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The Portunid Crabs (Crustacea : Portunidae) Collected by the NAGA Expedition

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THE PORTUNID CRABS (CRUSTACEA : PORTUNIDAE)
COLLECTED BY THE NAGA EXPEDITION

by

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THE PORTUNID CRABS (CRUSTACEA : PORTUNIDAE)

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INTRODUCTION

Although the collections of NAGA Expedition are small and contain many well-known and widely distributed species of the Indo-West Pacific area, they also contain several little-known forms (e.g. *Charybdis edwardsi* Leene and Buitendijk, *Portunus minutus* [Shen] and *P. tweediei* [Shen]) and two new species. A few additional Indo-West Pacific Specimens from the collections of the Scripps Institution, other than NAGA material, are included in the present report.

With the better-known species the synonymy has been abbreviated to one or two recent references which permit ready identification; in other cases a full synonymy is given.

NAGA collections are reported in the text as Station Numbers (followed by NAGA Catalogue Numbers) with detailed localities and their lists of species in the Appendix. These localities are also plotted on the map.

Measurements are of total breadths, including last anterolateral teeth; those over 100 mm to the nearest 0.5 mm, and the remainder to the nearest 0.1 mm.

SYSTEMATICS

Subfamily PORTUNINAE Stephenson and Campbell, 1960
non PORTUNINAE Alcock, 1899.

Genus CHARYBDIS de Haan, 1833.

Charybdis bimaculata (Miers)

Goniosoma variegatum var. *bimaculatum* (Miers), 1886, p. 191, pl. 15, fig. 3.

Charybdis (Gonioneptunus) bimaculata (Miers). Leene, 1938, pp. 126-129, figs. 70, 71. Stephenson, Hudson and Campbell, 1957, pp. 504-5, figs. 2J, 3K; pl. 3, fig. 4; pls. 4H, 5A. Stephenson and Rees, 1967, pp. 12-13.

Charybdis (Gonioneptunus) subornata (Ortmann). Leene, 1938, pp. 122-125, figs. 68, 69.

Charybdis (Gonioneptunus) whiteleggei Ward. Leene, 1938, pp. 125-126.

Charybdis bimaculata (Miers). Sakai, 1939, pp. 410-412, figs. 10, 11; 1965, pp. 120-121, pl. 58, fig. 4.

MATERIAL:

Ovig. female, 26.7 mm; Sta. No. 60-0208, Cat. No. 43-00100. 3 males, 25.1, 26.1, 27.9 mm; 2 females, 25.3, 29.2 mm; Sta. No. 60-0212, Cat. No. 43-00114.

REMARKS:

In an area naturally bared of hairs, near the center of the mesobranchial region of the carapace, is a small brownish-red spot.

DISTRIBUTION:

India, Maldives to Japan and E. Australia.

Charybdis callianassa (Herbst)

Cancer callianassa Herbst, 1789, pl. 54, fig. 7 (fide Leene, 1938).

Charybdis (Charybdis) callianassa (Herbst). Leene, 1938, pp. 81-84, figs. 41-43. Stephenson, Hudson and Campbell, 1957, pp. 493-495, figs. 1B-D, 2C, 3D; pl. 1, fig. 2; pl. 4A. Stephenson and Rees, 1967, pp. 8-9.

MATERIAL:

2 males, 31.8, 33.4 mm; Sta. No. 60-0215, Cat. No. 43-01207.

4 males, 26.9-27.6 mm; female, 25.9 mm; Sta. No. 61-210, Cat. No. (unavailable).

DISTRIBUTION:

Karachi to northern Australia.

Charybdis curtidentata n. sp.

Pl. 4

MATERIAL:

Holotype, ovig. female; 41.7 mm, LUSIAD H17, dredged at Seychelles, 19-x-1962.

Paratype, ovig. female; 31.0 mm, other data as above (with damaged front).

FRONT.—Six lobed. Medians broad, with oblique outer borders, and approximately twice width of submedians which partly overlap them, scarcely protruding beyond submedians. Deep

and moderately wide fissure between submedians and triangular laterals. Inner supraorbital angle inclined and blunt-tipped. Supraorbital border with inner and outer incisions, the former deep and conspicuously open.

ANTEROLATERAL TEETH.—Six; first tooth blunt, square-cut or truncate; second distinctly smaller than first with blunt tip pointing forwards; third and fourth subequal, broad, somewhat square-cut, with stout forwardly directed sharp tips; fifth small (about as broad as second), with sharp forwardly directed tip; sixth narrow, protruding slightly more than remainder, and with anterolaterally directed spine. Outer margins of all teeth except last, coarsely granular.

CARAPACE.—Relatively narrow (L/B holotype 0.67, paratype 0.62). General surfaces microscopically granular and bearing fine hairs, with more coarsely granulated, elevated areas and some granular ridges; postlateral junction angular. Bases of median and submedian frontal teeth coarsely granular but not elevated; rounded, slightly elevated granular patches just behind them; proto-gastrics broadly separated, coarsely granular patches with a hint of a ridge-like anterior border (particularly in paratype); mesogastrics a broad, continuous, slightly sinuous, granular ridge; meta-gastrics coarsely granular elevated areas bearing two short coarsely granular ridges which merge centrally into general granulation extending anteriorly to mesogastric ridge and posteriorly almost to cervical groove; cardiacs broad granular patches separated in midline; anterolaterals with moderate-sized granules indistinctly separated into patches opposite the first and second, third and fourth teeth; epibranchials a distinct ridge; anterior mesobranchial a distinct ovoid patch; mesobranchial a moderately elevated granular patch; posterior mesobranchial a small but distinct granular patch.

CHELIPEDS.—Left slightly larger than right, with very conspicuous coarsely granular carinae, granules tending to a squamiform arrangement. Merus— anterior border armed with three stout spines, increasing in size distally; posterodistal border with small sharp spinule, (tip sometimes broken); lower and upper surfaces squamiform; outer surface granular. Carpus—coarsely granular, bearing three coarsely granular carinae; inner spine long and robust; three outer spines. Propodus—upper surface with conspicuous inner carina with large central and distal spines; outer carina less well-developed with moderate-sized spine about two thirds along it; well-developed spine at carpus articulation. Outer surface with three well-developed carinae, with large regularly arranged granules; central the most conspicuous. Under surface with squamiform granules. Inner surface with very conspicuous central carina with a secondary branch leading to a rounded boss near articulation of dactylus. Surfaces above and below carina concave with squamiform markings. Index and dactyl—short, stout, deeply grooved.

FIFTH LEG. — Merus short, broad (L/B ca. $1\frac{1}{2}$), with well-developed posterodistal spine. Propodus with posterior border bearing 4-7 spinules.

BASAL ANTENNAL JOINT.—With short curved ridge of large rounded granules.

REMARKS:

In Leene's key (1938, pp. 22-23), this species falls between *C. hoplites* group on the one hand, and *C. hongkongensis*—*C. vadorum* group on the other, because the separation of the lateral frontal teeth from the four median frontal teeth is by an incision of moderate width. Its affinities in other respects are closest to *C. hoplites* and *C. longicollis*, the three species possessing the following common features: relatively short and slightly curved anterolateral borders; last anterolateral teeth of moderate length and directed laterally or slightly forwards; remaining anterolateral teeth somewhat square-cut, but with sharp forwardly directed spines. The present species differs from the other two in having: (1) broadly rounded median frontal lobes, scarcely protruding

beyond the submedians; as against sharp or narrowly rounded, protruding lobes; (2) narrower fissure between submedian and lateral frontal teeth; (3) shorter last anterolateral teeth; (4) mesobranchial areas of carapace only slightly swollen; (5) a line of longitudinal granules connecting the mesogastric and metagastric regions of the carapace; (6) broad as against short metagastric ridges; (7) large granular cardiac elevations as against either ridges or small granular patches.

Charybdis edwardsi Leene and Buitendijk

Goniosoma truncatum (Fabricius). A. Milne Edwards, 1861, p. 380; pl. 34, fig. 4.

Charybdis (Goniobellenus) edwardsi Leene and Buitendijk, 1949, pp. 296-298, figs. 3, 4c. Della Croce and Holthuis, 1965, pp. 33-38 (with plate).

MATERIAL:

1 male, 34.9 mm; 1 female, 37.4 mm; LUSIAD, Sta. No. 22.

6 males, 46.1—55.2 mm; 7 females, 38.5—54.6 mm; LUSIAD, Sta. No. 29.

