

NEW RECORDS OF *CRYPTOPODIA* (CRUSTACEA: DECAPODA: PARTHENOPIDAE) FROM AUSTRALIA

P.J.F. DAVIE & P.A. TURNER

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Six species of *Cryptopodia* are recorded from northern Australian waters and an identification key is provided. Three, *C. angulata* H. Milne Edwards & Lucas, 1841, *C. dorsalis* White & Adams, 1847, and *C. pan* Laurie, 1906, are new to the Australian fauna and represent large range extensions. The known range of *C. queenslandi* Rathbun, 1918, is extended, and allometric growth is noted for this species. Dorsal and ventral photographs, and figures of the male first gonopods, are provided for all six species. □ Crustacea, Brachyura, Parthenopidae, *Cryptopodia*, Indo-West Pacific, Australia.

P.J.F. Davie & P.A. Turner, Crustacea Section, Queensland Museum, P.O. Box 3300, South Brisbane, Queensland. 4101 Australia; 20 September 1995.

Collections on which the current study is based were largely provided by two surveys undertaken by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), off North West Shelf, north-western Australia aboard the R.V. *Soela*, and in the Gulf of Carpentaria, using the R.V. *Southern Surveyor*. These have been supplemented by additional material in the Queensland and Northern Territory Museum collections. The North West Shelf was investigated using a beam trawl and epibenthic sledge, and the results of the analysis of the structure of the decapod community have been reported by Ward & Rainer (1988).

There has been relatively little work on the Indo-West Pacific Parthenopidae, with Flipse (1930) still being the single most important reference. Miers (1879), Haswell (1879), and Campbell & Stephenson (1970), have made the most significant contributions to our knowledge of the Australian fauna. Very little is known of the rich group of tropical parthenopid species.

Abbreviations used in the text are: c.b., carapace breadth; c.l., carapace length; G1, first male gonopod; NHM, The Natural History Museum, London; NTM, Northern Territory Museum, Darwin; QLD, Queensland, Australia; QM, Queensland Museum, Brisbane. Measurements given in the text are of the carapace breadth (measured at the widest point) followed by length.

SYSTEMATICS

KEY TO AUSTRALIAN SPECIES OF *CRYPTOPODIA*

1. Carapace with cardio-intestinal region relatively flat, and laterally demarcated by long, narrow, very deep grooves so as to appear lyre-shaped *C. dorsalis* White & Adams, 1847
 Cardio-intestinal region separated by broad shallow depressions; cardiac region more-or-less elevated 2
2. Carapace with margins strongly serrated and spinous
 . . . *C. angulata* H. Milne Edwards & Lucas, 1841
 Carapace sometimes with anterolateral margins moderately spinous, but posterior margin at most crenellated 3
3. Third maxilliped noticeably swollen, with conspicuous, broad, flattened granules on inner margin of ischium which may extend over the entire outer surface *C. pan* Laurie, 1906
 Third maxilliped not swollen 4
4. Carapace surface relatively smooth except for slightly granular crests; shallow gastric depression centrally; presence of closed fissures radiating in from margins visible dorsally
 *C. queenslandi* Rathbun, 1918
 Carapace surface more-or-less coarsely granulated and pitted; deep gastric depression centrally; marginal closed fissures not obvious dorsally 5
5. Carapace with margins of rostrum subparallel over proximal half; branchial, cardiac, and gastric regions strongly inflated
 *C. fistulosa* Chiong & Ng, 1994

