

**NEW RECORDS OF THREE RARE BRACHYURAN
CRABS FROM SINGAPORE SEAS (CRUSTACEA:
DECAPODA: BRACHYURA: PARTHENOPIDAE:
XANTHIDAE AND PILUMNIDAE)**

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ABSTRACT. - Three rare and poorly known species of crabs are added to the Singapore Brachyuran fauna: *Pseudolambrus bicornis* (Flipse, 1930) (Parthenopidae MacLeay, 1838), *Hypocolpus rugosus* (Henderson, 1893) (Xanthidae MacLeay, 1838, s. str.) and *Mertonia lanka* Laurie, 1906 (Pilumnidae Samouelle, 1819). *Pseudolambrus bicornis* has not been reported since its discovery in 1930 (type locality Java Sea), whilst *Hypocolpus rugosus* is not known outside Sri Lanka (= Ceylon). *Mertonia lanka* has a wide distribution in the Indo-West Pacific but has not been hitherto reported from the centre of the Sunda Shelf.

INTRODUCTION

The Brachyuran crab fauna of Singapore is reasonably well known, and over 300 species are known at present. Recent dredging operations revealed the presence of three rare Brachyuran crab species not previously recorded from Singapore waters - *Pseudolambrus bicornis* (Flipse, 1930) (Parthenopidae MacLeay, 1838), *Hypocolpus rugosus* (Henderson, 1893) (Xanthidae MacLeay, 1838, s. str.) and *Mertonia lanka* Laurie, 1906 (Pilumnidae Samouelle, 1819).

The present note briefly discusses the taxonomy of the poorly known xanthid, *Hypocolpus rugosus* and reports the pilumnid *Mertonia lanka* from Singapore waters. Measurements (in millimetres) are of the carapace width and length respectively. The specimens are deposited in the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore.

***Pseudolambrus bicornis* (Flipse, 1930)**

(Pl. 1, Fig. 1A-F)

Parthenope (Pseudolambrus) bicornis Flipse, 1930: 54, fig. 38 (Java Sea, Indonesia); Serène, 1968: 61 (list only).

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Parthenope (Pseudolambrus) harpax - Campbell & Stephenson, 1970: 267 (partim), fig. 34A (Moreton Bay, Australia) (nec Adams & White, 1848).

? *Lambrus harpax* - Haswell, 1880: 450 (partim) (Port Denison, Australia) (nec Adams & White, 1848).

Material examined.- 1 young female (13.9 by 13.4 mm) (ZRC 1993.355), dredged from Southern Islands, Singapore, leg. Zhiling Xu, v.1992.

Diagnosis.- Carapace slightly broader than long. Gastric, branchial and cardiac regions swollen; gastric region with a strong posteriorly-directed projection and 6 tubercles of varying sizes lining ridge leading to projection, tip of projection with stiff setae; urogastric region with 2 small tubercles, posterior tubercle tipped with setae; cardiac region with 1 large vertical projection tipped with setae; subcardiac region with 3 large tubercles, arranged in a triangular pattern, anteriormost tubercle tipped with setae; posterior margins of intestinal region expanded into distinct triangular lobe; hepatic regions laterally expanded, surfaces depressed and smooth; branchial region raised medially, forming oblique ridge which leads to strong posteriorly-directed projection, ridge with several tubercles tipped with setae. Anterolateral margins divided into 2 halves by deep median cleft; anterior half (hepatic margin) with 3 lobes, posterior half (branchial margin) with 8 lobes; posterolateral margin with 4 lobes. Antero- and posterolateral lobes sporadically lined with setae. Front strongly deflexed, forming distinct postfrontal ridge; lateral edges of postfrontal ridge with 2 strong projections which extend beyond frontal margin, tipped with long stiff setae; posterior part of postfrontal projections converge posteriorly into centre of carapace, forming V-shaped structure which meets median ridge and projection on gastric region. Supraorbital cleft deep, forming distinct fissure. Antennules folding obliquely, basal segment large, occupying two-thirds of antennular fossa; antenna free, fitting into orbital hiatus, last 2 segments of antenna tuberculate; suborbital, pterygostomian, hepatic regions



Pl. 1. *Pseudolambrus bicornis* (Flipse, 1930), young female, 13.9 by 13.4 mm (ZRC 1993.355)

tuberculate. Ischium and merus of third maxilliped granulated, ischium rectangular, distinct deep median sulcus, closer to outer margin, merus subquadrate, anteroexternal angle auriculiform, anterointernal angle with sharp tooth, exopod reaching almost to anterior edge of merus, granulated.