REMARKS:

C. edwardsi and *C. hoplites* var. *omanensis* Leene (1938, pp. 104-107, fig. 57) are similar in numerous particulars. Thus while both have been placed in the subgenus *Goniobellenus* Alcock 1899, neither of them conform exactly to two of the diagnostic features of this subgenus. Thus Leene's diagnosis (1938, p. 18) includes: "The posterior border of the cephalothorax is straight and forms an eared junction with the posterolateral borders." Meanwhile her description of *C. hoplites* var. *omanensis* states (1938, p. 105): "The posterior border is very slightly sinuous, it does not form a curve with the posterolateral borders, but its angles are not distinctly eared, they are only a little turned up." Almost exactly the same words could be used to describe the present specimens of *C. edwardsi*.

Other resemblances between the two species are:

- (1) relatively long and markedly curved anterolateral borders,
- (2) relatively narrow carapaces,
- (3) short to very short last anterolateral teeth, which are directed slightly backwards,
- (4) all anterolateral teeth except the last very square-cut,
- (5) two distantly spaced spines on the anterior border of the arm often reduced to tubercles; in these respects several of the present specimens closely resemble Leene's figure of *C. hoplites* var. *omanensis*.

The differences between the two species include: (1) the carapace of *C. edwardsi* is "absolutely smooth" (Leene and Buitendijk, 1949, p. 296) or "smooth and highly polished (though minutely shagreened)" (Della Croce and Holthuis, 1965, p. 36), while that of *C. hoplites* var. *omanensis* bears granular ridges in the gastric region and granular patches in the cardiac and mesobranchial regions. The fact that some of the smaller of the present specimens of *C. edwardsi* bear a faint granular mesogastric ridge does not eliminate this distinction.

(2) the fissure separating the submedian from the lateral frontal teeth in *C. edwardsi* is narrower than in *C. hoplites* var. *omanensis*.

Barnard (1950, p. 818) considers that *C. edwardsi* is a synonym of *C. smithii* McLeay, 1838, which Barnard (1950, pp. 163-164, fig. 31j) redescribed from a photograph of McLeay's type. Barnard's justification for this was the opinion of Mr. Melbourne Ward that McLeay's species and the *Goniosoma truncatum* of A. Milne Edwards belonged to the same species.

C. smithii which was unmentioned between McLeay (1838) and Barnard (1950) (apart from listings by Krauss, 1843, p. 24, and Stebbing, 1910, p. 37) appears to resemble *C. hoplites* var. *omanensis* more closely than *C. edwardsii*. Thus *C. smithii* is described by Barnard (1950, p. 163) as possessing on its carapace: "very faint granular transverse lines, with patches of granules on cardiac, and inner branchial regions." In addition Barnard's (1950) figure 31j shows wide frontal fissures resembling those in Leene's figure of *C. hoplites* var. *omanensis*.

Meanwhile Leene (1938, p. 16) had concluded that *C. smithii* McLeay was a synonym of *C. bimaculata* Miers, again at the suggestion of Mr. Melbourne Ward. The one feature upon which this synonymization seems to depend is that the basal antennal joint fails to reach the front, so that the antennal flagellum is not excluded from the orbital hiatus. Evidently Barnard also accepted this conclusion because he placed the species in the subgenus *Gonioneptunus* Ortmann. In a large number of features *C. smithii* does not resemble *C. bimaculata*. It is obviously important that the types of *C. smithii* and *C. hoplites* var. *omanensis* should be re-examined, and meanwhile the present author inclines to the belief that the latter is a synonym of the former.

Della Croce and Holthuis (1965) report on *C. edwardsi* which was swarming over an extensive area of surface waters during Cruise No. 8 of the ANTON BRUUN (INTERNATIONAL INDIAN OCEAN Expedition). These specimens were collected in early November, 1964, roughly on a line from 5°14'S, 41°40'E to 9°45'S, 43°39'E. The present specimens, collected at night-time in July, 1962, came from two more northerly, and more easterly localities (°30'S, 55°03'E and 5°02'S, 53°01'E respectively). Additional specimens, mostly trawled, were obtained by the ANTON BRUUN on earlier cruises of the INTERNATIONAL INDIAN OCEAN Expedition which have recently been examined by the author and Miss Rees. Localities extend from 17°25'N, 71°39'E to 25°25'N, 58°20'E. It seems increasingly probable that the noting of massive surface swarms of crabs by the HEREFORDSHIRE reported by Della Croce and Holthuis (1965) at 10°43'N and 59°26'E do refer to the present species.

Two species of portunids are now known to swarm offshore—*Polybius henslowi* Leach (see Della Croce, 1961, pp. 5-13), and the present species. In addition, *Portunus xantusii affinis* (Faxon) apparently occurs in considerable numbers offshore in the American Pacific (see Alverson, 1963; Juhl, 1955; Garth and Stephenson, 1966).

Charybdis feriatus (L.)

Cancer feriatus Linnaeus, 1758, p. 625.

Charybdis (*Charybdis*) *cruciata* (Herbst). Leene, 1938, pp. 24-27, figs. 1, 2. Stephenson, Hudson and Campbell, 1957, pp. 495, 497, figs. 2E, 3F; pl. 1, fig. 3; pl. 4B. Crosnier, 1962, pp. 75-77, figs. 130-132.

Charybdis cruciata (Herbst). Sakai, 1939, pp. 403-404; pl. 82, fig. 3; 1965, pp. 123-124; pl. 62; pl. 63, fig. 1.

Charybdis (*Charybdis*) *feriatus* (L.). Stephenson and Rees, 1967, p. 10.

MATERIAL:

1 yg, 16.8 mm; Sta. No. 60-0103, Cat. No. 43-00068.

1 yg, 19.2 mm; Sta. No. 60-0820, Cat. No. 43-00155.

1 male; Sta. No. 60-0941, Cat. No. 43-00164.

3 males; Sta. No. 60-0943, Cat. No. 43-00166.

1 male; Sta. No. 60-1074, Cat. No. 43-00168.

Sizes: Males, 37.4—115.5 mm.

REMARKS:

The young specimens, as the one described by Stephenson and Rees, lack the connection of the basal antennal articulation to the front, the antennal flagellum thus being included in the orbit. Both the present specimens lack the characteristic coloring of the dorsal surface of the carapace.

DISTRIBUTION:

East coast of South Africa to Japan and Australia (Stephenson, Hudson and Campbell, 1957; Crosnier, 1962).

Charybdis miles (de Haan)

Portunus (Charybdis) miles de Haan, 1835, p. 41, pl. 11, fig. 1.

Charybdis miles (de Haan). Stimpson, 1858, p. 39. Doflein, 1902, p. 659. Rathbun, 1902, p. 27. Stimpson, 1907, p. 82. Parisi, 1916, p. 175. Balss, 1922, p. 104. Yokoya, 1933, p. 175. Sakai, 1939, p. 405, pl. 46, fig. 2; 1965, p. 123, pl. 61.

Goniosoma miles (de Haan). A. Milne Edwards, 1861, pp. 378, 385. Ortmann, 1893, p. 81.

Charybdis (Goniosoma) miles (de Haan). Alcock, 1899, p. 62. Chopra, 1935, p. 486, text-fig. 9. Shen, 1937, p. 123, text-fig. 13.

Charybdis (Charybdis) miles (de Haan). Leene, 1938, pp. 38-42, figs. 10, 11, 12 and 13. Stephenson, Hudson and Campbell, 1957, pp. 500-501, figs. 2H, 3I; pl. 2, fig. 3; pl. 4F. Rees and Stephenson, 1966, p. 37. Stephenson and Rees, 1967, p. 11.

MATERIAL:

2 males; Sta. No. 59-0052, Cat. No. 43-0144.

1 female; Sta. No. 60-0212, Cat. No. 43-00115.

1 male, 1 *Sacculina* infected (unsexable); Sta. No. 60-0237, Cat. No. 43-00129.

1 male; Sta. No. 60-0636, Cat. No. 43-00147.

1 female; Sta. No. 60-0777, Cat. No. 43-00150.

Sizes: Males, 23.0—59.9 mm; females, 48.2, 56.4 mm; *Sacculina* infected, 27.1 mm.

REMARKS:

Leene's (1938) description of the first anterolateral tooth as "notched" is misleadingly emphatic. The index and dactylus of the chelipeds of the present specimens are bright red-orange after (presumably) formalin and then alcohol preservation.

DISTRIBUTION:

From Ganjam Coast of India to Hong Kong and Japan, including eastern Australia (see Leene, 1938).

Charybdis natator (Herbst)

Cancer natator Herbst, 1789, pl. 40, fig. 1 (fide Leene, 1938).

Charybdis (Charybdis) natator (Herbst). Leene, 1938, pp. 93-97, figs. 50, 51. Stephenson, Hudson and Campbell, 1957, pp. 501-502, figs. 2G, 3H; pl. 2, fig. 4; pl. 4J. Crosnier, 1962, pp. 82-83, figs. 143-144; pl. 13, fig. 2. Stephenson and Rees, 1967, p. 11.

Charybdis natator (Herbst). Sakai, 1939, p. 407. Barnard, 1950, pp. 169-170.

