennal scale with inner margin unarmed and curved; first pair of legs as large pincer, second and third legs slender and forming false pincers; abdominal pleura more or less rounded and sometimes ending in a strong ventral tooth; tail fan entirely hardened, telson bearing movable spines and with posterior margin broadly convex.



**POLYCHELIDAE**

**Blind lobsters**

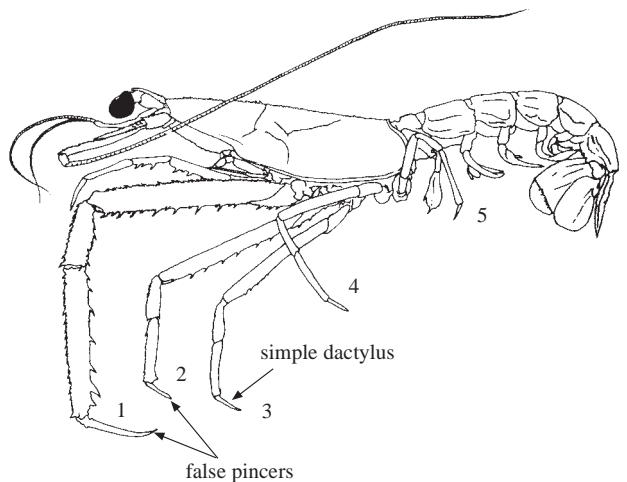
Eyes small, cornea lacking pigmentation; carapace box-like, rostrum absent or rudimentary; antennae thread-like, shorter than body; first 4 or all legs with true pincers, first pair long and slender; tail fan entirely hardened, telson pointed. All species found in very deep waters and of no interest to fisheries in the area.



**GLYPHEIDAE**

**Fenix lobsters**

Body somewhat flattened dorsoventrally; eyes large and black, inserted on a median elevation of cephalon; carapace with a well-developed rostrum; antennae long and thread-like; first 2 legs forming false pincers, first 2 legs very strong; uropods of tail fan entirely hardened. A single deep-water species, rare and of no commercial importance.

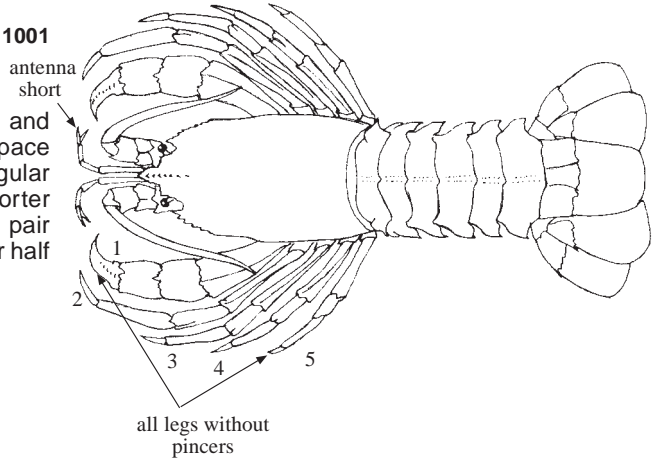


**SYNAXIDAE**

Page 1001

**Furry lobsters**

Body somewhat flattened dorsoventrally and very hairy, without enlarged spines; carapace laterally angular, with a broad and flat triangular or rounded rostrum; antennae whip-like, shorter than carapace; legs without pincers, first pair much more robust than the others; posterior half of tail fan soft and flexible.

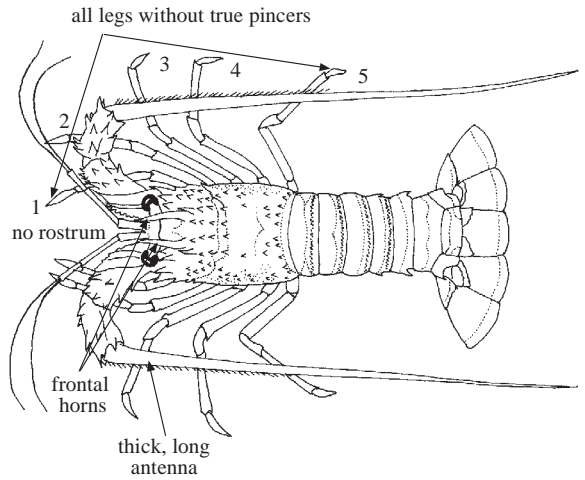


**PALINURIDAE**

Page 1005

**Spiny lobsters, langoustes**

Body tubular or slightly flattened dorsoventrally; hairs, if present, few and scattered; rostrum absent or reduced to a small spine; carapace subcylindrical or prismatic, laterally rounded or straight, surface spiny and with a pair of large frontal horns above eyes; antennae very long and rather thick, whip-like or spear-like; legs without true pincers and first pair (except in *Justitia*) not or only slightly longer than the following legs, but often somewhat more robust; posterior half of tail fan soft and flexible.

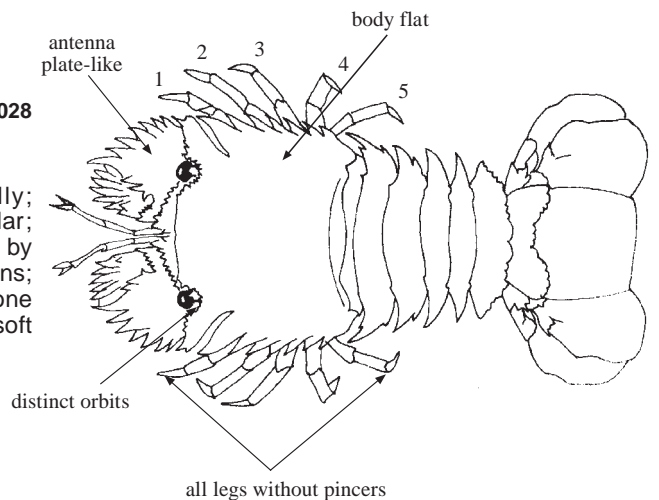


**SCYLLARIDAE**

Page 1028

**Slipper lobsters**

Body strongly flattened dorsoventrally; carapace depressed and laterally angular; rostrum absent or minute; eyes enclosed by distinct orbits and without large frontal horns; antennae plate-like; legs without pincers, none of them enlarged; posterior half of tail fan soft and flexible.



## LIST OF FAMILIES AND SPECIES OCCURRING IN THE AREA

The symbol 🦞 is given when species accounts are included.

### NEPHROPIDAE

- 🦞 *Acanthacaris tenuimana* Bate, 1888
- 🦞 *Metanephrops andamanicus* (Wood-Mason, 1891)
- 🦞 *Metanephrops arafurensis* ((De Man, 1905)
- 🦞 *Metanephrops australiensis* (Bruce, 1966)
- 🦞 *Metanephrops neptunus* (Bruce, 1965)
- 🦞 *Metanephrops sibogae* (De Man, 1916)
- 🦞 *Metanephrops sinensis* (Bruce, 1966)
- 🦞 *Metanephrops thomsoni* (Bate, 1888)
- 🦞 *Metanephrops velutinus* Chan and Yu, 1991
- Nephropsis acanthura* Macpherson, 1990
- Nephropsis ensirostris* Alcock, 1901
- Nephropsis holthuisi* Macpherson, 1993
- Nephropsis serrata* Macpherson, 1993
- 🦞 *Nephropsis stewarti* Wood-Mason, 1873
- Nephropsis suhmi* Bate, 1888
- Nephropsis sulcata* Macpherson, 1990

### THAUMASTOCHELIDAE

- Thaumastocheles japonicus* Calman, 1913
- Thaumastochelopsis wardi* Bruce, 1988

### ENOPLOMETOPIDAE

- Enoplometopus chacei* Kensley and Child, 1986
- 🦞 *Enoplometopus daumi* Holthuis, 1983
- 🦞 *Enoplometopus debelius* Holthuis, 1983
- Enoplometopus gracilipes* (De Saint Laurent, 1988)
- 🦞 *Enoplometopus holthuisi* Gordon, 1968
- 🦞 *Enoplometopus occidentalis* (Randall, 1840)

### POLYCHELIDAE

- Polycheles baccatus* Bate, 1878
- Polycheles carpenteri* (Alcock, 1894)
- Polycheles enthrix* (Bate, 1878)
- Polycheles gracilis* (Bate, 1888)
- Polycheles laevis* (Bate, 1878)
- Polycheles obscurus* (Bate, 1878)
- Polycheles typhlops* Heller, 1862
- Stereomastis andamanensis* (Alcock, 1894)
- Stereomastis auriculata* (Bate, 1878)
- Stereomastis helleri* (Bate, 1878)
- Stereomastis phosphoreus* (Alcock, 1894)
- Stereomastis sculpta* (S.I. Smith, 1880)
- Stereomastis trispinosa* (De Man, 1905)

### GLYPHEIDAE

- Neoglyphea inopinata* Forest and De Saint Laurent, 1975

### SYNTAXIDAE

- 🦞 *Palibythus magnificus* Davie, 1990
- 🦞 *Palinurellus wieneckii* (De Man, 1881)



## PALINURIDAE

- ✚ *Justitia chani* Poupin, 1994
- ✚ *Justitia japonica* (Kubo, 1955)
- ✚ *Justitia longimanus* (H. Milne Edwards, 1837)
- ✚ *Justitia vericeli* Poupin, 1994
- ✚ *Linuparus sordidus* Bruce, 1965
- ✚ *Linuparus trigonus* (Von Siebold, 1824)
- ✚ *Palinustus unicornutus* Berry, 1963
- ✚ *Palinustus waguensis* Kubo, 1963
- ✚ *Panulirus albiflagellum* Chan and Chu, 1996
- ✚ *Panulirus homarus* (Linnaeus, 1758)
- ✚ *Panulirus longipes* (A. Milne Edwards, 1868)
- ✚ *Panulirus ornatus* (Fabricius, 1798)
- ✚ *Panulirus pascuensis* Reed, 1954
- ✚ *Panulirus penicillatus* (Olivier, 1791)
- ✚ *Panulirus polyphagus* ((Herbst, 1793)
- ✚ *Panulirus stimpsoni* Holthuis, 1963
- ✚ *Panulirus versicolor* (Latreille, 1804)
- ✚ *Puerulus angulatus* (Bate, 1888)
- ✚ *Puerulus velutinus* Holthuis, 1963

## SCYLLARIDAE

- ✚ *Arctides regalis* Holthuis, 1963
  - Ibacus brevipes* Bate, 1888
  - Ibacus brucei* Holthuis, 1977
- ✚ *Ibacus ciliatus* (Von Siebold, 1824)
- ✚ *Ibacus novemdentatus* Gibbes, 1850
  - Ibacus peronii* Leach, 1815
- ✚ *Ibacus pubescens* Holthuis, 1960
- ✚ *Parribacus antarcticus* (Lund, 1793)
- ✚ *Parribacus caledonicus* Holthuis, 1960
- ✚ *Parribacus holthuisi* Forest, 1954
- ✚ *Parribacus scarlatinus* Holthuis, 1960
- ✚ *Scyllarides haanii* (De Haan, 1841)
- ✚ *Scyllarides squammosus* (H. Milne Edwards, 1837)
  - Scyllarus aesopius* Holthuis, 1960
  - Scyllarus aureus* Holthuis, 1963
  - Scyllarus aurora* Holthuis, 1982
  - Scyllarus batei* Holthuis, 1946
- ✚ *Scyllarus bertholdii* Paulson, 1875
  - Scyllarus bicuspidatus* (De Man, 1905)
  - Scyllarus cultrifer* (Ortmann, 1897)
  - Scyllarus demani* Holthuis, 1946
  - Scyllarus gibberosus* (De Man, 1905)
  - Scyllarus martensii* Pfeffer, 1881
  - Scyllarus rapanus* Holthuis, 1993
- ✚ *Scyllarus rugosus* H. Milne Edwards, 1837
  - Scyllarus sordidus* (Stimpson, 1860)
  - Scyllarus timidus* Holthuis, 1960
  - Scyllarus umbilicatus* Holthuis, 1963
  - Scyllarus vitiensis* (Dana, 1852)
- ✚ *Thenus orientalis* (Lund, 1793)

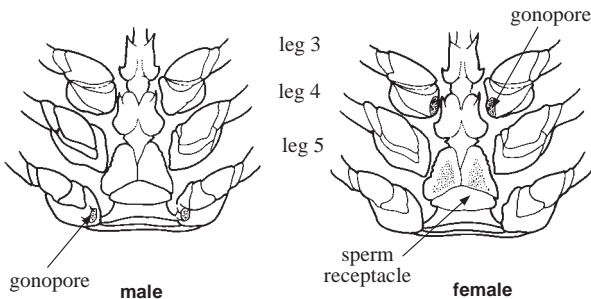
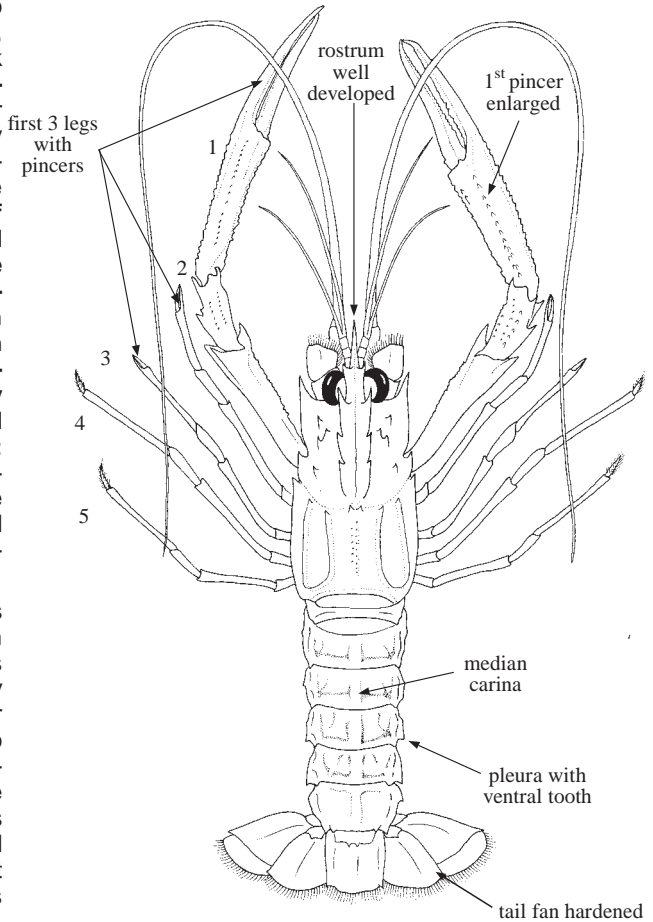


**NEPHROPIDAE**

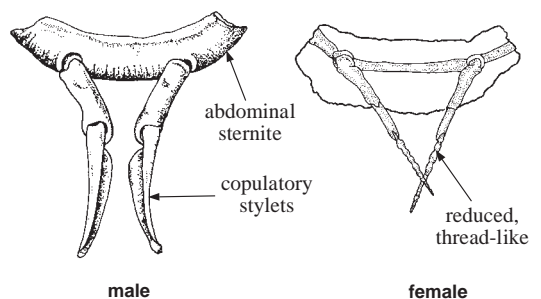
**True lobsters and lobsterettes**

**Diagnostic characters:** Moderate to large-sized crustaceans. Body tubular, surface almost naked or covered with thick fur. Carapace (or "head") with a well-developed rostrum, ornamented with spines or nodules, occasionally smooth. Eyes usually well developed and black, or small and lacking pigmentation, or even absent. Antennae very long and thread-like; **antennal scale, if present, with inner margin unarmed and curved.** First 3 pairs of legs forming true pincers, with the first pair greatly enlarged and long. Both abdomen and tail fan well developed and powerful. Abdomen smooth or variously sculptured, **pleura ending in acute ventral tooth.** Tail fan entirely hardened, telson with fixed spines and posterior margin broadly convex. **Colour:** with the typical coloration of deep-sea crustaceans - from white to pink or red, some species with special markings (usually red and/or white) on body; setae or hairs, if present, are light brown.

**Habitat, biology, and fisheries:** All species are deep-sea forms and found at depths from 150 to more than 1 893 m. Their adult sizes are ranging from 5 cm to over 40 cm. They are bottom-dwellers with a preference for soft substrate. Some species are known to live in self-made burrows. The sexes are easily distinguished by the position of the gonopores, which are situated at the bases of the third and fifth legs in the females and males, respectively. In addition, the first pleopods ("legs" of the abdomen) of males are transformed into a strong and rigid pen-like copulatory organ while they are reduced and thread-like in females. The females bear large and colourful eggs (white, blue or red, and other colours) on the ventral side of the abdomen. They seem to have a long incubation period, but a short larval development. At present, none of the species of this family is of significant commercial importance in the Western Central Pacific. However, the large size of several species and the fact that some of them are commonly caught on the basis of exploratory trawling suggest that they may have some commercial potential with the development of deep-sea fisheries. This is especially the case with members of the genus *Metanephrops*, which are treated here in separate species accounts.



bases of last 3 legs in nephropids



first pleopods of nephropids

**Similar families occurring in the area**

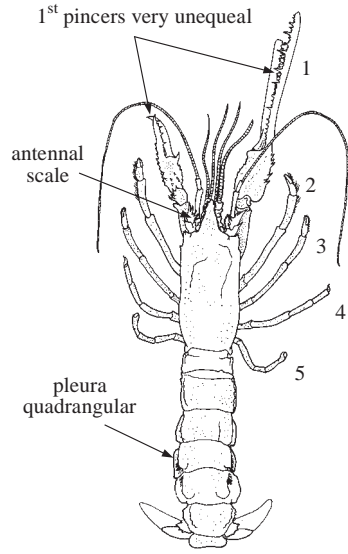
**Thaumastochelidae:** body somewhat flattened dorsoventrally; antennal scale with several large teeth along inner margin; first pair of pincers very unequal; abdominal pleura short, quadrangular and not ending in a point; telson unarmed.

**Enoplometopidae:** body distributed with tufts of long stiff hairs; second and third legs forming false pincers; telson bearing movable spines.

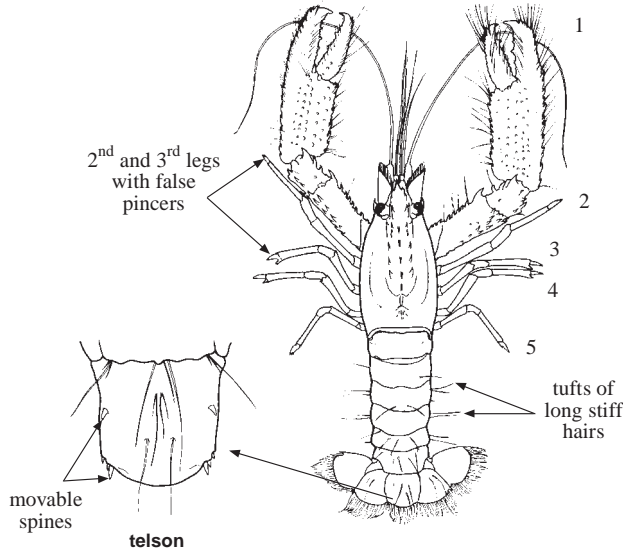
**Polychelidae:** carapace box-like, rostrum absent or rudimentary; first 4 or all legs with pincers, first pair long but slender; telson pointed.

**Glypheidae:** body somewhat flattened dorsoventrally; eyes inserted on a median elevation of cephalon; first 2 legs forming false pincers.

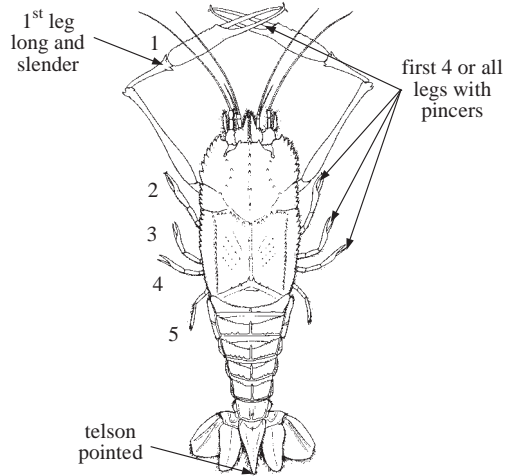
**Synaxidae:** body somewhat flattened dorsoventrally and hairy; all legs simple and without pincers, the first pair heavier than the others; antennae whip-like and shorter than carapace; posterior half of tail fan soft and flexible.



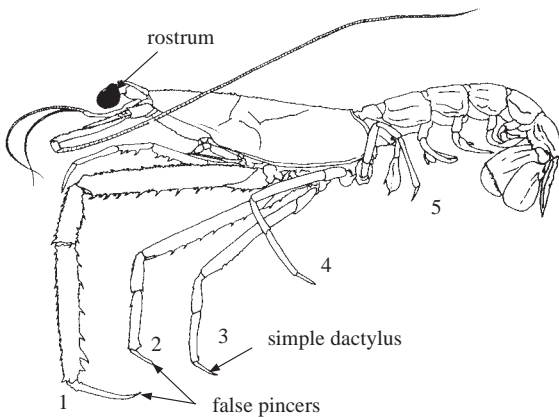
**Thaumastochelidae**



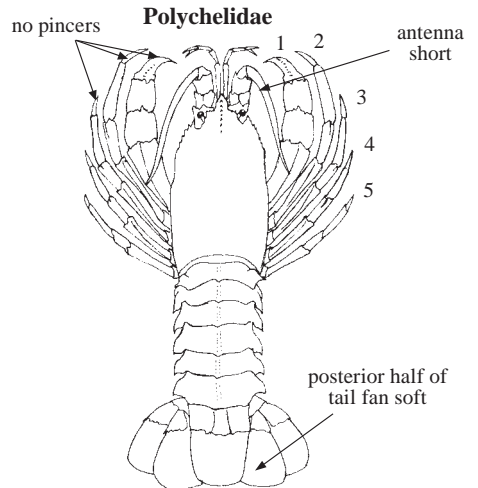
**Enoplometopidae**



**Polychelidae**



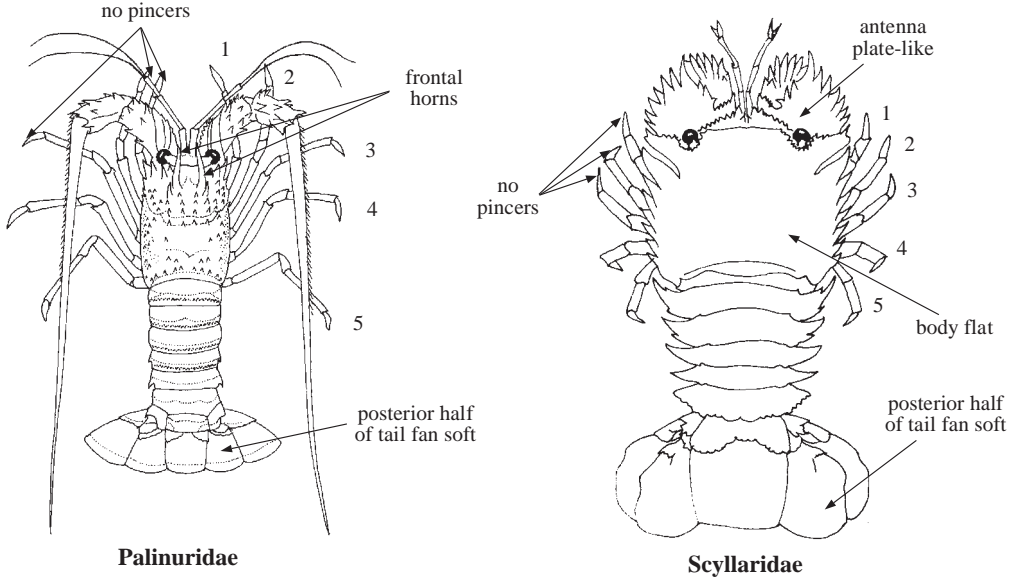
**Glypheidae**



**Synaxidae**

Palinuridae: carapace without rostrum or with rostrum reduced to a small spine, but with a pair of large frontal horns over the eyes; antennae very long and thick, whip-like or spear-like; legs without true pincers and first pair generally not enlarged (except in *Justitia*); posterior half of tail fan soft and flexible.

Scyllaridae: body strongly flattened dorsoventrally; rostrum absent or rudimentary; eyes enclosed by distinct orbits; antennae plate-like; legs without true pincers and none of them enlarged; posterior half of tail fan soft and flexible.



**Key to the genera of Nephropidae occurring in the area**

- 1a. Eyes large and black; antennal scale present; body provided with some spines but never uniformly spinulose (Fig. 1) . . . . . *Metanephrops*
- 1b. Eyes minute, cornea lacking pigmentation . . . . . → 2
- 2a. Antennal scale present; body more or less uniformly spinulose and not covered with soft pubescence (Fig. 2) . . . . . *Acanthacaris*  
(a single species, *A. tenuimana*, in the area)
- 2b. Antennal scale absent; body not uniformly spinulose but covered with thick pubescence (Fig. 3) . . . . . *Nephropsis*

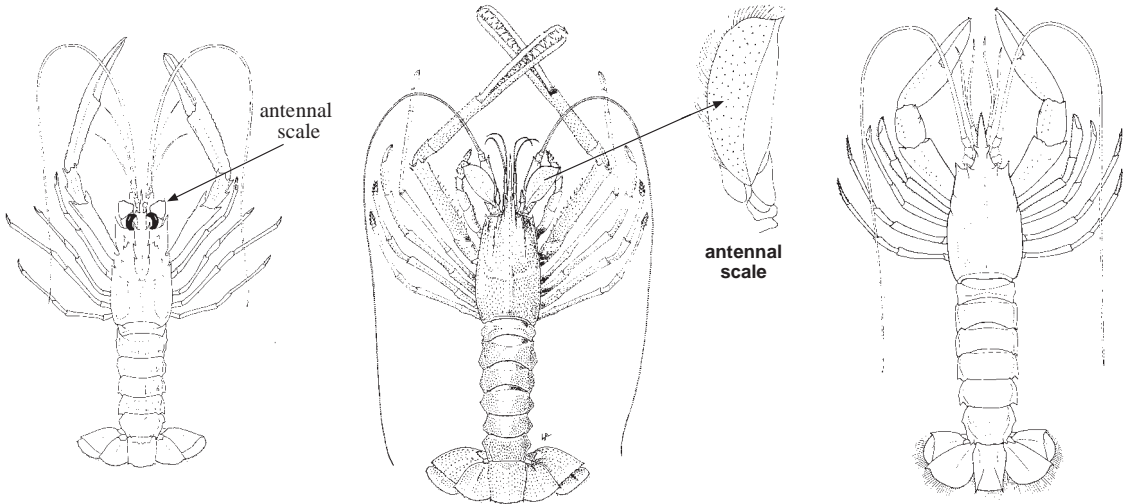


Fig. 1 *Metanephrops*

Fig. 2 *Acanthacaris*

Fig. 3 *Nephropsis*

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

**1a.** Carapace rather uniformly spinulose (Fig. 4a); dorsal surface of uropods covered with spinules . . . . . → 2

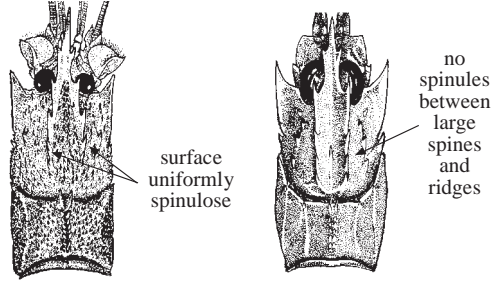
**1b.** Carapace smooth between the ridges and large spines (Fig. 4b); uropods unarmed dorsally . . . . . → 4

**2a.** Abdominal segments each with 2 transverse grooves (Fig. 5a); large pincer with finger distinctly longer than palm (Fig. 6a) . . . . . *Metanephrops neptunus*

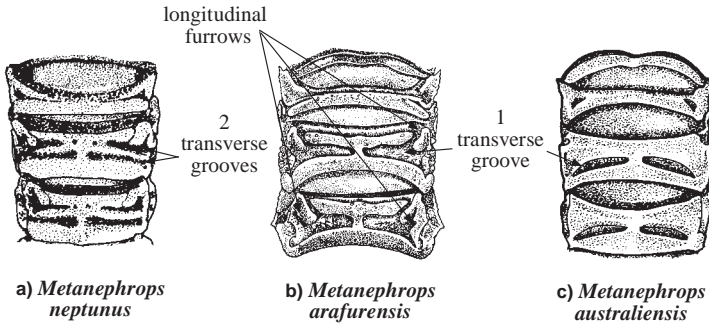
**2b.** Abdominal segments each with 1 transverse groove only (Fig. 5b, c); large pincer with finger shorter than palm (Fig. 6b) . . . . . → 3

**3a.** Abdomen with deep longitudinal furrows (Fig. 5b); large pincer covered with sharp tubercles . . . . . *Metanephrops arafurensis*

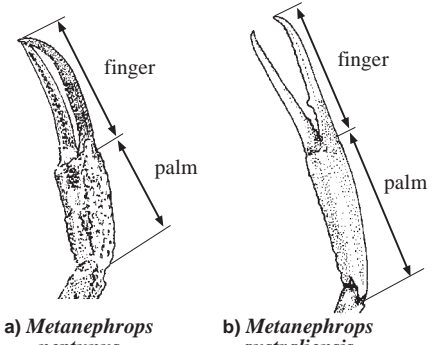
**3b.** Abdomen without distinct longitudinal furrows (Fig. 5c); large pincer finely granular to nearly smooth . . . . . *Metanephrops australiensis*



a) *Metanephrops neptunus*      b) *Metanephrops sibogae*  
**Fig. 4 carapace (dorsal view)**



a) *Metanephrops neptunus*      b) *Metanephrops arafurensis*      c) *Metanephrops australiensis*  
**Fig. 5 first 3 abdominal segments (dorsal view)**



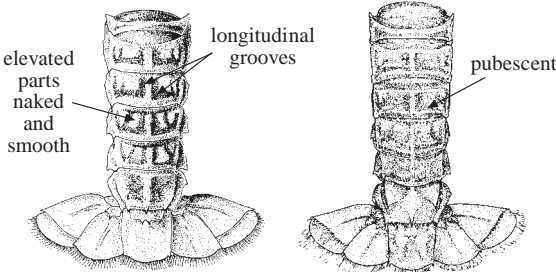
a) *Metanephrops neptunus*      b) *Metanephrops australiensis*  
**Fig. 6 large pincer**

**4a.** Abdomen with distinct transverse and longitudinal grooves (Fig. 7); large pincers distinctly ridged (Fig. 8a), with outer border flat . . . . . → 5

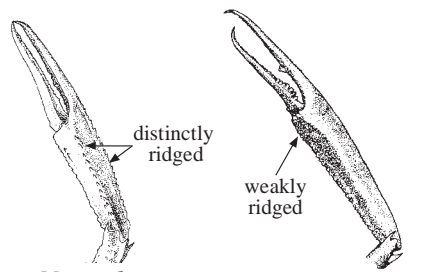
**4b.** Abdomen smooth or with only narrow transverse grooves; large pincer smooth or weakly ridged (Fig. 8b), with outer border always angular. . . . . → 6

**5a.** Elevated parts of abdomen naked and smooth (Fig. 7a) . . . . . *Metanephrops andamanicus*

**5b.** Elevated parts of abdomen coarse and pubescent (Fig. 7b) . . . . . *Metanephrops velutinus*



a) *Metanephrops andamanicus*      b) *Metanephrops velutinus*  
**Fig. 7 abdomen (dorsal view)**



a) *Metanephrops andamanicus*      b) *Metanephrops sibogae*  
**Fig. 8 large pincer**

- 6a. Abdomen smooth, without grooves (Fig. 9a) . . . . . *Metanephrops sibogae*
- 6b. Abdomen with narrow transverse grooves (Fig. 9b, c) . . . . . → 7

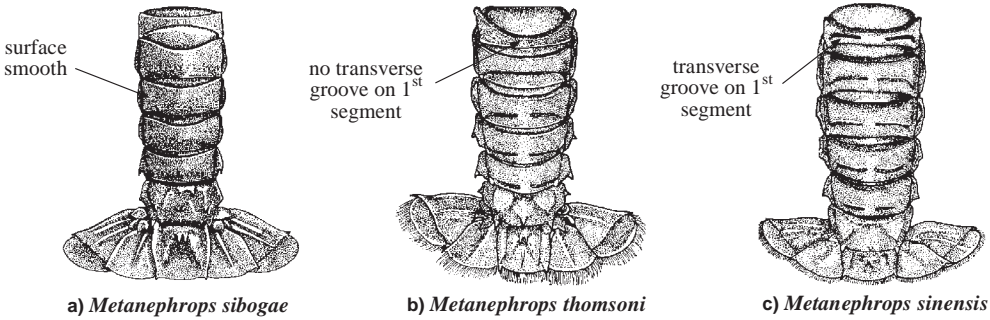


Fig. 9 abdomen (dorsal view)

- 7a. Two postorbital spines present (Fig. 10a); large pincers with inner margin naked but often bearing some large spines (Fig. 11a); first abdominal segment generally without distinct transverse grooves (Fig. 9b) . . . . . *Metanephrops thomsoni*
- 7b. Three postorbital spines present (Fig. 10b); large pincers without large spines along inner margin, lateral margin of movable fingers bearing a brush of setae (Fig. 11b); first abdominal segment usually with short, lateral, transverse grooves (Fig. 9c) . . . . . *Metanephrops sinensis*

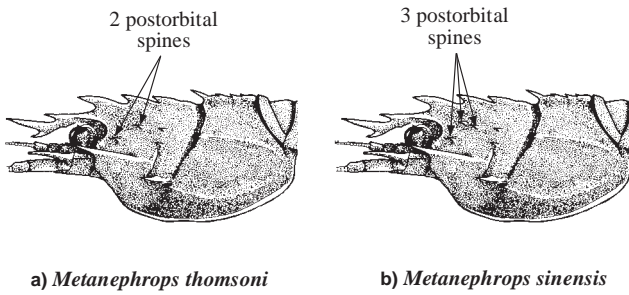


Fig. 10 carapace (lateral view)

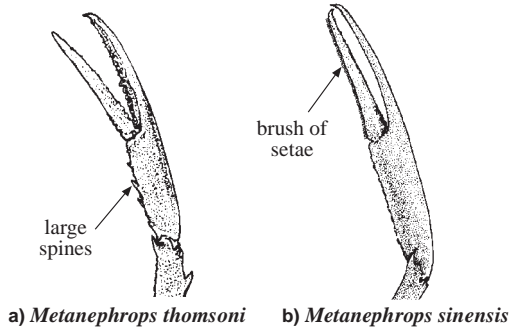


Fig. 11 large pincer

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

- 1a. Rostrum without lateral teeth (Fig. 12a) . . . . . *Nephropsis ensirostris*
- 1b. Rostrum with lateral teeth (Fig. 12b-d) . . . . . → 2
- 2a. Rostrum with 2 pairs of lateral teeth (Fig. 12b) . . . . . → 3
- 2b. Rostrum with 1 pair of lateral teeth (Fig. 12c, d) . . . . . → 4

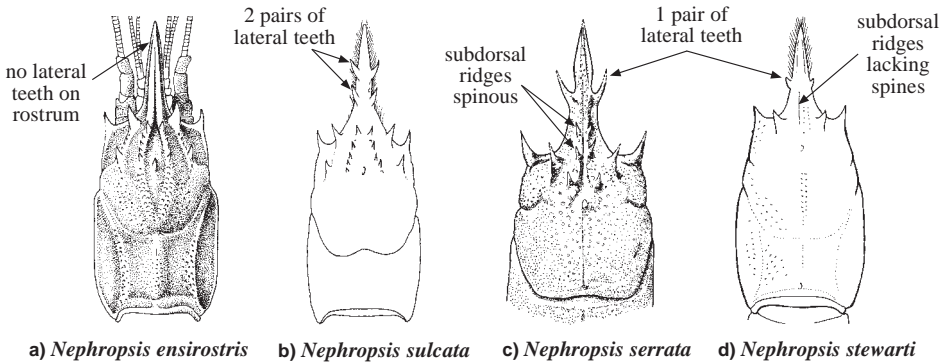


Fig. 12 carapace (dorsal view)



- 3a. Abdomen with a median longitudinal carina (Fig. 13) . . . . . *Nephropsis sulcata*  
 3b. Abdomen without a median longitudinal carina . . . . . *Nephropsis suhmi*
- 4a. Basal part of telson with an erect dorsal spine (Fig. 14a) . . . . . *Nephropsis acanthura*  
 4b. Basal part of telson without an erect dorsal spine (Fig. 14b) . . . . . → 5
- 5a. Abdomen with a median longitudinal carina . . . . . *Nephropsis holthuisi*  
 5b. Abdomen without a median longitudinal carina . . . . . → 6
- 6a. Subdorsal ridges of carapace spinose (Fig. 12c) . . . . . *Nephropsis serrata*  
 6b. Subdorsal ridges of carapace lacking spines (Fig. 12d) . . . . . *Nephropsis stewarti*

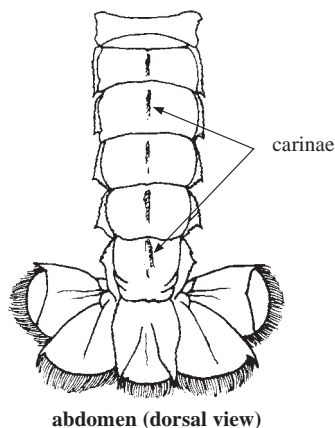
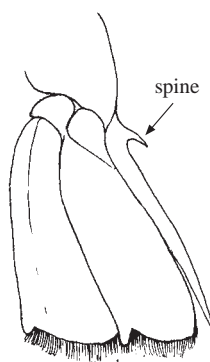
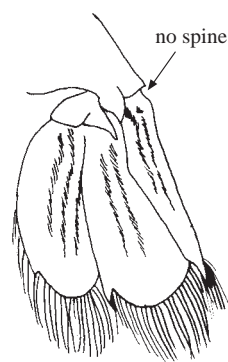


Fig. 13 *Nephropsis sulcata*




a) *Nephropsis acanthura*







b) *Nephropsis holthuisi*,  
*N. serrata*, *N. stewarti*

Fig. 14 tail fan (lateral view)

#### List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Acanthacaris tenuimana* Bate, 1888
-  *Metanephrops andamanicus* (Wood-Mason, 1891)
- Metanephrops arafurensis* (De Man, 1905)
-  *Metanephrops australiensis* (Bruce, 1966)
-  *Metanephrops neptunus* (Bruce, 1965)
-  *Metanephrops sibogae* (De Man, 1916)
-  *Metanephrops sinensis* (Bruce, 1966)
-  *Metanephrops thomsoni* (Bate, 1888)
-  *Metanephrops velutinus* Chan and Yu, 1991
- Nephropsis acanthura* Macpherson, 1990
- Nephropsis ensirostris* Alcock, 1901
- Nephropsis holthuisi* Macpherson, 1993
- Nephropsis serrata* Macpherson, 1993
-  *Nephropsis stewarti* Wood-Mason, 1873
- Nephropsis suhmi* Bate, 1888
- Nephropsis sulcata* Macpherson, 1990

#### References

- Chan, T.Y. and H.P. Yu. 1993. *The Illustrated lobsters of Taiwan*. Taipei, SMC Publishing Inc., 248 p.
- Holthuis, L.B. 1991. FAO species catalogue. Vol. 13. Marine lobsters of the world. An annotated and illustrated catalogue of species of interest to fisheries known to date. *FAO Fish. Synop.*, 125(13):1-292.