Cheliped asymmetrical, right larger. Merus and manus each with a distinct, large tubercle (red in life). All margins of merus serrated or granulated, with 1 large, red tubercle tipped with long stiff setae on inner surface, one third from distal margin. Carpus short, small, slightly granulated on surface, with 1 large tubercle on inner distal angle; 2 distinct ridges separating dorsal surface from outer surface and inner distal transverse surface. Manus 5-faceted; Y-shaped ridge demarcates inner, dorsal and distal oblique surfaces; dorsal surface with a distinct red median tubercle which is closer to dorsal margin; proximal dorsal margin expanded into prominent lamelliform lobe. Dorsal margin of dactylus with 3 large teeth and 1 small denticle.

Posterior margins of ambulatory ischium, merus and coxa serrated; anterior margins of third and fourth ambulatory carpus and propodus dentiform; dactylus long and slender, subequal in length to merus.

Shallow median suture between sternal segments 1 and 2, deep median sutures between sternal segments 2 and 3 and between sternal segments 3 and 4, lateral parts of sutures indistinct, surface of sternum granulated, appearing eroded with distinct depression especially along sutures; abdominal segment 7 with granules, granulated ridges along segments 1 to 6, segments 3 to 5 immovable but sutures between segments evident. Female pleopods not setose.

Discussion.- Campbell & Stephenson (1970) stated that there is extreme variation within *P. harpax* (Adams & White, 1848) and doubted Flipse's (1930) key to *Pseudolambrus* and the validity of his two new species, *P. bicornis* and *P. lobatus*. Other than basing their argument on the variability of their specimens from Moreton Bay, Australia, they also referred to the comments of Miers (1884) and Haswell (1880) on this species as well. Haswell (1880: 450) stated that there are two varieties of *P. harpax*. Variety A "... has the characters of Adams and White's description and figure ...", whilst variety B differed from variety A in three features, viz. 1. a long gastric projection (= spine of Haswell, 1880) "... directed forwards and upwards ..." behind the eyes; 2. projections are found on the gastric and cardiac regions, and 3. the proximal dorsal margin of the merus is developed into "... a prominent rounded lamella ...". Miers (1884) also discerned two kinds of *P. harpax*, viz. the smooth and granulated forms. Campbell & Stephenson (1970) defined *P. harpax* as a species which is extremely variable in size, shape, form and degree of ornamentation on the carapace. There is therefore a need to clarify the identities of *P. harpax* (Adams & White, 1848) s. str., *P. bicornis* (Flipse, 1930) and *P. lobatus* (Flipse, 1930).

Pseudolambrus harpax and *P. bicornis* are regarded as two distinct species in the present paper on the basis of the following three characters: 1. the postfrontal projections extend well beyond the frontal margin in *P. bicornis* but is very short or only just touches the frontal margin in *P. harpax*; 2. the presence of a well developed lamelliform lobe on the manus of the cheliped in *P. bicornis* (absent in *P. harpax*); and 3. the live carapace colour of the *P. harpax* was described to be olive-green with bluish-grey chelipeds whereas the present specimen of *P. bicornis* is white throughout the carapace and chelipeds, with a distinct red tubercle on each cheliped merus and manus (fide Adams & White, 1848: pl. 6, fig. 3; Flipse, 1930: 54, fig. 38). These differences are not associated with age as all the specimens of both species were similar in size.