MATERIAL:

Yg. female, 37.3 mm; Sta. No. 60-0431, Cat. No. 43-00143.

REMARKS:

Rees and Stephenson (1966) have described a new species *C. moretonensis* which shows many resemblances to *C. natator*.

DISTRIBUTION:

East coast of Africa to Japan and Australia.

Charybdis riversandersoni Alcock

Charybdis (Goniosoma) riversandersoni Alcock, 1899, p. 53. Alcock and McArdle, 1902, pl. 40, fig. 3.

Charybdis riversandersoni Alcock. Balss, 1922, p. 105. Gordon, 1931, pp. 537-538, fig. 13c. Sakai, 1939, pp. 404-405; pl. 46, fig. 1; 1965, pp. 122-123; pl. 60, fig. 2.

Charybdis (Charybdis) riversandersoni Alcock. Leene, 1938, pp. 28-30, figs. 3, 4a, 4b.

MATERIAL:

2 males, 39.9, 67.2 mm; 1 female, 42.4 mm; Sta. No. 60-0212, Cat. No. 43-00116.

REMARKS:

These specimens, collected in company with *C. miles* were originally confused with it particularly because in some cases the anterior border of the merus has four spines as in *C. miles*, not three. Such cases are that of a female, left merus; a larger male, left merus (here the right one missing). In addition, the swollen branchial regions, a diagnostic feature of Leene, are only exhibited in the larger male. The species are distinguished by *C. riversandersoni* possessing blunter frontal teeth, the second anterolateral tooth larger than the first (and not vice versa), and a longer merus of the fifth leg.

DISTRIBUTION:

Previously Konkak Coast (Alcock); Bay of Sagami (Balss)—see Leene (1938).

Charybdis truncata (Fabricius)

Portunus truncatus Fabricius, 1798, p. 365.

Charybdis (Goniobellenus) truncata (Fabricius). Leene, 1938, pp. 118-121, figs. 66, 67. Stephenson, Hudson and Campbell, 1957, pp. 503-504, figs. 2D, 3E; pl. 3, fig. 3; pl. 4I. Crosnier, 1962, pp. 87-89, figs. 149-150; pl. 8, fig. 1. Rees and Stephenson, 1966, p. 39; Stephenson and Rees, 1967, p. 12.

Charybdis truncata (Fabricius). Sakai, 1939, p. 412; pl. 45, fig. 4; 1965, p. 122; pl. 59, fig. 3.

MATERIAL:

1 female, 26.0 mm; Sta. No. 60-0316, Cat. No. 43-00284.

1 female, 26.9 mm; Sta. No. 60-0636, Cat. No. 43-00147.

1 *Sacculina* infected, unsexed, 17.6 mm; Sta. No. 60-1077, Cat. No. 43-01634.

2 males, 31.1, 39.9 mm; Sta. No. 60-1097, Cat. No. 43-00174.

1 female, 23.9 mm; Sta. No. 60-1103, Cat. No. 43-01109.

DISTRIBUTION:

Madagascar to India, Australia and Japan (Crosnier, 1962).

Charybdis vadorum Alcock

Charybdis (Goniobellenus) hoplites var. *vadorum* Alcock, 1899, p. 67.

Charybdis (Goniobellenus) sinensis Gordon, 1930, p. 522; 1931, p. 534, figs. 11, 12c, d, d¹. Shen, 1934, p. 44, figs. 9, 10.

Charybdis (Goniobellenus) vadorum Alcock. Chopra, 1935, p. 493, text fig. 13, pl. 9, fig. 2. Leene, 1938, pp. 114-117, figs. 63-65. Stephenson and Rees, 1967, p. 12.

?*Archais sexdentatus* Paulson, 1875, p. 56; pl. 8, fig. 3-3b. Nobili, 1906, p. 198 (fide Leene, 1938).

MATERIAL:

1 male, 18.0 mm; Sta. No. 60-0104, Cat. No. 43-00061 (chelipeds missing).

1 female, 18.6 mm; Sta. No. 60-1106, Cat. No. 43-01064.

1 female, 22.2 mm; Sta. No. 61-0045, Cat. No. 43-00970.

DISTRIBUTION:

Red Sea to Hong Kong.

Genus LUPOCYCLUS Adams and White, 1849

Lupocyclus quinquedentatus Rathbun

Pl. 1

Lupocyclus quinquedentatus Rathbun, 1906, p. 869; pl. 12, fig. 7, text-fig. 28; 1911, p. 210. Leene, 1938, p. 11; 1940, pp. 171-174, text-fig. 4, pl. 2.

MATERIAL:

2 ovig. females, 22.6, 22.1 mm; LUSIAD H16, dredged at Seychelle, X-19-1962.

REMARKS:

Present specimens differ from Leene's (1940) description only in that on both specimens the posterodistal border of the merus of the left cheliped bears a small spine rather than a spinule. Spinules are present on the right cheliped.

On the outer surface of the propodus of the left chelipeds (but not the right) there is a small spine in line with the center of the dactylus.

After brief preservation, there are scattered pink-colored hairs over most of the carapace with a special concentration on the lateral portions of the protogastric ridges and mesobranchial areas.

DISTRIBUTION:

Cardagos Carajos, Amirante, Seychelles to Hawaii (Leene, 1938) and Timor (Leene, 1940).

Genus PORTUNUS Weber, 1795

Portunus argentatus (A. Milne Edwards)

Amphitrite argentata White, 1847, p. 146. (descriptio nulla).

Neptunus argentatus A. Milne Edwards, 1861, pp. 332, 339; pl. 31, figs. 4, 4a, 4b. Henderson, 1893, p. 368.

Neptunus (Amphitrite) gladiator var. *argentatus* Miers, 1886, pp. 177-178. Cano, 1889, p. 214. Ortmann, 1893, p. 73 (fide Alcock, 1899).

Neptunus (Amphitrite) argentatus A. Milne Edwards. Alcock, 1899, pp. 36-37. Laurie, 1906, p. 413. Sakai, 1939, p. 391, fig. 5b; pl. 81, fig. 1.

Portunus (Achelous) argentatus (A. Milne Edwards). Rathbun, 1906, p. 871. Edmondson, 1954, pp. 238-239, figs. 14, 15.

Monomia argentata (White, A. M. Edwards). Barnard, 1950, pp. 156-158, figs. 27c, 30a-d.

Portunus argentatus (A. Milne Edwards). Stephenson, 1961, pp. 105-106, figs. 1F, 3D; pl. 2, fig. 2; pls. 4D, 5A. Crosnier, 1962, pp. 50-51, figs. 71, 75, 77, 80, 81; pl. 3, fig. 1. Stephenson and Rees, 1967, pp. 16-19, fig. 2.

MATERIAL:

1 male, 27.5 mm; female, ca. 22 mm (damaged); Sta. No. 60-0237, Cat. Nos. 43-00128 and 43-01455, respectively.

5 males, 17.0—18.4 mm; 2 females, 15.9, 17.5 mm; 15 yg., 12.6—17.8 mm; Sta. No. 60-0283, Cat. No. 43-00140. (Some young probably sexable, but abdomens and pleopods "cemented" in.)

REMARKS:

In the smaller specimens no black spots were visible on the dactyls of the fifth legs. In the largest male and the three smaller males from which pleopods could be recovered these were all clubbed (see Stephenson, 1961, and Stephenson and Rees, 1967).

DISTRIBUTION:

East coast of Africa to Australia, Hawaii and Japan (Stephenson, 1961; Crosnier, 1962).

Portunus gracilimanus (Stimpson)

Amphitrite gracilimanus Stimpson, 1858, p. 38; 1907, pp. 77-78; pl. 10, fig. 3a, b, c.

Achelous whitei A. Milne Edwards, 1861, pp. 336, 343; pl. 31, fig. 6. Lanchester, 1900, p. 746.

Neptunus (Lupocycloporus) whitei (A. Milne Edwards). Alcock, 1899, pp. 44-45. Laurie, 1906, p. 416.

Neptunus (Lupocycloporus) gracilimanus (Stimpson). Balss, 1922, p. 108. Chopra, 1935, pp. 481-482, text-fig. 6a, b. Shen, 1937, pp. 113-114, fig. 9.

Portunus gracilimanus (Stimpson). Stephenson and Campbell, 1959, pp. 115-116, fig. 2M, 3M; pl. 4, fig. 1; pls. 4M, 5M (excluding synonymy). Rees and Stephenson, 1966, p. 40.

?*Achelous whitei* A. Milne Edwards. Henderson, 1893, p. 371.

non ? *Neptunus (Lupocycloporus) gracilimanus* Alcock, 1899, p. 45 = *Portunus (Lupocycloporus) innominatus* Rathbun, 1909, p. 114.

non *Neptunus (Lupocycloporus) innominatus* Rathbun. Chopra, 1935, p. 481 (footnote).