*Acanthacaris tenuimana* Bate, 1888

**Frequent synonyms / misidentifications:** *Phoberus tenuimanus* Bate, 1888; *P. caecus sublevis* Wood-Mason and Alcock, 1891; *Acanthacaris opipara* Burukovsky and Musy, 1976; *Phoberus brevirostris* Thung and Wang, 1985 / None.

**FAO names:** **En** - Prickly deep-sea lobster; **Fr** - Langoustine spinuleuse; **Sp** - Cigala raspa.

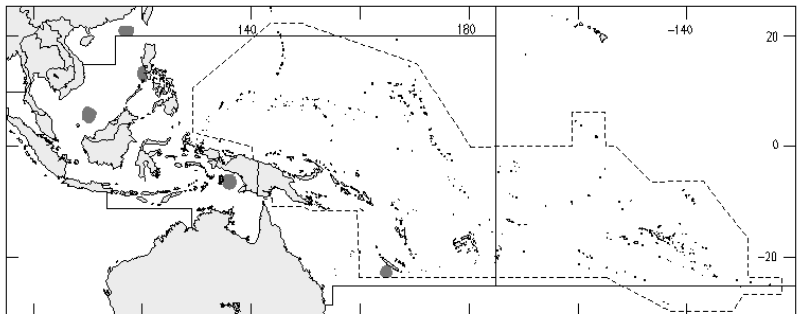
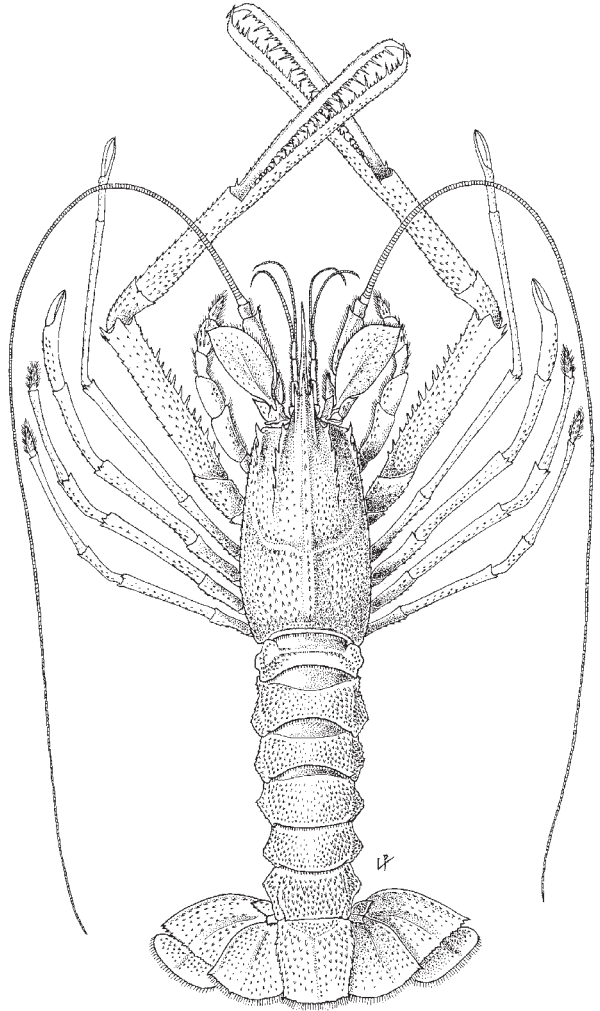
**Diagnostic characters:** A large lobster. Body tubular, **entirely covered with small spines and sharp tubercles, but not covered with soft pubescence.** Carapace with a well-developed rostrum. **Eyes minute, cornea lacking pigmentation.** Antennae long and thread-like, **antennal scale well developed.** **First 3 pairs of legs ending in pincers; first pair equal-sized, very slender and longer than body, with pincers bearing long teeth along cutting edges;** second pair of legs much longer but less spiny than third pair. Tail fan entirely hardened; posterior margin of telson truncate.

**Colour:** uniform delicate pink.

**Size:** Maximum carapace length 21 cm (total length to 40 cm), ovigerous females between 11 and 19 cm carapace length.

**Habitat, biology, and fisheries:** Found in deep water at depths from 600 to 1 670 m on muddy bottoms where it lives in burrows. This species is occasionally taken during exploratory trawling operations in deep water, but only in very small quantities. Due to its large size it may have some fishery potential once suitable fishing grounds are found.

**Distribution:** Indo-West Pacific from the eastern coast of Africa to Japan, the East and South China Sea, Indonesia, and New Caledonia.



***Metanephrops sibogae* (De Man, 1916)**

**Frequent synonyms / misidentifications:**  
*Nephrops sibogae* De Man, 1916 / None.

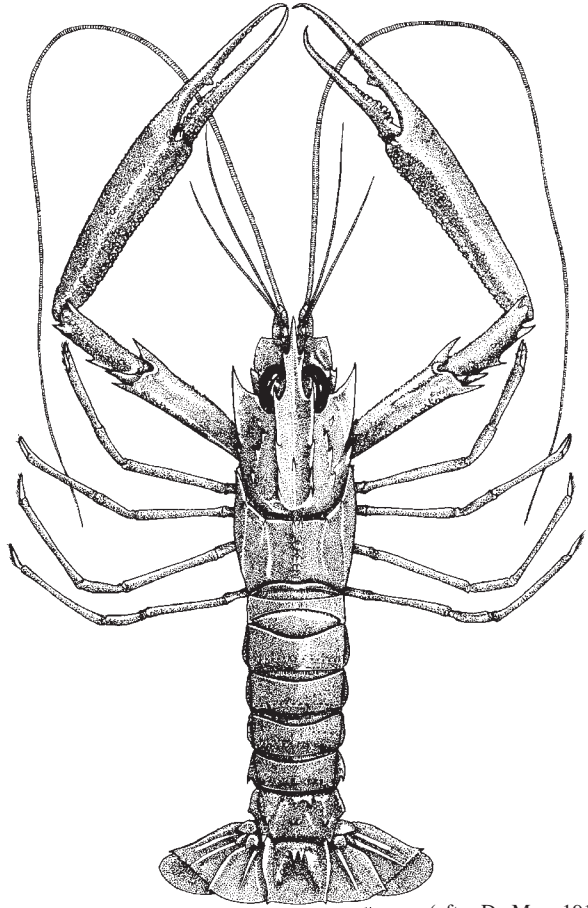
**FAO names:** En - Siboga lobster.

**Diagnostic characters:** A small to medium-sized lobster. Body cylindrical and naked. **Carapace spiny, but not uniformly so;** rostrum well developed, armed with lateral and ventral teeth only; **4 pairs of postrostral teeth and 3 postorbital spines present. Eyes large and pigmented.** Antennae long and thread-like, **antennal scale present.** First 3 pairs of legs ending in pincers; **first pair enlarged and long; pincers feebly ridged and finely granular, their inner margin without pubescence but occasionally bearing a few large spines. Abdomen naked and smooth, without distinct sculptures.** Tail fan entirely hardened; posterior margin of telson broadly convex. **Colour: body uniformly orange-pink.**

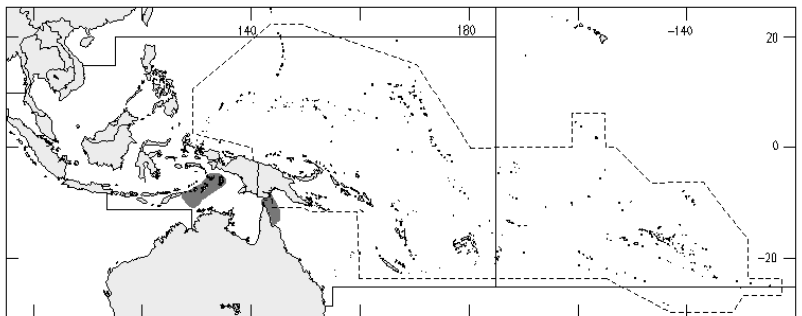
**Size:** Maximum body length 18 cm, commonly to about 13 cm.

**Habitat, biology, and fisheries:** At depths from 246 to 320 m on soft sandy sediment; probably lives in burrows. Of minor importance to fisheries in northern Australia, where it is trawled commercially during the northern prawn fishery closed seasons. Also taken in a fair amount during experimental trawling operations in southern Indonesia.

**Distribution:** Only known from southern Indonesia and northern Australia.



(after De Man, 1916)





***Metanephrops thomsoni* (Bate, 1888)**

**Frequent synonyms / misidentifications:**  
*Nephrops thomsoni* Bate, 1888 / None.

**FAO names:** En - Red-banded lobster.

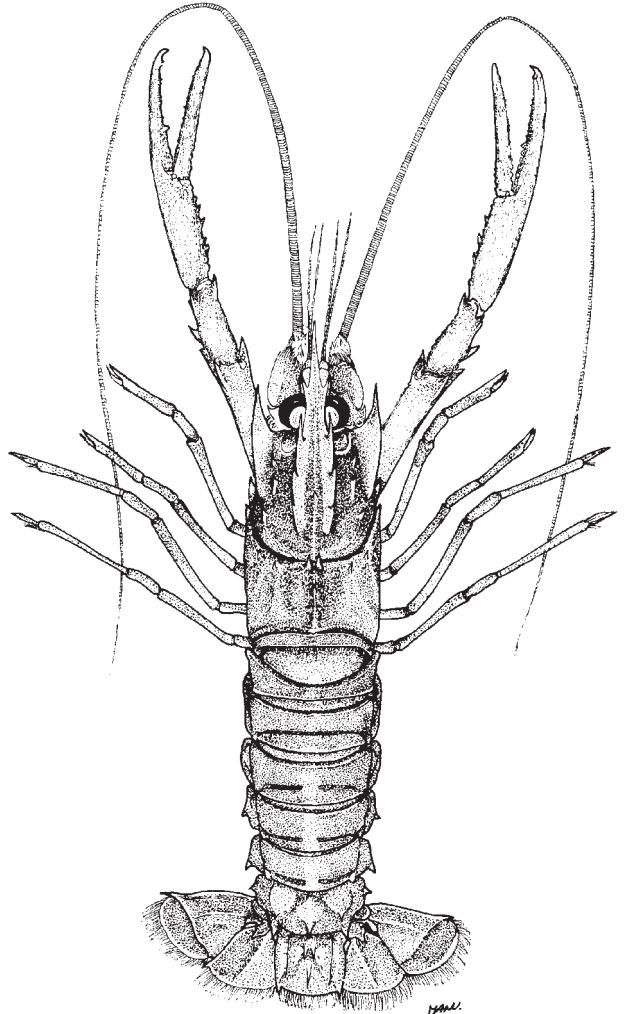
**Diagnostic characters:** A small to medium-sized lobster. Body cylindrical and naked. **Carapace spiny, but not uniformly so;** rostrum well developed, armed with lateral and ventral teeth only; **3 pairs of postrostral teeth and only 2 postorbital spines present. Eyes large and pigmented.** Antennae long and thread-like, **antennal scale present.** First 3 pairs of legs ending in pincers; **first pair enlarged and long; pincers feebly ridged and finely granular, inner margin without pubescence but often bearing some large spines.** Abdomen without median longitudinal carina and weakly sculptured; transverse grooves very shallow (nearly absent on first segment) and broadly interrupted medially, longitudinal grooves absent. Tail fan entirely hardened; posterior margin of telson broadly convex. **Colour:** body almost uniformly orange-pink; post-orbital margin, tips of fingers of large pincers, margins of abdominal pleura, and posterior margin of tail fan whitish. Eyes dark brown. **Eggs blue,** becoming dirty white when eye spots appear.

**Size:** Maximum body length 15 cm, commonly between 9 and 12 cm.

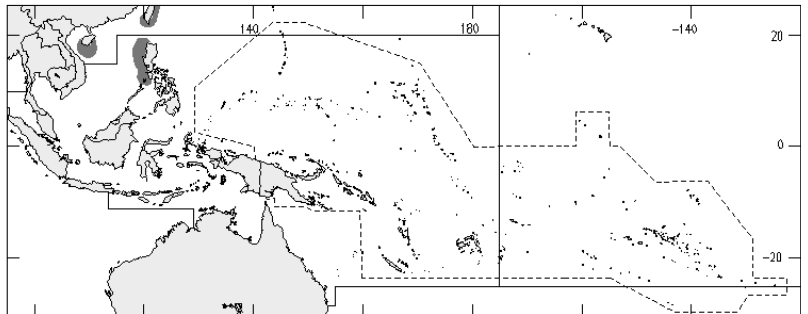
**Habitat, biology, and fisheries:** On sandy mud bottoms at depths from 50 to 509 m. Caught in the Philippines by lobster cages called "Panak", but not in large quantities and only occasionally sold in local fish markets. Often taken on the basis of exploratory deep-water trawling around the northwest coasts of the Philippines and may therefore have more fishery potential in the area.

**Distribution:** Western Pacific from Japan, the Ryukyu Islands, the East and South China Sea, Taiwan Province of China, and the Philippines.

**Remarks:** The common name "Red-banded lobster" refers to the presence of red bands on the first pair of legs. However, specimens known from the area (i.e. the Philippines) differ from those found elsewhere in its range by the lack of these red bands.



(after Chan and Yu, 1988)



***Nephropsis stewarti*** Wood-Mason, 1873

**Frequent synonyms / misidentifications:**  
None / None.

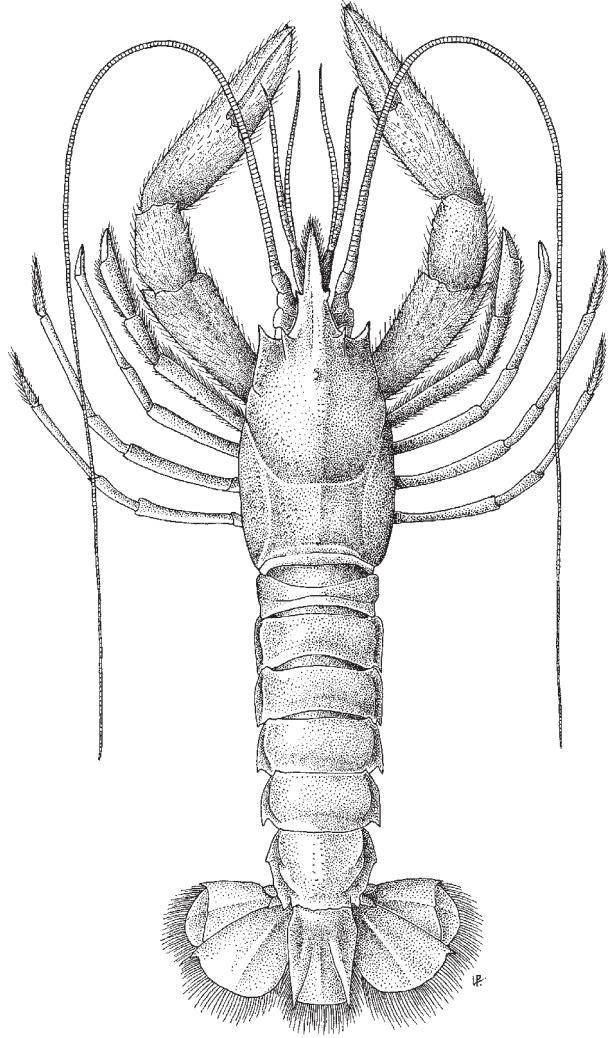
**FAO names:** **En** - Indian Ocean lobsterette;  
**Fr** - Langoustine indienne; **Sp** - Cigala del  
Oceano Indico.

**Diagnostic characters:** A small to medium-sized lobster. Body cylindrical, **covered with thick fur**. Carapace with a well-developed **rostrum armed with 1 pair of lateral spines; anterior carapace bearing only supraorbital and antennal spines; sub-dorsal ridges without spines. Eyes minute, cornea lacking pigmentation.** Antennae long and thread-like; **antennal scale absent.** First 3 pairs of legs ending in pincers; **first pair rather stout and very hairy. Abdomen without median longitudinal carina, all pleura sharply pointed ventrally but lacking spines on front edges. Tail fan entirely hardened; outer blade showing a transverse fissure; telson with a pair of fixed posterolateral spines but unarmed dorsally. Colour: body whitish and covered with thick grey fur.** Anterior carapace including rostrum, ventral surface, mouth parts and tail fan pink-red. Antennal and antennular flagella orange. Legs orange-pink, with distal segments reddish; large pincers sometimes slightly orange. Eggs white.

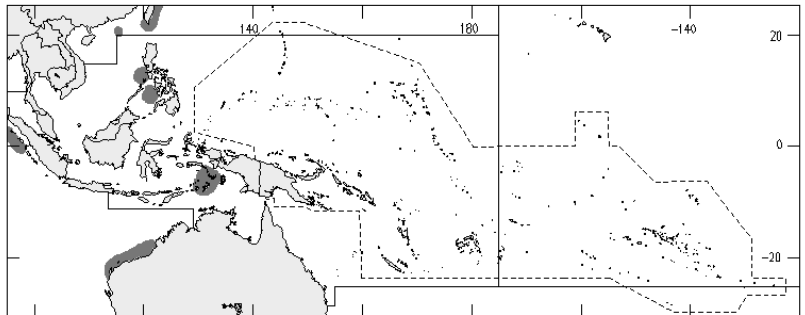
**Size:** Maximum known body length about 20 cm, commonly between 10 and 15 cm.

**Habitat, biology, and fisheries:** Deep sea at depths from 170 to 1 060 m, mostly between 500 and 750 m on soft muddy substrate. A common bycatch of deep-water trawling operations throughout its range. Although it is probably the largest and most common species of the genus, its quantities are at present too small for significant interest to fisheries.

**Distribution:** Widely distributed in the Indo-West Pacific, from eastern Africa to Japan, the Philippines, Indonesia, and northwestern Australia.



(after Alcock and Anderson, 1896)

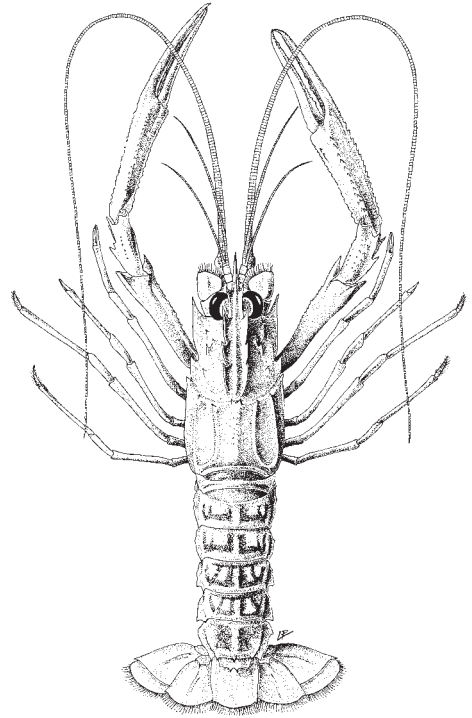
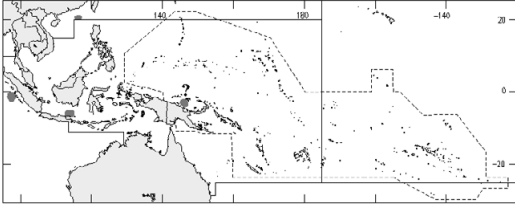


***Metanephrops andamanicus* (Wood-Mason, 1891)**

NEA

**En** - Andaman lobster; **Fr** - Langoustine andamane; **Sp** - Cigala de Andamán.

Maximum total body length 20 cm, commonly between 15 and 18 cm. On hard mud in depths from 250 to 750 m, but mostly from 300 to 450 m; probably lives in burrows. In the Western Central Pacific, so far only taken in very small numbers during experimental deep-water trawling operations, but its high abundance just north of the Philippines in the South China Sea may indicate that it has some fishery potential in the area. Indo-West Pacific from eastern Africa to the Andaman Sea, the South China Sea, Indonesia, and perhaps also Papua New Guinea.

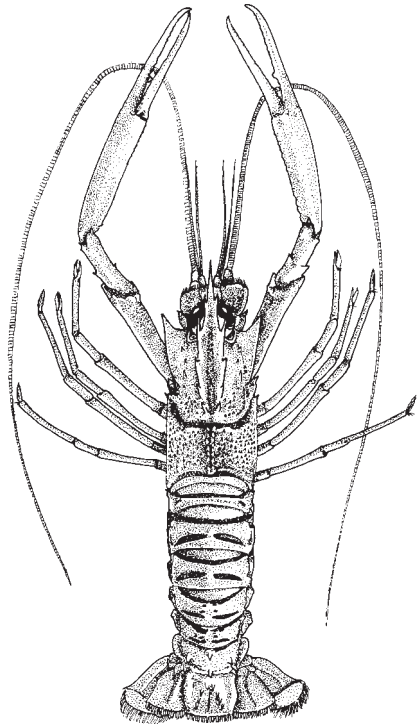
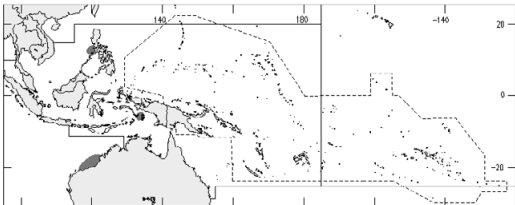


(after Alcock, 1894)

***Metanephrops australiensis* (Bruce, 1966)**

**En** - Northwest lobster.

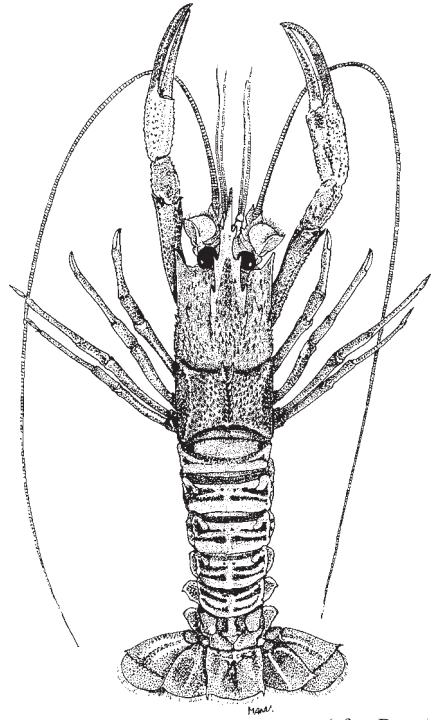
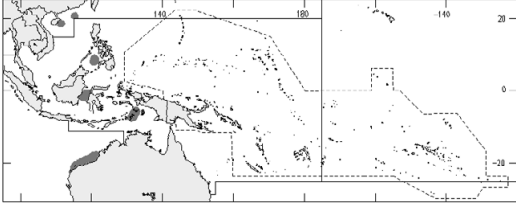
Maximum total body length 18 cm. At depths from 418 to 500 m, on firm sediments such as *Globigerina* ooze; probably lives in burrows. In the area, so far only taken in few numbers during experimental deep-water trawling operations. However, as this lobster is the main component of the commercial *Metanephrops* fishery in northwestern Australia, more knowledge of its fishing grounds may reveal that it has also some fishery potential elsewhere in the Western Central Pacific. Known from the Philippines, Indonesia, and northwestern Australia.



(after Bruce, 1966)

***Metanephrops neptunus* (Bruce, 1965)****En** - Neptune lobster.

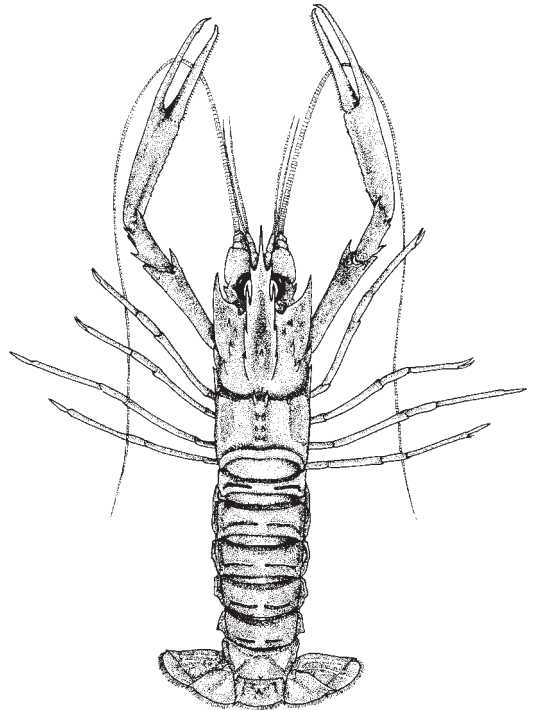
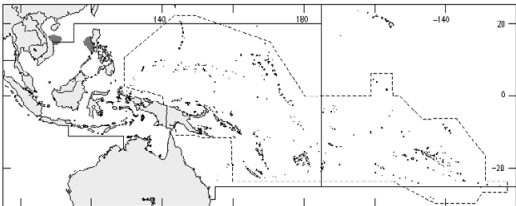
Maximum total body length 25 cm; probably the largest species of the genus. On soft bottoms at depths to 940 m, mostly more than 500 m; probably lives in burrows. Occasionally caught in rather small quantities during deep-water trawling operations. With the development of deep-sea fishing gear this lobster is potentially very attractive for fisheries, due to its large size. Western Pacific from the South China Sea to the Philippines, Indonesia, and northwestern Australia.



(after Bruce, 1965)

***Metanephrops sinensis* (Bruce, 1966)****En** - China lobster.

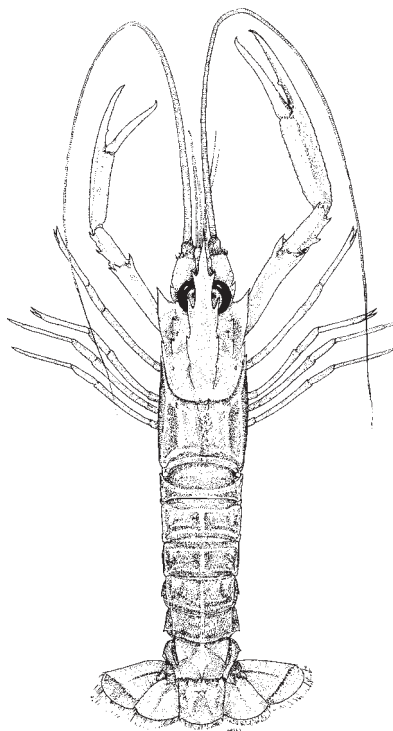
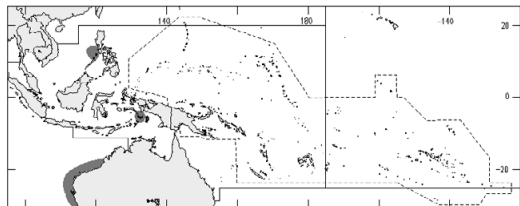
Maximum total body length 15 cm. Found on muddy bottoms in deep water at depths from 203 to 407 m, sometimes with shells. Not fished commercially at present, but often caught in large numbers during experimental deep-water trawling operations around the Philippines and may therefore have some fishery potential in the area. So far only known from the South China Sea and the northwestern coast of the Philippines.



(after Bruce, 1966)

***Metanephrops velutinus* Chan and Yu, 1991****En - Velvet lobster.**

Maximum carapace length 8.6 cm. In deep water at depths of 238 to 702 m, mostly between 350 and 450 m on hard muddy substrate. A commercial species in northwestern Australia, but not yet fished in the area. Often caught on the basis of exploratory deep-water trawling operations around the Philippines and Indonesia and may therefore also have some fishery potential in area. So far only found in the Philippines, Indonesia, and Western Australia.