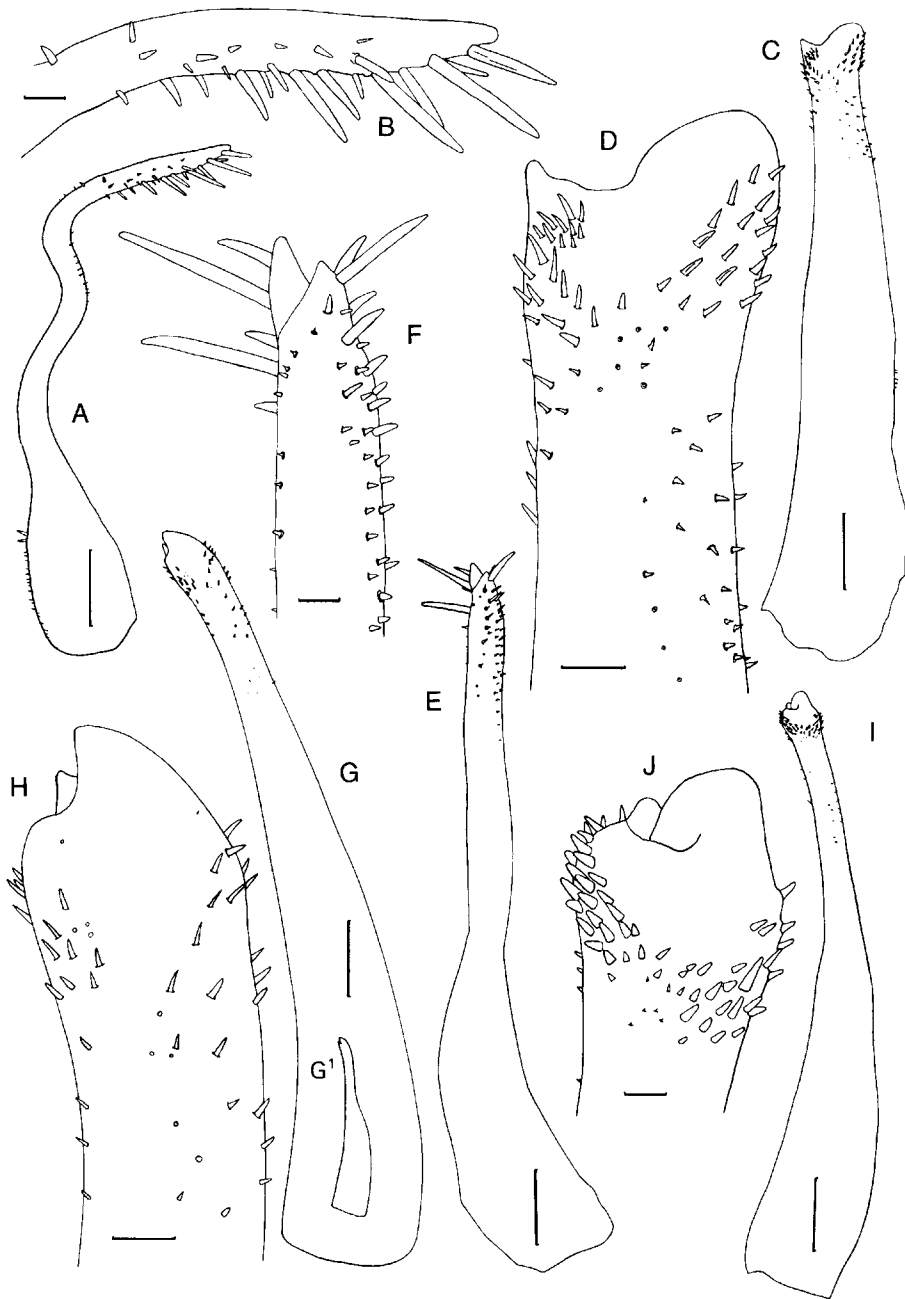


FIG. 1. Male first gonopods of *Cryptopodia* species, showing entire view and magnified view of apex. A, B, C. *pan* (QMW18473). C, D, *C. queenlandi* (QMW18981). E, F, *C. angulata* (QMW18306). G, G¹ (rotated view). H, *C. fistulosa* (QMW18980). I, J, *C. dorsalis* (QMW18291). Scale line: A, C, E, G=0.05mm. D, B, F, H, J=0.01mm; I=0.10mm.