MATERIAL:

1 male, 40.7 mm; Sta. No. 60-1074, Cat. No. 43-00169.

3 males, 21.9—36.7 mm; 1 female, 31.3 mm; plus extra cheliped; Sta. No. 60-1085, Cat. No. 43-01014.

Ovig. female, 33.4 mm; Sta. No. 60-1097, Cat. No. 43-00172.

REMARKS:

Rathbun (1909) and Chopra (1935) concluded that Alcock's (1899) ?*Neptunus (Lupocycloporus) gracilimanus* belongs to an otherwise undescribed species. Shen (1937), followed by Stephenson and Campbell (1959), synonymized it with the present species. However, the discovery of a new species close to *P. gracilimanus*, herein described as *P. sinuosodactylus*, indicates the general closeness of species in this group and supports the separation of *P. innominatus*. It differs from

the present species and *P. sinuosodactylus* in the form of the front and the spinulation of the posterior border of the merus of the cheliped.

DISTRIBUTION:

Andamans, India, Hong Kong, Malaya, New Guinea and Australia (Stephenson and Campbell, 1959).

Portunus hastatoides Fabricius

Portunus hastatoides Fabricius, 1798, p. 368. Stephenson and Campbell, 1959, pp. 101-102, figs. 2D, 3D; pl. 1, fig. 4; pls. 4D, 5D. Crosnier, 1962, pp. 68-69, figs. 98, 109, 117, 122-123. Sakai, 1965, p. 119; pl. 58, fig. 2. Stephenson and Rees, 1967, pp. 27-28.

Neptunus (Amphitrite) hastatoides (Fabricius). de Haan, 1835, pp. 39-40, pl. 1, fig. 3. de Man, 1895, pp. 557-558.

Neptunus (Hellenus) hastatoides (Fabricius). Alcock, 1899, pp. 38-39 (synon.). Sakai, 1939, pp. 391-392; pl. 47, fig. 1.

Hellenus hastatoides (Fabricius). Barnard, 1950, pp. 158-159.

MATERIAL:

1 male, left branchial cavity parasitically swollen; Sta. No. 60-0102, Cat. No. 43-00056.

2 males, 1 female, 1 *Sacculina* infected specimen; Sta. No. 60-0104, Cat. No. 43-01636.

4 males, 9 females, Sta. No. 60-0206, Cat. No. 43-00090.

2 males, 5 females, 4 ovig. females; Sta. No. 60-211, Cat. No. 43-00103.

5 males (fragmenting), 1 unsexed (fragmented); Sta. No. 60-1049, Cat. No. 43-00999.

1 male, 1 female; Sta. No. 60-1052, Cat. No. 43-01001.

3 males, 1 female, 1 ovig. female; Sta. No. 60-1071, Cat. No. 43-01537.

2 males, 1 female (fragmenting); Sta. No. 60-1077, Cat. No. 43-01613.

1 male; Sta. No. 60-1085, Cat. No. 43-01012.

2 females; Sta. No. 60-1091, Cat. No. 43-01017.

1 female; Sta. No. 60-1094, Cat. No. 43-00892.

8 males, 3 females, 6 ovig. females, 1 *Sacculina* infected specimen; Sta. No. 60-1097, Cat. No. 43-00176.

1 male, 1 female; Sta. No. 60-1103, Cat. No. 43-01059.

Sizes: Males, 21.5—43.8 mm; females, 22.2—40.3 mm; ovig. females, 27.8—39.4 mm; *Sacculina* infected specimens, 26.1, 33.1 mm.

REMARKS:

The black spot on the dactyl immediately distinguishes this from the superficially similar *P. tweediei* which was present in some of the above collections. The mouth parts often show a nacreous sheen. In smaller specimens the last anterolateral tooth is relatively longer than in the larger specimens. In the specimen with a parasitized branchial cavity the ornamentation of the carapace is more tubercular than usual. This is the most abundant and ubiquitous species in the collection.

DISTRIBUTION:

East coast of Africa to Japan, Australia and Philippines (Stephenson and Campbell, 1959) but not from Red Sea (Stephensen, 1945).

Portunus minutus (Shen)

Pl. 2

Neptunus (Lupocycloporus) minutus Shen, 1937, p. 115, text-fig. 9a-c.

Portunus minutus (Shen). Stephenson and Campbell, 1959, p. 89 (in key).

MATERIAL:

1 female, 15.5 mm; Sta. No. 60-1085, Cat. No. 43-01014.

Because this species closely resembles *P. sinuosodactylus* and because of the brevity of Shen's description, a full redescription is given.

FRONT.—Four shallow lobes. Medians less than half width of laterals. Inner supraorbital angles separated by shallow notch from laterofrontal lobes; barely detectable subdivision between inner and outer portions. Inner supraorbital fissure closed, outer open but shallow, no dentiform process on border of orbit on median side. Suborbital fissure broadly open. Inner suborbital angle rounded and obscure.

ANTEROLATERAL TEETH.—First stout and broad, last stout, slightly elongate, and pointing directly outwards. Second, fourth, sixth and eighth slightly smaller than intervening third, fifth and seventh, respectively. Second to fourth relatively small and blunt, fifth to eighth relatively large and pointed with fifth the largest.

CARAPACE.—Very convex, hirsute, bearing granular ridges and patches, postlateral junction rounded, only moderately broad (B/L 1.78). Areas of beaded granules (broadly separated by smooth areas): frontal and postfrontal patches, feebly developed; protogastrics, two narrow diffuse ridges well separated in midline and merging laterally with mesogastrics; mesogastrics, two narrow ridges distinctly separated in midline; metogastrics, two short patches with ridgelike anterior termination and narrowly separated in midline; a single longitudinal central gastric ridge extending almost from level of protogastrics to metogastrics; cardiacs, two ovoid patches; median postcardiac, very small patch; lateral postcardiac patches absent; anterolaterals, a diffuse band from first to seventh teeth with concentrations opposite third and fifth; epibranchial ridge, sharply curved; anterior and posterior mesobranchials, elongate patches, posterior with ridgelike border; posterolateral patches present, with smaller granules than remainder. Posterior border, elevated and granular.

CHELIPEDS.—(Left only present.) Elongate, very slender, propodus much less massive than merus, with beaded granules covering carinae and undersurface. Merus—posterodistal border with two sharp spines, anterior border with five spines, the four proximal well separated from the subterminal distal (Shen's specimen has three proximal spines.) Undersurface with terminal boss bearing small spine. Carpus—elongate, inner and outer spines well developed and acute. Y-shaped carina on upper surface, two carinae on outer surface. Propodus—long, thin, narrow and strongly carinated. Spine at carpus articulation long and sharp. Upper surface with two conspicuous carinae, inner with larger subterminal spine (about three quarters of way along it) and blunt terminal spine, outer with smaller spine opposite that on inside and terminating in blunt tubercle. Outer surface with conspicuous outer carina bifurcating just beyond halfway. Under surface coarsely granular, inner surface with conspicuous central carina. Index and dactylus—extremely long, sharp and sinuously curved.

FIFTH LEG.—Merus 1.25 times as long as broad with conspicuous spine on posterodistal border.

THIRD MAXILLIPED.—Hirsute, merus longer than broad, anteroexternal angle not produced laterally.

REMARKS:

This specimen differs from Shen's only in the following characteristics: (1) more discrete median frontal lobes; (2) fifth anterolateral tooth bigger than seventh; (3) five spines instead of four on anterior border of merus of cheliped; (4) propodus of cheliped (compare plate with Shen's figure 10a) even more attenuated. This species resembles *P. sinuosodactylus*, see later for distinctions.

DISTRIBUTION:

Previously only Siglap, Singapore.

Portunus orbitosinus Rathbun

Portunus (Amphitrite) gladiator de Haan, 1833, p. 65 (only), pl. 18, fig. 1.

Portunus (Achelous) orbitosinus Rathbun, 1911, p. 205; pl. 15, fig. 11.

Neptunus (Achelous) orbitosinus (Rathbun). Gordon, 1938, pp. 182-185, figs. 5a-g, 6c, 6d.

Neptunus orbitospinus Rathbun (sic). Sakai, 1939, p. 396; pl. 81, fig. 2.

Portunus orbitosinus Rathbun. Stephenson and Campbell, 1959, pp. 113-114, figs. 2L, 3L; pl. 3, fig. 4; pls. 4L, 5L. Stephenson, 1961, pp. 108-109. Crosnier, 1962, pp. 55-57, figs. 88, 90, 91, 93. Stephenson and Rees, 1967, pp. 31-34, fig. 6.

Portunus orbitospinus Rathbun (sic). Sakai, 1965, p. 118; pl. 57, fig. 2.

MATERIAL:

1 female, 26.9 mm; LUSIAD H17, dredged at Seychelles, 19-X-1962.