(after Chan and Yu, 1991)

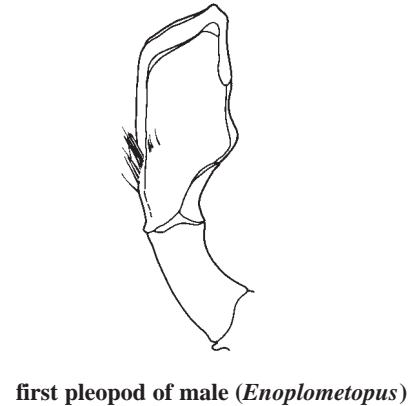
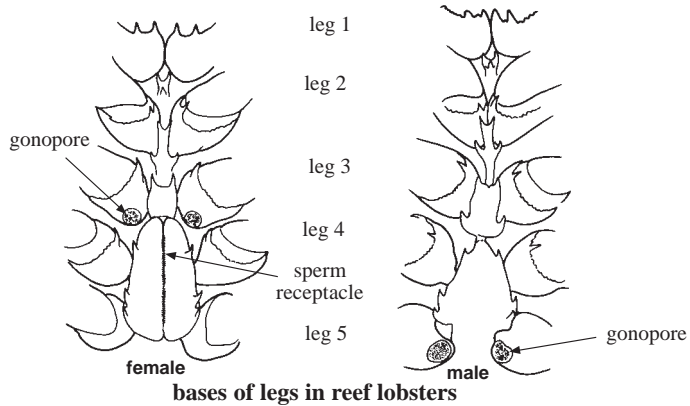
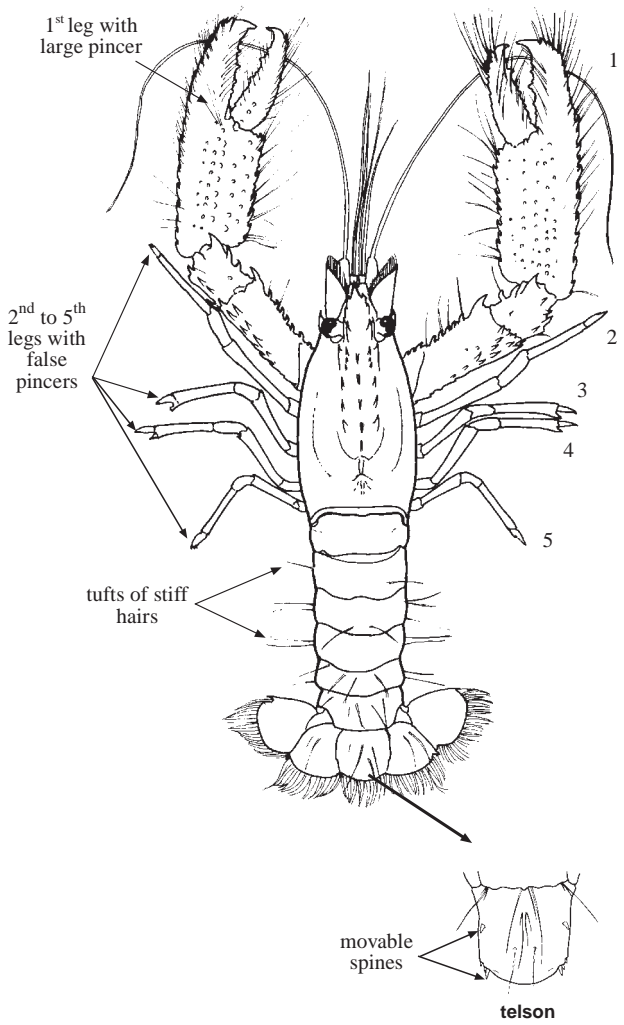


**ENOPLOMETOPIDAE**

**Reef lobsters**

**Diagnostic characters:** Moderate- to small-sized crustaceans. Body cylindrical, **distributed with tufts of long stiff hairs**. Carapace (or "head") with a well-developed rostrum. **Eyes well developed and black**. Antennae long and thread-like, **antennal scale with inner margin unarmed and curved**. **First pair of legs greatly enlarged and forming true pincers; second to fifth legs slender and ending in false pincers** (less distant in posterior legs). Abdomen well developed and powerful, **pleura more or less rounded and sometimes bearing strong spines**. Tail fan entirely hardened; **telson bearing movable spines**, its posterior margin broadly convex. **Colour: brilliant and attractive - orange-red, red, purple and/or white, with conspicuous spots on body, sometimes also with stripes.**

**Habitat, biology, and fisheries:** Reef lobsters usually live in coral and rocky reefs or in deeper parts of reef slopes at depths of 30 cm to 300 m. As in nephropids, the sexes can be determined by the position of the gonopores at the bases of legs. In addition, the first pleopods ("legs" of the abdomen) of males are large and leaf-like (thin but rigid), while they are small and thread-like in females. A large sperm receptacle process is present on the thoracic sternum between the last 3 legs in females. The eggs are small (about 0.5 mm in diameter) and numerous. They hatch within a short time (about 6 days for *Enoplometopus debelius*) but the larvae are very difficult to rear. Since reef lobsters are nocturnal and shy, they are very difficult to catch. However, they are often highly valued in the aquarium trade for their attractive coloration. Reef lobsters presumably originating from Indonesia or the Philippines can be found in aquarium shops of other Asian countries, Europe, and the USA. Therefore, species accounts are provided here for the more common species.



bases of legs in reef lobsters

first pleopod of male (*Enoplometopus*)

**Similar families occurring in the area**

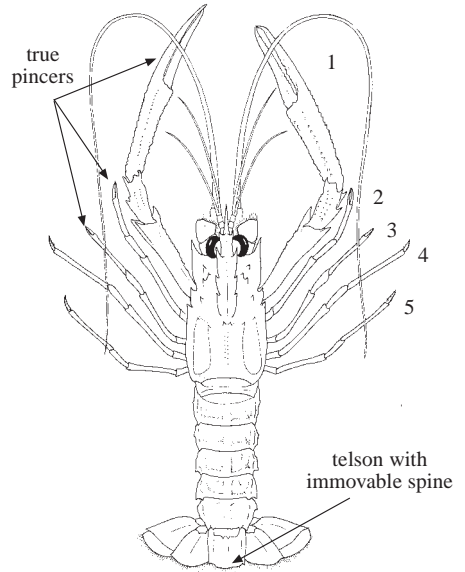
**Nephropidae:** body almost naked or covered with thick fur; first 3 pairs of legs ending in true pincers, with the first pair much larger than the others; telson only bearing immovable spines.

**Thaumastochelidae:** body slightly depressed dorsoventrally; eyes strongly reduced, cornea lacking pigmentation; antennal scale bearing several large teeth along inner margin; first 3 pairs of legs (occasionally also fifth legs) ending in true pincers, first pair large but very unequal; abdominal pleura short, quadrangular and without large ventral tooth; telson unarmed.

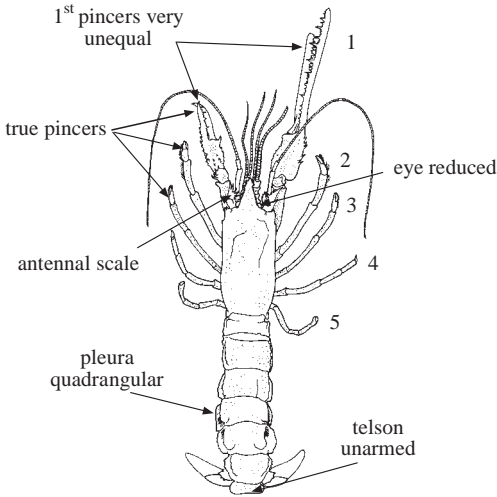
**Polychelidae:** eyes small, cornea lacking pigmentation; carapace box-like, rostrum absent or rudimentary; first 4 or all legs ending in true pincers, first pair long and slender; telson pointed.

**Glypheidae:** body somewhat flattened dorsoventrally; eyes inserted on a median elevation of cephalon; first 2 legs forming false pincers with first pair very strong, third leg simple.

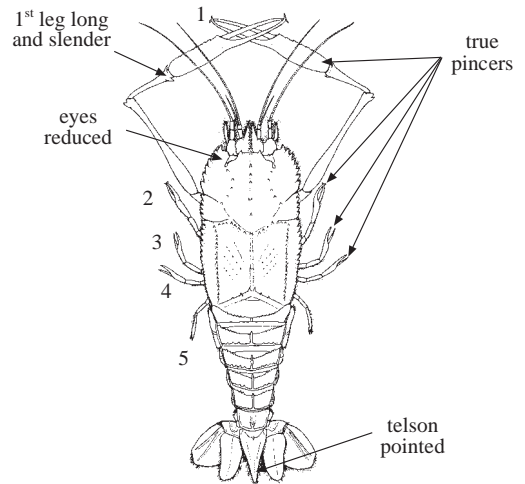
**Synaxidae:** body somewhat flattened dorsoventrally and uniformly hairy; legs simple and without pincers, first pair much more robust than others; antennae rather thick and whip-like, shorter than carapace; posterior half of tail fan soft and flexible.



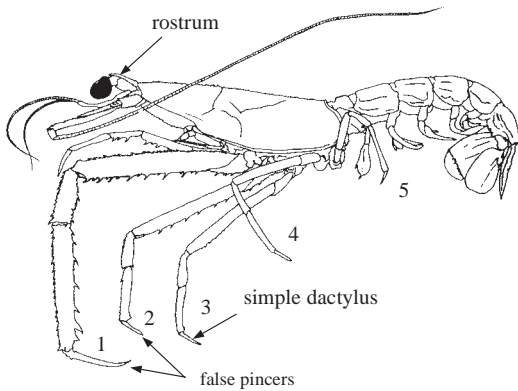
**Nephropidae**



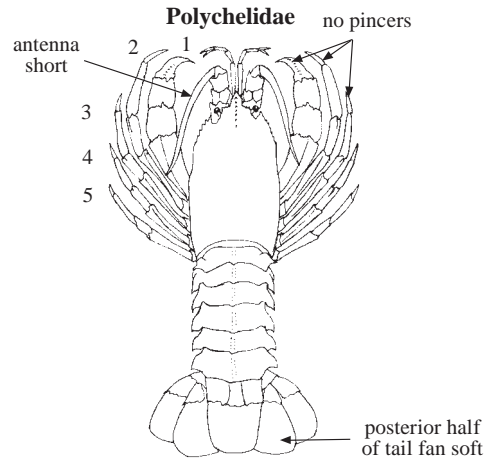
**Thaumastochelidae**



**Polychelidae**



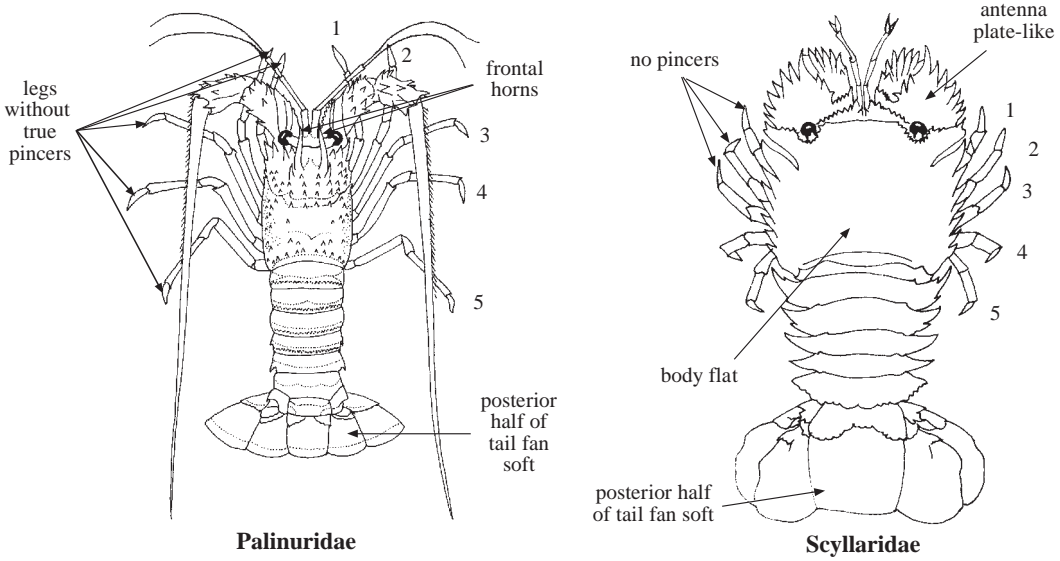
**Glypheidae**



**Synaxidae**

Palinuridae: body tubular or slightly flattened dorsoventrally; rostrum absent or reduced to a small spine; carapace spiny and with a pair of large frontal horns above eyes; antennal flagella rather thick and very long, whip-like or spear-like; legs without true pincers and first pair generally not enlarged (except in *Justitia*); posterior half of tail fan soft and flexible.

Scyllaridae: body strongly flattened dorsoventrally; rostrum absent or minute; eyes enclosed by distinct orbits; legs without true pincers and none of them enlarged; antennae plate-like; posterior half of tail fan soft and flexible.



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

Note: since reef lobsters generally have particular colour patterns, live specimens of the various species are easily distinguished by their coloration.

- 1a. Carapace with or without 1 postcervical spine (Fig. 1a, b); abdominal pleura broadly convex, with a blunt posterolateral angle (Fig. 2a); lateral margins of telson armed with 1 pair of median spines (Fig. 3a) . . . . . → 2
- 1b. Carapace with 2 postcervical spines (Fig. 1c); abdominal pleura bearing a strong tooth (Fig. 2b); lateral margins of telson armed with 2 pairs of median spines (Fig. 3b) . . . . . → 5
- 2a. Rostrum bearing 2 pairs of lateral teeth; body orange-red and with colour markings mainly limited to lower carapace and posterior margins of abdominal segments . . . . . *Enoplometopus chacei*
- 2b. Rostrum bearing 3 or more pairs of lateral teeth; colour spots and/or stripes present on whole body . . . . . → 3

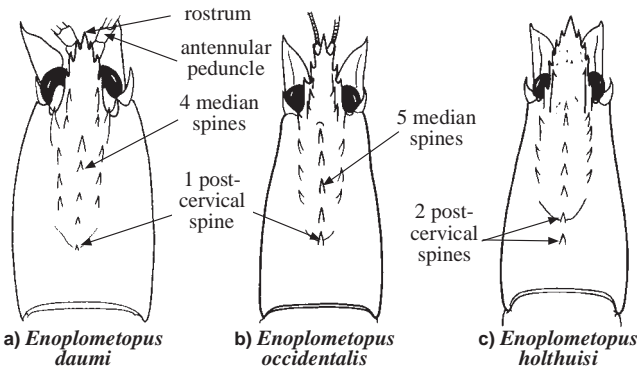


Fig. 1 carapace (dorsal view)

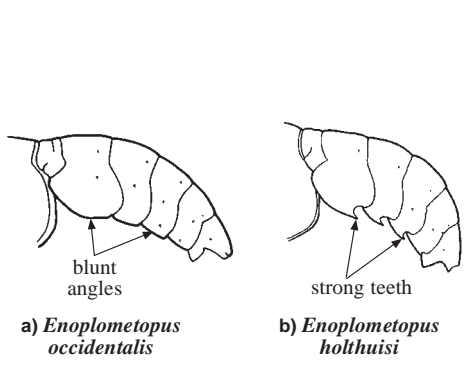


Fig. 2 abdomen (lateral view)



- 3a. Carapace with 5 median spines; rostrum reaching to or beyond antennular peduncle (Fig. 1b); colour orange-red with some conspicuous white spots on abdomen, fewer on carapace . . . . . *Enoplometopus occidentalis*
- 3b. Carapace with 4 median spines; rostrum reaching to about middle of distal segment of antennular peduncle (Fig. 1a); colour mainly purplish. . . . . → 4

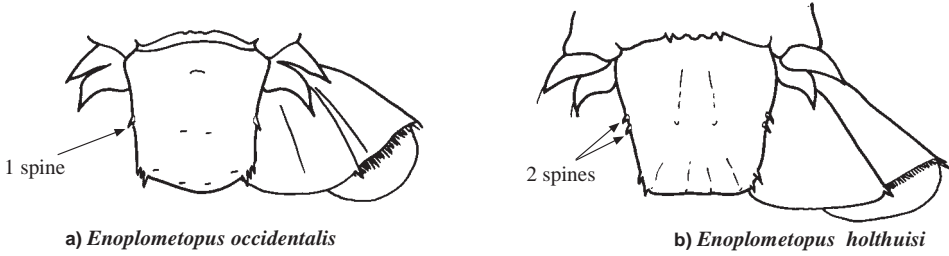


Fig. 3 tail fan (dorsal view)

- 4a. Postcervical tooth distinct; body whitish, almost uniformly covered with small purple dots (Fig. 4a) . . . . . *Enoplometopus debelius*
- 4b. Postcervical tooth rather indistinct; carapace with vertical reddish brown stripes; abdomen provided with many white spots (Fig. 4b). . . . . *Enoplometopus daumi*
- 5a. Body pale pink and almost uniformly covered with small non-circular red spots (Fig. 4c) . . . . . *Enoplometopus gracilipes*
- 5b. Body reddish; lateral carapace with a large ocellated spot and some vertical white stripes (Fig. 4d); abdomen provided with many white spots . . . . . *Enoplometopus holthuisi*

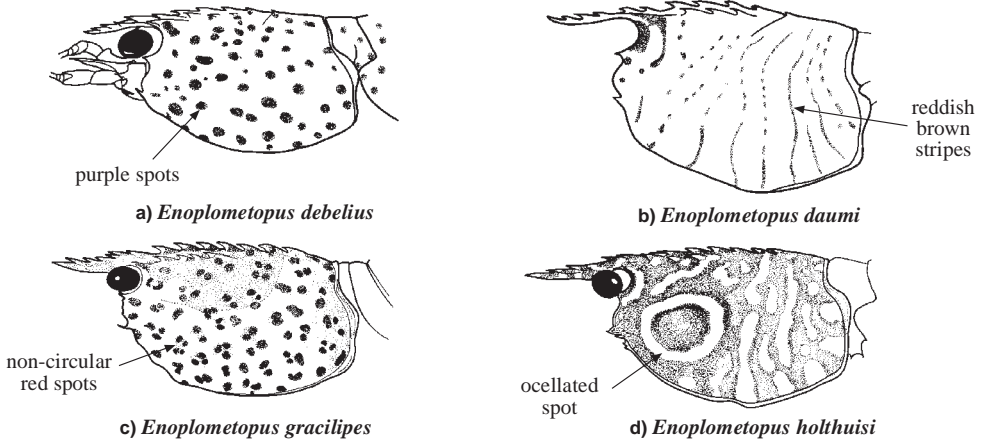








Fig. 4 carapace (lateral view)

List of species occurring in the area

The symbol  is given when species accounts are included.

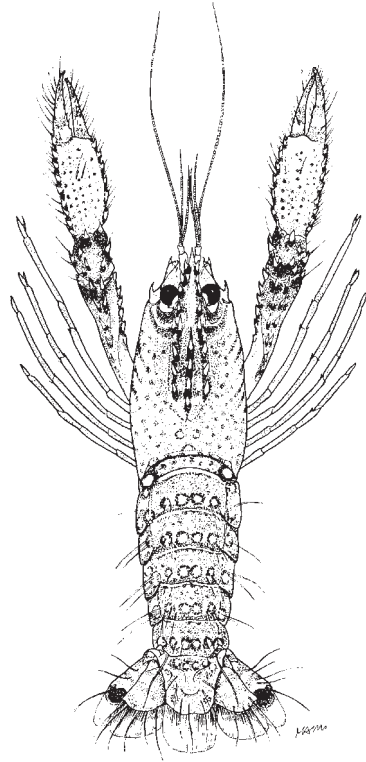
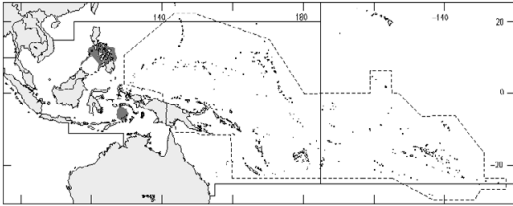
-  *Enoplometopus chacei* Kensley and Child, 1986
-  *Enoplometopus daumi* Holthuis, 1983
-  *Enoplometopus debelius* Holthuis, 1983
-  *Enoplometopus gracilipes* (De Saint Laurent, 1988)
-  *Enoplometopus holthuisi* Gordon, 1968
-  *Enoplometopus occidentalis* (Randall, 1840)

Reference

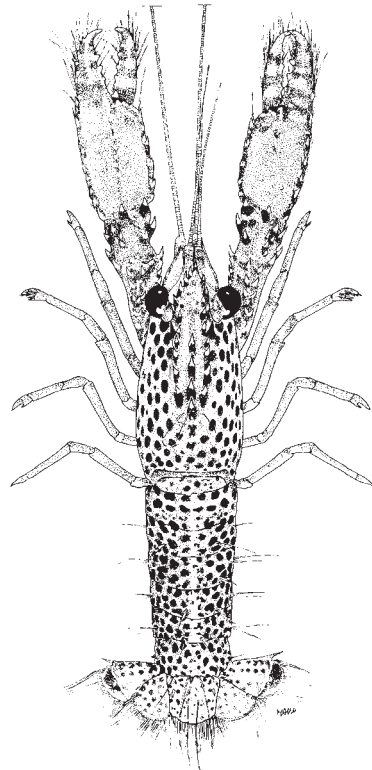
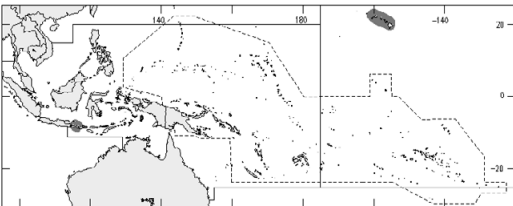
Holthuis, L.B. 1983. Notes on the genus *Enoplometopus*, with descriptions of a new subgenus and two new species (Crustacea Decapoda, Axiidae). *Zool. Med. Leiden*, 56(22):281-298.

***Enoplometopus daumi* Holthuis, 1983****En** - Striped reef lobster.

Carapace length of adults between 1.3 and 2.6 cm, body length between 4 and 6 cm. Shallow coral reef areas. Shy, generally hide in rock cavities, often with only the pincers visible. Territorial and extremely aggressive against members of the same species except during mating. Collected by rotenone and probably also by divers. Not common, but a favourite for the aquarium trade because of its small size and special coloration. Live specimens are probably regularly exported from the Philippines and Indonesia. With certainty only known from Indonesia and the Philippines.

***Enoplometopus debelius* Holthuis, 1983****En** - Violet-spotted reef lobster.

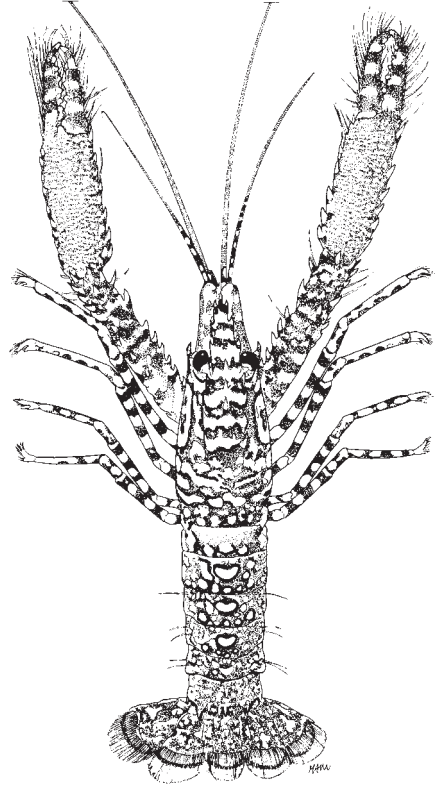
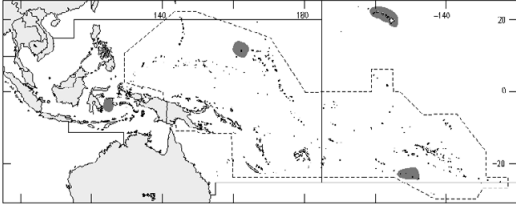
Carapace length of adults between 2.2 and 2.4 cm, body length reaching 5 cm or more. On reef slopes in depths from 15 to 25 m. Collected by hand net during night diving. Appears to be slightly less aggressive than other species of the genus. An uncommon species that is sold at high prices in the aquarium trade for its attractive coloration. Specimens are mostly exported from Indonesia. Western Pacific from Indonesia to Hawaii and possibly Japan.



***Enoplometopus holthuisi* Gordon, 1968**

**En** - Bullseye reef lobster.

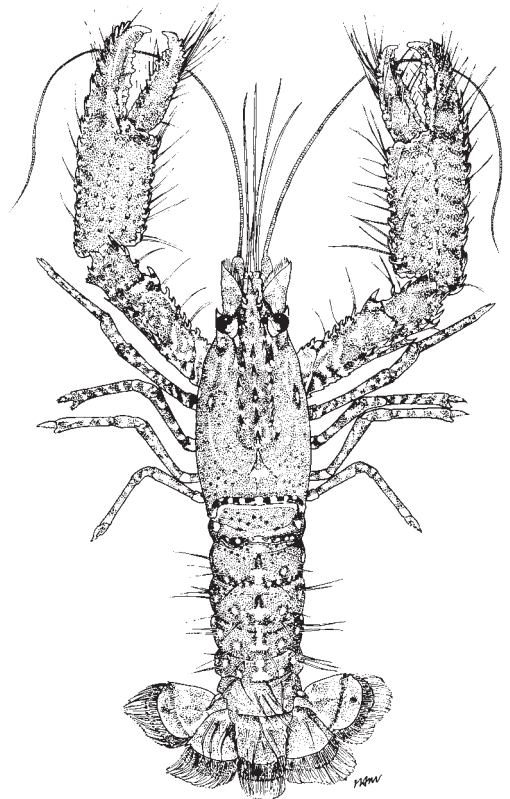
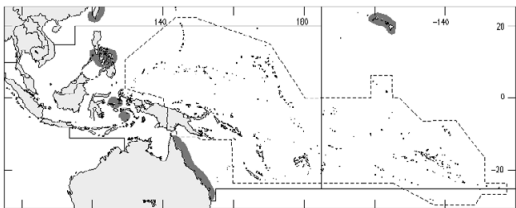
Maximum body length about 12 cm. Lives on rocky reef slopes and deeper parts of reefs at depths of about 20 m to 80 m. Less shy and more aggressive than other species of the genus. Occasionally found in the aquarium trade and sold at a high price. Probably caught by night diving. Western Pacific from the Philippines, Indonesia, Eniwetok Atoll (Marshall Islands), Austral Islands, and Hawaii.



***Enoplometopus occidentalis* (Randall, 1840)**

**En** - Red reef lobster.

Body length between 4 and 14 cm. Inhabits coral or rocky reefs and often found in deeper areas at the fringe of reefs, at depths of a few meters to about 100 m. Nocturnal and shy, usually found hiding in crevices and rocks. Very aggressive against members of the same species except during mating. Probably the most common species of the genus but still rather rare and only occasionally caught by divers collecting spiny lobsters or aquarium fishes. Small specimens are occasionally found in the aquarium trade and sold at a high price. Indo-West Pacific from eastern Africa to Japan, eastern Australia, and Hawaii.



**SYNTAXIDAE**

**Furry lobsters**

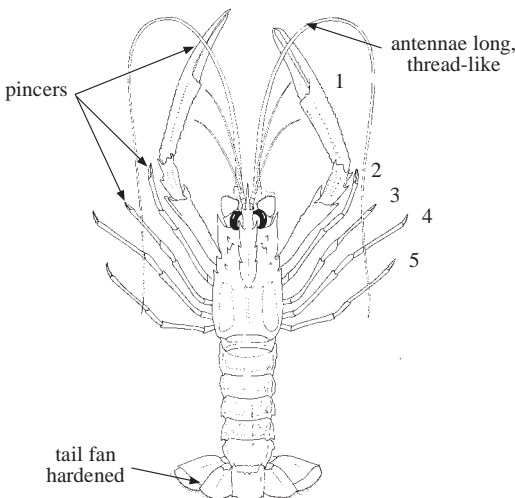
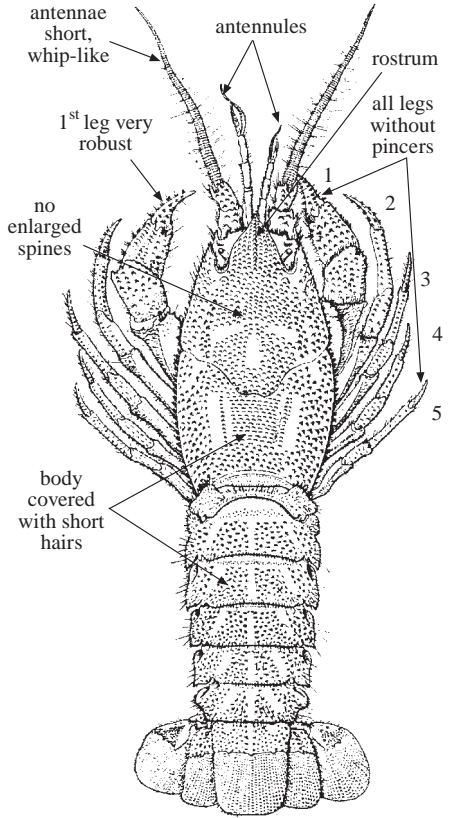
**Diagnostic characters:** Moderate- to small-sized crustaceans. Body somewhat flattened dorsoventrally and covered with a dense fur of short hair. Carapace long and laterally angular, covered with small rounded granules only, without enlarged spines; rostrum broad and flat triangular or rounded. Eyes small but distinct. Antennae rather thick and whip-like, but shorter than carapace; antennulae with flagella shorter than peduncle; stridulating organ sometimes present between bases of antennae and antennular plate. Legs without pincers but first pair much heavier than others. Both abdomen and tail fan well developed and powerful, posterior half of tail fan soft and flexible; abdomen hairy, with a low smooth keel along dorsal midline, but without transverse grooves. **Colour:** uniformly orange to bright orange or orange-red. Eyes black.

**Habitat, biology, and fisheries:** This family contains only 2 genera and a total of 2 species in the Western Central Pacific. The shallow water genus *Palinurellus* is smaller (maximum total length about 20 cm) than the slightly larger deep-water genus *Palibythus* (maximum total length 27 cm). Both genera live on hard bottom and are difficult to catch. Furry lobsters generally occur in few numbers and have therefore a very limited commercial potential. However, the "exotic" appearance and bright coloration of *Palinurellus* species has caught the attention of the tropical marine aquarium trade. Specimens presumably originating from the Philippines and Indonesia are occasionally sold for high prices in aquarium shops of other Asian countries, Europe, and the USA. The sexes of furry lobsters can be determined by the position of the gonopores as in the other families of lobsters. Furthermore, the first pair of pleopods ("legs" of the abdomen) is absent in males but present in females.

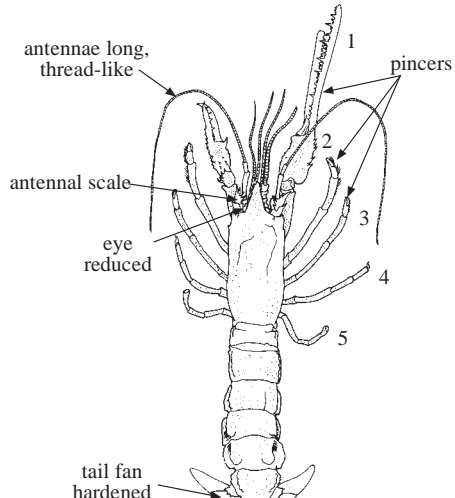
**Similar families occurring in the area**

**Nephropidae:** body tubular, almost naked or covered with thick fur; antennae very long and thread-like; first 3 pairs of legs ending in pincers, first pair greatly enlarged; tail fan entirely hardened.

**Thaumastocheilidae:** eyes strongly reduced, cornea lacking pigmentation; antennae very long and thread-like, scale with several large teeth along inner margin; first 3 pairs of legs (occasionally also fifth legs) ending in pincers, first pair large but very unequal; tail fan entirely hardened.



**Nephropidae**



**Thaumastocheilidae**

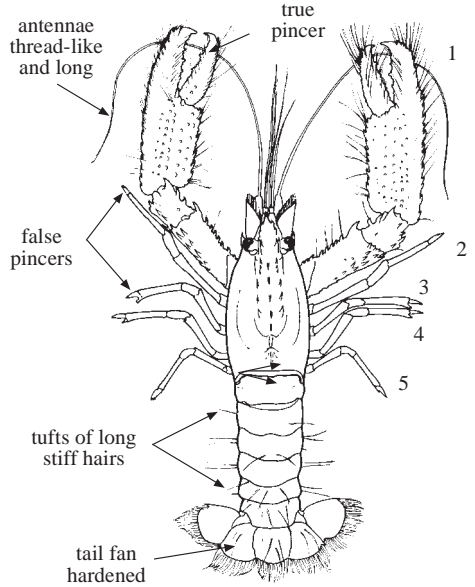
**Enoplometopidae:** body tubular, distributed with tufts of long stiff hairs; antennae very long and thread-like; first pair of legs enlarged and forming true pincer, second and third legs slender and ending in false pincers; tail fan entirely hardened.

**Polychelidae:** eyes small, cornea lacking pigmentation; rostrum absent or rudimentary; antennae thread-like and shorter than body; first 4 or all legs with pincers, first pair long and slender; tail fan entirely hardened, with telson pointed.

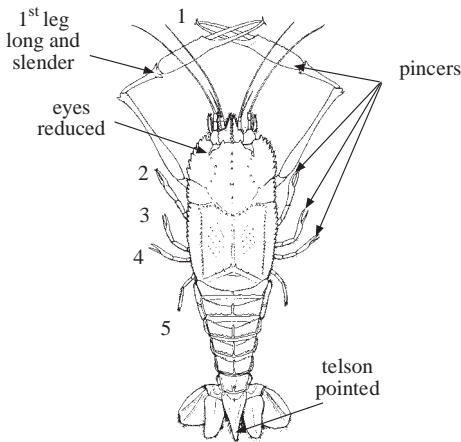
**Glypheidae:** eyes inserted on a median elevation of cephalon; antennae very long and thread-like; first 2 legs forming false pincers, with first pair very strong, third legs simple; uropods of tail fan entirely hardened.

**Palinuridae:** body naked or with few and scattered hairs; carapace spiny and with a pair of large frontal horns over eyes, but lacking a median rostrum or with rostrum greatly reduced; antennae very long and whip-like or spear-like; legs without pincers and first pair generally not enlarged (except in one species of *Justitia*).

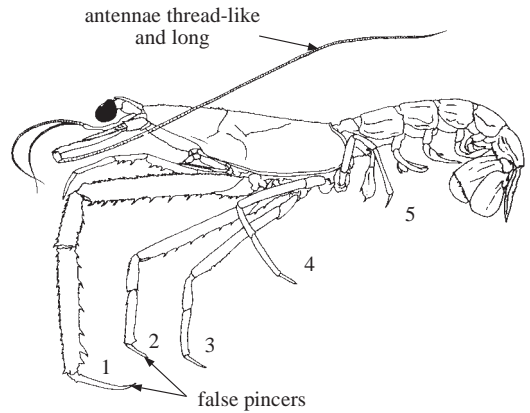
**Scyllaridae:** body strongly flattened dorsoventrally; rostrum absent or minute; antennae plate-like; legs without pincers and none of them enlarged.



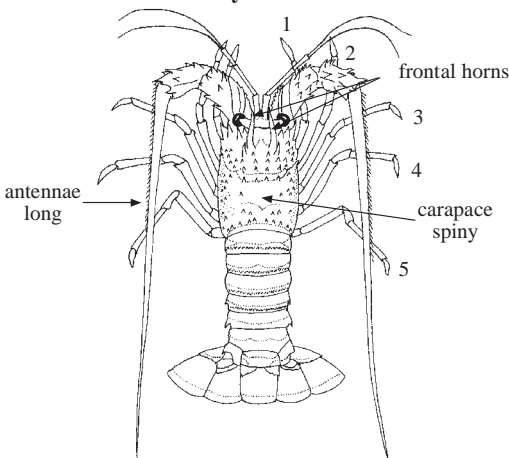
**Enoplometopidae**



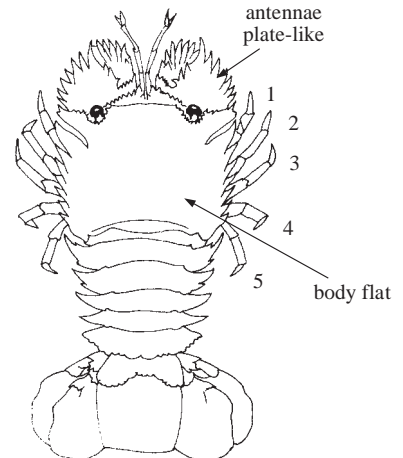
**Polychelidae**



**Glypheidae**



**Palinuridae**

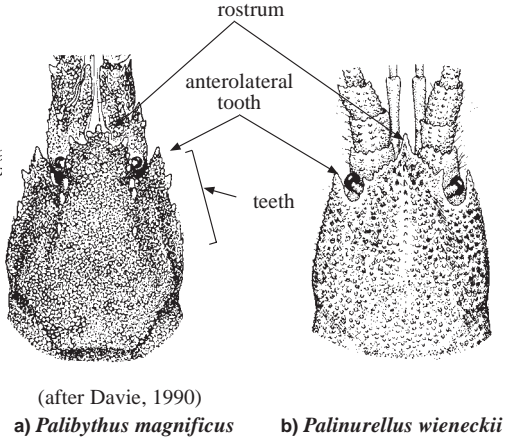
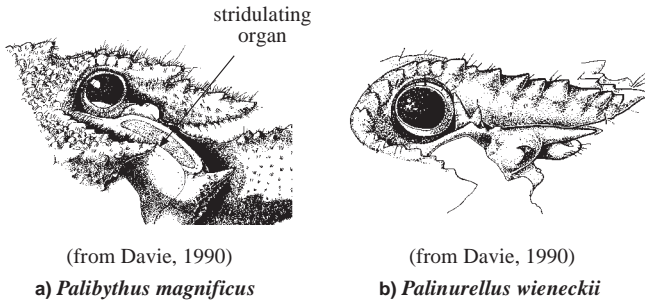


**Scyllaridae**



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

- 1a. Antennular plate with stridulating organ (Fig. 1a); rostrum transversely oval, wider than long; lateral margin of carapace with distinct teeth behind anterolateral tooth (Fig. 2a) . . . . . *Palibythus magnificus*
- 1b. Antennular plate without stridulating organ (Fig. 1b); rostrum triangular, longer than wide; lateral margin of carapace without teeth behind anterolateral tooth (Fig. 2b) . . . . . *Palinurellus wieneckii*



**Fig. 1 lateral part of orbital region and antennular plate**

**Fig. 2 anterior part of carapace**

**List of species occurring in the area**

The symbol ➤ is given when species accounts are included.