Pseudolambrus lobatus, should also be recognised as a good species for the moment. From the text and drawing of Flipse (1930), it has a lamelliform lobe on the manus of the cheliped as in *P. bicornis* (thus differing from *P. harpax* s. str. in this aspect), and the post frontal projections are not as strong compared to *P. bicornis*. In general, it is also a much more tuberculate species compared with *P. harpax* s. str. and *P. bicornis*.

On the basis of these species observations, the authors believe that the Moreton Bay specimens examined by Campbell & Stephenson (1970) could have been a mixture of at least two species, and this is perhaps true for Haswell's (1880) material as well. Haswell's variety B, with its long, posteriorly directed gastric projection and lamelliform chelipedal manus is possibly *P. bicornis*, although it must be noted that he made no mention of any strong postfrontal projections. From Campbell & Stephenson's (1970) text and drawings, at least one of their specimens (see their fig. 34A) could be identified as *P. bicornis* (cf. fig 1A, C, D), especially with regard to its strong postfrontal projections and lamelliform chelipedal manus. Their specimen (Queensland Museum, W2891, Moreton Bay, sex not specified), is almost identical with the Singapore specimen except that it differs in having only seven anterolateral lobes on the branchial region (vs. eight in the Singapore specimen) and the margin of the first hepatic lobe is straight (vs. concave in the Singapore specimen) (see Fig. 1A, Table 1).

In the fresh Singapore specimen, there is a red tubercle on each chelipedal merus and manus (pl. 1). This feature is not mentioned by Flipse (1930), probably because his specimen had lost its colour after prolonged storage in preservatives. In Flipse's (1930: fig. 38) figure, there is a tubercle on the distal margin of the chelipedal merus which differs from the Singapore specimen (fig. 1B, C) in its position. The other red tubercle on the dorsal margin of the chelipedal manus in the Singapore specimen (fig. 1B, C) is not illustrated or described by Flipse (1930). Re-examining the Singapore specimen after half a year of storage in alcohol, the red pigmentation has faded substantially. Since the tubercle on the manus is weak, without the distinct red colour it could be easily overlooked. Another tubercle which is figured on the lower border of the chelipedal carpus in Flipse's (1930) drawing is absent in the Singapore specimen. The postfrontal projections in the Singapore specimen extend beyond the frontal margin (fig. 1A). However, when the anterior part of the carapace is slightly raised, the projections appear to be much shorter (fig. 1F) which somewhat resembles the condition depicted in Flipse's (1930: fig. 38) drawing. Other differences between the holotype and Singapore specimen are detailed in Table I.

Parthenopids are known to vary a great deal in form and in the ornamentation on the carapace (see Monod, 1956; Gore & Scotto, 1979). Furthermore, sexual dimorphism has also been shown to exist in some species of *Pseudolambrus* (e.g. in *P. beaumontii*, fide Alcock, 1895). The differences observed between the holotype of *P. bicornis* and the present Singapore specimen, thus, cannot be regarded as specifically important. Far too few specimens of *P. bicornis* are known, and it would be premature to separate the Singapore and Australian specimens as a distinct species purely on the basis of the differences mentioned above.