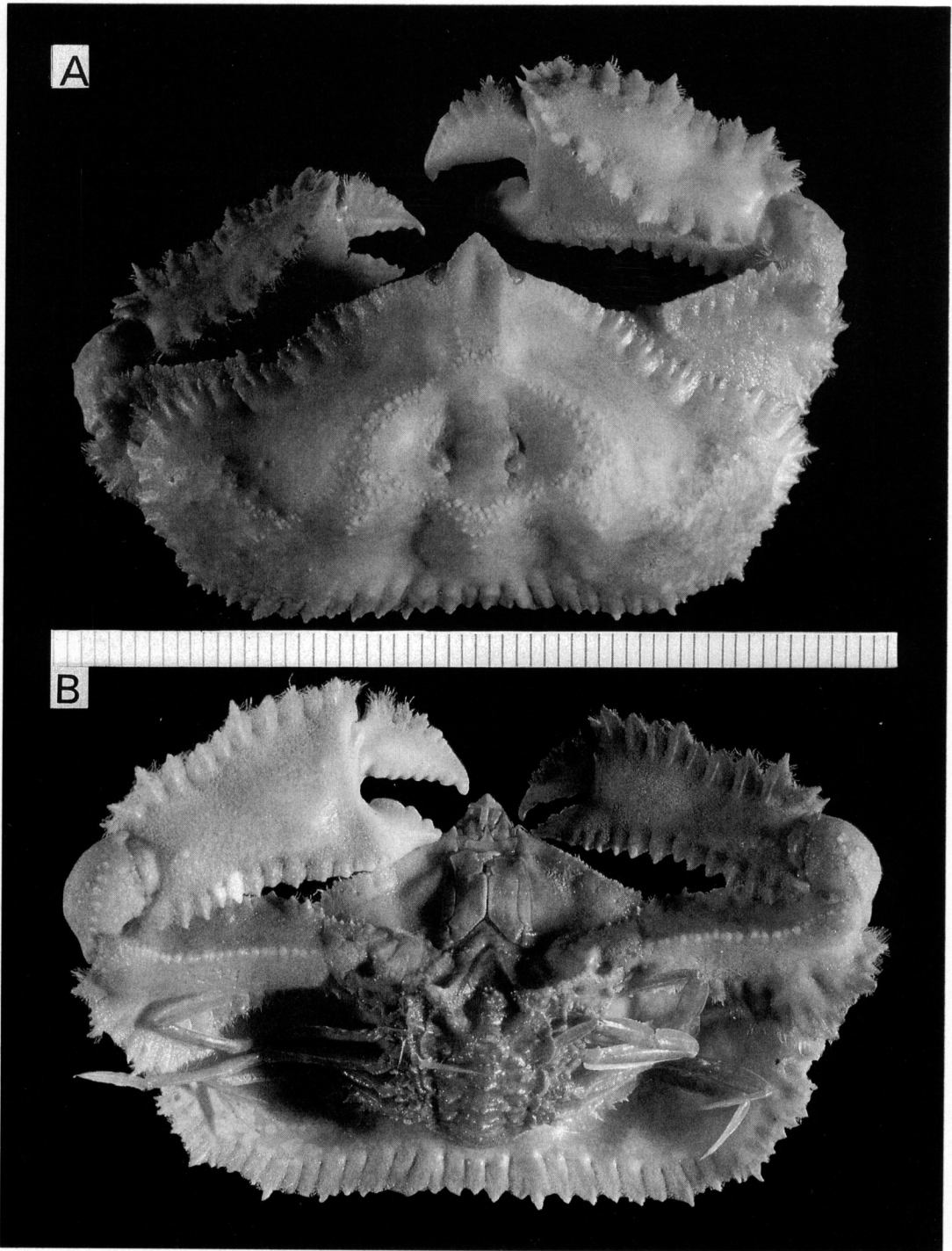


FIG. 2. *Cryptopodia angulata* H. Milne Edwards & Lucas, 1841 (QMW18299). A, dorsal view. B, ventral view. Scale line in mm.

Carapace with margins of rostrum tapering from the base; branchial, cardiac, and gastric regions not strongly inflated
 *C. spatulifrons* Miers, 1879

Cryptopodia angulata

H. Milne Edwards & Lucas, 1841
 (Figs 1E, F; 2A, B)

Cryptopodia angulata H. Milne Edwards & Lucas, 1841: 481, pl. 28, figs 16-19; Alcock, 1895: 282; Chopra, 1935: 473; Chhapgar, 1957: 415, pl. 4; Ahmad et al., 1973: 15 (listed); Tirmizi, 1980: 107 (listed); Tirmizi & Kazmi, 1983: 369 (listed); 1991: 211-213; Banu & Nurul Hudu, 1989: 646-647.

Cryptopodia angulata var. *cippifer* Alcock 1895: 283; Flipse, 1930: 62, 82.

MATERIAL EXAMINED

CSIRO, F.R.V. *Southern Surveyor*, Gulf of Carpentaria: QMW18305, ♂ (34.2 x 20.2mm), 13°02'S, 139°22.2'E, Stn 36, 58m, 24.11.1991. QMW18306, ♂ (21.9 x 14.1mm), 13°25.6'S, 138°36.0'E, Stn 34, 54m, 24.11.1991. QMW18298, ♀ (38.2 x 22.2mm), 14°00.7'S, 139°11.6'E, Stn 35, 59m, 28.11.1990. QMW18299, ♂ (37.1 x 22.8mm), ♀ (54.6 x 30.2mm), 13°28.9'S, 139°11.9'E, Stn 34, 57m, 28.11.1990. QMW17334, ♂ (37.8mm c.b., rostrum damaged), 14°27.4'S, 138°11.9'E, Stn 20, 52m, 25.11.1990.