- *Palibythus magnificus* Davie, 1990
- *Palinurellus wieneckii* (De Man, 1881)

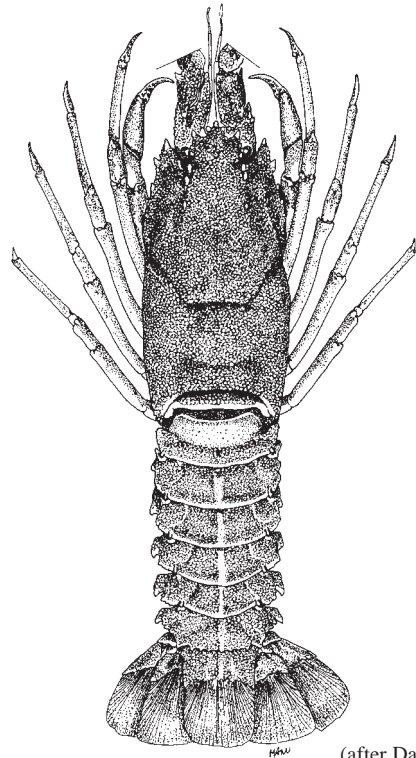
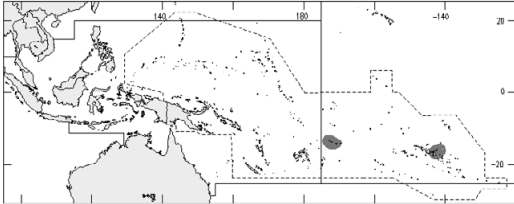
**Reference**

Holthuis, L.B. 1991. FAO species catalogue. Vol. 13. Marine lobsters of the world. An annotated and illustrated catalogue of species of interest to fisheries known to date. *FAO Fish. Synop.*, 125(13):1-292.

***Palibythus magnificus*** Davie, 1990

**En** - Musical furry lobster.

Maximum body length about 27 cm. On rocky bottoms at depths between 90 and 300 m. Although this furry lobster is of a fair size, it is rare and so far only caught by experimental trapping. Only known from Western Samoa and Tuamotu Archipelago.

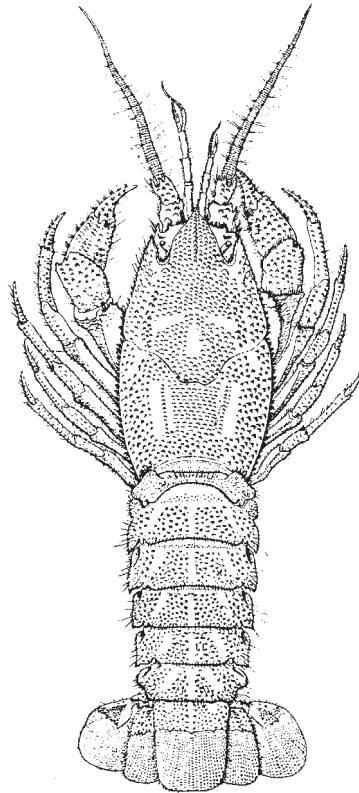
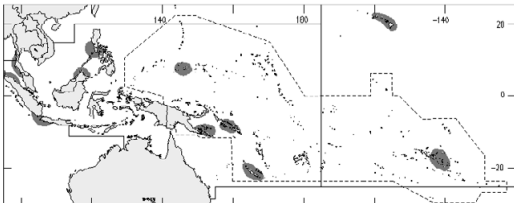


(after Davie, 1990)

***Palinurellus wieneckii*** (De Man, 1881)

**En** - Indo-Pacific furry lobster; **Fr** - Cacahouète indopacifique; **Sp** - Langosta del Indo-Pacífico.

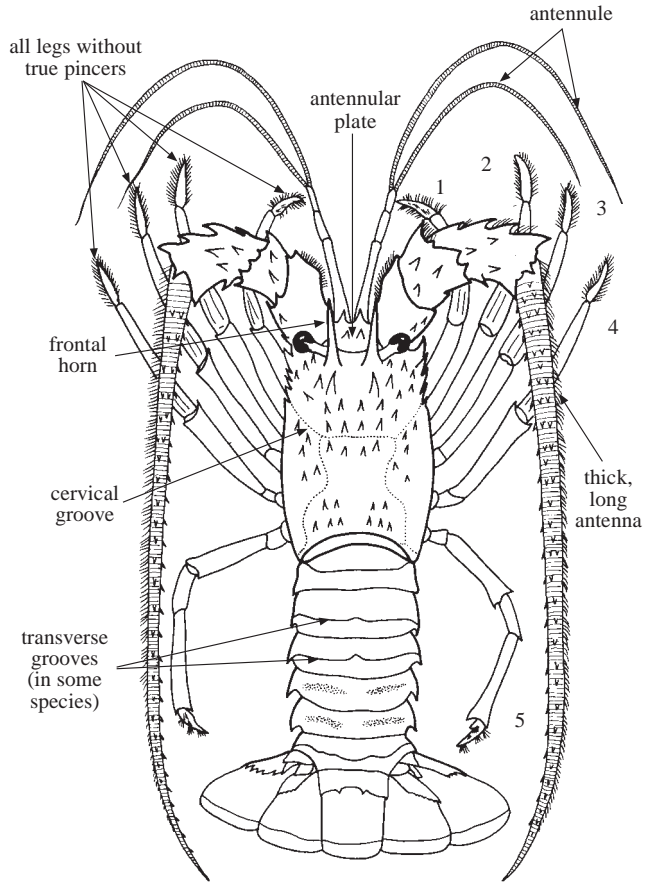
Maximum body length about 20 cm, commonly between 7 and 14 cm. In shallow waters on coral reefs at depths from 9 to 27 m. Probably nocturnal and often found in deep caves. Occasionally caught by divers (using hand) or gill nets. Too rare and small to be of significant importance as food, but highly valued in the aquarium trade for its bright colour and rarity. Specimens in the aquarium trade are presumably originated from the Philippines and Indonesia. Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Red Sea, southern Japan, New Caledonia, French Polynesia, and Hawaii.



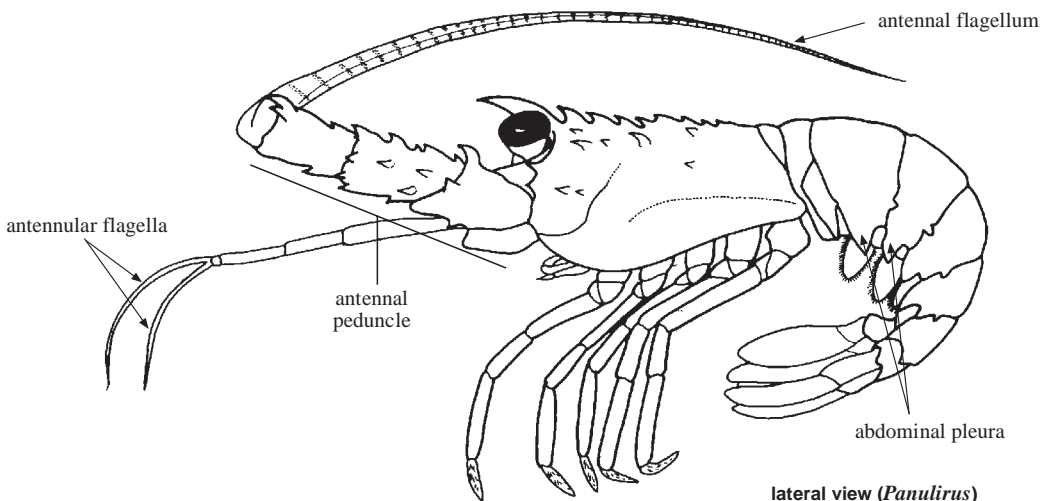
**PALINURIDAE**

**Spiny lobsters, langoustes**

**D**iagnostic characters: Moderate- to large-sized crustaceans. Body tubular or slightly flattened dorsoventrally; hairs, if present, few and scattered. Carapace (or "head") subcylindrical or box-like, laterally rounded or straight, **without a well-developed rostrum, ornamented with spines and granules of various sizes, sometimes with scale-like sculpture (*Justitia*)**. Eyes well developed, each protected by a strong, spiny frontal projection of the carapace (frontal horns). **Antennae rather thick and very long, whip-like or spear-like**; antennal scale absent; antennulae slender and each with 2 long or short flagella. **Bases of antennae often separated by a broad antennular plate usually bearing some spines**. In some genera a projection from the base of antenna is developed and forms with the rim of the antennal plate a stridulating organ which can produce a grating sound by movement of the antenna. **Legs generally simple, without true pincers; the first pair not or only slightly longer than the following legs (except in male of *Justitia longimanus*), but often somewhat more robust**. Both abdomen and tail fan well developed and powerful, **posterior half of tail fan soft and flexible**. Abdominal segments either smooth or each provided with 1 or more transverse grooves. **Colour**: mostly brightly coloured and provided with special markings, bands or spots, or uniformly coloured.

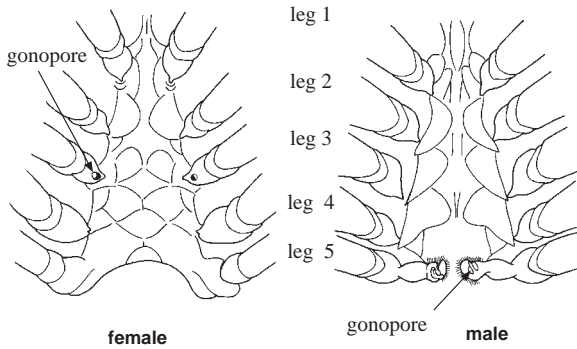


dorsal view (*Panulirus*)

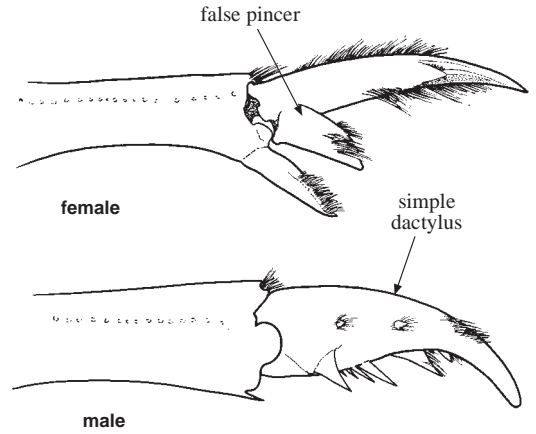


lateral view (*Panulirus*)

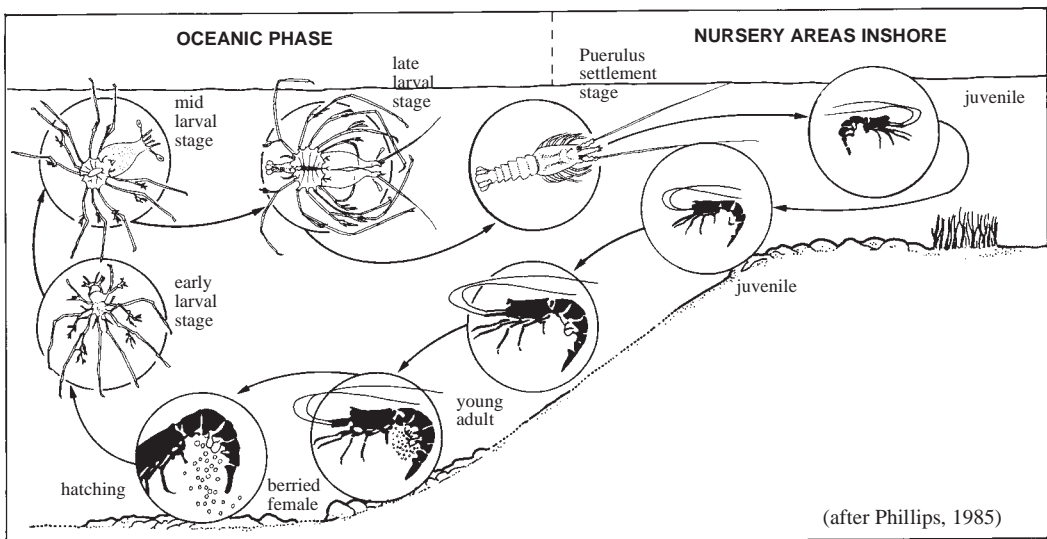




bases of legs in spiny lobsters

terminal segments of 5<sup>th</sup> leg in spiny lobsters

**Habitat, biology, and fisheries:** The maximum body length of species in the area ranges from about 14 cm to over 60 cm. The sexes are easily distinguished by the position of the gonopores which are situated at the bases of the third and fifth legs in females and males, respectively. Furthermore, the last leg forms a false (mostly) or true pincer in mature females, but is simple in mature males. Members of this family are characterized by the eggs (usually orange in colour) being very small and numerous, and by having a relatively shorter carrying time and very long planktonic larval stages (i.e. the phyllosoma). Spiny lobsters are all bottom-dwelling and can be found from very shallow water to a depth of 683 m. The shallow-water genus *Panulirus* comprises most of the species which are mainly nocturnal and live in coral or rocky reefs in depths less than 40 m. These are traditionally considered as excellent seafood and have a high economic value in the area. Juveniles are sometimes also seen in the aquarium trade. All species of *Panulirus* are actively fished throughout the area by divers (taken both by hand and spears), tangle nets, traps, or sometimes even by trawls, although they are not landed anywhere in large quantities. From 1990 to 1995, FAO's Yearbook of Fishery Statistics reports a range of yearly catch of *Panulirus* of 2 450 to 4 126 t from the Western Central Pacific. The other 4 genera occurring in the area are more commonly found in deeper water, some of them living in rocky areas (e.g. *Justitia* and *Palinustus*) and others on soft substrate (e.g. *Linuparus* and *Puerulus*). All these deep-water species are not very abundant, some even rare, and so far only taken as bycatch. Nevertheless, the rarer species are also used for human consumption. Due to their rather large size, some species may have more commercial potential with the development of deep-sea fisheries. Therefore, all spiny lobsters occurring in the area are treated here in separate species accounts.



(after Phillips, 1985)

life cycle of spiny lobsters of the genus *Panulirus*

**Similar families occurring in the area**

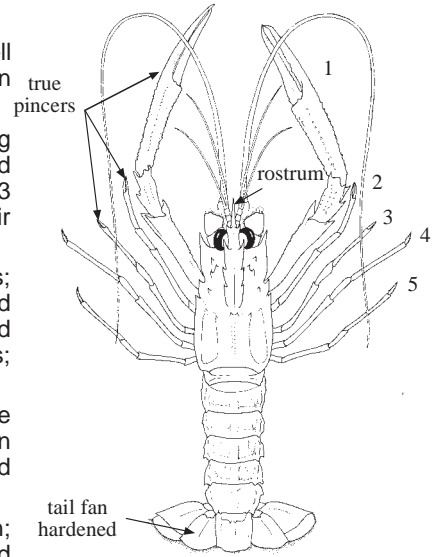
**Nephropidae:** body almost naked or covered with thick fur; rostrum well developed; antennae thin and thread-like; first 3 pairs of legs ending in pincers, first pair greatly enlarged; tail fan entirely hardened.

**Thaumastochelidae:** eyes strongly reduced, cornea lacking pigmentation; rostrum well developed; antennae thin and thread-like, scale with several large teeth along inner margin; first 3 pairs of legs (occasionally also fifth legs) forming pincers, first pair large but very unequal; tail fan entirely hardened.

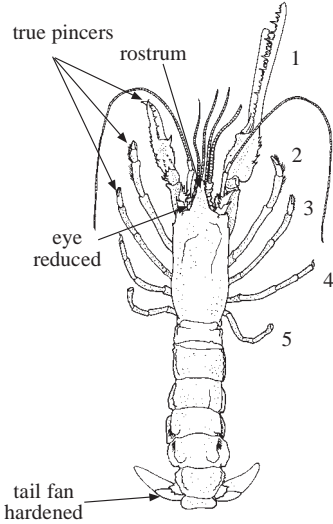
**Enoplometopidae:** body distributed with tufts of long stiff hairs; carapace with a well-developed rostrum; antennae thin and thread-like, antennal scale present; first pair of legs enlarged and forming true pincers, second and third legs ending in false pincers; tail fan entirely hardened.

**Polychelidae:** eyes small, cornea lacking pigmentation; antennae thin and thread-like, shorter than body; first 4 or all legs ending in pincers, with first pair long and slender; telson entirely hardened and with telson pointed.

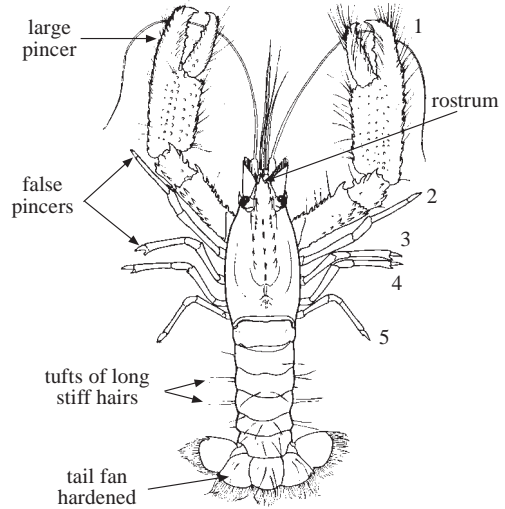
**Glypheidae:** eyes inserted on a median elevation of cephalon; carapace with a well-developed rostrum; antennae thin and thread-like; first 2 legs forming false pincers, the first pair very strong, third legs simple; uropods of tail fan entirely hardened.



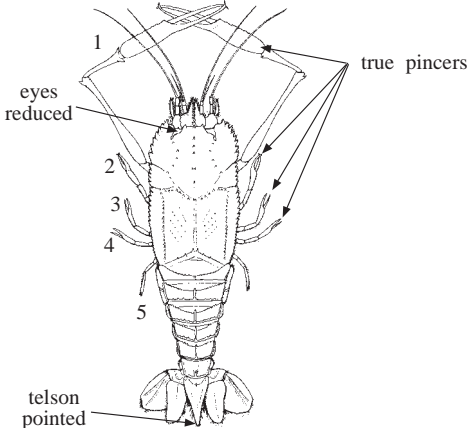
**Nephropidae**



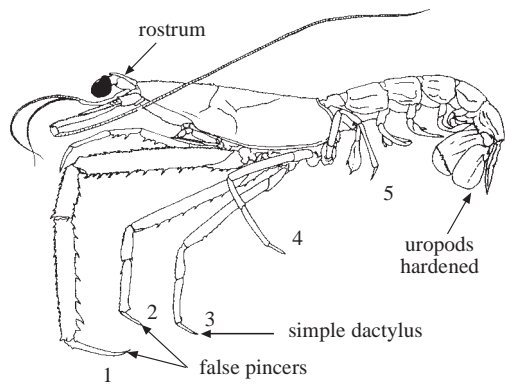
**Thaumastochelidae**



**Enoplometopidae**



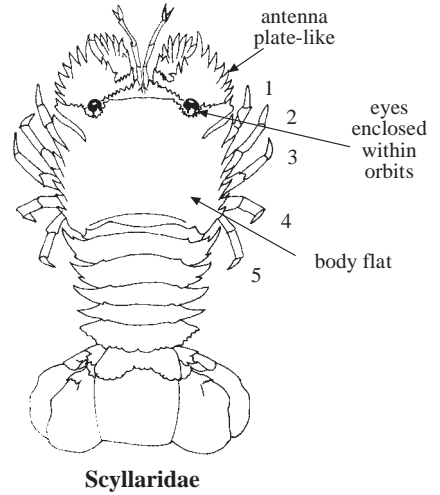
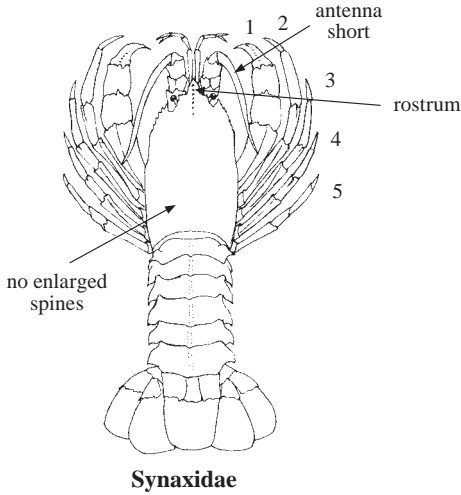
**Polychelidae**



**Glypheidae**

Synaxidae: body very hairy; carapace laterally angular, with a broad and flat triangular or rounded rostrum, covered with small rounded granules but without enlarged spines; antennae whip-like but shorter than carapace; legs without pincers but first pair much heavier than others.

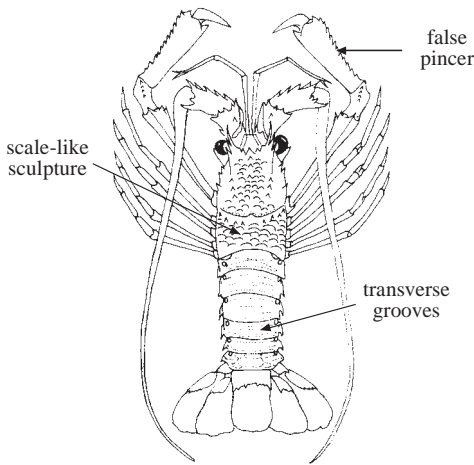
Scyllaridae: body strongly flattened dorsoventrally; carapace depressed and laterally angular; eyes enclosed by distinct orbits and lacking large frontal horns; antennae plate-like; legs without pincers and none of them enlarged.



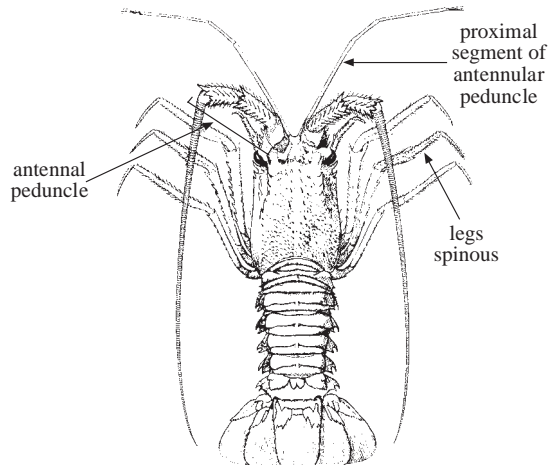
**Key to the genera of Palinuridae occurring in the area**

Note: members of this family, particularly those of the genus *Panulirus*, generally have distinctive colour markings on the body and live and fresh specimens of the various species are often easily distinguished by their coloration.

- 1a. Carapace covered with scale-like sculpture; each abdominal segments with 4 or more transverse grooves; first pair of legs sometimes enlarged and forming false pincers in males (Fig. 1) . . . . . *Justitia*
- 1b. Carapace without scale-like sculpture; abdomen smooth or each segment at most with 2 transverse grooves; first pair of legs simple and never enlarged . . . . . → 2
- 2a. Frontal horns truncated; proximal segment of antennular peduncle longer than antennal peduncle; legs very spinous (Fig. 2) . . . . . *Palinustus*
- 2b. Frontal horns pointed; proximal segment of antennular peduncle distinctly shorter than antennal peduncle; legs sparsely covered with spines . . . . . → 3



**Fig. 1** *Justitia*



**Fig. 2** *Palinustus*

- 3a. Carapace subcylindrical, without median keel (Fig. 3); antennule with flagellum longer than peduncle (Fig. 4a); abdominal pleura ending in 1 strong tooth only (Fig. 5a) . . . . . *Panulirus*
- 3b. Carapace box-like, with a median keel; antennule with flagellum much shorter than peduncle (Fig. 4b); abdominal pleura ending in 2 or more strong teeth . . . . . → 4

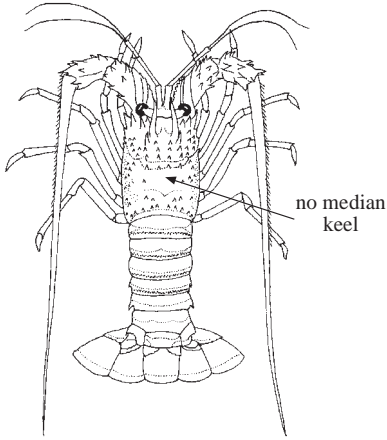


Fig. 3 *Panulirus*

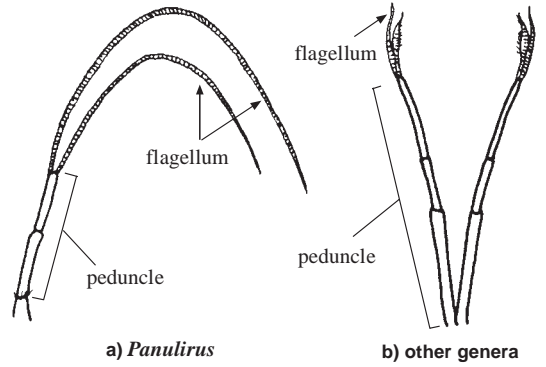


Fig. 4 antennule of spiny lobsters

- 4a. Frontal horns small and fused at the middle of anterior carapace (Fig. 6a); abdominal pleura ending in short teeth (Fig. 5b); antennae thick, inflexible and shorter than body length (Fig. 7) . . . . . *Linuparus*
- 4b. Frontal horns large and widely separated (Fig. 6b); abdominal pleura ending in 2 long teeth (Fig. 5c); antennae slender and much longer than body length (Fig. 8) . . . . . *Puerulus*

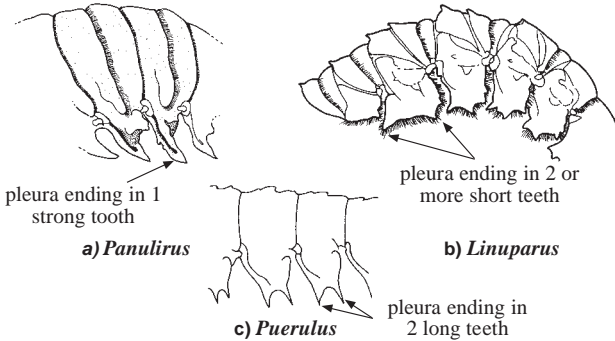


Fig. 5 abdomen (lateral view)

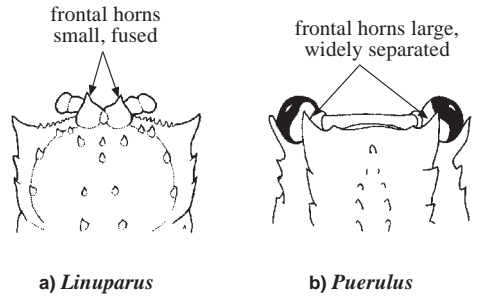


Fig. 6 anterior part of carapace (dorsal view)

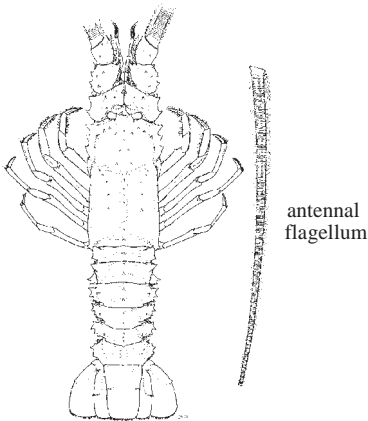


Fig. 7 *Linuparus*

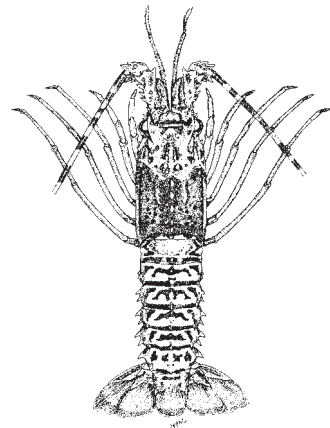
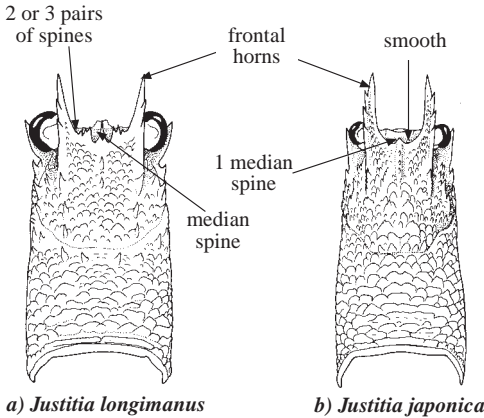


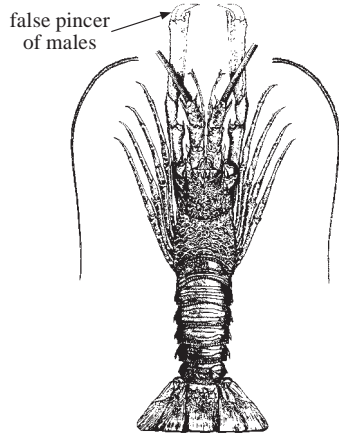
Fig. 8 *Puerulus*

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

- 1a. Median spine on anterior margin of carapace flanked by 2 to 3 pairs of spines (Fig. 9a); antennular peduncle distinctly exceeding antennal peduncle; first pair of legs of males extremely long and forming false pincers (Fig. 10); abdomen not banded . . . . . *Justitia longimanus*
- 1b. A single median spine present on anterior margin of carapace (Fig. 9b); antennular peduncle reaching as far as antennal peduncle; first pair of legs short and simple in both sexes; abdomen covered with red bands . . . . . → 2

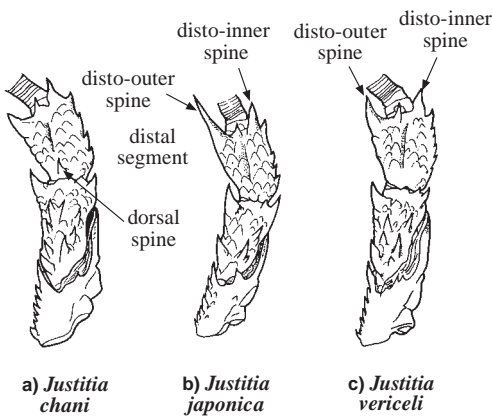


**Fig. 9 carapace (dorsal view)**

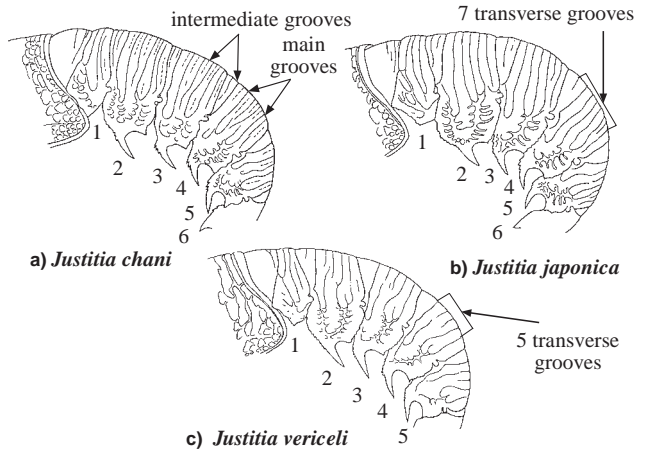


**Fig. 10 *Justitia longimanus***

- 2a. Distal antennal segment with dorsal spine (Fig. 11a); frontal horns usually with 2 dorsal teeth; abdomen with intermediate grooves, usually interrupted and poorly defined, present between main grooves (Fig. 12a); red bands on abdomen located at posterior margin of each segment . . . . . *Justitia chani*
- 2b. Distal antennal segment without dorsal spine; frontal horns usually with 3 dorsal teeth; abdominal grooves simple, without intermediate grooves; red bands on abdomen located at anterior margin of each segment . . . . . → 3
- 3a. Antennal peduncle with disto-outer spine much larger than disto-inner spine (Fig. 11b); third to fifth abdominal segments each with 7 transverse grooves (Fig. 12b); lateral carapace without special coloured patches . . . . . *Justitia japonica*
- 3b. Disto-outer and disto-inner spines of antennal peduncle similar in length (Fig. 11c); third to fifth abdominal segments each with 5 transverse grooves (Fig. 12c); lateral carapace with 2 red patches . . . . . *Justitia vericeli*



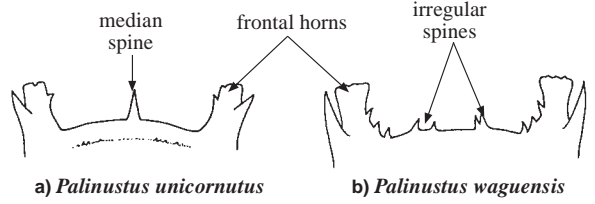
**Fig. 11 right antennal peduncle (dorsal view)**



**Fig. 12 abdomen (lateral view)**  
(from Poupin, 1994)

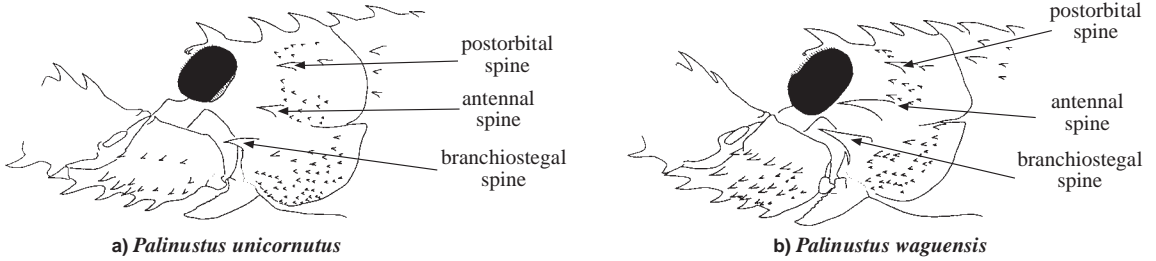
**Key to the species of *Palinustus* occurring in the area**

**1a.** Elevated parts of abdomen almost naked; anterior margin of carapace between frontal horns generally with a single median spine (Fig. 13a); post-orbital, antennal and branchiostegal spines moderately long and similar in size (Fig. 14a); antennules uniformly orange-red and legs covered with broad pale bands . . . *Palinustus unicornutus*