DISTRIBUTION:

From Madagascar and Seychelles to Japan, Philippines and Australia.

Portunus pelagicus (L.)

Cancer pelagicus Linnaeus, 1766, p. 1042.

Neptunus pelagicus (L.). Sakai, 1939, pp. 387-388, pl. 49.

Portunus pelagicus (L.). Stephenson and Campbell, 1959, pp. 96-98, figs. 2A, 3A; pl. 1, fig. 1; pls. 4A, 5A. Crosnier, 1962, pp. 43-45, figs. 58, 61, 67. Sakai, 1965, p. 117, pls. 55, 56. Stephenson and Rees, 1967, pp. 34-35, figs. 12c, d, 17b.

MATERIAL:

1 male; Sta. No. 60-0110, Cat. No. 43-00181.

1 female; Sta. No. 60-0556, Cat. No. 43-00220.

2 males; Sta. No. 60-0699, Cat. No. 43-00148.

1 female; Sta. No. 60-0820, Cat. No. 43-00154.

1 male; Sta. No. 60-0845, Cat. No. 43-00161.

1 female; Sta. No. 61-0156, Cat. No. 43-00985.

Sizes: Males, 78.9—148.5 mm; females, 65.5—150.5 mm.

DISTRIBUTION:

From E. Africa to Tahiti, Japan and Philippines; Mediterranean (Stephenson and Campbell, 1959).

Portunus pulchricristatus (Gordon)

Neptunus (Hellenus) spinipes Alcock, 1899, pp. 31-32, 39-40.

Neptunus (Hellenus) pulchricristatus Gordon, 1931, p. 534, figs. 8, 10 (A).

Portunus pulchricristatus (Gordon). Stephenson and Rees, 1967, pp. 35-37, fig. 7.

non *Neptunus (Amphitrite) spinipes* Miers, 1886, p. 178; pl. 25, fig. 1.

MATERIAL:

2 males, 2 females; Sta. No. 60-0211, Cat. No. 43-00105.

1 male, 1 ovig. female; Sta. No. 60-0237, Cat. No. 43-01638.

1 male; Sta. No. 60-0853, Cat. No. 43-00935.

4 males; Sta. No. 60-1046, Cat. No. 43-00785.

1 female, 1 *Sacculina* infected specimen (?female); Sta. No. 60-1052, Cat. No. 43-01640.

1 male, 1 female; Sta. No. 60-1056, Cat. No. 43-00769.

6 males, 1 female; Sta. No. 60-1059, Cat. No. 43-01590.

3 males, 1 female, 1 *Sacculina* infected specimen (?female); Sta. No. 60-1085, Cat. No. 43-01643.

Sizes: Males 9.2—26.8 mm, females 15.1—26.0 mm, ovig. female 22.2 mm; *Sacculina* infected specimens 16.7, 17.3 mm.

REMARKS:

This species has unusually long walking legs.

DISTRIBUTION:

Madras, Andaman Islands, Gulf of Martaban, Arakan Coast, Muscat, Hong Kong and Philippines.

Portunus rubromarginatus (Lanchester)

Achelous rubromarginatus Lanchester, 1900, pp. 746-747, pl. 46, fig. 8.

Portunus rubromarginatus (Lanchester). Stephenson and Campbell, 1959, pp. 112-113, figs. 2K, 3K; pl. 3, fig. 3; pls. 4K, 5K. Stephenson and Rees, 1967, p. 37.

MATERIAL:

1 male, 44.1 mm; Sta. No. 60-0941, Cat. No. 43-00165.

DISTRIBUTION:

South China Sea, Hong Kong, Malay Archipelago and N. Australia.

Portunus sanguinolentus (Herbst)

Cancer sanguinolentus Herbst, 1796, p. 161; pl. 8, figs. 56, 57.

Portunus sanguinolentus (Herbst). Fabricius, 1798, p. 367. Rathbun, 1906, p. 870. Stephenson and Campbell, 1959, pp. 98-99, figs. 2B, 3B; pl. 1, fig. 2; pls. 4B, 5B. Crosnier, 1962, pp. 45-47, figs. 59, 62, 63, 68. Sakai, 1965, p. 116; pl. 53. Stephenson and Rees, 1967, pp. 45-46, figs. 12a, b.

Neptunus sanguinolentus (Herbst). de Haan, 1833, p. 38. Milne Edwards, A., 1861, pp. 319-320. Alcock, 1899, pp. 32-33 (synon.). Sakai, 1939, p. 387, pl. 47, fig. 1.

MATERIAL:

- 1 yg. male, 29.8 mm; Sta. No. 60-0152, Cat. No. 43-00077.
- 1 male, 54.6 mm; Sta. No. 60-0269, Cat. No. 43-00135.
- 1 female, 73.7 mm; Sta. No. 60-0865, Cat. No. 43-00162.
- 1 female, 52.4 mm; Sta. No. 60-0991, Cat. No. 43-00167.

REMARKS:

As indicated by Stephenson and Rees (1967), juvenile specimens without pigment are distinguishable from *P. pelagicus* by the front and third maxillipeds.

DISTRIBUTION:

E. Africa to Hawaii, including Australia; also Adriatic (Stephenson and Campbell, 1959).

Portunus sinuosodactylus n. sp.

Pl. 3

MATERIAL:

Holotype, ovig. female, 32.9 mm; Sta. No. 60-0895, Cat. No. 40-001080.

FRONT.—Four distinct lobes, medians slightly protruding and only slightly narrower than laterals which are inclined outwards. Inner supraorbital angles separated by deep U from lateral frontal lobes, and distinctly separated into inner and outer portions. Inner supraorbital fissure detectable, outer obvious and with dentiform process on border of orbit on median side. Suborbital fissure broadly open. Inner suborbital angle rounded but conspicuous.

ANTEROLATERAL TEETH.—First stout and broad; last stout with tip curving forwards. Barely detectable alternation between larger and smaller teeth, but fifth and seventh relatively large. Ninth anterolateral tooth approximately twice as long as the eighth.

CARAPACE.—Moderately convex, hirsute, bearing granular ridges and some patches, postlateral junction rounded, moderately long (B/L 1.65). Ridges and patches (broadly separated by smooth areas): frontal and post frontal patches, moderately well developed; protogastrics, short ridges well separated in midline; mesogastrics, short curved ridges well separated in midline; metagastrics, small clusters well separated in midline; no longitudinal central ridge of granules; cardiacs, two short conspicuous ridges; median postcardiac, a minute clump; lateral postcardiac patches absent; anterolaterals, broad clump opposite second to fourth teeth, other narrower clumps opposite fifth, sixth, seventh and eighth teeth; epibranchial ridge, sharply curved and very elevated; anterior and posterior mesobranchials, both ridges; posterolaterals absent. Posterior border slightly elevated and feebly granular.

CHELIPEDS.—Elongate, very slender; propodus much less massive than merus, with beaded granules covering carinae and undersurface. Merus—posterodistal border with two sharp spines, anterior border with four spines, the three proximal well separated from the subterminal distal. Undersurface with terminal boss bearing spine. Carpus—elongate, inner and outer spines well developed and acute; Y-shaped carina on upper surface, three carinae on outer surface. Propodus—long, thin, narrow and strongly carinated. Spine at carpus articulation long and sharp. Upper surface with two conspicuous carinae, inner with very large curved subterminal spine (about 0.7 of the way along it) and terminal tubercle, outer with large spine opposite that on inside. Outer surface with single well-developed central carina. Under surface with granules approximating to

squamiform arrangement, inner surface with central carina. Index and dactylus—extremely long, sharp and sinuously curved.

FIFTH LEG.—Merus 1.6 times as long as broad with conspicuous spine on posterodistal border.

THIRD MAXILLIPED.—Hirsute, merus longer than broad, anteroexternal angle not produced laterally.

REMARKS:

This species differs from *P. minutus* in (1) more equal frontal lobes, (2) numerous details of carapace ornamentation, but broadly speaking, in having more ridgelike granular elevations, (3) forward curvature of ninth anterolateral tooth, (4) longer and more curved spine on the inner side of the upper surface of the chelipeds, (5) broader merus of fifth legs.

It is much more closely related to *P. gracilimanus* which it resembles in the ridgelike elevations of the carapace, similar spinulation of the upper surface of the cheliped, similar nature of the front, and similarly broad merus of the fifth legs. *P. gracilimanus* differs in having a broad, continuous mesogastric ridge, a continuous metagastric, a rudimentary longitudinal central gastric line of granules, and the anteroexternal angle of the merus of the third maxilliped produced slightly in a lateral direction.

Portunus tweediei (Shen)

Neptunus (Hellenus) tweediei Shen, 1937, pp. 108-109, figs. 6a, b, c.