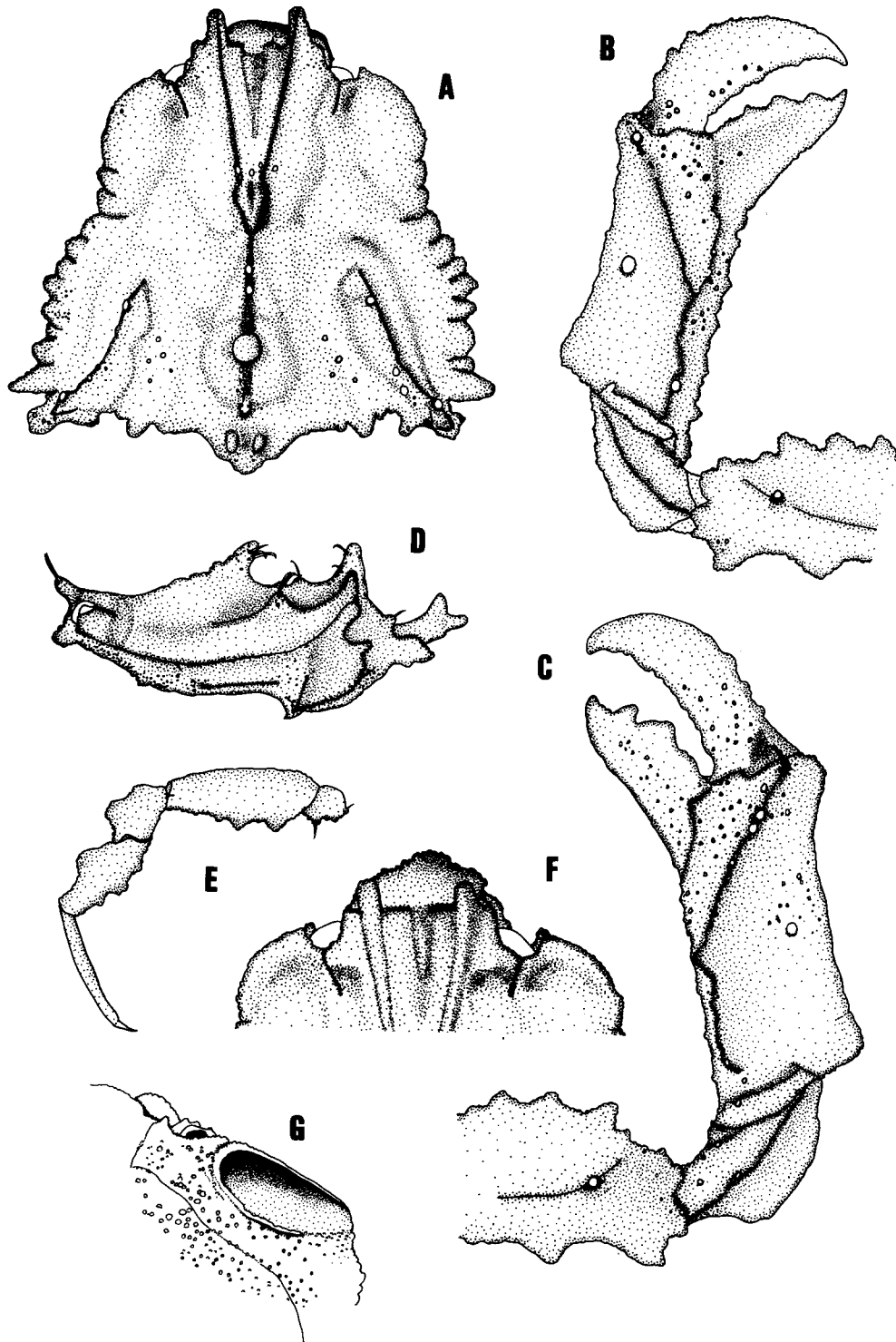


Fig. 1A-F, *Pseudolambrus bicornis* (Flipse, 1930), young female, 13.9 by 13.4 mm (ZRC 1993.355); A, Carapace, dorsal view; B, Left cheliped, dorsal view; C, Right cheliped, dorsal view; D, Carapace, lateral view; E, Fourth left ambulatory leg; F, Dorsal view of frontal margin. G, *Hypocolpus rugosus* (Henderson, 1893), hepatic cavity, male, 9.9 by 6.8 mm (ZRC 1991.9660).

Table 1. *Pseudolambrus bicornis*. Differences between Singapore specimen (ZRC 1993.355), Flipse's (1930) holotype and Australian specimen (W2891)*.

Characters	Singapore specimen (ZRC 1993.355)	Holotype (fide Flipse, 1930)	Australian specimen specimen (W2891)*
Large tubercle on the inner surface of chelipedal merus	Present	Present	Present
Median tubercle on dorsal margin of chelipedal manus	Present	Absent	Present
Large tubercle on inner distal angle of carpus of cheliped	Absent	Present	Not visible
Stiff long setae on tip of frontal projections	Present	Absent	Present
Strong postfrontal projections	Present	Present	Present
Number of tubercles on subcardiac region	3	2	2
Number of antero-lateral lobes (brachial region)	8	5	8
Depth of supra-orbital cleft	Deep	Shallow	Deep
Margin of first hepatic lobe	Strongly concave	Strongly concave	Straight

* fide Campbell & Stephenson (1972) as *Pseudolambrus harpax*, partim.