**Fig. 13** anterior part of carapace (dorsal view)

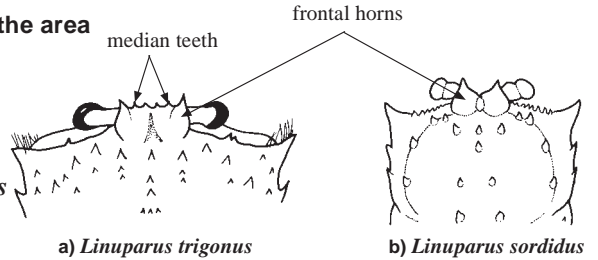
**1b.** Elevated parts of abdomen distinctly pubescent; anterior margin of carapace between frontal horns provided with 1 to 8 irregularly arranged spines, or spines absent (Fig. 13b); postorbital spine distinctly shorter than antennal spine and branchiostegal spines (Fig. 14b); antennules banded and legs covered with dense narrow red rings . . . *Palinustus waguensis*



**Fig. 14** anterior part of carapace (lateral view)

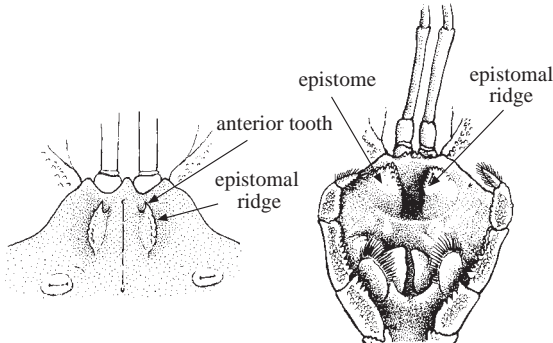
**Key to the species of *Linuparus* occurring in the area**

**1a.** Strong median teeth present between frontal horns (Fig. 15a); epistome ridges with strong anterior teeth (Fig. 16a); second and third abdominal pleura bearing basal teeth (Fig. 17) . . . . . *Linuparus trigonus*



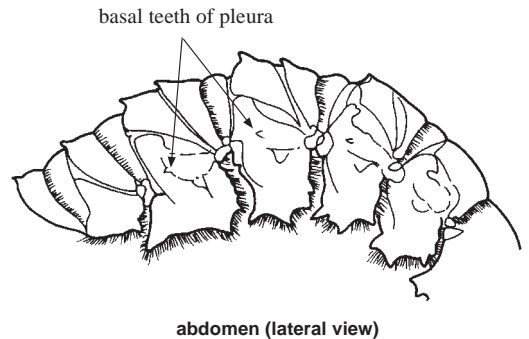
**Fig. 15** anterior part of carapace (dorsal view)

**1b.** No strong median teeth between frontal horns (Fig. 15b); epistome ridges without strong anterior teeth (Fig. 16b); second and third abdominal pleura without basal teeth . . . . . *Linuparus sordidus*



**a) *Linuparus trigonus*:** epistome  
**b) *Linuparus sordidus*:** anterior part of body (ventral view)

**Fig. 16**

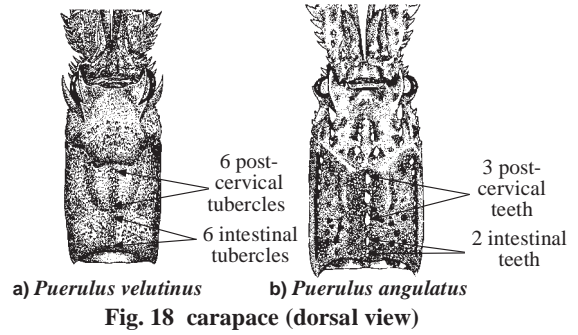


**Fig. 17** *Linuparus trigonus*



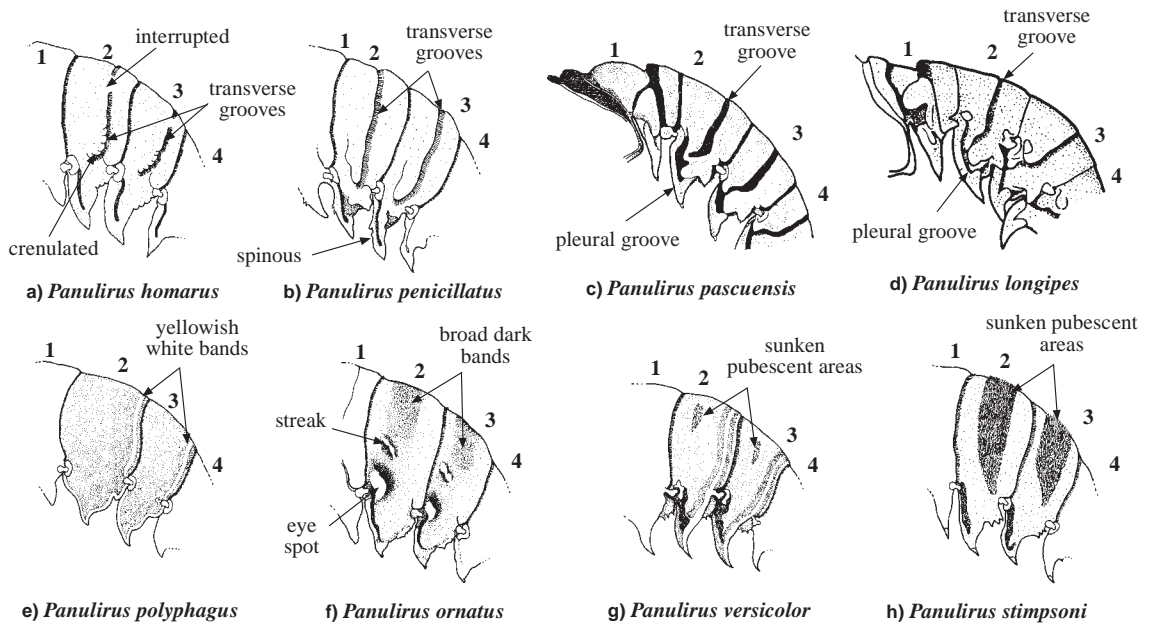
**Key to the species of *Puerulus* occurring in the area**

- 1a. Body heavily pubescent; postorbital spine present; median keel of carapace with 6 postcervical and 6 intestinal tubercles; eyes large, much broader than long (Fig. 18a) . . . . .  
 . . . . . *Puerulus velutinus*
- 1b. Body only slightly pubescent; postorbital spine absent; median keel of carapace with 3 postcervical and 2 intestinal teeth; eyes smaller, longer than broad (Fig. 18b) . . . . .  
 . . . . . *Puerulus angulatus*



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

- 1a. Abdomen provided with transverse grooves . . . . . → 2
- 1b. Abdomen without transverse grooves or only with broad sunken pubescent areas . . . . . → 6
- 2a. Anterior margins of transverse grooves on abdomen crenulated, grooves incomplete or interrupted in the middle (Fig. 19a); antennular plate bearing 4 well-separated principal spines and some small spinules (Fig. 20a); body greenish to brown, regions between eyestalks with bright orange and blue markings; legs blotched . . . . . *Panulirus homarus*
- 2b. Transverse grooves on abdomen with straight anterior margins, not crenulated . . . . . → 3
- 3a. Antennular plate armed with 4 close-set principal spines (Fig. 20b); anterior margin of third abdominal pleuron spinous (Fig. 19b); body dark blue and brown, membranes at outer bases of antennae light blue; legs striped . . . . . *Panulirus penicillatus*
- 3b. Antennular plate with 2 principal spines (Fig. 20c); anterior margin of third abdominal pleuron not spinous . . . . . → 4



**Fig. 19 abdominal segments (lateral view)**



- 4a. Transverse groove of second abdominal segment not joining corresponding pleural groove (Fig. 19c); body dark purple with some greenish, not speckled; irregular pale bands along posterior margin of abdominal segments, sometimes with whitish spots mixed in with them; spots on basis of tail fan; antennules not banded; legs striped . . . . . *Panulirus pascuensis*
- 4b. Transverse groove of second abdominal segment joining corresponding pleural groove (Fig. 19d) . . . . . → 5

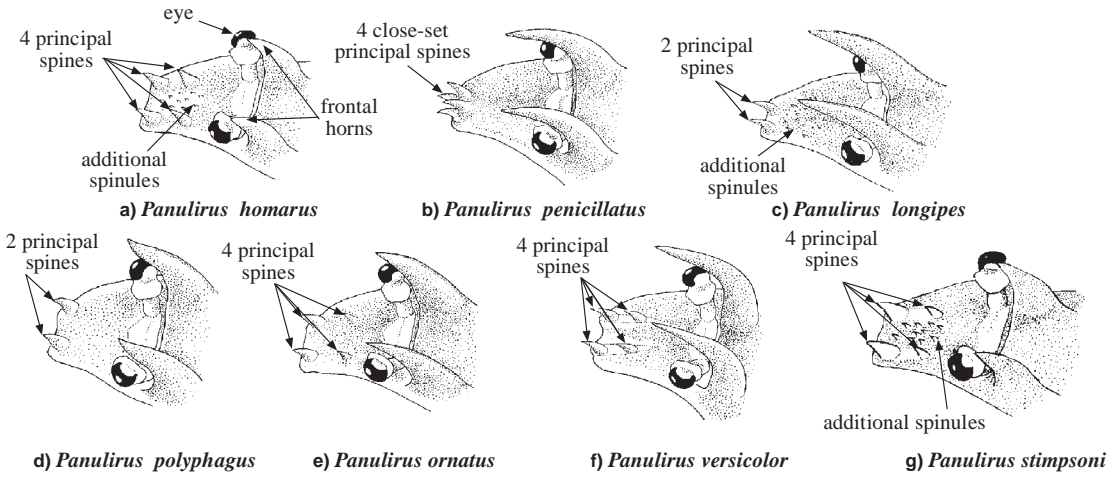


Fig. 20 antennular plate

- 5a. Median area at anterior carapace behind frontal horns usually bearing a longitudinal row of 3 spines only (Fig. 21a); ventral surfaces of distal 2 antennal segments each with 2 large spines only (Fig. 22a); thoracic sternum with 2 strong submedian protrusions (Fig. 23a); antennules with outer flagella dark brown and inner flagella entirely whitish; antennal peduncle including stridulating pad pinkish; lateral carapace with 2 complete longitudinal white strips extending along the entire carapace; legs striped . . . . . *Panulirus albiflagellum*
- 5b. Median area at anterior carapace behind frontal horns always bearing some smaller, irregular spines in addition to the regular row of 3 spines (Fig. 21b); ventral surfaces of distal 2 antennal segments each with 1 large spine (sometimes also with several other scattered spinules, Fig. 22b); thoracic sternum without strong submedian protrusions (Fig. 23b); antennules alternated with dark brown and white bands; antennular peduncle brown to purple and with stridulating pad bright blue; lateral carapace with 1 short (upper) and 1 long (lower) longitudinal white stripes; legs striped or spotted . . . . . *Panulirus longipes*

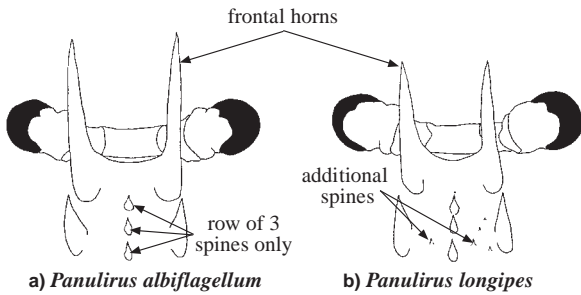


Fig. 21 anterior part of carapace

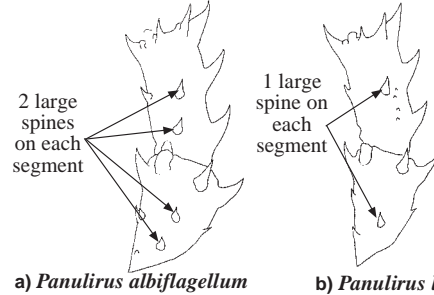


Fig. 22 distal 2 segments of antenna (ventral view)

- 6a. Abdomen naked and smooth (Fig. 19e, f); legs blotched . . . . . → 7
- 6b. At least second and third abdominal segments with broad sunken pubescent areas (Fig. 19g, h); legs striped . . . . . → 8
- 7a. Antennular plate armed with 1 pair of principal spines (Fig. 20d); body pale green and abdomen with narrow transverse yellowish white bands (Fig. 19e) . . . . . *Panulirus polyphagus*
- 7b. Antennular plate armed with 2 pairs of principal spines (Fig. 20e); body greenish and abdomen with broad transverse dark bands (Fig. 19f), legs and antennules conspicuously ringed with light yellow and black . . . . . *Panulirus ornatus*

- 8a.** Antennular plate armed with 2 pairs of principal spines only (Fig. 20f); fourth to sixth abdominal segments smooth (Fig. 24a); body deep blue and green, abdomen with narrow transverse white bands, antennal and antennular flagella whitish. . . . *Panulirus versicolor*
- 8b.** Antennular plate with many small spinules in addition to the 2 pairs of principal spines (Fig. 20g); sunken pubescent areas present on all abdominal segments (Fig. 24b); body greenish, region between eyestalks not brightly marked and abdomen not banded  
 . . . . . *Panulirus stimpsoni*

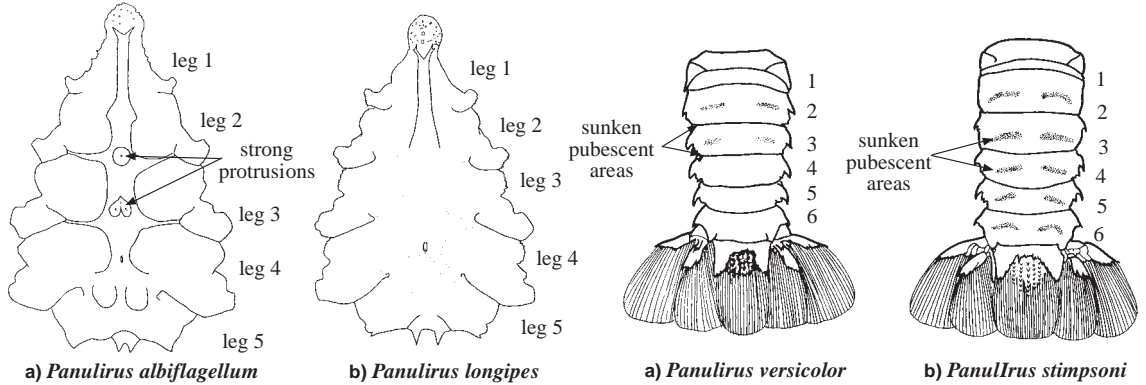


Fig. 23 thoracic sternum (ventral view)

Fig. 24 abdomen (dorsal view)

### List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Justitia chani* Poupin, 1994
-  *Justitia japonica* (Kubo, 1955)
-  *Justitia longimanus* (H. Milne Edwards, 1837)
-  *Justitia vericeli* Poupin, 1994
-  *Linuparus sordidus* Bruce, 1965
-  *Linuparus trigonus* (Von Siebold, 1824)
-  *Palinustus unicornutus* Berry, 1963
-  *Palinustus waguensis* Kubo, 1963
-  *Panulirus albiflagellum* Chan and Chu, 1996
-  *Panulirus homarus* (Linnaeus, 1758)
-  *Panulirus longipes* (A. Milne Edwards, 1868)
-  *Panulirus ornatus* (Fabricius, 1798)
-  *Panulirus pascuensis* Reed, 1954
-  *Panulirus penicillatus* (Olivier, 1791)
-  *Panulirus polyphagus* (Herbst, 1793)
-  *Panulirus stimpsoni* Holthuis, 1963
-  *Panulirus versicolor* (Latreille, 1804)
-  *Puerulus angulatus* (Bate, 1888)
-  *Puerulus velutinus* Holthuis, 1963

### References

- Chan, T.Y. and K.H. Chu. 1996. On the different forms of *Panulirus longipes femoristriga* (von Martens, 1872) (Crustacea: Decapoda: Palinuridae), with description of a new species. *J. Nat. Hist.*, 30:367-387.
- Chan, T.Y. and H.P. Yu. 1993. *The illustrated lobsters of Taiwan*. Taipei, SMC Publishing Inc., 248 p.
- Chan, T.Y. and H.P. Yu. 1995. The rare lobster genus *Palinustus* A. Milne Edwards, 1880 (Decapoda: Palinuridae), with description of a new species. *J. Crust. Biol.*, 15(2):376-394.
- Holthuis, L.B. 1991. Marine lobsters of the world. FAO species catalogue. Vol. 13. An annotated and illustrated catalogue of species of interest to fisheries known to date. *FAO Fish. Synop.*, 125(13):1-292.
- Poupin, J. 1994. The genus *Justitia* Holthuis, 1946, with the description of *J. chani* and *J. vericeli* spp. nov. (Crustacea, Decapoda, Palinuridae). *J. Taiwan Mus.*, 47(1):37-56.

***Panulirus albiflagellum*** Chan and Chu, 1996

**Frequent synonyms / misidentifications:** None / *Panulirus longipes* (A. Milne Edwards, 1868); *P. longipes femoristriga* (Von Martens, 1872).

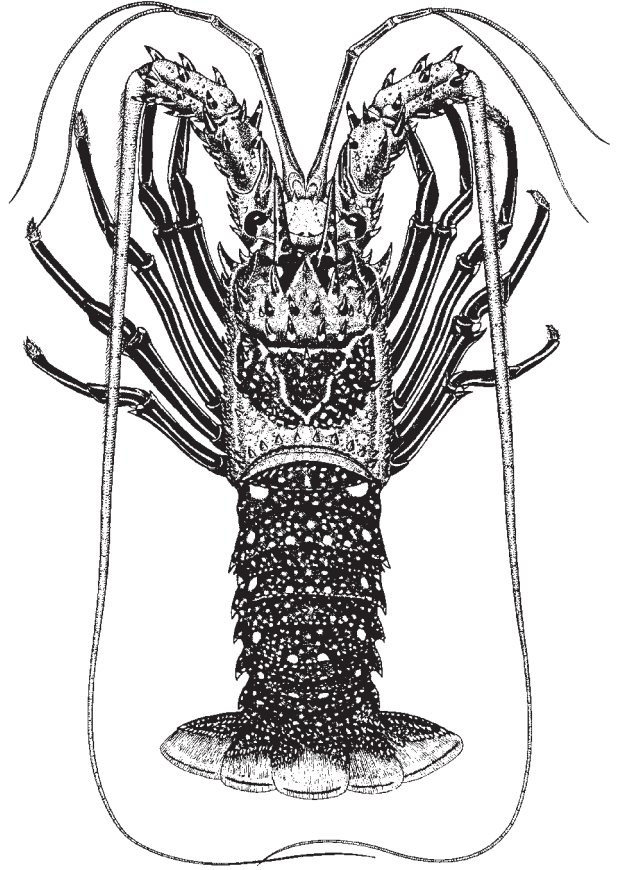
**FAO names:** En - White whisker spiny lobster.

**Diagnostic characters:** Carapace rounded and spiny; rostrum absent; anterior margin armed with irregular-sized spines; **height of frontal horn about 2.5 times the eye height; median area behind frontal horns generally with a longitudinal row of 3 spines only; cervical groove distinctly wider than posterior marginal groove.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae bearing 1 pair of well-separated principal spines and some scattered spinules; ventral surfaces of distal 2 antennal segments each with a row of 2 equal-sized large spines only.** First 4 pairs of legs without pincers. **Thoracic sternum with 2 strong submedian protrusions. Abdominal segments with a complete transverse groove joining the pleural groove; abdominal pleura only with that of second segment sometimes bearing spinules.** Posterior half of tail fan soft and flexible. **Colour:** body dark brown to indigo, covered with numerous white spots and markings. Eyes black-brown. **Lateral carapace with 2 longitudinal white stripes running along the entire carapace. Inner surface of antennal peduncle (including stridulating pad) and antennular plate pink; antennal flagella dorsally brown, ventrally whitish to pink; antennules with peduncle dark brown but laterally white, outer flagella dark brown and inner flagella entirely whitish. Legs striped with conspicuous white lines. Abdomen covered with numerous medium-sized white spots.** Soft part of tail fan orange-brown with distal margin whitish. Pleopods somewhat greenish with white margins. Eggs orange.

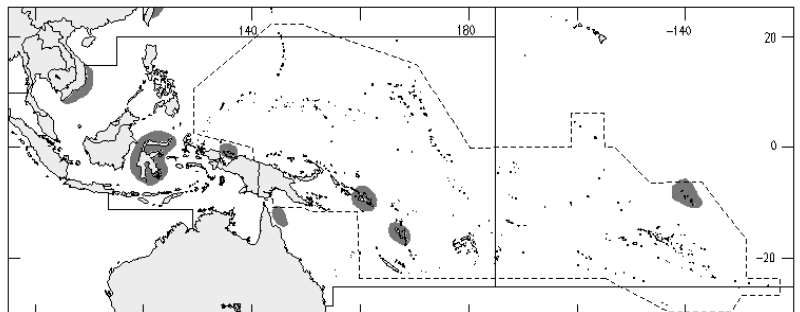
**Size:** Maximum body length about 25 cm, commonly between 18 and 21 cm.

**Habitat, biology, and fisheries:** In shallow reef areas to a depth of about 20 m. Caught throughout its range, but apparently nowhere abundant. Nevertheless, in Indonesia this lobster can periodically be found in markets (live and fresh) and is sometimes even exported (live). No separate statistics are reported for this species because of former confusion with *Panulirus longipes*.

**Distribution:** Indo-West Pacific from the Maldives Islands, Viet Nam, Indonesia, Great Barrier Reef (Australia), Taiwan Province of China, and Japan; probably also occurs in the Solomon Islands, New Hebrides, and French Polynesia.



(after George and Holthuis, 1965)



*Panulirus homarus* (Linnaeus, 1758)

**Frequent synonyms / misidentifications:**

*Panulirus dasypus* (H. Milne Edwards, 1837);  
*P. burgeri* (De Haan, 1841) / None.

**FAO names:** **En** - Scalloped spiny lobster;  
**Fr** - Langouste festonée; **Sp** - Langosta festoneada.

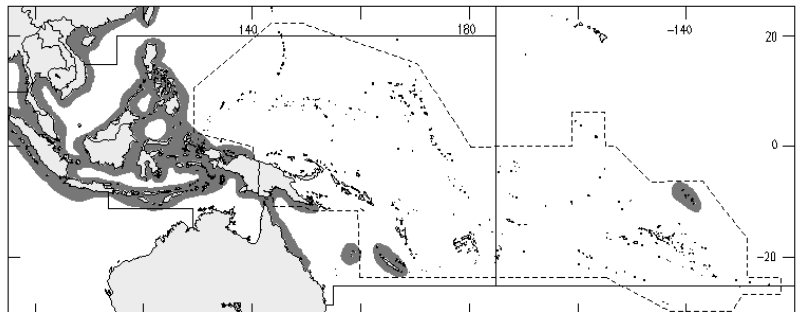
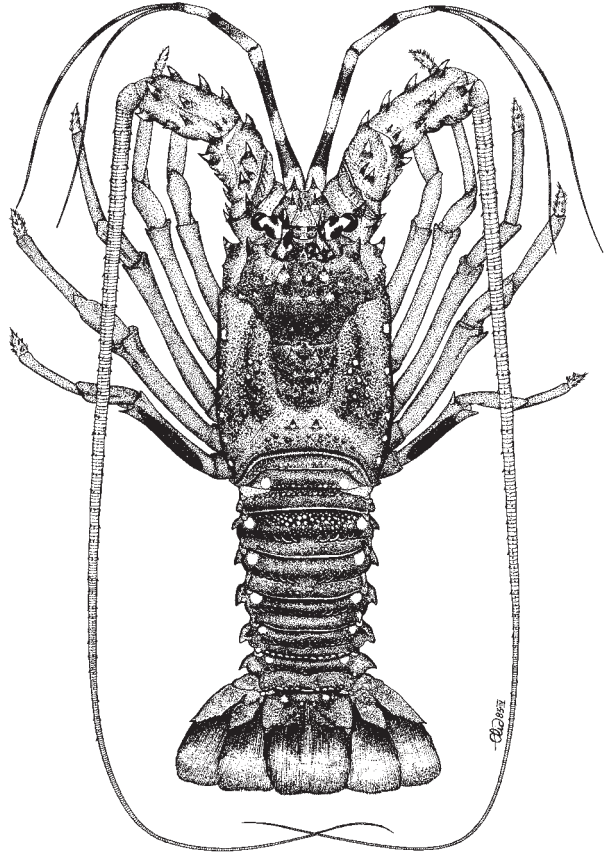
**Diagnostic characters:** Carapace rounded and spiny, sometimes with branchiostegal areas slightly inflated; rostrum absent; anterior margin armed with 4 regularly spaced large spines other than frontal horns; **height of frontal horns about 2 times the eye height, without spinules in between.** Antennules with flagella longer than peduncle, **antennular plate at bases of antennae bearing 2 pairs of well-separated principal spines (anterior pair slightly larger) and some spinules.** First 4 pairs of legs without pincers. **Abdominal segments with a slightly crenate transverse groove, sometimes interrupted at the middle.** Posterior half of tail fan soft and flexible.

**Colour:** body greenish to brownish. Eyes dark brown. **Anterior carapace and region between eyestalks with bright orange and blue markings. Frontal horns banded with black and white. Antennular flagella alternated with brown and white bands. Legs blotched.** Abdomen covered with tiny white spots. Pleopods red-brown. Eggs orange.

**Size:** Maximum body length 31 cm, commonly between 16 and 25 cm.

**Habitat, biology, and fisheries:** In reef areas with sand in the surf zone and sometimes also in turbid waters at depths from 1 to 5 m, but can be found down to a depth of 90 m. Gregarious and nocturnal. The females produce 100 000 to 900 000 eggs per brood and hatching occurs after 25 to 59 days. The phyllosoma larvae last 4 to 7 months and have 9 stages. The juveniles molt every few weeks and become sexually mature after 2 to 3 years (carapace length 5 to 6 cm) after larval settlement. In the fourth year the reproductive potential is highest (carapace length 7 to 7.9 cm). The adults molt about 4 times a year and the life span of this lobster is estimated to be 8 to 10 years. Actively fished throughout its range by hand, with traps, gill nets, cast nets, and baited lines. Big catches are often possible after typhoons or heavy rains. The fishery of this lobster is mostly local though it is exported in some areas such as the Philippines and Indonesia (sometimes live) together with other species of the genus.

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





***Panulirus longipes*** (A. Milne Edwards, 1868)

LOJ

**Frequent synonyms / misidentifications:** *Panulirus longipes femoristriga* (Von Martens, 1872) / *Panulirus japonicus* (Von Siebold, 1824); *P. albiflagellum* Chan and Chu, 1996.

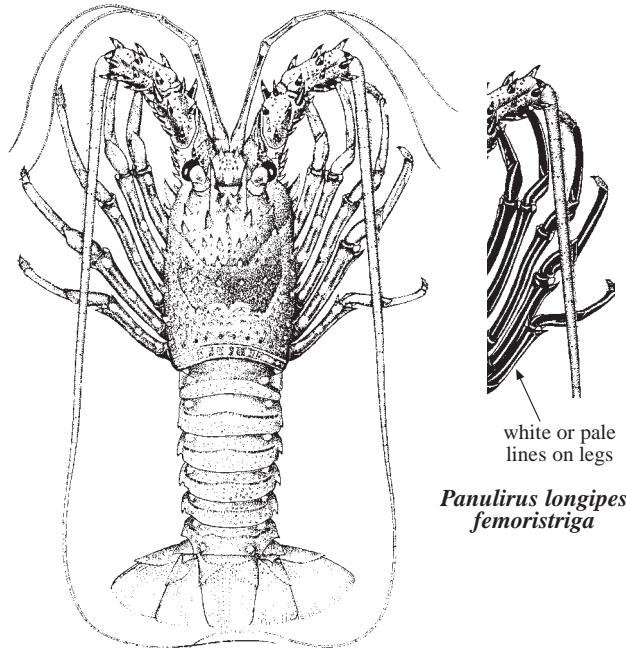
**FAO names:** **En** - Longlegged spiny lobster; **Fr** - Langouste diablotin; **Sp** - Langosta duende.

**Diagnostic characters:** Carapace rounded and spiny; rostrum absent; anterior margin armed with irregular-sized spines; **height of frontal horns about 2.5 times the eye height; median area behind frontal horns always bearing some additional spinules other than the regular longitudinal row of 3 spines; cervical groove about as wide as posterior marginal groove.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae bearing 1 pair of well-separated principal spines and some scattered spinules; ventral surfaces of distal 2 antennal segments each with 1 large spine, often flanked by some scattered spinules.** First 4 pairs of legs without pincers. Thoracic sternum without strong submedian protrusions. Abdominal segments with a complete transverse groove joining the pleural groove; abdominal pleura only with that of second segment sometimes bearing spinules. Posterior half of tail fan soft and flexible. **Colour:** body dark brown to indigo and covered with numerous white spots and markings. Eyes black-brown. **Lateral carapace with 1 short (upper) and 1 long (lower) longitudinal white stripe.** **Inner surfaces of antennae and antennular plate brown to purple and with stridulating pad bright blue;** antennal flagella brownish with ventral surface lighter in colour; **antennules dark brown and alternated with conspicuous white bands.** Legs covered with prominent white spots connected by orange lines, or only striped with white or pale lines. **Abdomen covered with numerous small to medium-sized white spots.** Soft part of tail fan orange-brown with posterior margin whitish. Pleopods somewhat greenish with white margins. Eggs orange.

**Size:** Maximum body length 35 cm, commonly between 18 and 25 cm.

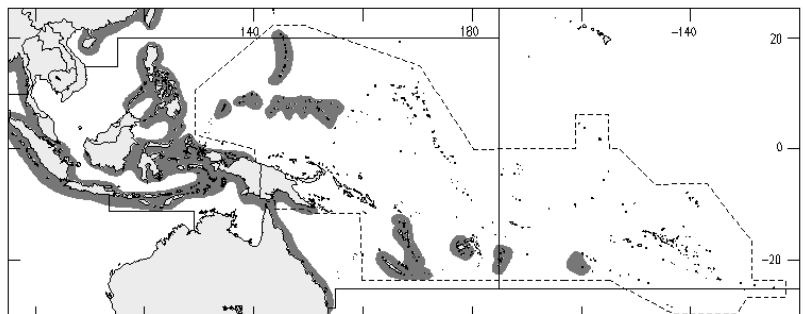
**Habitat, biology, and fisheries:** Found in shallow coral or rocky reefs (but can be found down to a depth of 130 m), usually in clear waters with moderate currents, sometimes in slightly turbid waters. Nocturnal and not gregarious; females produce an average of 132 000 eggs per brood. Actively fished throughout its range, but apparently nowhere very abundant. Taken by hand during night diving or with spears, also with traps, tangle nets and lobster pots. The fishery of this lobster is mostly of local interest. In some regions, such as the Philippines and Indonesia, occasionally exported live, together with other species of this genus.

**Distribution:** Widely distributed in the Indo-West Pacific from the eastern coast of Africa to Japan and Fiji. Two subspecies are recognized: the western or the spotted-legged form *Panulirus longipes longipes* occurring from eastern Africa to Thailand, Taiwan Province of China, the Philippines, and Indonesia; the eastern or the striped-legged form *P. longipes femoristriga* is known from Japan to the Bonin Islands, Taiwan Province of China, the Philippines, Indonesia, Australia, New Caledonia, the Loyalty Islands, New Hebrides, and Fiji; probably also in Micronesia, Papua New Guinea, Tonga, and the Cook Islands.



*Panulirus longipes longipes*

*Panulirus longipes femoristriga*

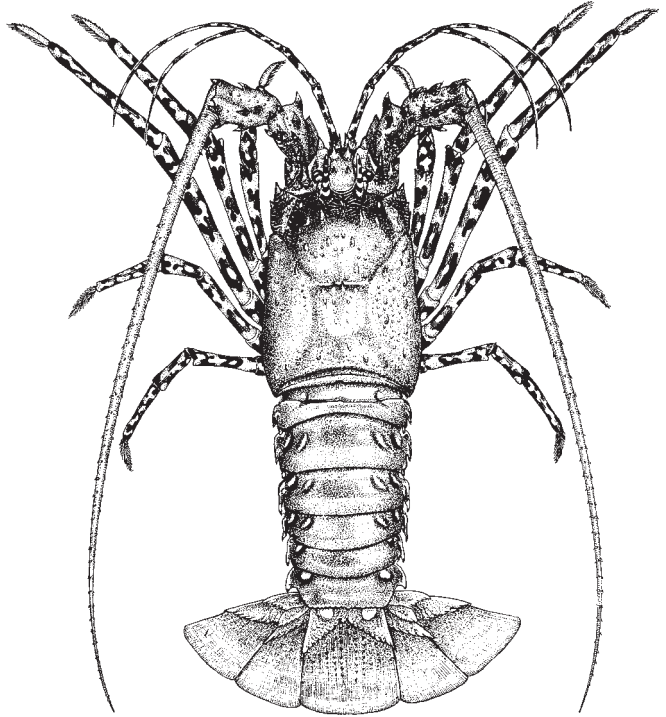


*Panulirus ornatus* (Fabricius, 1798)

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** **En** - Ornate spiny lobster; **Fr** - Langouste ornée; **Sp** - Langosta ornamentada.

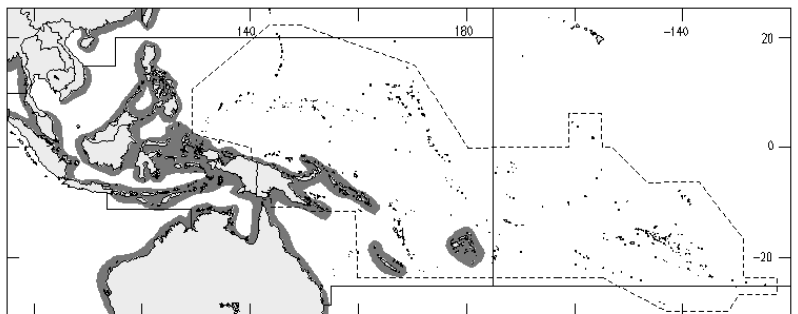
**Diagnostic characters:** Carapace rounded and spiny; rostrum absent; anterior margin bearing irregular-sized spines other than frontal horns; **height of frontal horns about 2 times the eye height, without spinules in between.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae bearing 2 pairs of well-separated principal spines (anterior pair considerably larger), sometimes also with several spinules.** First 4 pairs of legs without pincers. **Abdomen naked and smooth, without transverse grooves or sunken pubescent areas.** Posterior half of tail fan soft and flexible. **Colour:** body greenish with carapace slightly bluish. Eyes black-brown. **Frontal horns intricately banded with yellowish white and brown markings.** Antennal peduncle bluish with stridulating pad somewhat pinkish. **Antennules and legs conspicuously ringed with pale yellow and black. Abdomen covered with broad transverse dark bands over middle of each segment and bearing large pale yellowish spots near hinges.** Pleopods yellowish. Eggs orange.



