**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 1,641 to 3,115 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

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
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)

Key to the species of Ibacus occurring in the area

1a. Carapace with 6 to 9 posterolateral teeth (Fig. 7a-c) .................. \rightarrow 2

1b. Carapace with more than 9 posterolateral teeth (Fig. 7d-f) .................. \rightarrow 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) .................. \rightarrow 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. 5 Arctides regalis

Fig. 6 Scyllarus

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
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

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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

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

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 umbilicus Holthuis, 1963
  Scyllarus vitiensis (Dana, 1852)
◆ Thenus orientalis (Lund, 1793)

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

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

**FAO names:** En - Sculptured mitten lobster; Fr - Cigale savate; Sp - Cigarras chinesas.

**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 subcircular; 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.

**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 undercut 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.