***Hypocolpus rugosus* (Henderson, 1893)**

(Fig. 1G)

Hypocoelus rugosus Henderson, 1893: 358, pl. 36 figs. 9-11 (Gulf of Manaar, Ceylon); Alcock, 1898: 111 (no new locality).

Hypocolpus rugosus - Laurie, 1906: 401 (Gulf of Manaar, Ceylon).

Hypocolpus rugosus rugosus - Guinot-Dumortier, 1960: 195, Figs. 13, 14, 23, 28, 30, 40, 66, 67 (no new locality); Serène, 1968: 75 (list only); Naiyanetr, 1980: 35 (Gulf of Thailand); Serène, 1984: 77, 79, fig. 36 (no new locality).

Material examined.- Young male, 9.9 by 6.8 mm (ZRC 1991.9660), western part of Pulau Semakau, Singapore, coll. Reef Ecology Study Team, 18.iv.1990.

Discussion.- The present specimen from Singapore is probably referable to *H. rugosus* (Henderson, 1893), known thus far only from Sri Lanka. This species was described by Henderson (1893: 358, pl. 36, figs. 9-11) from the Gulf of Manaar, Sri Lanka, and is known on the basis of only three female specimens (see Guinot-Dumortier, 1960: 195). Laurie (1906: 401) recorded specimens from the same area in Sri Lanka. Laurie also commented and corrected on Henderson's comparisons with *H. granulatus* (De Haan, 1837). Guinot-Dumortier (1960) revised the genus, and provided a redescription and excellent figure of the lectotype female (17.5 by 12.3 mm) and paralectotype female (13.5 by 9.0 mm) in the British Museum (Natural History) (Guinot-Dumortier, 1960: 195, Figs. 13, 14, 23, 28, 30, 40, 66, 67).

The Singapore specimen differs in two main aspects, viz. 1. the anterolateral crest is projected more distinctly forwards although it is only half the size of the lectotype (fide Guinot-Dumortier, 1960: Figs. 40, 66-69); and 2. there is no longitudinal depression along the exterior of the inner margin of the subhepatic cavity (longitudinal depression present along the exterior of the inner margin along median part) in *H. rugosus* (fide Guinot-Dumortier, 1960: Figs. 13, 14). The absence of a longitudinal depression on the subhepatic cavity is significant, and may well suggest that we are dealing with a separate species instead. But as the present specimen is substantially smaller than the known specimens of *H. rugosus* (and a male at that), slight changes in the structure of the subhepatic cavity cannot be discounted. In the absence of a larger specimen, however, we prefer to refer the present specimen to *H. rugosus*.

The Singapore specimen is the first male of the species known, and it is unfortunate that its gonopods are too poorly developed to be useful taxonomically.

Although Guinot-Dumortier (1960) recognised two subspecies of *Hypocolpus rugosus*, *H. rugosus rugosus* Henderson, 1893, and *H. rugosus stenocoelus* Guinot-Dumortier, 1960 (type locality Mauritius), the substantial differences in the subhepatic cavity strongly suggest we are dealing with two distinct species, and *H. rugosus stenocoelus* is here regarded as a separate species.

The only other species of *Hypocolpus* previously known from Sunda Shelf are *H. granulatus* (De Haan, 1837) (Gulf of Thailand) and *H. diverticulatus* (Strahl, 1861) (off southern Vietnam) (fide Guinot-Dumortier, 1960). The present record of *H. rugosus* in Singapore waters extends the known range of the species eastwards.