**Size:** Maximum body length about 60 cm, commonly between 20 and 35 cm. Maximum weight over 6 kg. Probably the largest species of the genus.

**Habitat, biology, and fisheries:** Usually occurs at depths from 1 to 10 m, but can be found to a depth of 200 m. In calm areas of coral and rocky reefs or reef slopes, sometimes also found on muddy substrate in river mouths with fairly turbid water. Lives solitary or in pairs; seasonal mass migrations have been observed in Torres Strait populations. Actively fished throughout its range, mostly by divers (using hand and spear), sometimes by hand nets and trawls (formerly a main fishing method in Torres Strait, but now banned). Sold mostly fresh or frozen in local markets, sometimes exported (as from the Philippines and Australia, live or tailed). In most parts of the area the catches are not very large but a commercial fishery for this species has been developed in Papua New Guinea (off the Gulf of Papua) and Australia (off Torres Strait and N.E. Queensland) since 1966, with an annual catch of about 250 t "tail weight" in 1990. It is reported that traps are not effective to catch this species and mass mortality may occur in breeding lobsters.

**Distribution:** Widely distributed in the Indo-West Pacific from East Africa to Japan, Australia, and Fiji. Recently also reported to enter the Mediterranean from the Red Sea.





*Panulirus penicillatus* (Olivier, 1791)

**Frequent synonyms / misidentifications:** None / None.

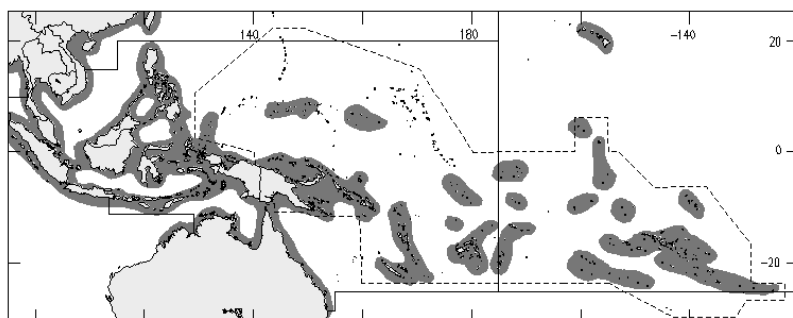
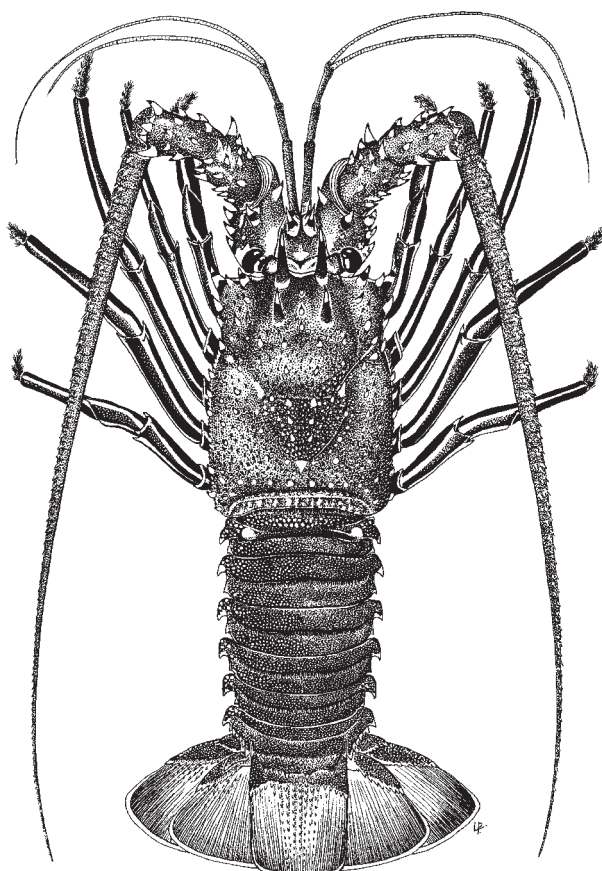
**FAO names:** **En** - Pronghorn spiny lobster; **Fr** - Langouste fourchette; **Sp** - Langosta horquilla.

**Diagnostic characters:** Carapace rounded and spiny, with branchiostegal areas slightly inflated; rostrum absent; anterior margin armed with 4 large and regularly spaced large spines other than frontal horns; **height of frontal horns about 2 times the eye height; median area behind frontal horns with a longitudinal row of spinules.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae armed with 4 close-set principal spines (posterior pair larger).** First 4 pairs of legs without pincers. **Abdominal segments with a transverse groove, not continuous with pleural groove; anterior margins of pleura spinous.** Posterior half of tail fan soft and flexible. **Colour:** body dark blue and brown; males usually darker than females. Eyes black. Tips of large spines on carapace yellowish. Antennular peduncle striped with white lines, flagella uniformly brownish; **membranous areas at outer base of antenna light blue. Legs conspicuously striped with white lines.** Abdomen with tiny pale dots. Pleopods and soft part of tail fan black.

**Size:** Maximum body length 40 cm, commonly between 20 and 30 cm (males usually larger).

**Habitat, biology, and fisheries:** Found in shallow waters, usually at depths from 1 to 4 m (maximum depth 16 m) at seaward edges of reefs, in clear waters not influenced by rivers. Nocturnal and usually not gregarious, but sometimes occurs in a "harem" of mixed sexes; often found in deep caves during the daytime and strongly clinging to rocks at surf zones or areas with strong currents such as surge channels. Good catches are often possible during dark nights, particularly after the full moon. The phyllosoma larval stage of this species probably lasts 7 to 8 months and has 10 substages. The females seem to be reproductive all year around in the south western Pacific. Requires silt-free clear waters and is therefore found in optimal conditions around oceanic islands; it is the predominant spiny lobster in the South Pacific Islands. Fished throughout its range and mostly taken during day and night diving by hand and spear, sometimes also by trammel nets and traps, but less effectively so. However, the catches are generally not very abundant and it is mostly sold fresh, live, cooked whole or tailed for local consumption, but also exported in some regions, such as from the Philippines and Indonesia. Considered a commercially threatened species by the World Conservation Union (IUCN).

**Distribution:** Probably the most widely distributed species of the genus and can be found in the Indo-Pacific from the eastern coast of Africa to the Red Sea, Japan, Australia, French Polynesia, Hawaii, and the offshore islands near the western coasts of America (e.g. the Galapagos Archipelago).



*Panulirus polyphagus* (Herbst, 1793)

**Frequent synonyms / misidentifications:** *Panulirus fasciatus* (Fabricius, 1798) / None.

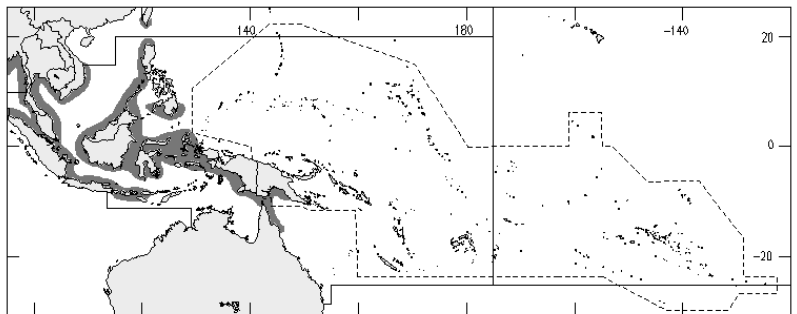
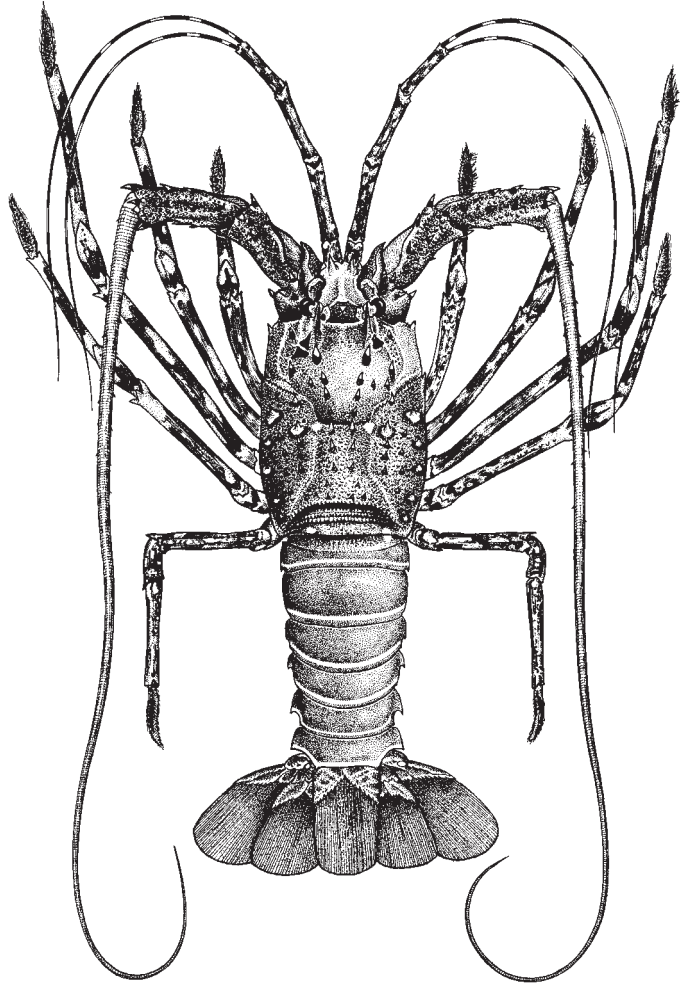
**FAO names:** **En** - Mud spiny lobster;  
**Fr** - Langouste de vase; **Sp** - Langosta fanguera.

**Diagnostic characters:** Carapace rounded and spiny; rostrum absent; anterior margin with irregular-sized spines other than frontal horns; **height of frontal horns less than 2 times the eye height, without spinules in between.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae armed with 1 pair of well-separated principal spines only.** First 4 pairs of legs without pincers. **Abdomen naked and smooth; without transverse grooves or sunken pubescent areas.** Posterior half of tail fan soft and flexible. **Colour:** body dull green. Eyes black-brown. Spines on carapace with yellowish brown tips, **orbital margin and posterior marginal groove yellowish white.** Antennular plate with a medial longitudinal yellowish white line; **antennular peduncle alternated with yellowish white and pale green bands, flagella banded with yellowish white and dark brown.** Legs light brown with yellowish white blotches. **Abdomen with tiny pale dots; a yellowish white band with brown margins near posterior border of each segment.** Pleopods and soft part of tail fan orange-brown with yellowish white margins.

**Size:** Maximum body length about 40 cm, commonly between 20 and 25 cm.

**Habitat, biology, and fisheries:** Mainly found on muddy bottoms (sometimes also on rocky bottoms) in turbid waters near river mouths at depths from 3 to 90 m, but usually less than 40 m deep. Unlike other spiny lobsters, this species is mainly taken by trawling, sometimes also by set nets, and seines, but rarely enters traps. Uncommon or absent in most parts of the area because of its preference for muddy substrate. Commercially and economically important mostly from the Gulf of Thailand. Sold fresh or frozen in local markets, and mounted dry specimens are sold as souvenirs to tourists.

**Distribution:** Indo-West Pacific from Pakistan to India, Thailand, Viet Nam, Taiwan Province of China, the Philippines, Indonesia, Papua New Guinea, and northern Australia.



***Panulirus versicolor*** (Latreille, 1804)

**Frequent synonyms / misidentifications:** None / *Panulirus fasciatus* (Fabricius, 1798) (= *P. polyphagus* (Herbst, 1793)).

**FAO names:** En - Painted spiny lobster; Fr - Langouste barriolée; Sp - Langosta colorete.

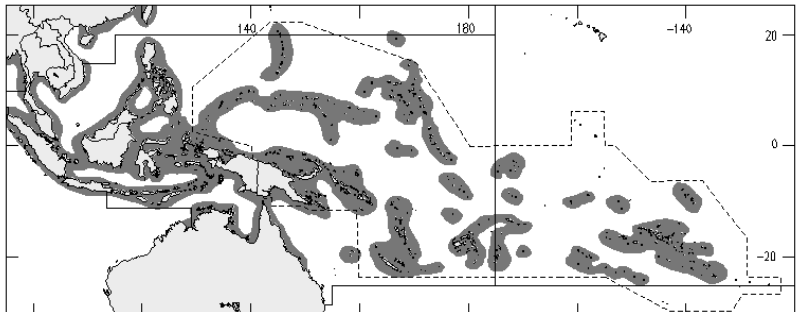
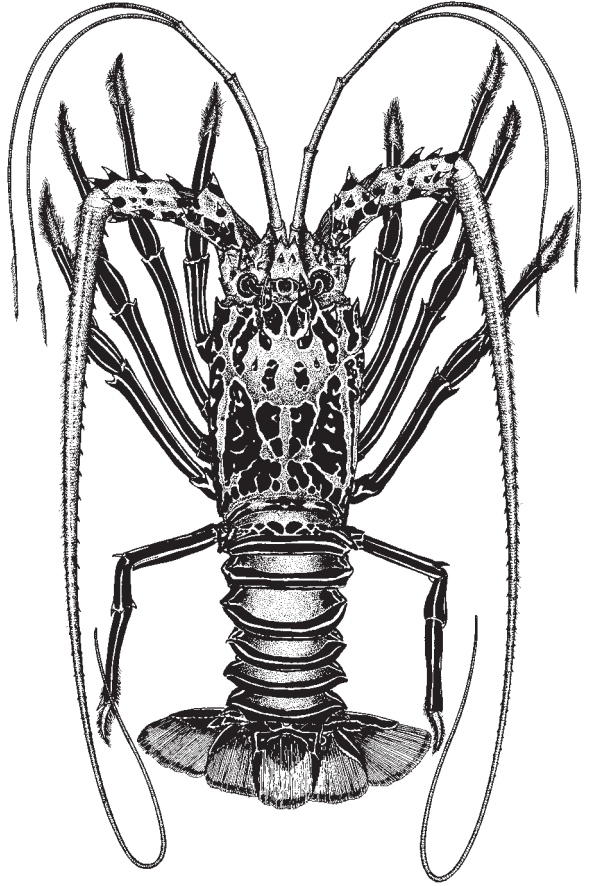
**Diagnostic characters:** Carapace rounded and spiny; rostrum absent; anterior margin bearing 4 regularly spaced large spines other than frontal horns; **height of frontal horns more than 3 times the eye height, without spinules in between.** Antennules with flagella longer than peduncle; **antennular plate at bases of antennae armed with 2 pairs of well-separated principal spines only (anterior pair larger).** First 4 pairs of legs without pincers. **Abdomen more or less smooth, with broad but shallow sunken pubescent areas only present at each half of second and third segments.** Posterior half of tail fan soft and flexible.

**Colour:** body of adults generally blue and green; more greenish in large individuals. Carapace, including frontal horns, with a mosaic pattern of green, white and blue. Eyes black-brown. **Antenna with inner surface pink and outer surface blue; inner surface of antennular peduncle white, outer surface blue; flagella whitish.** **Legs blue, distinctly striped with white lines.** **Abdomen greenish, having white lines with blue margins along posterior margin of each segment.** Soft part of tail fan green and blue or orange-brown (large individuals). Pleopods blue, with white margins and a conspicuous medial white line. **Coloration of juveniles somewhat different:** body bluish to dark blue with conspicuous longitudinal white lines on lateral carapace; antennae and antennular plate almost entirely whitish; antennules bluish and distally whitish; legs with dark blue stripes; pleopods without medial white line.

**Size:** Maximum body length about 40 cm, commonly between 20 to 30 cm.

**Habitat, biology, and fisheries:** Found in reef areas at depths of usually less than 16 m (mostly between 4 and 12 m) in clear or sometimes turbid water with strong currents, often on seaward edges of the reef plateau. Nocturnal and not gregarious; hides in crevices during the daytime with only the white antennae visible. Actively fished throughout its range by divers (using hand or spear), but apparently rarely enters traps or pots. The catches of this lobster are nowhere very large and it is mainly locally consumed live, fresh, cooked whole, or tailed, but in some regions, such as from the Philippines, exported live or tailed. The attractive coloration of the juveniles has caught the attention of the tropical marine aquarium trade and specimens presumably originating from the Philippines and Indonesia are sometimes sold in the aquarium shops of other Asian countries as well as in Europe and the USA (juveniles of other *Panulirus* species are occasionally also found in the aquarium trade, but usually sold at lower prices).

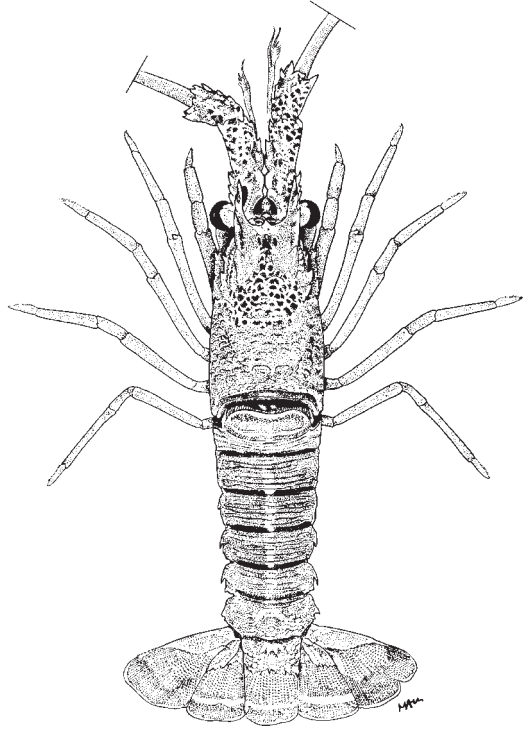
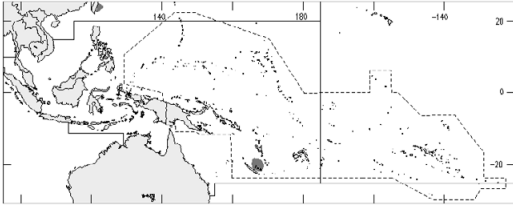
**Distribution:** Widely distributed in the Indo-West Pacific from the eastern coast of Africa to the Red Sea, Japan, Micronesia, Melanesia, northern Australia, and French Polynesia.



***Justitia chani*** Poupin, 1994

**En** - Small furrow lobster.

Body length between 11 and 15.5 cm; probably the smallest species of the genus. On rocky substrate in depths from 150 to 340 m. Caught by tangle nets and dredges. Rare and of very limited interest to fisheries. Known from the western Pacific and so far only recorded from Japan, Taiwan Province of China, and New Caledonia.

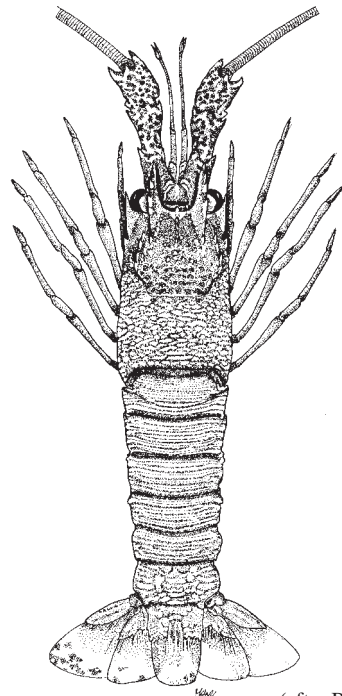
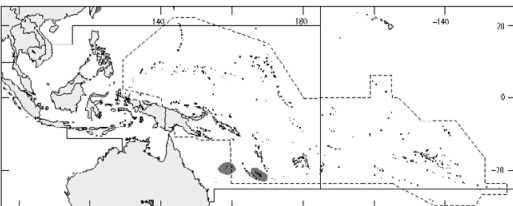


(after Poupin, 1994)

***Justitia japonica*** (Kubo, 1955)

**En** - Japanese furrow lobster.

Maximum body length about 27 cm, commonly between 15 and 25 cm; probably the largest species of the genus. On rocky bottoms at depths from 90 to 340 m. A limited fishery potential because of its deep, untrawlable habitat; seldom caught by lobster pots and trap nets. Indo-West Pacific from Madagascar to Taiwan Province of China, Japan, New Caledonia, and the Chesterfields Islands.



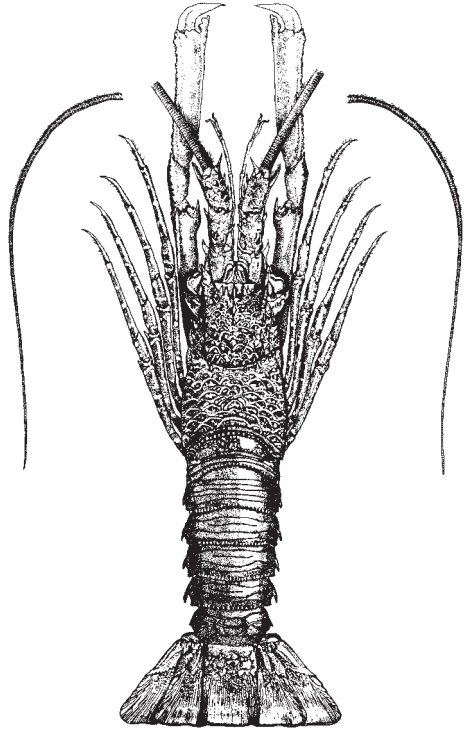
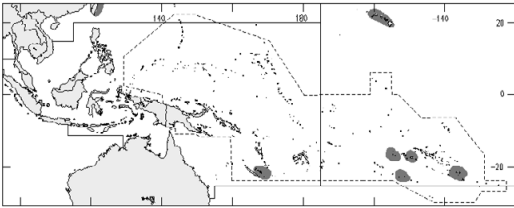
(after Baba et al., 1986)



***Justitia longimanus*** (H. Milne Edwards, 1837)

**En** - Longarm furrow lobster; **Fr** - Langouste gibbon; **Sp** - Langosta de muelas. (The old FAO name of this species is re-used because recent research showed that *J. longimanus* and *J. mauritiana* represent the same species).

Maximum body length 18.5 cm, commonly between 11 and 16 cm. At depths from 23 to 454 m, usually between 50 and 150 m. Inhabits the outer parts of coral or rocky reef slopes. Although perhaps the most common species of the genus, it is only occasionally caught by traps, tangle nets, or divers. Of limited interest to fisheries because of its rocky habitat and usual occurrence in deeper waters. Worldwide distribution in tropical and subtropical seas; recorded in the western Atlantic from Bermuda to Brazil and in the Indo-Pacific from Madagascar to Taiwan Province of China, Japan, Hawaii, and French Polynesia.

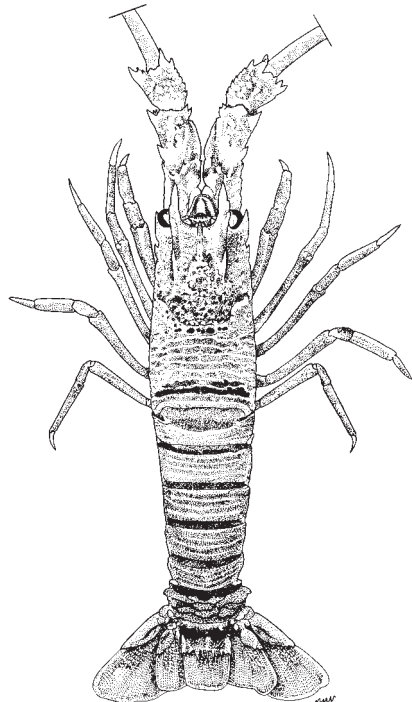
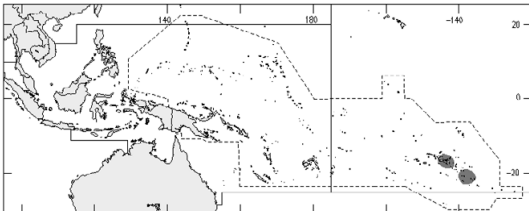


(after Miers, 1882)

***Justitia vericeli*** Poupin, 1994

**En** - Polynesian furrow lobster.

Body length about 18 cm. On hard coral bottoms at depths from 160 to 320 m. Apparently very rare and only caught during experimental trapping operations. So far only known from the Tuamotu Archipelago (French Polynesia).

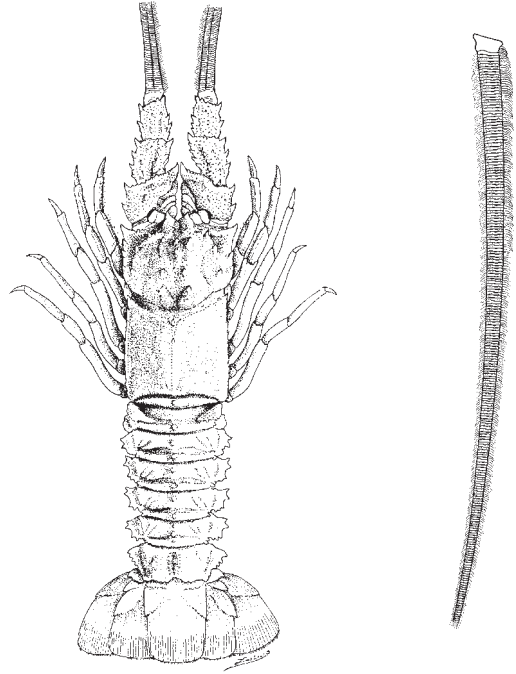
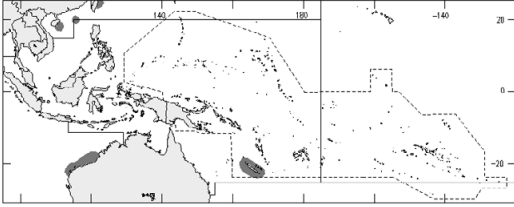


(after Poupin, 1994)

***Linuparus sordidus* Bruce, 1965**

**En** - Oriental spear lobster.

Body length between 17 and 27 cm. On sandy mud and limestone rocks in depths from 200 to 500 m. A rare species, occasionally caught by trawls or traps. However, because of its large size and occurrence in only moderately deep water, this lobster is potentially attractive for fisheries. Reported in the Indo-West Pacific from Taiwan Province of China, the South China Sea, northwestern Australia, and New Caledonia.

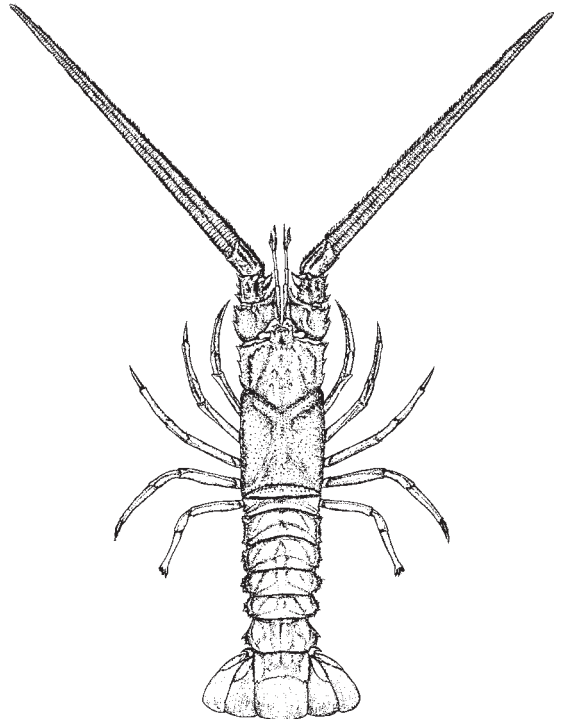
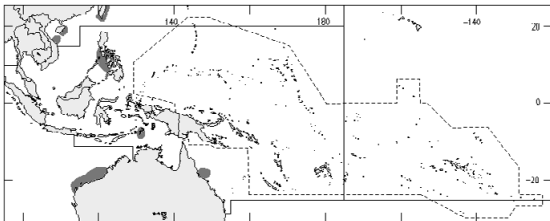


(after Bruce, 1965)

***Linuparus trigonus* (Von Siebold, 1824)**

**En** - Japanese spear lobster.

Maximum body length 47 cm, commonly between 20 and 35 cm. On sand or mud bottoms in depths from 30 to 318 m. Occasionally taken by trawls, but apparently nowhere very abundant. Rarely sold in fish markets in the Philippines. Caught commercially on a small scale off northern Australia and Queensland during the northern prawn fishery closed seasons. The lobsters are tailed because their rigid antennae make them difficult to pack up. Indo-West Pacific from Japan to Taiwan Province of China, Viet Nam, the Philippines, Indonesia, and Australia.

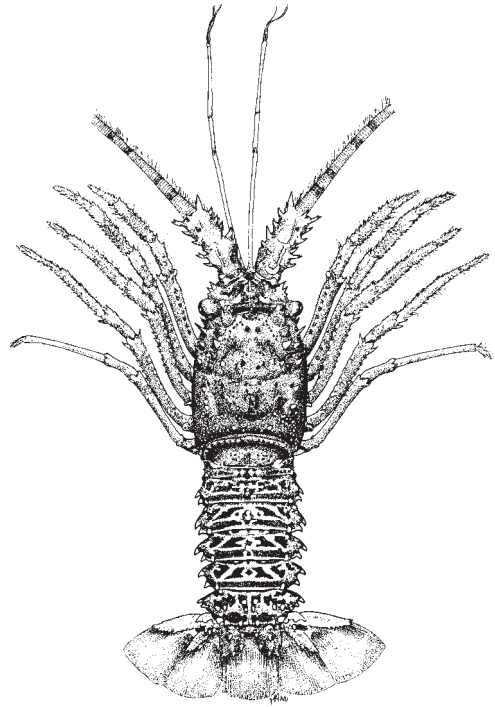
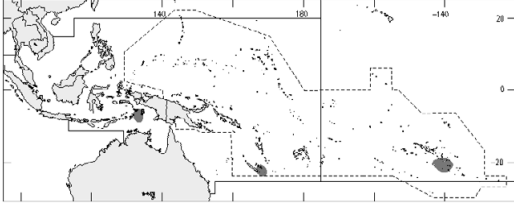


(from Ho and Yu, 1979)



***Palinustus unicornutus* Berry, 1979****En** - Unicorn blunthorn lobster.

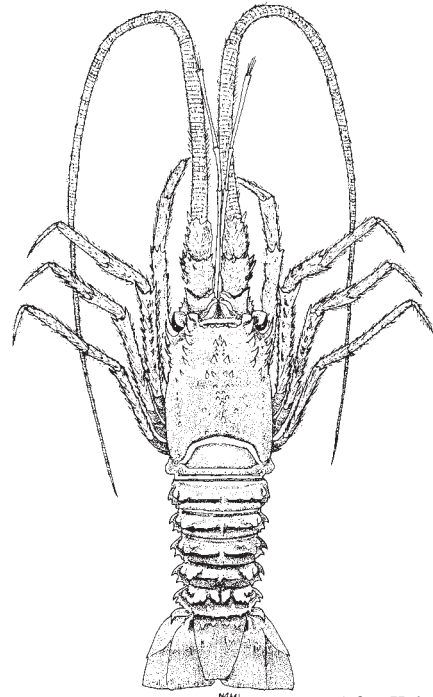
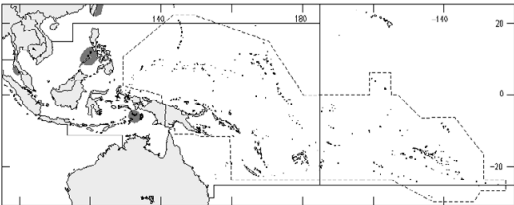
Maximum body length about 14 cm. On hard bottoms at depths from 205 to 670 m. Rare and mainly taken during experimental trawling and trapping operations. Indo-West Pacific from the eastern coast of South Africa to La Réunion, Comoro Islands, Japan, Indonesia, New Caledonia, and French Polynesia.



(after Berry, 1979)

***Palinustus waguensis* Kubo, 1963****En** - Japanese blunthorn lobster.

Maximum body length about 14 cm, commonly to 10 cm. Inhabits the outer parts of coral and rocky reef slopes at depths from 72 to 180 m. The most common species of the genus although still moderately rare and only occasionally caught by tangle nets and trawls. A small species of very limited interest to fisheries. In Thailand, dried specimens are occasionally sold as souvenirs to tourists. Indo-West Pacific from Japan to Taiwan Province of China, the Philippines, Indonesia, Thailand, India, and Madagascar.

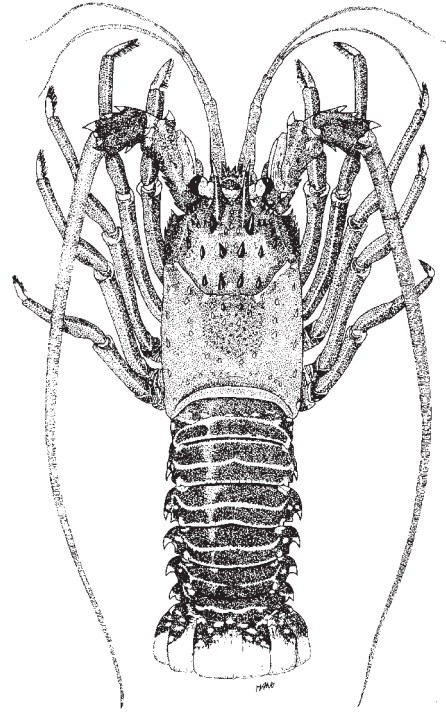
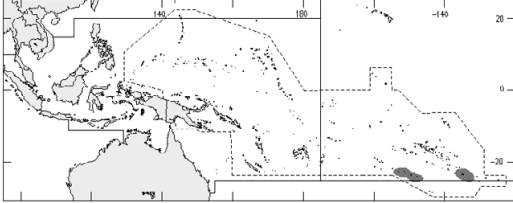


(after Kubo, 1963)

*Panulirus pascuensis* Reed, 1954

**En** - Easter Island spiny lobster.

Total body length of adults between 15 and 25 cm. Lives on rocky substrate in shallow waters to a depth of 50 m; breeding season around December. Caught by divers during both day and night by hand and spears, also by gill nets and lobster pots. Sold fresh and consumed locally. Only known from Easter Island, Pitcairn Islands and Austral Islands of French Polynesia.