Portunus tweediei (Shen). Stephenson and Campbell, 1959, p. 90 (in key).

MATERIAL:

1 male, 28.3 mm; Sta. No. 60-0104, Cat. No. 43-01637.

3 males, 26.0—28.9 mm; 1 female, 22.8 mm; 1 ovig. female, 24.9 mm; Sta. No. 60-1052, Cat. No. 43-01641.

3 males, 26.0—35.7 mm; 1 female, 27.0 mm; Sta. No. 60-1071, Cat. No. 43-01642.

1 female, 26.6 mm; Sta. No. 60-1091, Cat. No. 43-01644.

1 male, 25.1 mm; Sta. No. 60-1094, Cat. No. 43-00892.

REMARKS:

In all the present specimens the median frontal lobe is smaller and less protruding than in Shen's figure (6a). The male abdomens vary in breadth, some being as broad as Shen's figure (6c), but some distinctly narrower. In these the distinction between the parallel-sided proximal portion and the converging distal portion is still evident, but is less obvious.

In one of the present specimens (Sta. No. 60-1091, Cat. No. 43-01017) the mesogastric and cardiac granulated elevations of the carapace are tubercular eminences, showing a close resemblance to those in *P. spiniferus* Stephenson and Rees, 1967. The present specimen probably belongs to the same species as the remainder, which differ from *P. spiniferus* in the form of the male abdomen and third maxilliped.

In view of the variations in the present species and in the allied *P. tenuipes* (see Stephenson and Rees, 1967) a critical review of the following five closely related species should be undertaken: *P. alcocki* (Nobili), 1905; *P. mariei* Guinot, 1957; *P. spiniferus* Stephenson and Rees, 1967, *P. tenuipes* (de Haan), 1833; and *P. tweediei* (Shen), 1937.

DISTRIBUTION:

Previously from Singapore only.

Genus **SCYLLA** de Haan, 1833

Scylla serrata (Forskål)

Cancer serratus Forskål, 1755, p. 90.

Scylla serrata (Forskål). de Haan, 1833, p. 44. Sakai, 1939, p. 384, fig. 4; 1965, pp. 115-116, pl. 52. Stephenson and Campbell, 1959, pp. 111-115, fig. 2N; pl. 4, fig. 4; pls. 5N, 6C. Rees and Stephenson, 1966, pp. 40-41; Stephenson and Rees, 1967, pp. 55-56.

MATERIAL:

1 female, 94.7 mm; Sta. No. 59-0030, Cat. No. 43-00836.

1 ovig. female, 110 mm; Sta. No. 60-0886, Cat. No. 43-00163.

REMARKS:

In both specimens the external spine on the upper surface of the propodus is fairly well developed, as is the lower spine on the outer surface of the carpus. Possibly these specimens come close to Estampador's (1949), var. *paramamosain* (see also Serène, 1952; and Stephenson and Campbell, 1960).

DISTRIBUTION:

E. Africa and Red Sea to Japan, Australia, New Zealand and Tahiti.

Genus **THALAMITA** Latreille, 1829

Thalamita sima H. Milne Edwards

Thalamita sima H. Milne Edwards, 1834, p. 460. Milne Edwards, A., 1861, pp. 359, 367. Miers, 1876, p. 28. Sakai, 1939, pp. 414, 423, fig. 16a, b, c; pl. 51, fig. 3; 1965, p. 125; pl. 64, fig. 1. Stephenson and Hudson, 1957, pp. 352-354, figs. 2C, 3C; pl. 5, fig. 2; pls. 8O, 9G. Stephenson and Rees, 1967, p. 93.

MATERIAL:

1 male 62.9 mm; Sta. No. 59-131, Cat. No. 43-00049.

Yg. female, 13.9 mm; Sta. No. 60-0656, Cat. No. 43-01141.

1 male, 19.0 mm; 1 ovig. female, 53.8 mm; Sta. No. 60-0833, Cat. No. 43-00157.

1 male, 60.2 mm; Sta. No. 60-1094, Cat. No. 43-00886.

1 male, 58.5 mm; Sta. No. 60-1097, Cat. No. 43-00173.

Ovig. female, 26.5 mm; LUSIAD H17 dredge at Seychelles, 19-X-1962.

DISTRIBUTION:

Mozambique and Red Sea, to Japan and Hawaii, including Australia (Stephenson and Hudson, 1957).

Subfamily **PODOPHTHALMINAE** Borradaile, 1907

Genus **PODOPHTHALMUS** Lamarck, 1801

Podophthalmus vigil (Fabricius)

Portunus vigil Fabricius, 1798, p. 368.

Podophthalmus vigil (Fabricius). Milne Edwards, A., 1861, p. 420. Sakai, 1939, p. 427; pl. 42,

fig. 2; 1965, p. 126; pl. 65, fig. 2. Stephenson and Campbell, 1959, pp. 115-116, figs. 1L, 2O; pl. 5, fig. 1; pl. 50.

MATERIAL:

1 female, ca. 23 mm; Sta. No. 61-0142, Cat. No. 43-00984.

DISTRIBUTION:

From Red Sea, Iranian Gulf, Indian Ocean, Formosa and Philippines to Hawaii, including Australia.

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PLATE 1. *Lupocyclus quinquedentatus* Rathbun. Scale 1 mm. A. dorsal view, ovig. female (22.6 mm). B. left cheliped outer surface, specimen as above.

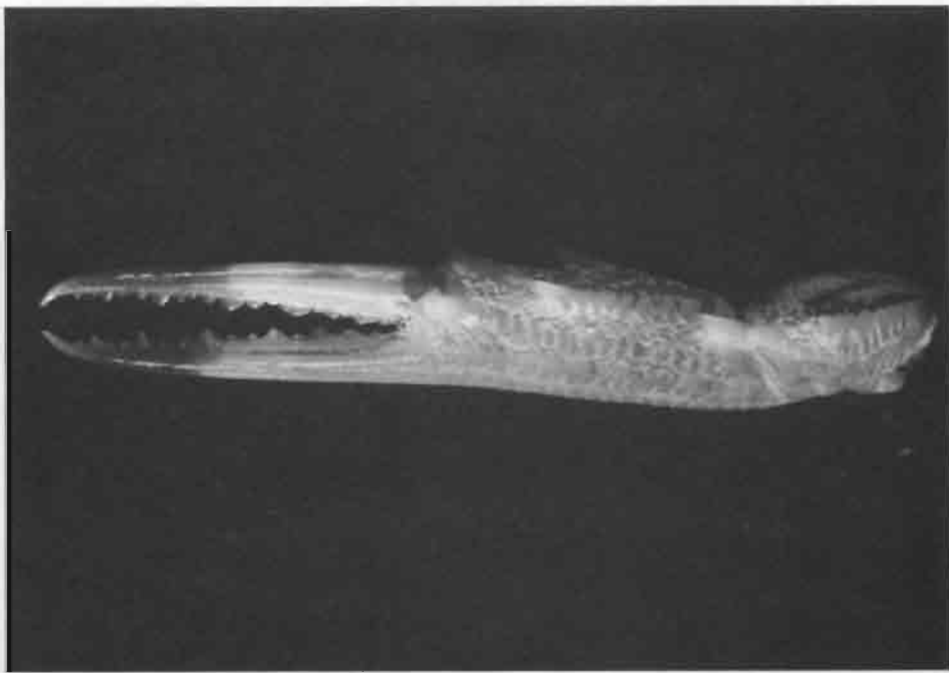


PLATE 2. *Portunus minutus* (Shen). Scale 1 mm. A. dorsal view, female (15.5 mm).
B. left cheliped outer surface, specimen as above.