***Mertonia lanka* Laurie, 1906**

Mertonia lanka Laurie, 1906: 424, pl. 1 fig. 11 (Gulf of Manaar: Ceylon); Rathbun, 1910: 342, pl. 2 fig. 4 (Gulf of Siam); Tesch, 1918: 217, pl. 16 fig. 2a (Aru Islands); Sakai, 1935: 191 pl. 55 fig. 3 (Japan); Yokoya, 1936: 144, fig. 10 (Misaki: Japan); Sakai, 1939: 573, pl. 68 fig. 3 (Ito, Hatsushima, Simoda: Japan); Stephensen, 1946: 180 (Iranian Gulf); Serène, 1964: 234, fig. 13, pl. 21B (Kei Islands); Sakai, 1965: 172 pl. 85 fig. 2 (Sagami Bay: Japan); Serène, 1968: 92 (list only); Guinot, 1969: 699 (no new record); Sakai, 1976: 549, pl. 195 fig. 3 (Tosa: Japan); Naiyanetr, 1980: 41 (Gulf of Thailand, Andaman Sea); Miyake, 1982: 221 (list only); Ng, 1987: 78, 94 (no new record).

Material examined.- Female, 4.7 by 3.6 mm (ZRC 1993.72), dredged from muddy substrate, ca. 20 m depth, off Pulau Semakau, Singapore, leg. P. K. L. Ng & T. H. T. Tan, 27.x.1992.

Discussion.- Ng (1987) reviewed the taxonomic position of the genus *Mertonia* (with two known species) and noted that its placement was in the subfamily Rhizopinae, family Pilumnidae.

The present specimen was a dirty white with several orange dots on the centre of each branchial region. The long hairs were golden-yellow in colour. The eyes (particularly the corneas) are strongly reduced. The specimen, when alive, had the habit of shuffling backwards into sand, using its last pair of ambulatory legs as shovels.

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LITERATURE CITED

- Adams, A. & A. White, 1848, 1849. *Crustacea. Zoology of the Voyage of H.M.S. Samarang; under the Command of Captain Sir Edward Belcher, C.B., F.R.A.S., F.G.S. During the Years 1843-1846* (A. Adams, editor). Pt. 1, pp. 1-32, pls 1-6. Pt. 2, pp. 33-66, i-viii, pls 7-13.
- Alcock, A. 1898. Materials for a carcinological fauna of India. No. 3. The Brachyura Cyclometopa. Part I. The Family Xanthidae. *J. Asiat. Soc. Bengal*, 67(2)(1): 67-233.
- Campbell, B.M. & W. Stephenson, 1970. The sublittoral Brachyura (Crustacea: Decapoda) of Moreton Bay. *Mem. Qld Mus.*, 15(4): 235-301, pl.22.
- Flipse, H. J., 1930. Die Decapod Brachyura der Siboga Expedition VI. Oxyrhyncha: Parthenopidae. *Siboga Exp. Monogr.*, 39C²: 1-96.
- Garth, J., 1958. Brachyura of the Pacific coast of America. Oxyrhyncha. *Allan Hancock Pacific Expeditions*, 21(1): 1-499. 21(2): 501-854, pls. A-Z, Z₁-Z₄, 1-55.
- Gore, R.H. & L.E. Scotto, 1979. Crabs of the Family Parthenopidae (Crustacea Brachyura: Oxyrhyncha) with notes on specimens from the Indian River Region of Florida. *Mem. Hourglass Cruises*, 3(4): 91 pp., app. 1-2.
- Guinot, D., 1969. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VII. Les Goneplacidae (suite et fin). *Bull. Mus. Natn. Hist. Nat.*, (2)41(3): 688-724.
- Guinot-Dumortier, D., 1960. Révision des genres *Euxanthus* Dana et *Hypocolpus* Rathbun (Crust. Decap. Brach.). Remarques sur les cavités sous-hépatiques et les coaptations des *Hypocolpus*. *Mém. Mus. Natn. Hist. Nat.*, (A) Zool. 20(2): 153-218.
- Haswell, W. A., 1880. On the Australian Brachyura Oxyrhyncha. *Proc. Linn. Soc. N. S. W.*, 4: 431-458, pl. 25-27.