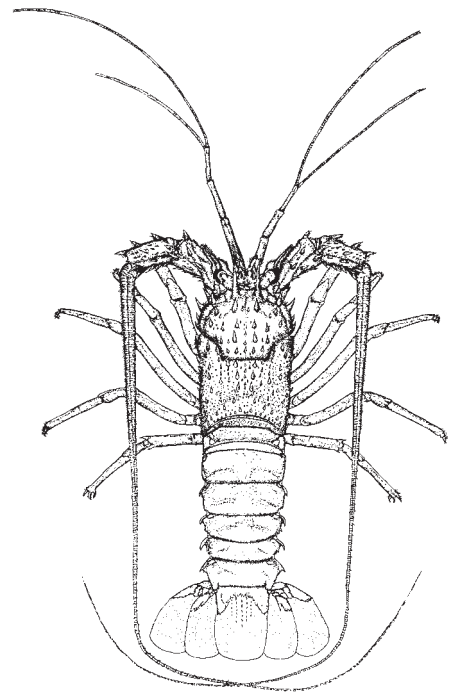
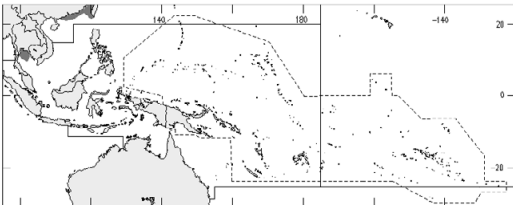


(after George and Holthuis, 1965)

*Panulirus stimpsoni* Holthuis, 1963

**En** - Chinese spiny lobster.

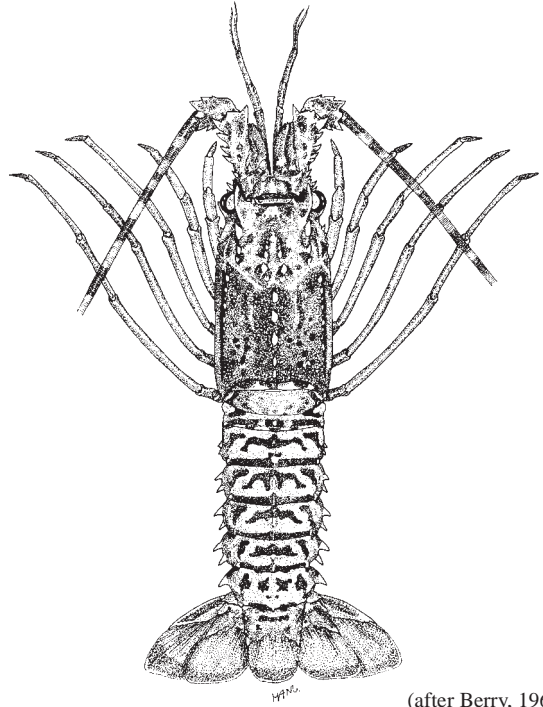
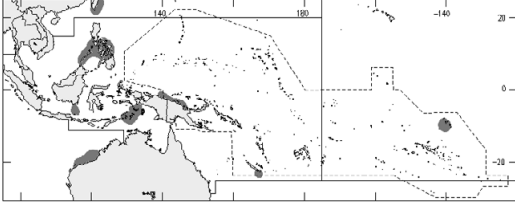
Maximum body length 35 cm, commonly between 16 and 23 cm; maximum weight about 3 kg. Found in reef areas at depths of less than 40 m. Mainly distributed along the southern coast of China, including Hong Kong, and the western coast of Taiwan Province of China. In the Western Central Pacific, only recently found in the Gulf of Thailand where it is apparently rare.



(from Ho and Yu, 1979)

***Puerulus angulatus* (Bate, 1888)****En** - Banded whip lobster.

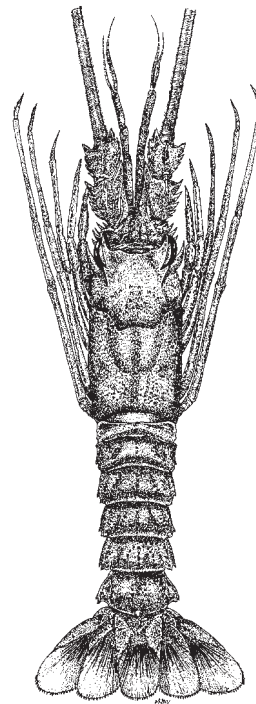
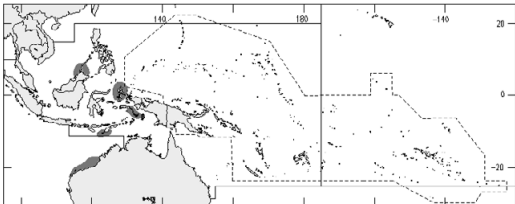
Maximum body length about 21 cm, commonly between 11 and 17 cm. On soft substrate at depths from 180 to 536 m. Often taken as bycatch during deep-sea trawling operations, but usually not in large numbers. Of potential interest to fisheries. Indo-West Pacific from the eastern coast of Africa to Japan, Taiwan Province of China, the Philippines, Indonesia, New Guinea, northwestern Australia, New Caledonia, and Marquesas Islands.



(after Berry, 1969)

***Puerulus velutinus* Holthuis, 1963****En** - Velvet whip lobster.

Maximum body length about 19 cm. On sand or mud bottoms at depths from 485 to 683 m. So far only taken during experimental trawling operations, but sometimes collected in relatively great numbers and may therefore be of potential interest to fisheries. Only known from the Philippines, Indonesia, and northwestern Australia.



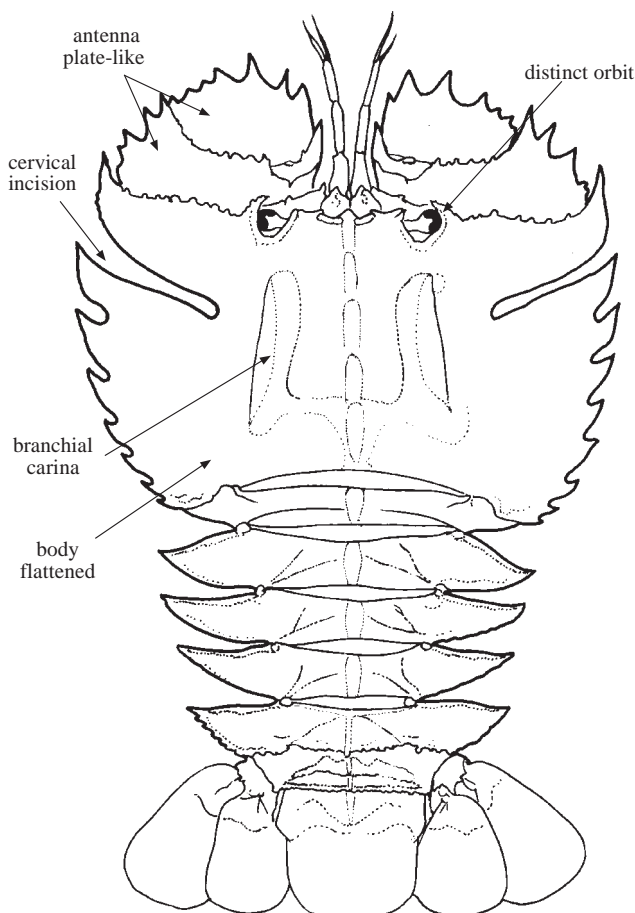
(after De Man, 1916)

## SCYLLARIDAE

## Slipper lobsters

**Diagnostic characters:** Small to large crustaceans. **Body strongly depressed.** Carapace laterally angular, rostrum absent or minute; eyes small but distinct and pigmented, enclosed within distinct orbits; no large frontal horns. Antennae short, broad, extremely flattened and plate- or scale-like; antennules short and slender, with short flagella. All legs similar in size and generally without pincers (except in *Scyllarus cultrifer*, third and fourth legs ending in false pincers). Both abdomen and tail fan well developed and powerful, posterior half of tail fan soft and flexible. **Colour:** usually drab, somewhat brownish in various shadings; dorsal surface of first abdominal segment often with a characteristic pattern of brightly coloured large spot(s).

**Habitat, biology, and fisheries:** Six genera and about 30 species of slipper lobsters are currently known from the Western Central Pacific. Their adult sizes are ranging from 2 to 50.5 cm body length. All species are bottom dwelling and are found from very shallow water to a depth of more than 484 m. As in spiny lobsters, the sexes can easily be distinguished by the position of the gonopores at the bases of the third or fifth legs. Mature female slipper lobsters also have the tip of the fifth leg transformed into a small false or true pincer (except in *Thenus*). The eggs are generally very small and numerous and orange or yellowish in colour. Slipper lobsters have a long planktonic phyllosoma larval stage similar to that of spiny lobsters. Members of the genera *Arctides*, *Parribacus*, and *Scyllarides* live in shallow coral and rocky reefs. *Arctides* species are rare but species of the latter 2 genera often form the bycatches of fisheries for spiny lobsters and are of moderate commercial value. The genera *Ibacus* and *Thenus* mainly occur on soft bottoms (the former one in deeper waters) and can be taken by commercial trawlers. They reach a high production in some regions and may be used for export as well as for local consumption. Yearly production of all slipper lobsters in the Western Central Pacific from 1990 to 1995 ranged from 1641 to 3115 t (FAO Yearbook of Fishery Statistics). About 1/3 to 1/2 of this production originated in the Gulf of Thailand. The genus *Scyllarus* has the most numerous species in the family which occur in both soft and hard bottoms from shallow to deep waters. However, they are usually small in size and few in numbers and are therefore without economic value. Since the taxonomic status of many species of the genus *Scyllarus* is still unclear, a key to the species of this genus is not presented here, and only abbreviated species accounts are provided for 2 of the common species in the Western Central Pacific to give an idea of their general appearances.



The genera *Ibacus* and *Thenus* mainly occur on soft bottoms (the former one in deeper waters) and can be taken by commercial trawlers. They reach a high production in some regions and may be used for export as well as for local consumption. Yearly production of all slipper lobsters in the Western Central Pacific from 1990 to 1995 ranged from 1641 to 3115 t (FAO Yearbook of Fishery Statistics). About 1/3 to 1/2 of this production originated in the Gulf of Thailand. The genus *Scyllarus* has the most numerous species in the family which occur in both soft and hard bottoms from shallow to deep waters. However, they are usually small in size and few in numbers and are therefore without economic value. Since the taxonomic status of many species of the genus *Scyllarus* is still unclear, a key to the species of this genus is not presented here, and only abbreviated species accounts are provided for 2 of the common species in the Western Central Pacific to give an idea of their general appearances.

**Similar families occurring in the area**

None. No other family of lobsters has such a strongly flattened body or plate-like antennae.

Key to the genera of Scyllaridae occurring in the area

- 1a. Carapace with deep cervical incisions and lateral margins cut into large teeth; abdominal pleura directed laterally (Figs 1, 2) . . . . . → 2
- 1b. Carapace with very shallow cervical incisions and lateral margins not cut into large teeth; abdominal pleura directed downwards (Figs 3 to 6) . . . . . → 3
- 2a. Dorsal surface of body rather smooth and provided with distinct branchial carinae; fifth abdominal segment bearing a posteromedian spine; body colour plain (Fig. 1) . . . . . *Ibacus*
- 2b. Dorsal surface of body entirely covered with scale-like tubercles; branchial carina absent; fifth abdominal segment without posteromedian spine; body coloration mottled (Fig. 2) . . . . . *Parribacus*

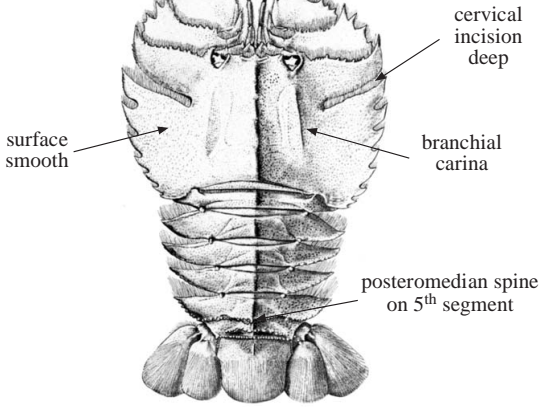


Fig. 1 *Ibacus*

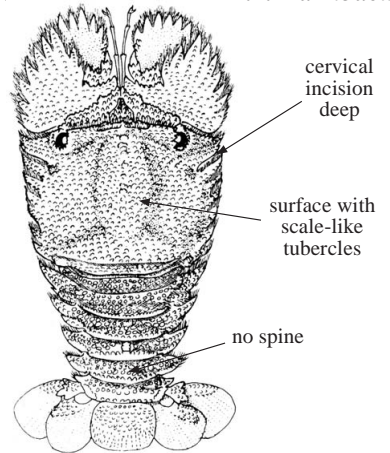


Fig. 2 *Parribacus*

- 3a. Body strongly depressed; carapace trapezoid and narrowing posteriorly; orbits located at anterolateral angles of carapace (Fig. 3) . . . . . *Thenus*  
(a single species, *T. orientalis*, in this genus)
- 3b. Body not strongly depressed, sometimes slightly vaulted; carapace more or less rectangular; orbits situated on anterior margin . . . . . → 4
- 4a. Size large (up to 50.5 cm body length); distal margin of antenna finely crenate; abdomen uniformly granulate and not particularly sculptured (Fig. 4) . . . . . *Scyllarides*
- 4b. Size medium or small (body length less than 17 cm); distal margin of antenna cut into distinct teeth; abdomen with transverse grooves or arborescent sculpture . . . . . → 5

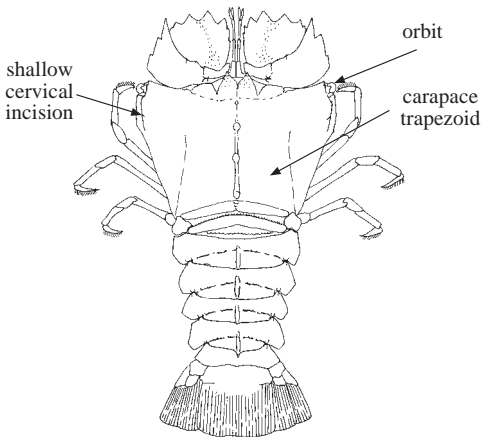


Fig. 3 *Thenus orientalis*

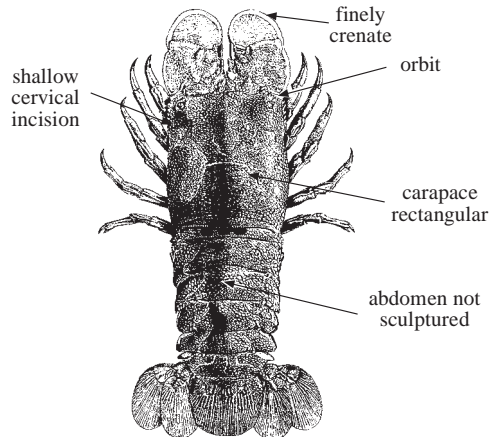


Fig. 4 *Scyllarides*



- 5a. Medium size (adults more than 12 cm body length); distal margin of antenna with more than 20 small teeth; exopods of maxillipeds with multiarticulate flagella (Fig. 5) . . . . . *Arctides*  
(a single species, *Arctides regalis*, in the area)
- 5b. Small size (usually less than 10 cm body length); distal margin of antenna with less than 10 large teeth; exopods of maxillipeds without flagellum or with flagellum transformed to a single laminate segment (Fig. 6) . . . . . *Scyllarus*  
(generally, the species of *Scyllarus* can be separated into 2 groups: 1 has arborescent sculpture on the abdomen while the other group has broad transverse grooves on the abdomen and lacks an arborescent sculpture)

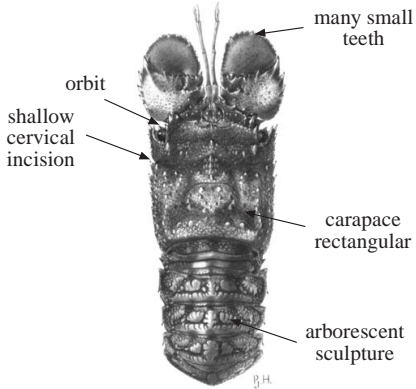


Fig. 5 *Arctides regalis*

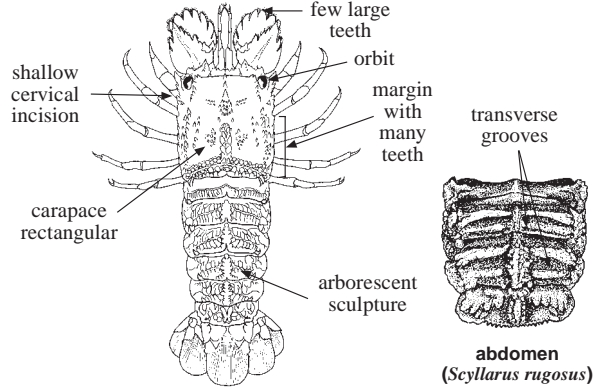


Fig. 6 *Scyllarus*

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

- 1a. Carapace with 6 to 9 posterolateral teeth (Fig. 7a-c) . . . . . → 2
- 1b. Carapace with more than 9 posterolateral teeth (Fig. 7d-f) . . . . . → 4
- 2a. Merus of third maxilliped concave on ventral surface and without deep incisions on inner margin (Fig. 8a); cervical incision very wide (Fig. 7a) . . . . . *Ibacus brucei*
- 2b. Merus of third maxilliped convex on ventral surface and provided with deep incisions on inner margin (Fig. 8b, c); cervical incision narrow (Fig. 7b, c) . . . . . → 3
- 3a. Branchial carina nearly straight (Fig. 7b); posterior incision of orbit without tubercle . . . . . *Ibacus novemdentatus*
- 3b. Branchial carina strongly convex (Fig. 7c); posterior incision of orbit with a distinct tubercle . . . . . *Ibacus peronii*

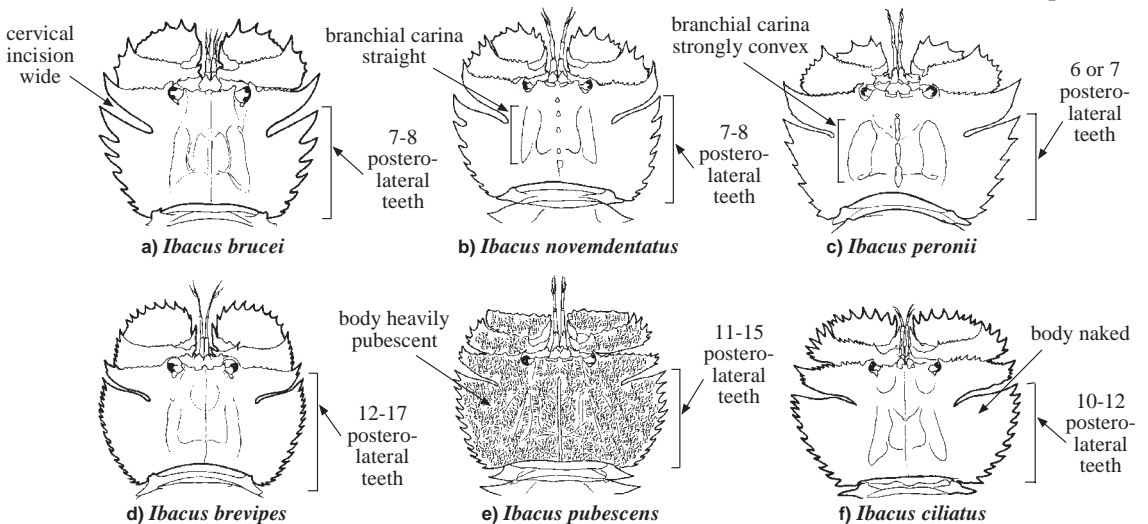
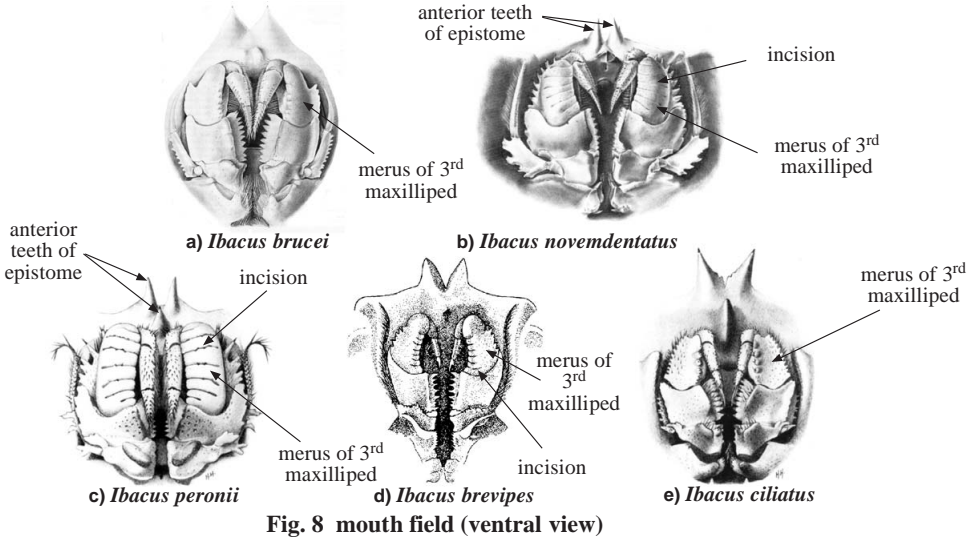


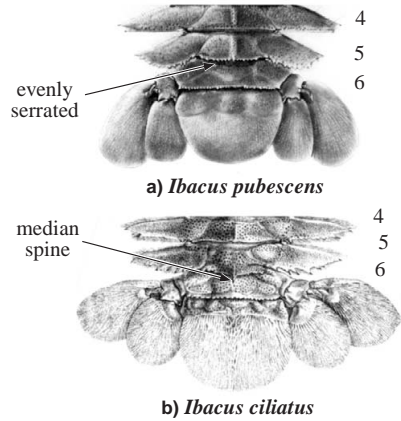
Fig. 7 carapace (dorsal view)



- 4a. Merus of third maxilliped convex on ventral surface and provided with deep incisions on inner margins (Fig. 8d) . . . . . *Ibacus brevipes*
- 4b. Merus of third maxilliped concave on ventral surface and without deep incisions on inner margin (Fig. 8e) . . . . . → 5



- 5a. Body heavily pubescent (Fig. 7e); posterior margin of fifth abdominal segment evenly serrated (Fig. 9a) . . . . . *Ibacus pubescens*
- 5b. Body except distal segment of antenna naked (Fig. 7f); posterior margin of fifth abdominal segment only with a median spine and 3 to 4 lateral tubercles (Fig. 9b) . . . *Ibacus ciliatus*



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

- 1a Median carina on second and third abdominal segments markedly elevated; transverse grooves separating articulated and non-articulated parts of abdominal segments wide and almost naked (Fig. 10a) . . . *Parribacus antarcticus*
- 1b Median carina on second and third abdominal segments low; transverse grooves separating articulated and non-articulated parts of abdominal segments narrow and hairy (Fig. 10b) . . . . . → 2

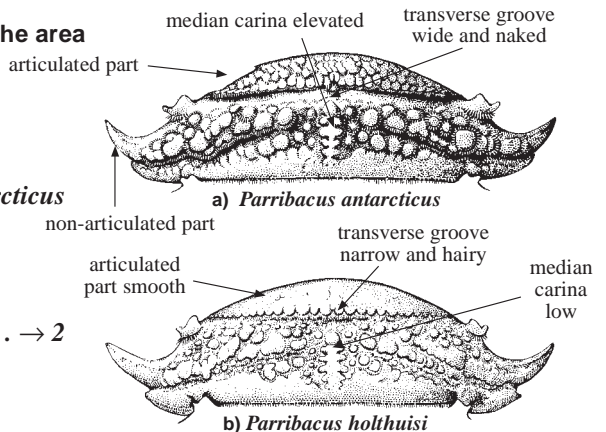


Fig. 10 third abdominal segment (dorsal view)

- 2a. Articulated parts of abdominal segments bearing distinct tubercles (Fig. 11a); fourth segment of antenna with 7 outer teeth (apical tooth not included) . . . . . *Parribacus caledonicus*
- 2b. Articulated parts of abdominal segments more or less smooth (Fig. 10b); fourth segment of antenna with 5 to 6 outer teeth (apical tooth not included) . . . . . → 3
- 3a. Fourth segment of antenna bearing 5 outer teeth (apical tooth not included); the posterior of the 2 lateral teeth of carapace before cervical incision much smaller than the first (Fig. 11b) . . . . . *Parribacus holthuisi*
- 3b. Fourth segment of antenna bearing 6 outer teeth (apical tooth not included); the 2 lateral teeth of the carapace before cervical incision only slightly unequal in size (Fig. 11c) . . . . . *Parribacus scarlatinus*

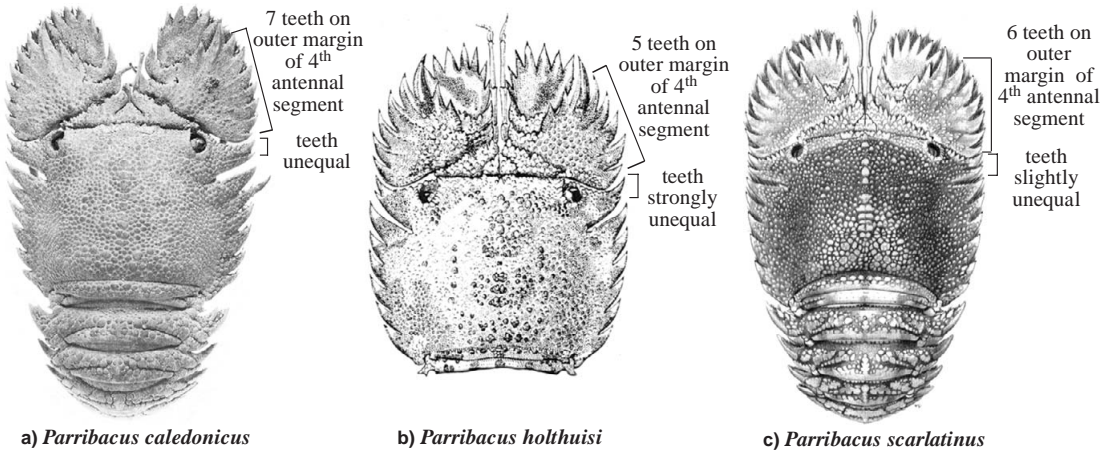


Fig. 11 carapace and anterior abdominal segments (dorsal view)

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

- 1a. Carapace with a deep cervical groove and with posterior part distinctly wider than anterior half (Fig. 12a); fourth abdominal segment always produced into a remarkable hump medially; posterior margin of second abdominal pleuron somewhat concave (Fig. 13a); only diffuse spots present on first abdominal segment . . . . . *Scyllarides haanii*
- 1b. Carapace with a shallow cervical groove and with anterior part more or less as wide as posterior half (Fig. 12b); middle of fourth abdominal segment never with a hump, only moderately ridged; posterior margin of second abdominal pleuron somewhat convex (Fig. 13b); first abdominal segment with large distinct spots . . . . . *Scyllarides squammosus*

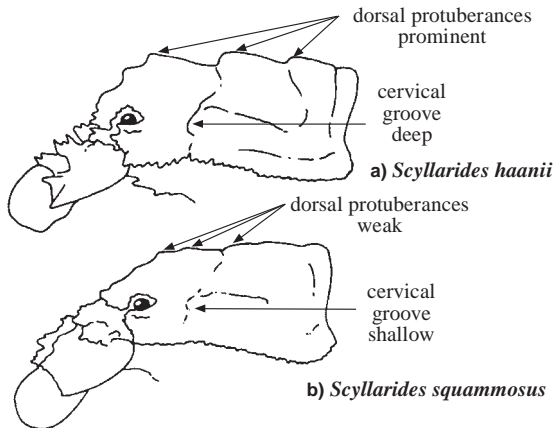


Fig. 12 carapax (lateral view)

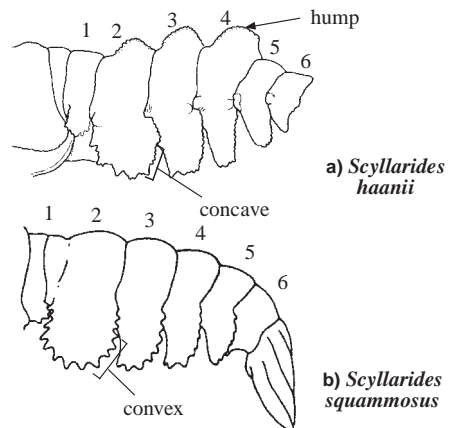


Fig. 13 abdomen (lateral view)

### List of species occurring in the area

The symbol 🦞 is given when species accounts are included.

- 🦞 *Arctides regalis* Holthuis, 1963
  - Ibacus brevipes* Bate, 1888
  - Ibacus brucei* Holthuis, 1977
- 🦞 *Ibacus ciliatus* (Von Siebold, 1824)
- 🦞 *Ibacus novemdentatus* Gibbes, 1850
  - Ibacus peronii* Leach, 1815
- 🦞 *Ibacus pubescens* Holthuis, 1960
  
- 🦞 *Parribacus antarcticus* (Lund, 1793)
- 🦞 *Parribacus caledonicus* Holthuis, 1960
- 🦞 *Parribacus holthuisi* Forest, 1954
- 🦞 *Parribacus scarlatinus* Holthuis, 1960
  
- 🦞 *Scyllarides haanii* (De Haan, 1841)
- 🦞 *Scyllarides squammosus* (H. Milne Edwards, 1837)
  - Scyllarus aesopius* Holthuis, 1960
  - Scyllarus aureus* Holthuis, 1963
  - Scyllarus aurora* Holthuis, 1982
  - Scyllarus batei* Holthuis, 1946
- 🦞 *Scyllarus bertholdii* Paulson, 1875
  - Scyllarus bicuspidatus* (De Man, 1905)
  - Scyllarus cultrifer* (Ortmann, 1897)
  - Scyllarus demani* Holthuis, 1946
  - Scyllarus gibberosus* (De Man, 1905)
  - Scyllarus martensii* Pfeffer, 1881
  - Scyllarus rapanus* Holthuis, 1993
- 🦞 *Scyllarus rugosus* H. Milne Edwards, 1837
  - Scyllarus sordidus* (Stimpson, 1860)
  - Scyllarus timidus* Holthuis, 1960
  - Scyllarus umblicatus* Holthuis, 1963
  - Scyllarus vitiensis* (Dana, 1852)
- 🦞 *Thenus orientalis* (Lund, 1793)

### References

- Chan, T.Y. and H.P. Yu. 1993. *The illustrated lobsters of Taiwan*. Taipei, SMC Publishing Inc., 248 p.
- Holthuis, L.B. 1991. FAO species catalogue. Marine lobsters of the world. Vol. 13. An annotated and illustrated catalogue of species of interest to fisheries known to date. *FAO Fish. Synop.*, 125(13):1-292.

*Ibacus ciliatus* (Von Siebold, 1824)

**Frequent synonyms / misidentifications:** None / None.

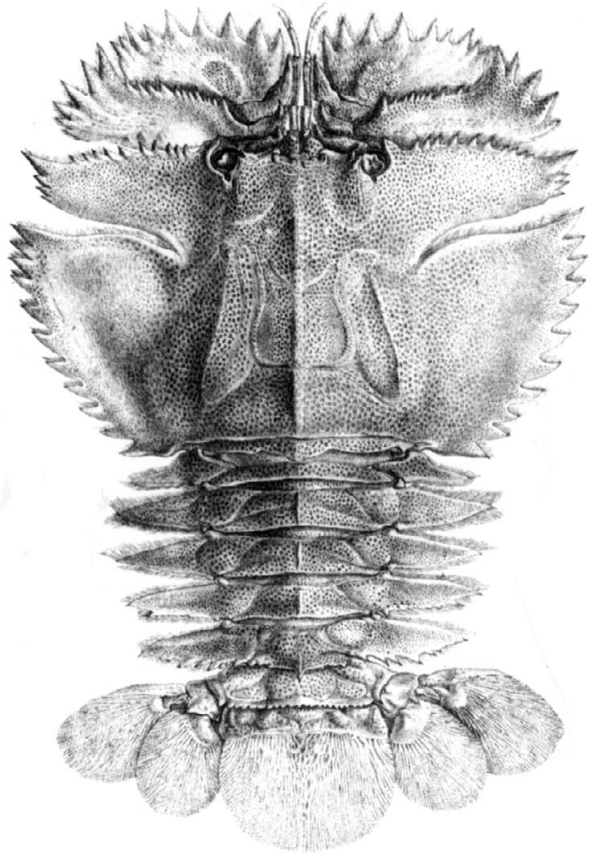
**FAO names:** En - Japanese fan lobster.

**Diagnostic characters:** Body extremely flattened with **dorsal surface rather smooth or slightly pitted; only distal segment of antenna heavily pubescent, particularly in adult males.** Carapace with well-developed branchial carinae and deep cervical incisions, **posterolateral margin cut into 10 to 12 large teeth.** Eyes small and subspherical; orbits not closed and situated on anterior margin of carapace. Antennae broad, flattened and plate-like. **Merus of third maxilliped ventrally concave, with only shallow incisions on inner margin.** All legs without pincers and similar in size. **Posterior margin of fifth abdominal segment armed with a median spine and 3 or 4 lateral tubercles; abdominal pleura directed laterally.** Posterior half of tail fan soft and flexible. **Colour:** body purplish brown all over. Eyes dark brown. Legs orange-brown. Soft part of tail fan transparent and somewhat reddish brown. Setae light brown. Eggs orange.

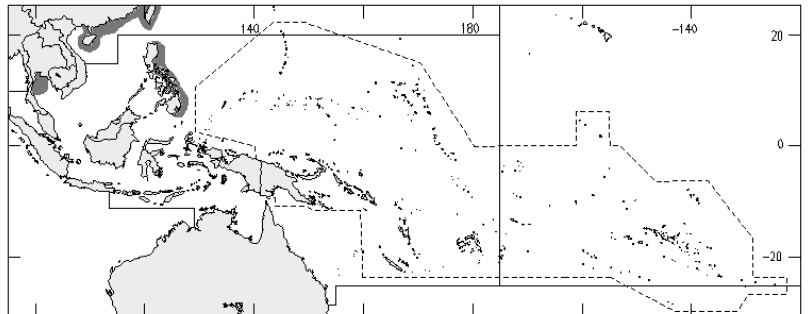
**Size:** Maximum body length 23 cm, commonly to about 15 cm.

**Habitat, biology, and fisheries:** Found on soft substrate of sand, mud, or clay at depths from 48 to 314 m, mostly between 100 and 250 m. Taken by commercial trawlers and common in fish markets of the Philippines, but sold at lower prices than spiny lobsters. The females carry the eggs for about 30 days until the larvae hatch out; the phyllosoma larvae passes through 9 stages in 76 days and metamorphose to the benthic reptant larvae.

**Distribution:** Western Pacific from Japan, Korea, coast of China, Taiwan Province of China, the east coast of the Philippines, and Thailand.



(from Holthuis, 1985)





***Ibacus novemdentatus*** Gibbes, 1850

**Frequent synonyms / misidentifications:** None / *Ibacus ciliatus* (Von Siebold, 1824); *I. pubescens* Holthuis, 1960; *I. peronii* Leach, 1815.