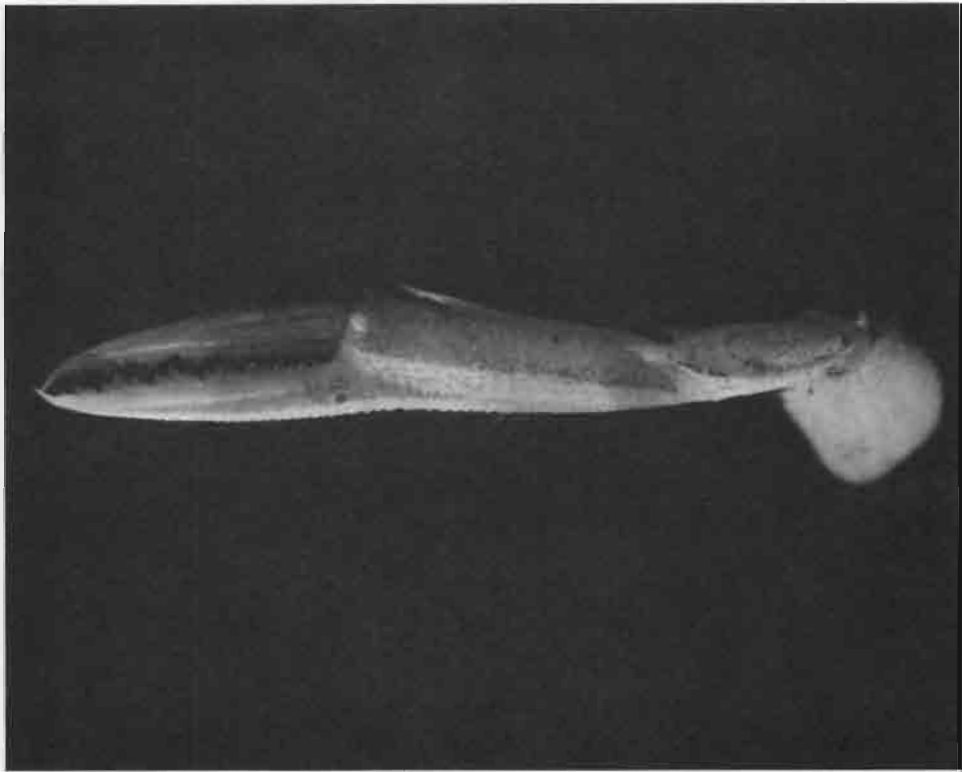


PLATE 3. *Portunus sinuosodactylus* n. sp. Scale 1 mm. A. dorsal view, holotype.
B. right cheliped upper surface, specimen as above.

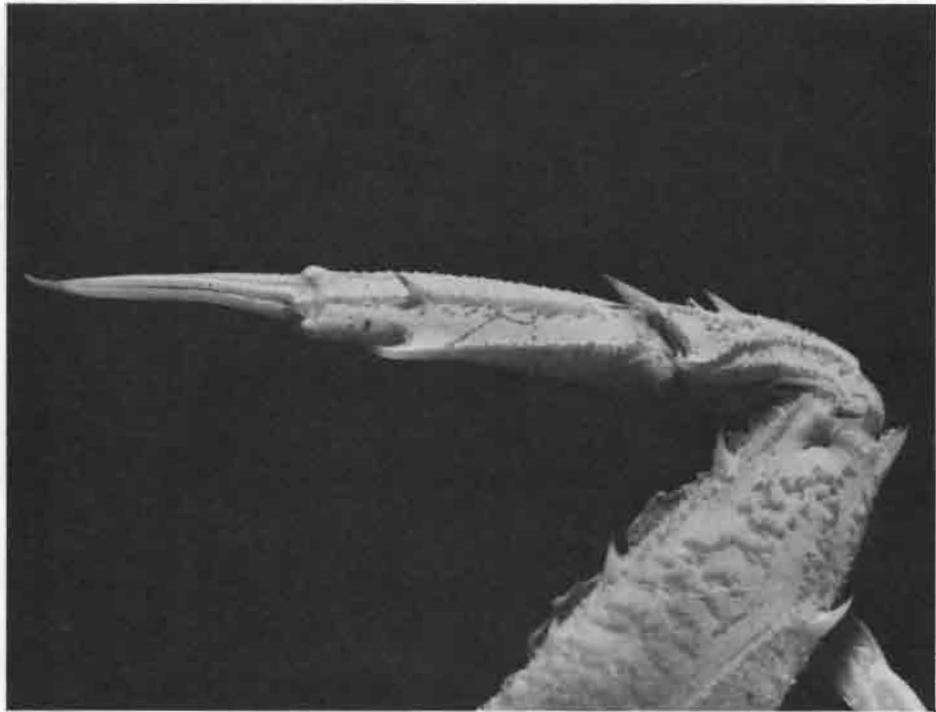
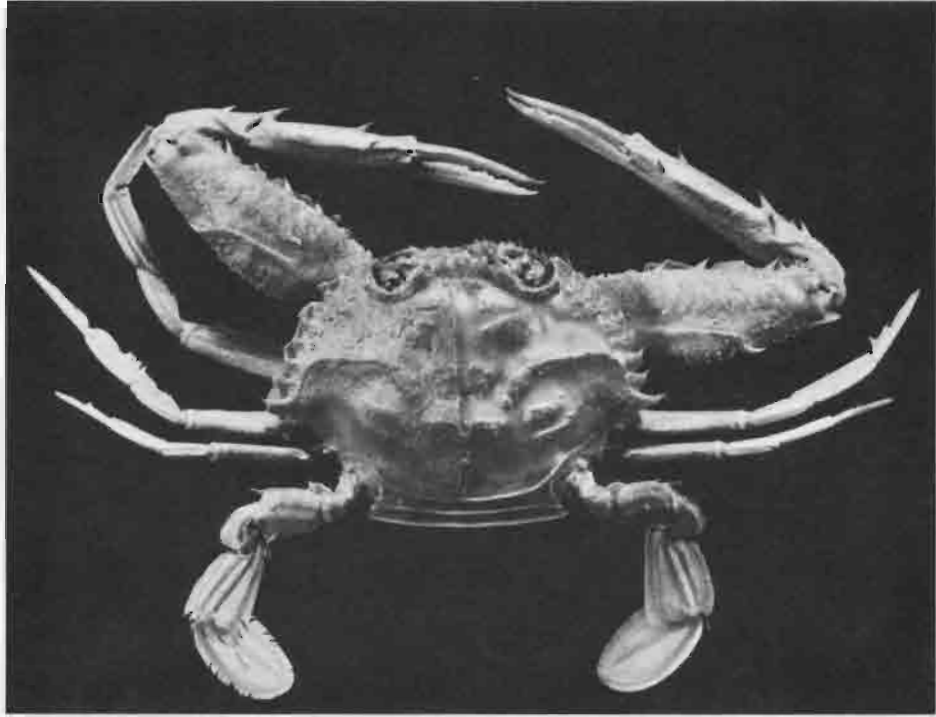


PLATE 4. *Charybdis curtidentata* n. sp. Scale 1 mm. Dorsal view, holotype.



APPENDIX: Station numbers of NAGA (and other) portunid collections. Numerical order with spp. obtained.