OTHER MATERIAL: NTM Cr000902, 2♀ (37.3 x 22.1, 51.5 x 28.2mm), Arafura Sea, 12°58.0'S, 132°10.0E, Stn HL, 81-82, 27m, 19.10.81, R.V. *Gemini*.

REMARKS

The present study greatly extends the previously known range of *C. angulata*. Specimens collected from the Gulf of Carpentaria, apart from a few minor differences, correspond closely with the descriptions of Milne Edwards & Lucas (1841) and Alcock (1895). The triangular gastric depression, noted by Alcock (1895) as being 'very deep', appears to be variable in depth: in our specimens it is moderately deep, but Chopra (1935) found it to vary from more or less shallow to quite deep. On our specimens the border of this depression had, in most cases, a tubercle at each branchial angle and, less frequently, two small tubercles side by side on the anterior angle of the depression. No tubercles were present on the summit of the cardiac region. Chopra (1935) and Tirmizi & Kazmi (1991) found this tuberculation to be variable, with one small individual examined by Chopra bearing small spines instead of tubercles. However, none of the specimens examined by Chopra (1935), Tirmizi & Kazmi (1991), nor ourselves had 'large, erect definitely-placed

spines', as described by Alcock (1895), for *C. angulata* var. *cippifer*.

Alcock described the rostrum as ending in a sharp point; the rostra of the specimens detailed herein are dome-shaped and end in a relatively blunt point. A dome-shaped rostrum was found in a male specimen by Tirmizi & Kazmi (1991).

Alcock (1895) pointed to the presence of spines on the meri of the ambulatory legs. This spination is present on our specimens but only on the first and last pair of legs. Tirmizi & Kazmi (1991) described an identical pattern of spination to that in our specimens.

Granulation on the carpus of the chelipeds was variable among the specimens examined by Chopra (1935), but showed little variation among the specimens of Tirmizi & Kazmi (1991). Most of Chopra's (1935) specimens were either smooth or slightly granular, as described for *C. angulata* var. *cippifer*, by Alcock (1895). Alcock's (1895) comparison of *C. angulata* and its variety suggests that there was no granulation on the carpi of the chelipeds of his specimens of *C. angulata*. The diagram of Tirmizi & Kazmi (1991) shows more granular carpi than those of either Chopra's (1935), or our specimens. Banu & Nurul Huda (1988) reported the presence of a granular carpus for a specimen collected off Penang Island, Malaysia, whereas a number of specimens collected by the same authors from the Chittagong Coast bordering Bangladesh possessed smooth carpi. There is only a small amount of carpal granulation among our specimens. Granulation is more evident on the ventral surface of the carpus. On two of our specimens, a male and a female, there is a small, sharp, sub-distal, median spine on the upper surface of the carpus. This replaces a small tubercle in the other specimens. No mention of this character is made by other authors for *C. angulata*.

The status of *Cryptopodia angulata* var. *cippifer* Alcock, 1895, is still uncertain. The other character used by Alcock (1895) to separate *C. angulata* var. *cippifer* from *C. angulata*, is the presence of prominent spines surrounding the central depression. Evidence from Chopra (1935), Tirmizi & Kazmi (1991), and this study, suggests a degree of intraspecific variation that may encompass most of the characteristics described by Alcock (1895) for *C. angulata* var. *cippifer*. It is probable that *C. angulata* var. *cippifer* is a junior synonym of *C. angulata*, but examination of Alcock's type specimens along with a large series of specimens from across the range