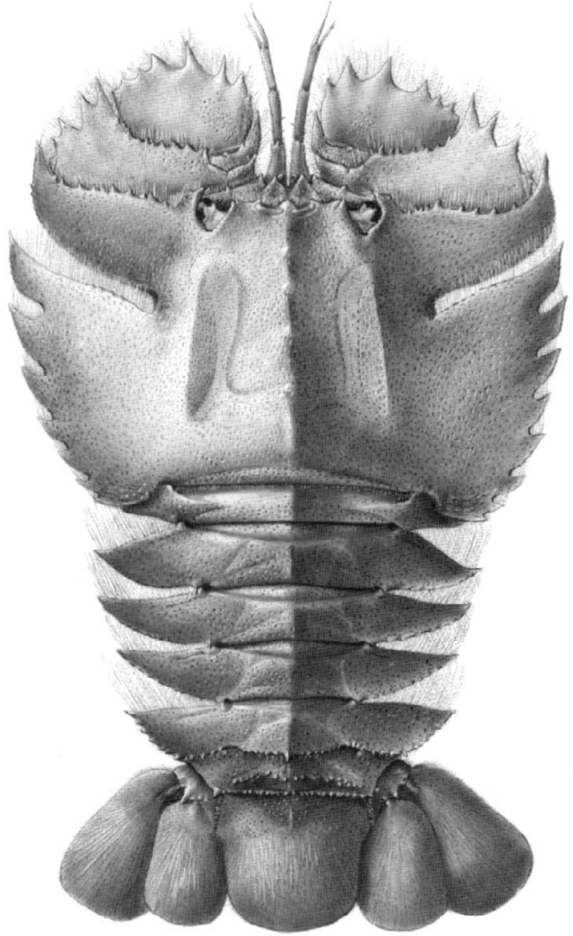
**FAO names:** En - Smooth fan lobster;  
Fr - Cigale glabre; Sp - Cigarra liso.

**Diagnostic characters:** Body extremely flattened and with dorsal surface rather smooth or slightly pitted. Carapace with nearly straight branchial carinae; cervical incisions deep but narrow; posterolateral margin cut into 7 or 8 large teeth. Eyes small and subspherical; orbits not closed and without tubercle at posterior incision, situated on anterior margin of carapace. Antennae broad, flattened and plate-like. Merus of third maxilliped ventrally convex, with deep incisions on inner margin. All legs without pincers and similar in size. Posterior margin of fifth abdominal segment evenly serrated, bearing a median spine; abdominal pleura directed laterally. Posterior half of tail fan soft and flexible. **Colour:** body pale yellowish brown and marbled with reddish brown patches on dorsal surface. Ventral surfaces of carapace and legs brown and white. Eyes dark brown. Soft part of tail fan transparent and somewhat pale yellowish. Eggs orange.

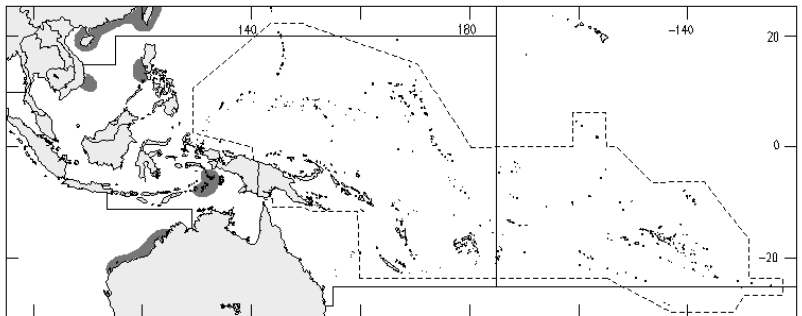
**Size:** Maximum body length 19 cm, commonly between 14 and 17 cm.

**Habitat, biology, and fisheries:** Found at depths from 37 to 400 m on levelled bottom of sand and mud. The phyllosoma larva of this species has 7 stages and lasts for 65 days. Taken by commercial trawlers in the Philippines, but in smaller catches than *Ibacus ciliatus*. Also used as food and sold in local fish markets (with same local names as *I. ciliatus*).

**Distribution:** Indo-West Pacific from the east coast of Africa to Japan, the Philippines, Indonesia, and northwestern Australia.



(from Holthuis, 1985)





***Ibacus pubescens* Holthuis, 1960**

**Frequent synonyms / misidentifications:** *Ibacus ciliatus pubescens* Holthuis, 1960 / *Ibacus ciliatus* (Von Siebold, 1824).

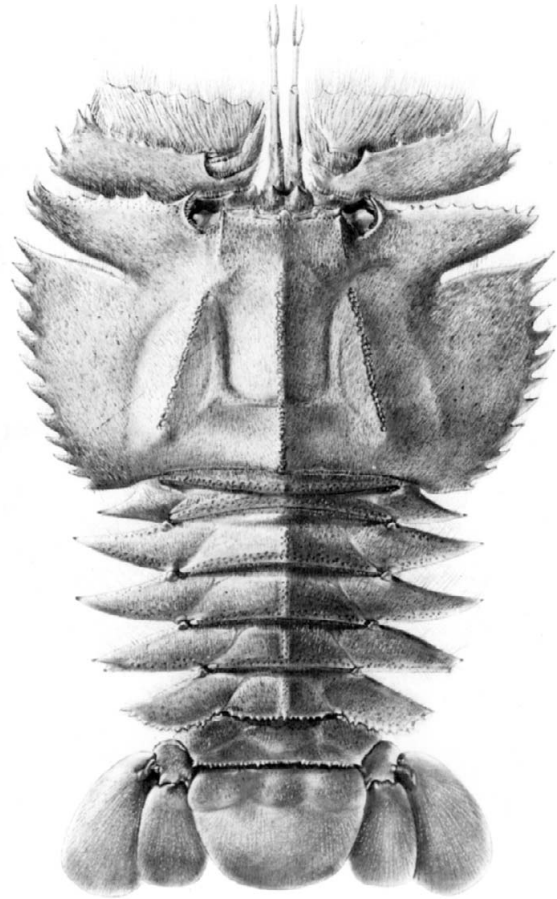
**FAO names:** En - Hairy fan lobster.

**Diagnostic characters:** Body extremely flattened and with **dorsal surface uniformly covered with dense short pubescence**. Carapace with well-developed branchial carinae and deep cervical incisions, **posterolateral margin cut into 11 to 15 distinct teeth**. Eyes small and subspherical; orbits not closed and situated on anterior margin of carapace. Antennae broad, flattened and plate-like. **Merus of third maxilliped ventrally concave, with only shallow incisions on inner margin**. All legs without pincers and similar in size. **Posterior margin of fifth abdominal segment evenly serrated, bearing a median spine; abdominal pleura directed laterally**. Posterior half of tail fan soft and flexible. **Colour:** body pale brown with lateral teeth on carapace somewhat whitish. Eyes dark brown. Soft part of tail fan transparent. Setae light brown.

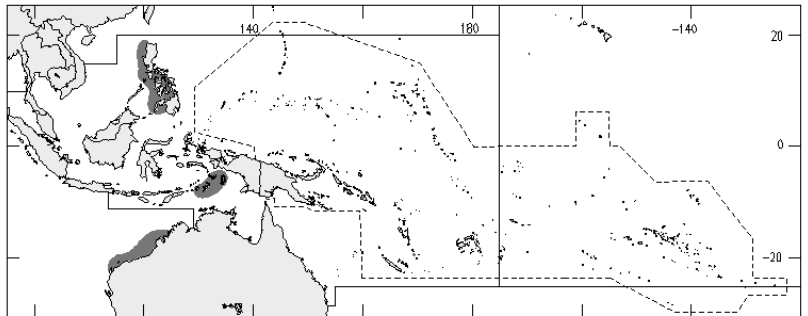
**Size:** Maximum carapace length 7.8 cm, with a maximum body length of about 20 cm.

**Habitat, biology, and fisheries:** Over sand or mud bottoms at depths from 150 to 391 m. Taken by trawls. The hairy fan lobster was formerly often confused with *Ibacus ciliatus*, and it is still not known which of these 2 species is more common in the Western Central Pacific. Very likely mixed with *I. ciliatus* in the markets of the Philippines.

**Distribution:** So far only known amongst the islands and along the west coast of the Philippines, Indonesia, and northwestern Australia.



(from Holthuis, 1985)

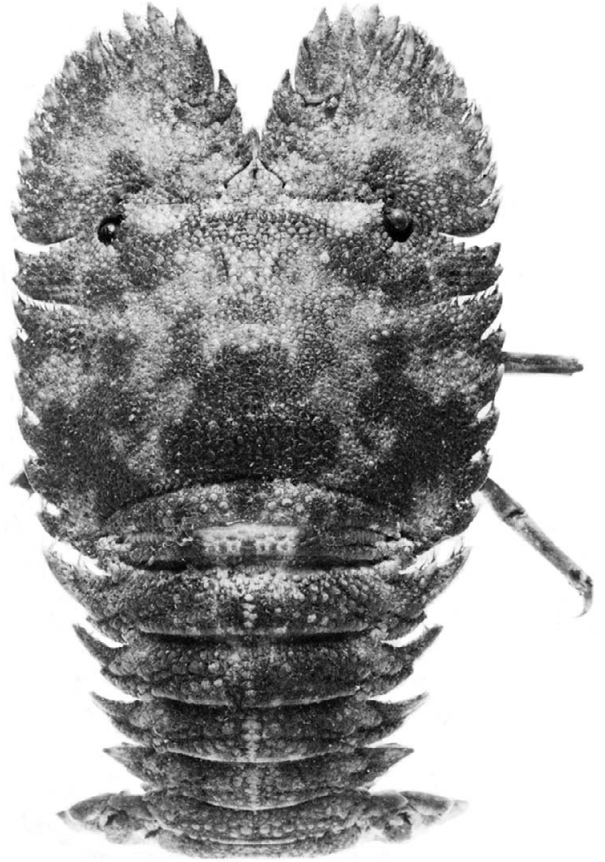


***Parribacus antarcticus*** (Lund, 1793)

**Frequent synonyms / misidentifications:** *Parribacus ursus major* (Herbst, 1793) / None.

**FAO names:** En - Sculptured mitten lobster;  
Fr - Cigale savate; Sp - Cigarra china.

**Diagnostic characters:** Body extremely flattened, with **dorsal surface uniformly covered with scale-like tubercles and short hairs**. Carapace with distinct rostral tooth; without branchial ridge but with deep cervical incisions; lateral margin cut into large teeth. Eyes small and subspherical; orbits not closed and situated on anterior margin of carapace. Antennae broad, flattened and plate-like; **fourth segment armed with 6 large outer teeth** (sometimes bifurcated and excluding apical tooth). All legs without pincers and similar in size. **Abdomen with median carina on second and third segments markedly elevated; transverse grooves separating articulated and non-articulated parts of each segment are wide and almost naked; fifth segment without posteromedian spine; pleura directed laterally**. Posterior half of tail fan soft and flexible. **Colour:** body yellowish and mottled with brown and black patches. **Rostrum and orbital margin purplish**. Eyes black. **Large teeth on lateral carapace and antennae intricately banded with yellow, orange, light purple, deep brown and black distally**. Abdomen with 2 black lateral lines; **central region of first segment yellowish with some brown patches**. Ventral surface of body greenish yellow, with pale green spots. Legs greenish yellow and covered with green bands, becoming rather inconspicuous on ventral surfaces. Tail fan light brown with deep blue dots.

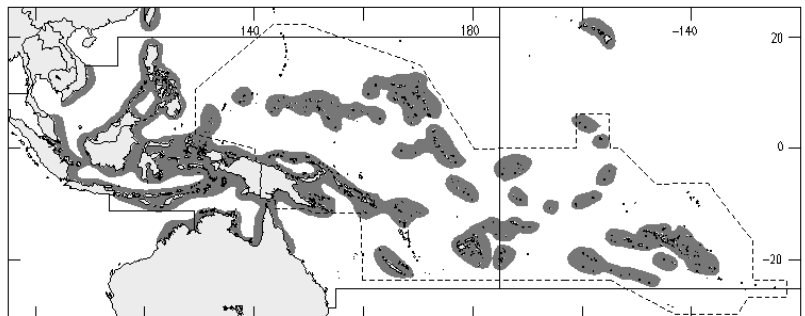


(from Holthuis, 1985)

**Size:** Maximum body length about 20 cm, commonly between 12 and 15 cm.

**Habitat, biology, and fisheries:** Lives in coral and stone reefs from shallow waters to a depth of 20 m. Nocturnal and sometimes found in small groups, hiding inside crevices and undercuts of reefs during daytime. Fished throughout its range but nowhere abundant. A common incidental catch for fisheries of spiny lobsters and caught by divers (using hand and spear), or by dipnets or tangle nets. Often considered as a delicacy, comparable to spiny lobsters, and mainly sold live or fresh in local markets.

**Distribution:** Worldwide in tropical seas and has been recorded in the Western Atlantic from the Caribbeans to Brazil, and in the Indo-West Pacific from the east coast of Africa to Taiwan Province of China, Hawaii, and French Polynesia.



*Scyllarides haanii* (De Haan, 1841)

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** En - Aesop slipper lobster.

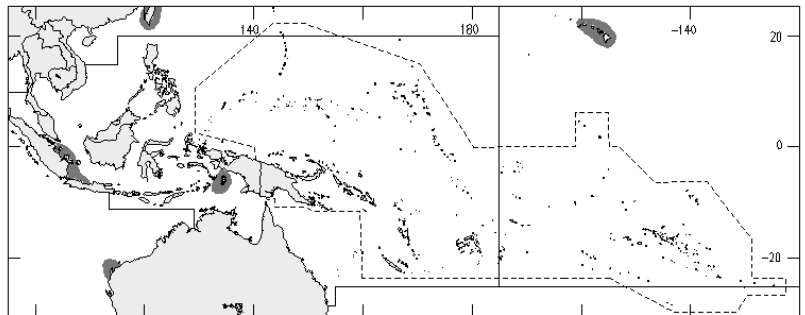
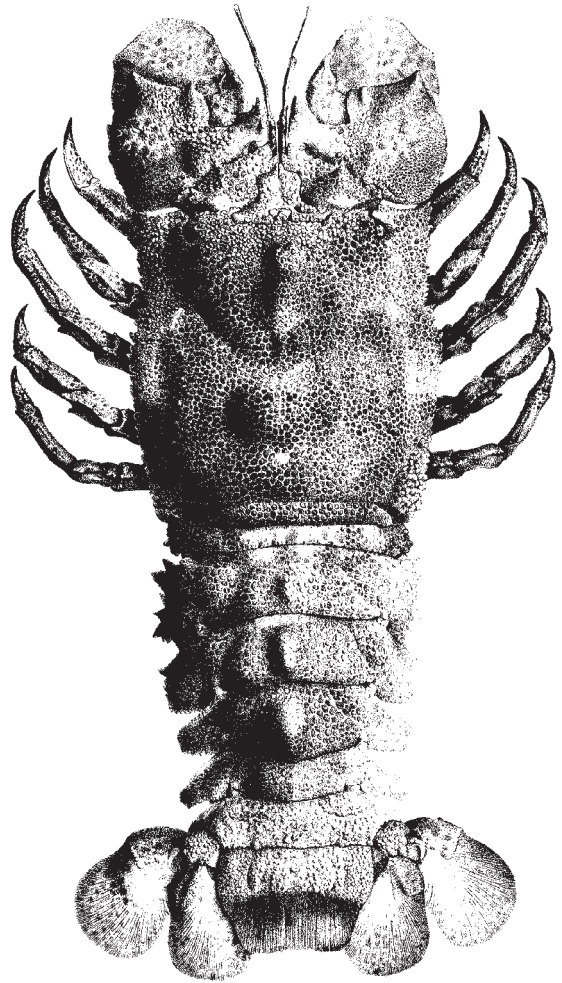
**Diagnostic characters:** Body vaulted, pubescent and covered with rounded tubercles. Eyes small and subspherical. **Carapace somewhat rectangular, but posterior half distinctly wider than anterior half; cervical groove strong; pregastric, gastric and cardiac teeth all strongly protruding.** Antennae broad, flattened and plate-like, with distal margin finely crenate. All legs without pincers and similar in size. Abdomen uniformly granulate and not particularly sculptured; **dorsal midline of second and third segments strongly ridged, and that of fourth segment produced into a remarkable hump; pleura directed downwards, with posterior margin of second pleuron somewhat concave.** Posterior half of tail fan soft and flexible.

**Colour:** body and legs yellowish white and covered with purplish red patches; dorsal surfaces more purplish, ventral surfaces more yellowish. Eyes dark brown. **Antennae with purplish margins;** antennules somewhat orange except distal segment of peduncle and flagella purplish. **First abdominal segment yellowish with 3 diffused purplish red spots.** Soft part of tail fan light brown with numerous purple dots.

**Size:** Maximum body length 50.5 cm, commonly between 16 and 30 cm; probably the largest species of the genus.

**Habitat, biology, and fisheries:** Found in coral or rocky reefs at depths from 10 to 135 m, usually less than 50 m. Apparently nowhere abundant and in some places even uncommon. Despite of its large size therefore mostly incidentally taken during fishing activities for spiny lobsters (e.g. by hand or by lobster pots). When caught, this slipper lobster is highly esteemed as food and sold (usually live or fresh) in local markets at prices comparable to that of spiny lobsters.

**Distribution:** Indo-West Pacific from Mauritius to the Red Sea, Japan, Hawaii, and Australia.





*Scyllarides squammosus* (H. Milne Edwards, 1837)

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** En - Blunt slipper lobster;

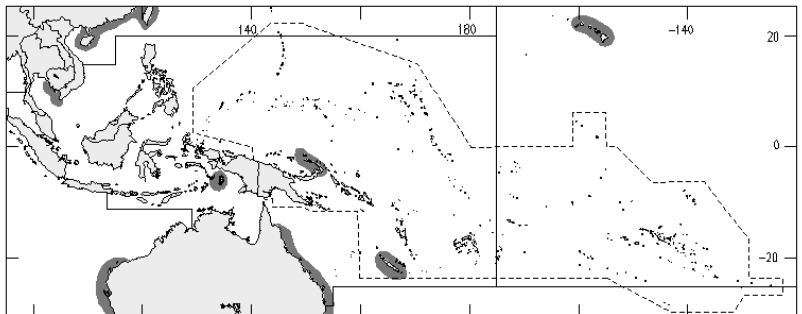
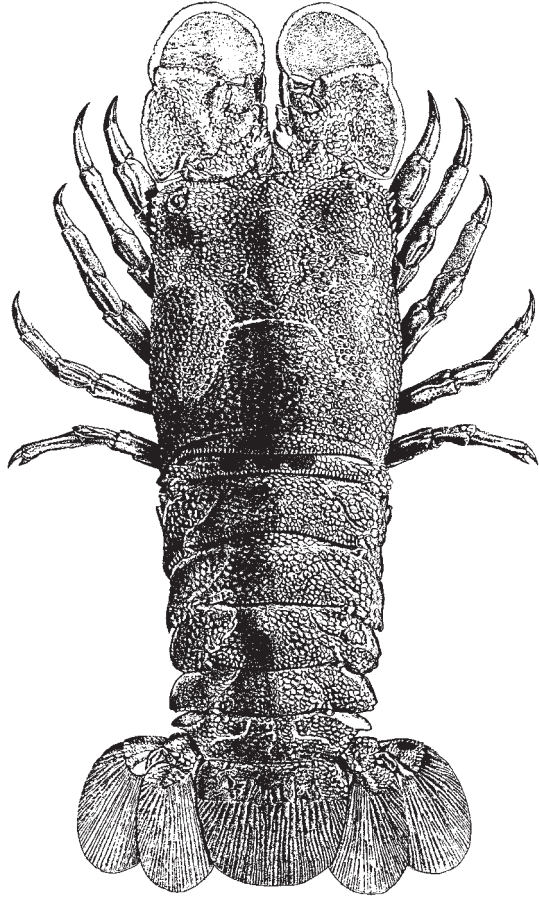
Fr - Cigale grenue; Sp - Cigarra ñato.

**Diagnostic characters:** Body vaulted, pubescent and densely covered with rounded tubercles. Eyes small and subspherical. **Carapace rectangular, with anterior half about as wide as posterior half; cervical groove shallow and constricted at middle; pregastric tooth slightly elevated, gastric tooth low and cardiac tooth almost levelled.** Antennae broad, flattened and plate-like, with distal margin finely crenate. All legs without pincers and similar in size. Abdomen uniformly granulate and not particularly sculptured; **dorsal midline of second to fourth segments weakly to moderately ridged and progressively higher posteriorly; pleura directed downwards, with posterior margin of second pleuron somewhat convex.** Posterior half of tail fan soft and flexible. **Colour:** body red-brown with depressed areas and ventral surfaces rather pale yellowish. Eyes black-brown. Margins of carapace orange-red; **antennae yellowish with orange-red margins;** antennules bright yellow with purplish flagella. Legs bright yellow with regions near joints distinctly purplish. **First abdominal segment with 3 distinct red spots, the central one much larger and anteriorly fused with lateral spots.** Soft part of tail fan light brown with red-brown dots.

**Size:** Maximum body length 40 cm, commonly to about 20 cm.

**Habitat, biology, and fisheries:** Nocturnal; inhabits coral and rocky reefs to a depth of about 80 m, mostly between 20 and 50 m. A common bycatch of fisheries for spiny lobsters and taken by hand during day and night diving, wire traps and tangle nets, but apparently nowhere abundant in the Western Central Pacific. Like other species of the genus, it is often considered as a delicacy and sold in local markets (fresh or live) at slightly lower prices than spiny lobsters.

**Distribution:** Indo-West Pacific from the eastern coast of Africa to Japan, Australia, New Caledonia, and Hawaii.



*Thenus orientalis* (Lund, 1793)

**Frequent synonyms / misidentifications:** None / None.

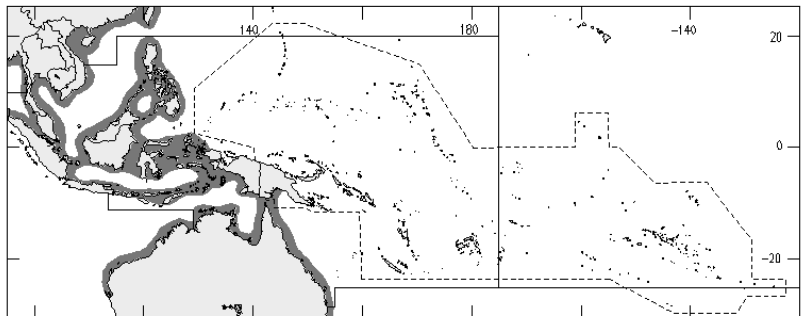
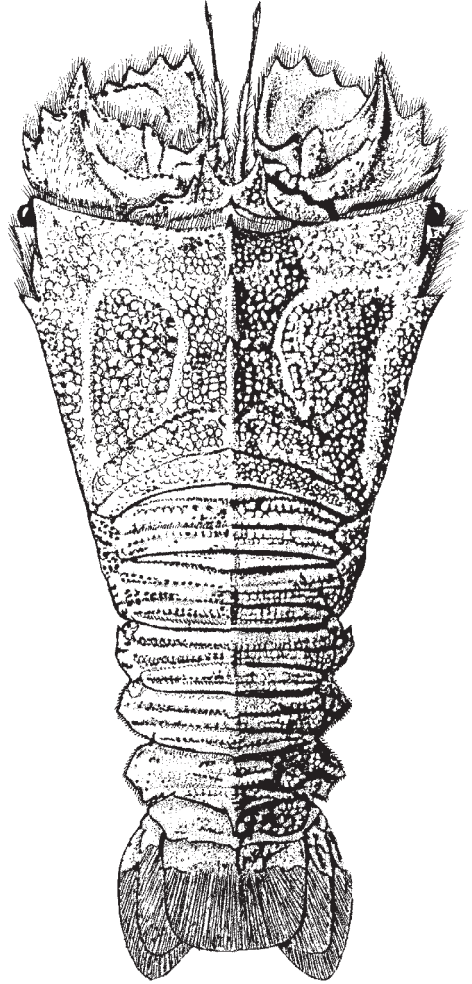
**FAO names:** En - Flathead lobster; Fr - Cigale raquette; Sp - Cigarra chata.

**Diagnostic characters:** Body markedly depressed, with surface pubescent and granulate. **Carapace trapezoid, narrowing posteriorly, with weak branchial carinae and shallow cervical incisions; anterior part of lateral margin with only 2 teeth, posterior 3/4 without teeth.** Eyes small and subspherical; **orbits situated at anterolateral angles of carapace.** Antennae broad, flattened and plate-like. All legs without pincers and similar in size. Abdomen with median carina and transverse grooves, **fifth segment armed with a strong posteromedian spine; pleura directed downwards.** Posterior half of tail fan soft and flexible. **Colour:** body brownish with reddish brown granules, ventral surface somewhat yellowish white. Eyes deep brown. Antennules yellowish white with red-brown bands. Legs yellowish white and distally brownish. Soft part of tail fan and pleopods somewhat orange-red. Setae light brown.

**Size:** Maximum body length 25 cm, commonly to about 16 cm; maximum weight over 0.5 kg.

**Habitat, biology, and fisheries:** Inhabits bottoms of soft substrate, sand and/or mud, sometimes with shells or gravel; at depths from 8 to more than 200 m, but usually between 10 and 60 m. It buries into the soft substrate with only the eyes and antennules visible during daytime; actively swims during nocturnal foraging, which covers long distances. The planktonic larval stage lasts for about 3 months. Common throughout its range but nowhere very abundant. Forms a bycatch of trawling operations and is sometimes also taken by diving (with a catch of over 500 t in Australia between 1989 and 1990). Marketed fresh or frozen in fish markets and used for food. Similar to the species of *Ibacus*, it is generally considered to have a good taste (in Queensland this species is even ranked above *Ibacus*) and sold at slightly lower prices than spiny lobsters.

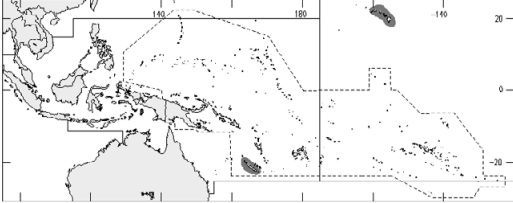
**Distribution:** Widely distributed in the Indo-West Pacific from the east coast of Africa to the Red Sea, Japan, and the northern coast of Australia.



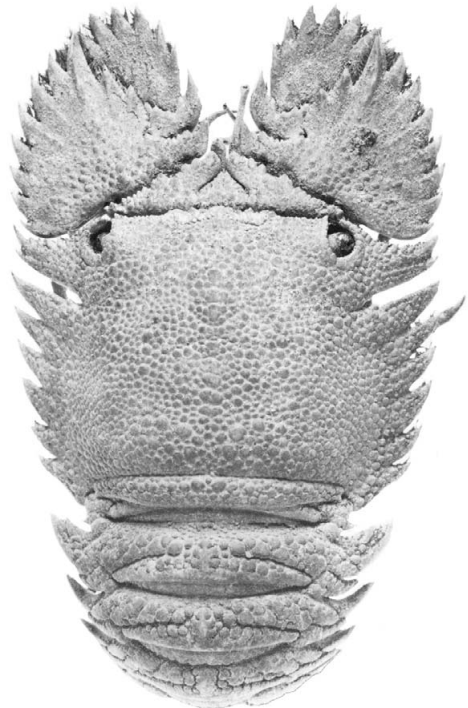
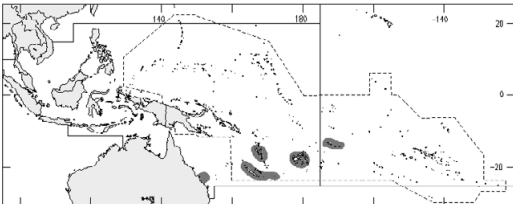


***Arctides regalis* Holthuis, 1963****En** - Royal Spanish lobster.

Maximum body length up to 17 cm. In shallow waters at depths from 5 to 50 m on the outer edges of coral reefs. Nocturnal and hides in cavities during daytime. Too rare to be of significant importance to fisheries, but highly valued in the aquarium trade for its bright coloration. Indo-West Pacific from Mauritius, La Réunion, New Caledonia, Hawaii, and Easter Islands.

***Parribacus caledonicus* Holthuis, 1960****En** - Caledonian mitten lobster.

Maximum body length about 18 cm. In shallow water to a depth of 6 m on reefs, usually on the exposed side and in surge channels. Hides in crevices during the daytime, often attached to the ceiling of caves. In Fiji, this species is often found in the same habitat with *Panulirus penicillatus*. Caught by divers with gloved hands and mainly for local consumption. Southern Pacific and known from Queensland (Australia), New Caledonia, Loyalty Islands, New Hebrides, Fiji, and Samoa.

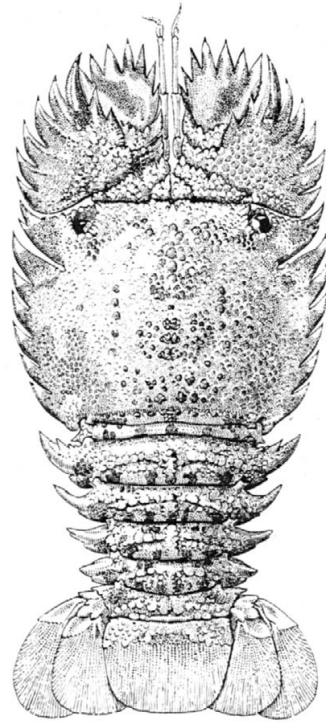
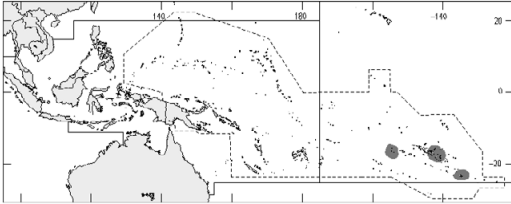


(from Holthuis, 1985)

***Parribacus holthuisi* Forest, 1954**

**En** - Red-spotted mitten lobster.

Maximum body length about 14 cm. In shallow water at depths from 1 to 5 m on the sandy bottoms of coral reefs. Used as food locally and collected at night with torches. Only known from the Society, Tuamotu, and Gambier Islands (French Polynesia).

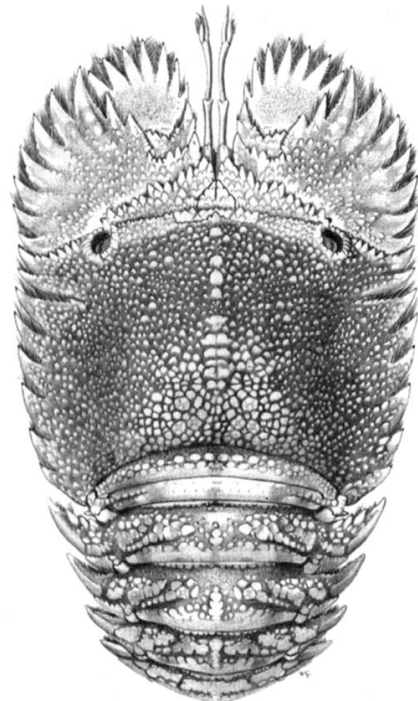
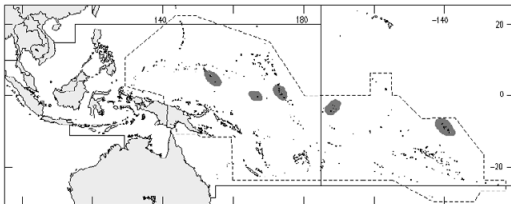


(from Forest, 1954)

***Parribacus scarlatinus* Holthuis, 1960**

**En** - Marbled mitten lobster.

Maximum body length about 15 cm. In shallow reefs areas. Like other species of mitten lobsters, this species is used locally for human consumption. Central and South Pacific from Kapingamarangi through the Marshall, Gilbert, and Phoenix islands to the Marquesas.

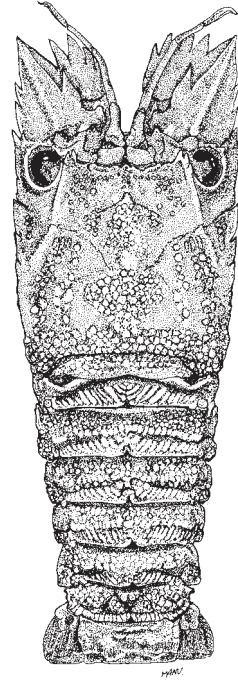
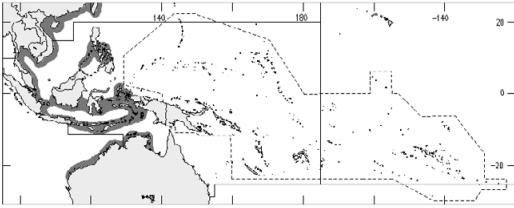


(from Holthuis, 1985)

***Scyllarus bertholdii* Paulson, 1875**

**En** - Two-spot locust lobster.

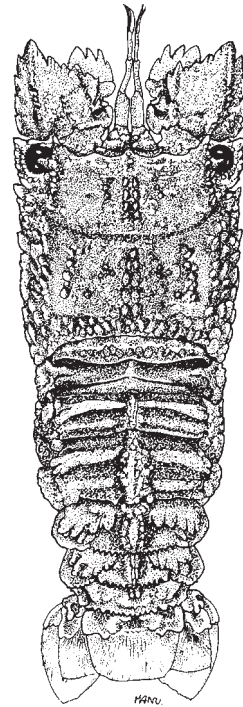
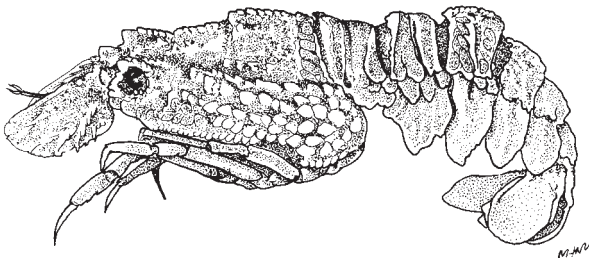
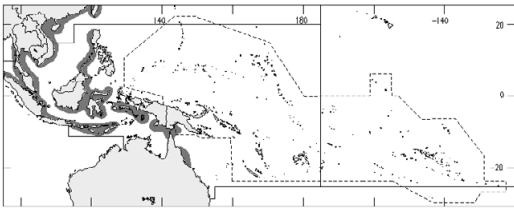
Maximum body length 7 cm, commonly between 3 and 5 cm. On soft bottoms at depths from 15 to 150 m, commonly between 40 and 75 m. Caught incidentally during trawling operations. Like the other Indo-West Pacific species of the genus, it is generally considered to be of no economic importance due to its small size and limited abundance. Western Pacific and western Australia; from the East and South China Sea, Taiwan Province of China to Viet Nam, Thailand, the Philippines, Indonesia, northern and western Australia.



***Scyllarus rugosus* H. Milne Edwards, 1837**

**En** - Hunchback locust lobster.

Maximum body length 6 cm, commonly between 4 and 5 cm. On soft bottoms at depths from 20 to 60 m, rarely to 200 m. Commonly and incidentally taken by trawlers fishing for other species. Nowhere abundant and of limited commercial importance due to its small size. Indo-West Pacific from East Africa to the Red Sea, Japan, and northeastern Australia.



(after Chan and Yu, 1986)