- Henderson, J. R., 1893. A contribution to Indian carcinology. *Trans. Linn. Soc. Lond, Zool.*, (2)5: 325-458, Pls. 36-40.
- Laurie, R. D., 1906. Report on the Brachyura collected by Prof. Herdman at Ceylon in 1902. *Rep. Pearl Oyster Fish. Gulf Manaar*, 5: 349-432.
- Miers, E. J., 1884. Crustacea. In: *Report on the Zoological Collections made in the Indo-Pacific Ocean during the voyage of H.M.S. 'Alert' (1881-1882)*. Pp. 178-322, pls. 17-33, 46-52.
- Miyake, S., 1982. *Japanese crustacean decapods and stomatopods in color*. Vol. II. Brachyura (Crabs). Hoikusha Publishing Co., Osaka, 277 pp., 64 colour pls.
- Monod, T., 1956. Hippidea et Brachyura ouest-Africains. *Mém. de Inst. Franc. Afr. Noire*, 45: 1-674.
- Naiyanetr, P., 1980. *Crustacea fauna of Thailand* (Decapoda and Stomatopoda). Department of Biology, Fac. Sci., Chulalongkorn Univ., Bangkok, 73 pp. (mimeographed).
- Ng, P. K. L., 1987. The Indo-Pacific Pilumnidae II. A revision of the genus *Rhizopa* Stimpson, 1858 and the status of the Rhizopinae Stimpson, 1858 (Crustacea: Decapoda: Brachyura). *Indo-Malay. Zool.*, 4(1): 69-111, Pl. 1.
- Rathbun, M. J., 1910. Brachyura. V. In: *The Danish Expedition to Siam 1899-1900. K. danske Vidensk. Selsk. Skr.*, (7)5(4): 301-367, Pls. 1-2.
- Sakai, T., 1935. *Crabs of Japan*. 66 pls. in life colours with descriptions. Sanseido, Tokyo.
- Sakai, T., 1939. *Studies on the crabs of Japan*. IV. Brachygnatha, Brachyrhyncha. Tokyo, pp. 365-741, Pls. 42-111.
- Sakai, T., 1965. *The Crabs of Sagami Bay collected by His Majesty the Emperor of Japan*. Maruzen Co., Tokyo, pp. i-xvi, 1-206, Pls. 1-100, 1 Map.
- Sakai, T., 1976. *Crabs of Japan and Adjacent Seas*. English Vol., xxix + 773 pp., pls. 1-251. Tokyo, Kodansha.
- Serène, R., 1964. Goneplacidae et Pinnotheridae. In: *Papers from Dr. Th. Mortensen's Pacific Expedition 1914-1916*. 80. *Vidensk. Meddr. dansk naturh. Foren.*, 126: 181-282, Pls. 16-24.
- Serène, R., 1968. The Brachyura of the Indo-West Pacific Region. In: *Prodromus for a Check List of the non-planctonic marine fauna of South East Asia*. UNESCO, Singapore, *Natn. Acad. Sci.*, Sp. Publ. No. 1, Fauna III Cc3: 33-112.
- Serène, R., 1984. Crustacés Decapodes Brachyours de l'Océan Indien Occidental et de la Mer Rouge. Xanthoidea: Xanthidae et Trapezidae, Addendum Carpiliidae et Menippidae- A. Crosnier. *Faune Tropicale (ORSTOM)*, 24: 1-400, pls. 1-48.
- Stephensen, K. 1946. The Brachyura of the Iranian Gulf. *Danish Sci. Invest. Iran*, Part IV, Copenhagen, pp. 57-237.
- Takeda, M., 1976. Crabs from Shallow Waters off Maga-jima Island, Southwest Japan. *Bull. Natn. Sci. Mus.*, (A) 3(2): 73-89.
- Tesch, J. J., 1918. Decapoda Brachyura II. Goneplacidae and Pinnotheridae. *Siboga Exp. Monogr.* 39^c1: 149-295, Pls. 7-18.
- Yokoya, Y., 1936. Some rare and new species of Decapod Crustaceans found in the vicinity of the Misaki Marine Biological Station. *Jap. J. Zool.*, 7(1): 129-146.