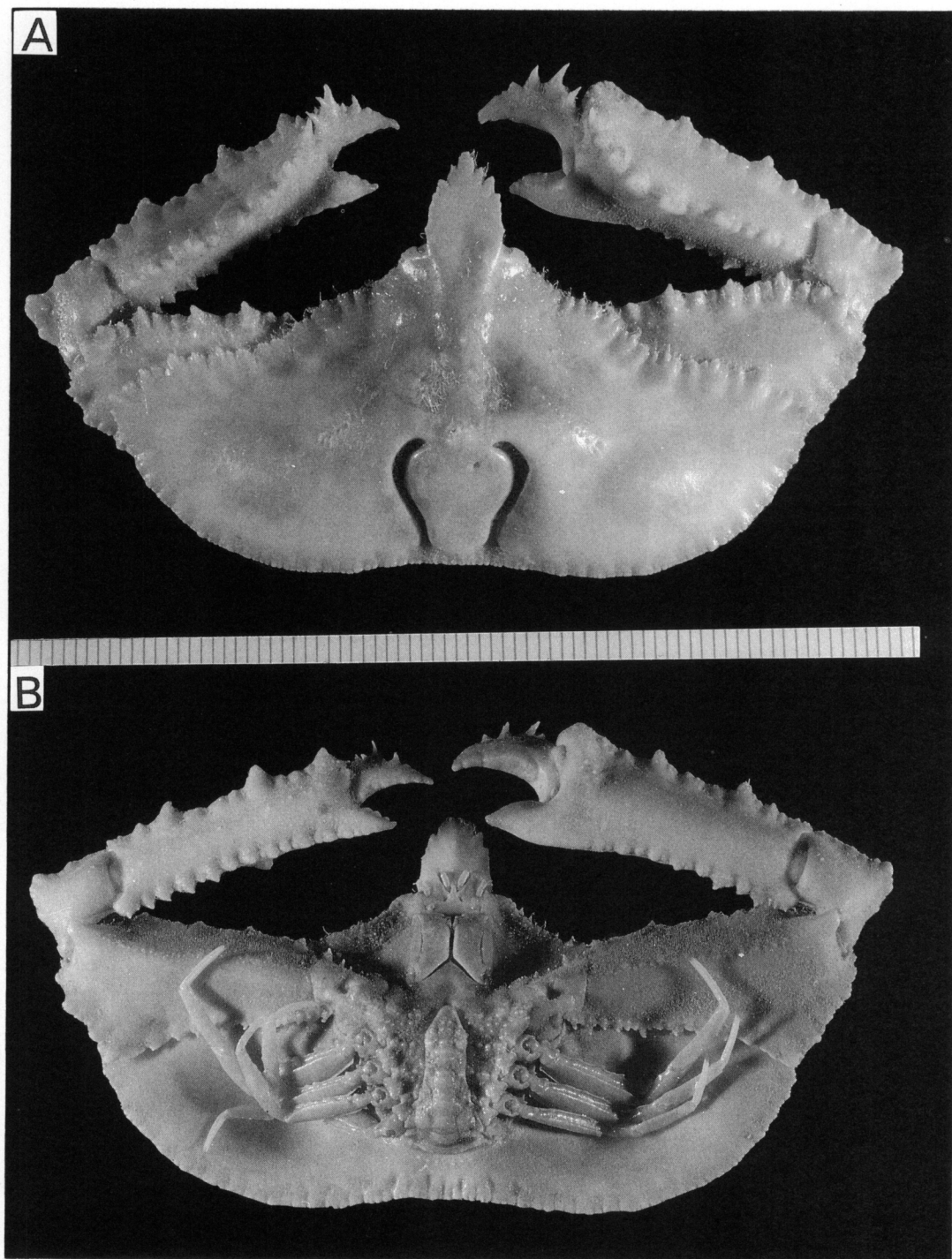


FIG. 3. *Cryptopodia dorsalis* White & Adams, 1847 (QMW18297). A, dorsal view. B, ventral view. Scale line in mm.



FIG. 4. *Cryptopodia pan* Laurie, 1906 (QMW18461). A, dorsal view. B, ventral view. Scale line in mm.

of occurrence of *C. angulata* is required for final certainty.

DISTRIBUTION

C. angulata: Type locality unknown; Karachi; west coast of India; Malabar Coast, Orissa Coast, Sandheads at mouth of Hugli River, India; Ceylon; Malaysia; and now northern Australia, from the Arafura Sea to the Gulf of Carpentaria. *C. angulata* var. *cippifer* is only known from Karachi, Pakistan (type locality). Bathymetric range: 52 to 59m.

Cryptopodia dorsalis

White & Adams, 1847 (in White, 1847)
(Figs 1 I, J; 3A, B)

Cryptopodia dorsalis White & Adams, 1847, in White, 1847a: 125 [nomen nudum]; 1847b: 84; White, 1847c: 205; Adams & White, 1848: 30, pl. 6, fig. 5; Flipse, 1930: 63, 82.