Cruise No.	Station No.		Lat. N.	Long. E.
—	59 - 0030	<i>Scylla serrata</i>	08°13.0'	131°36.0'
S1	59 - 0052	<i>Charybdis miles</i>	08°40'	102°18.5'
S2	59 - 131	<i>Thalamita sima</i>	13°01.8'	100°50.5'
S3	60 - 0102	<i>Portunus hastatooides</i>	12°33.0'	100°44.0'
S3	60 - 0103	<i>C. feriatus</i>	10°49.0'	100°31.0'
S3	60 - 0104	<i>C. vadorum, P. hastatooides, P. tweediei</i>	09°37'	100°21'
—	60 - 0110	<i>P. pelagicus</i>	06°22.2'	102°14.0'
S3	60 - 0152	<i>P. sanguinolentus</i>	10°41.2'	103°03.0'
S4	60 - 0206	<i>P. hastatooides</i>	12°09.5'	109°17.5'
S4	60 - 0208	<i>C. bimaculata</i>	12°14.7'	109°18.4'
S4	60 - 0211	<i>P. hastatooides, P. pulchricristatus</i>	15°41.0'	108°41.0'
S4	60 - 0212	<i>C. bimaculata, C. miles, C. riversandersoni</i>	15°40.0'	109°22.9'
S4	60 - 0215	<i>C. callianassa</i>	15°40.0'	109°43.5'
S4	60 - 0237	<i>C. miles, P. argentatus, P. pulchricristatus</i>	12°09.7'	109°24.7'
S4	60 - 0269	<i>P. sanguinolentus</i>	11°02'	108°59'
S4	60 - 0283	<i>P. argentatus</i>	07°37.0'	108°10.0'
S5	60 - 0316	<i>C. truncata</i>	09°46.2'	100°10.5'
S6	60 - 0431	<i>C. natator</i>	08°30.3'	106°05.5'
S7	60 - 0566	<i>P. pelagicus</i>	12°59.0'	100°15.0'
S7	60 - 0636	<i>C. miles, C. truncata</i>	10°19.8'	102°25.8'
S7	60 - 0656	<i>T. sima</i>	07°10'	100°39'
S7	60 - 0699	<i>P. pelagicus</i>	13°08.5'	100°50.0'
S8	60 - 0777	<i>C. miles</i>	12°09.7'	109°24.0'
S8	60 - 0820	<i>C. feriatus, P. pelagicus</i>	06°43.5'	107°58.0'
S8	60 - 0833	<i>T. sima</i>	06°14.8'	105°47.2'
S9	60 - 0845	<i>P. pelagicus</i>	12°54.5'	100°26.5'
S9	60 - 0853	<i>P. pulchricristatus</i>	10°04.2'	100°19.2'
S9	60 - 0865	<i>P. sanguinolentus</i>	09°54.2'	101°50.1'
S9	60 - 0886	<i>S. serrata</i>	10°21.2'	102°19.2'
S9	60 - 0895	<i>P. sinuosodactylus</i>	10°12.8'	103°32.5'
S9	60 - 0941	<i>C. feriatus, P. rubromarginatus</i>	07°38.7'	101°19.7'
S9	60 - 0943	<i>C. feriatus</i>	07°38.7'	101°19.7'
S9	60 - 0991	<i>P. sanguinolentus</i>	11°37.1'	101°46.6'
S9A	60 - 1046	<i>P. pulchricristatus</i>	11°25.0'	102°12.2'
S9A	60 - 1049	<i>P. hastatooides</i>	11°36.7'	102°26.0'
S9A	60 - 1052	<i>P. hastatooides, P. pulchricristatus, P. tweediei</i>	11°59'24"	102°11'06"
S9A	60 - 1056	<i>P. pulchricristatus</i>	11°43.0'	101°33.1'
S9A	60 - 1059	<i>P. pulchricristatus</i>	11°33.4'	100°53.5'
S9A	60 - 1071	<i>P. hastatooides, P. tweediei</i>	11°51.2'	99°54.8'
S9A	60 - 1074	<i>C. feriatus, P. gracilimanus</i>	12°09.9'	100°50.6'
S9A	60 - 1077	<i>C. truncata, P. hastatooides</i>	12°21.6'	101°31.9'
S9A	60 - 1085	<i>P. gracilimanus, P. hastatooides, P. minutus, P. pulchricristatus</i>	12°19.3'	100°43.7'
S9A	60 - 1091	<i>P. hastatooides, P. tweediei</i>	12°17.5'	100°18.7'
S9A	60 - 1094	<i>P. hastatooides, P. tweediei, T. sima</i>	12°16.7'	100°07.2'
S9A	60 - 1097	<i>P. gracilimanus, P. hastatooides, P. pelagicus, T. sima</i>	12°39.4'	100°15.8'
S9A	60 - 1103	<i>C. truncata, P. hastatooides</i>	13°05.8'	100°26.2'
S9A	60 - 1106	<i>C. vadorum</i>	13°21.8'	100°32.7'
S10	61 - 0045	<i>C. vadorum</i>	15°41.0'	108°39.3'
S10	61 - 0142	<i>Podophthalmus vigil</i>	12°08.7'	102°12.8'
S10	61 - 0156	<i>Portunus pelagicus</i>	13°20'	100°35'
SS11	61 - (0)210	<i>C. callianassa</i>	12°15.5'	129°13.5'
LUSIAD Stations: LUSIAD Expedition, HORIZON				
	LUSIAD H16	<i>Lupocyclus quinquedentatus</i>	04°26.5'	56°20'
	LUSIAD H17	<i>C. curtidentata, P. orbitosinus, T. sima</i>	04°26.5'	56°20'
	LUSIAD H22	<i>C. edwardsi</i>	0°03'	55°03'
	LUSIAD H29	<i>C. edwardsi</i>	05°02'	53°01'

NOTES: † Coll. No. 1012. * Coll. Charles W. Jerde. N.A. Not available.

Location	Gear	Bottom	Depth (In m, unless otherwise stated)	Date	Hour (local time)
—	Dipnet	—	—	Aug. 7, 1959	0818
Gulf of Siam	40' O trawl	—	70	Oct. 24, 1959	1045—1215
Gulf of Siam	40' O trawl	—	11 fm	Dec. 15, 1959	1108—1210
Off Ko Khram Yai, Gulf Thailand	6' B. trawl	Crs. grn. S.	27	Jan. 19, 1960	2009—2102
Gulf of Siam	Dipnet	—	55	Jan. 20, 1960	0830
Gulf of Siam	6' B. trawl	M. and S.	14-17 fm	Jan. 20, 1960	1755—1855
Gulf of Siam	6' B. trawl	Crs. S.	23-27	Jan. 22, 1960	1005—1105
Gulf of Siam	2 m. net	—	26	Jan. 27, 1960	2030—2100
Bay of Nhatrang	10' B. trawl	Soft M.	8	Feb. 23, 1960	1645—1710
Bay of Nhatrang	10' B. trawl	Crs. S.	85 ft	Feb. 25, 1960	1430—1530
South China Sea	10' B. trawl	M., S.	37	Feb. 27, 1960	1300—1332
South China Sea	10' B. trawl	Sh. det., S.	60-108	Feb. 27, 1960	1836—1907
South China Sea	2 M. S. net	—	476	Feb. 27, 1960	2323—2400
5-7 mi. off Hon Lon, Viet Nam	10' B. trawl	M., S., Sh. det.	101	Mar. 4, 1960	2020—2052
South China Sea	Dipnet	—	—	Mar. 10, 1960	0030—0115
South China Sea	Dipnet	—	80	Mar. 16, 1960	1720
5-6 mi. off Koh Phangan, Gulf Thailand	6' B. trawl	Soft M.	23	Apr. 22, 1960	1920—2008
South China Sea	2 m. net	—	24	May 25, 1960	2117—2154
9.0 mi. Laem Pak Bia	Dipnet	—	20	Aug. 2, 1960	2000
Gulf of Siam	6' B. trawl	—	62	Aug. 7, 1960	1800—1917
South of Thailand, Songkhla anchorage	Dipnet	—	—	Aug. 9, 1960	2120
Gulf of Thailand	Dipnet, caught surfc.	—	7 fm	Aug. 14-15, 1960	2000≈0100
South China Sea	6' B. trawl	—	93	Sep. 20, 1960	1052
South China Sea	Dipnet	—	77	Oct. 3, 1960	1155
South China Sea	6' B. trawl	S. and M.	49	Oct. 5, 1960	1120—1152
Gulf of Siam	6' B. trawl	—	19	Nov. 9, 1960	1652—1722
28 mi. Ko Tao, Gulf Thailand	6' B. trawl	M., Sh.	52	Nov. 10, 1960	1438—1510
Gulf of Siam	Dipnet	—	72	Nov. 11, 1960	1940
57 mi. from Kas Kong	Dipnet	—	71	Nov. 13, 1960	0115—0135
20.5 mi. from Ile de Phu Quoc	6' B. trawl	S. & M.	27-30	Nov. 13, 1960	1525—1545
Gulf of Siam	Dipnet	—	52	Nov. 16-17, 1960	1900—0600
Gulf of Siam	1 m. net	—	52	Nov. 17, 1960	0223—0322
Gulf of Siam	Dipnet	—	62	Nov. 22, 1960	1740
22.2 mi. off Ko Kut	7' B. trawl	Sandy M.	64	Dec. 10, 1960	1023—N.A.
5.7 mi. off Ko Kut	7' B. trawl	M. & C.	27	Dec. 10, 1960	1621—1709
6.8 mi. off Ko Chang	7' B. trawl	M. & C.	30	Dec. 10, 1960	2123—2207
47.1 mi. off Ko Chang	7' B. trawl	Sandy M.	60	Dec. 11, 1960	0253—0338
57.2 mi. off Ko Chang	7' B. trawl	M.	49	Dec. 11, 1960	0905—0940
4.4 mi. Ban Monglai	16' O. trawl	Sandy M., shells	23	Dec. 12, 1960	0528—0615
Gulf of Siam	16' O. trawl	Muddy S.	34	Dec. 12, 1960	1115—1220
11.2 mi. off Ko Samet	16' O. trawl	M.	26	Dec. 12, 1960	1803—1905
17.8 mi. off Ko Chang	16' O. trawl	S.	33	Dec. 13, 1960	0117—0202
17.2 mi. Sattakut	16' O. trawl	S.	34	Dec. 13, 1960	1055—1200
4.6 mi. off Ko Koran	16' O. trawl	—	50	Dec. 13, 1960	1411—1511
Gulf of Siam	16' O. trawl	Muddy S.	33	Dec. 13, 1960	1812—1900
20.5 mi. off Laem Pak Bia	16' O. trawl	S.	23	Dec. 13, 1960	2305—2340
19.3 mi. off Ko Si Chang	16' O. trawl	M.	12	Dec. 14, 1960	0325—0400
5.4 mi. Cap An Hog	7' B. trawl	M. & S.	32-35	Jan. 24, 1961	1652—1739
2.3 mi. Ko Chang	Dipnet	—	14	Feb. 11, 1961	2000—2015
Gulf of Thailand	Dipnet	—	—	Feb. 12, 1961	2000—0000
Timor Sea, Indian Ocean	Dipnet	S.	31	Apr. 6, 1961	2253†
50 mi. East of Seychelles	Chain dredge Sample D+16-H Dipnet—night light Dipnet—night light	—	45-70 surf. over deep wtr. surf. over deep wtr.	Oct. 17, 1962 July 18, 1962 July 31, 1962	0330—0639 2000—2115* 1930*