MATERIAL EXAMINED

CSIRO, R.V. *Soela*, North West Shelf: QMW18290, ♂ (62.3 x 35.3mm), 19°29.6'S, 118°52.2'E, Stn 05D03BT, 40m, 25.10.1983. QMW18291, ♂ (64.5 x 35.8mm), 19°58.6'S, 117°49.4'E, Stn 03D09BT, 43m, 26.06.1983. QMW18292, ♂ (17.1 x 11.4mm), 19°56.8'S, 117°53.5'E, Stn 03B02BT, 44m, 25.06.1983. QMW18293, ♂ (16.2 x 10.6mm), 19°45.7'S, 117°52.0'E, Stn 01B13BT, 54m, 20.02.1983. QMW18294, ♂ (20.8mm c.l., lateral margin broken), 19°03.6'S, 119°03.4'E, Stn 05B12BT, 82m, 23.10.1983. QMW18295, ♂ (25.1 x 15.5mm), 19°59.2'S, 117°03.6'E, Stn 04B18BT, 52m, 05.09.1983. QMW18296, ♂ (11.4 x 8.0mm), 19°30.8'S, 118°49.1'E, Stn 03B07S, 37-38m, 28.06.1983. QMW18478, ♂ (11.3 x 7.8mm), ♀ (16.0 x 11.6mm), 19°30.6'S, 118°49.4'E, Stn 03B07BT, 37-38m, 28.06.1983. QMW18552, ♂ (14.7mm c.l., lateral margin damaged), 19°30.8'S, 118°49.3'E, Stn 04B07BT, 38-39m, 30.08.1983. QMW18289, 2♂ (62.3 x 35.8, 22.4 x 16.4mm), 19°55.5'S, 117°55.5'E, Stn 02B03BT, 42m, 22.04.1983. QMW18288, ♂ (18.0 x 11.5mm), 19°54.6'S, 117°56'E, Stn 01B03S, 44m, 18.02.1983. QMW18287, ♀ (73.6mm c.b., rostrum broken), 19°55.9'S, 117°55.5'E, Stn 03B03BT, 42-43m, 26.06.1983.

OTHER MATERIAL: QMW18297, ♂ (61.1 x 35.3mm), Arafura Sea, 12°15.6'S, 129°15'E, Stn 508, 29m, 17.11.1989, Bureau Rural Resources. QMW12771, ♂ (76.3 x 42.4mm), N. of Cape Bowling Green, 19°08.9'S, 147°23.3'E, 09.05.1985, C. Jones, Qld. Fisheries Service.

REMARKS

The authorship of this species has been attributed to Adams & White, 1847, by Flipse (1930)

in his major revision of the Parthenopidae; however the first valid citation in White (1847b) puts the authorship as White & Adams (the very first mention of the name occurred in White (1847a) but was a nomen nudum). This species was listed as new in four separate publications, and there is some difficulty in being certain which of the two descriptions that appeared in 1847 has nomenclatural priority. Apparently the first to appear was the article in the 1847 *Proceedings of the Zoological Society of London*. This volume, according to the date stamp of the British Museum Library, was not available until July, 1848, but according to Sclater (1893) the journal was published in separate sheets prior to binding, and White's article on pp. 84-86, appears with sheet cixv which was delivered from the printers to the Zoological Society on 20 July 1847. White (1847c), as cited here, was date stamped "47.9.22.5" by the British Museum Library and therefore was available only later in September, 1847. There could be some dispute as to whether the earlier published work was distributed, and thus available, prior to the second that appeared in September, but this will probably never be known, and thus I choose to cite the publications in order of their known printing dates. *Cryptopodia dorsalis* is also described in Adams & White's 1848 report of the 'Voyage of the *Samarang*', and in this, authorship is reversed and given as Adams & White.

The distribution of *C. dorsalis* suggests that it is common throughout the waters of northern Australia and the Indonesian Archipelago. There is little doubt as to the correct identification of this species, given the presence of two deep, lyre-shaped grooves which border the lateral edges of the cardiac region, a character unique to *C. dorsalis*.

DISTRIBUTION

Sulu Sea (type locality); northern Australia, from the North West Shelf, Arafura Sea, and north of Cape Bowling Green (Townsville). Bathymetric range: 29 to 82m.

Cryptopodia pan Laurie, 1906 (Figs 1A, B; 4A, B)

Cryptopodia pan Laurie, 1906: 392, fig. 4, pl. 1, fig. 6; Rathbun, 1911: 259; Flipse, 1930: 63, 78, 82; Tan & Richer de Forges, 1993: 131, figs 6E, F.

MATERIAL EXAMINED

CSIRO, R.V. *Soela*, North West Shelf: QMW18474, 2♀ (10.1 x 7.9; 10.6 x 8.0mm), 20°00.2'S, 117°00.5'E, Stn 01B17BT, 53m, 22.02.1983. QMW18476, ♂