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THE IDENTITY OF *CRYPTOPODIA SPATULIFRONS* MIERS, 1879, AND DESCRIPTION OF A NEW SPECIES, *CRYPTOPODIA FISTULOSA* (CRUSTACEA: DECAPODA: BRACHYURA: PARTHENOPIDAE) FROM AUSTRALIA

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ABSTRACT. - The identities of the poorly known parthenopid crabs *Cryptopodia spatulifrons* Miers, 1879, from Australia, and *C. spatulifrons* var. *laevimana* Miers, 1879, from Borneo, are clarified. A new species, *Cryptopodia fistulosa*, previously confused with *C. spatulifrons,* is described from Australia. The two species differ in the degree of granulation on their carapaces, degree of elevation of the branchial, cardiac and gastric regions, depth of their postrostral depressions, and structures of their male first pleopods.

INTRODUCTION

As part of a revision of the genus *Cryptopodia* H. Milne Edwards, 1834, the authors examined the types and a good series of specimens of almost all the known species. During this study, it became apparent that specimens previously referred to *C. spatulifrons* Miers, 1879, and *C. spatulifrons* var. *laevimana* Miers, 1879, from Australia and Southeast Asia belonged to three separate species, one which is new. The study shows that *C. spatulifrons* var. *laevimana* is a distinct species, not closely related to *C. spatulifrons* s. str. This paper serves to clarify the identities of *C. spatulifrons* s. str., describe *C. fistulosa*, new species, and redescribe *C. spatulifrons* s. str. and *C. spatulifrons* var. *laevimana*.

Measurements, in millimetres, are of the carapace width and length respectively. G1 and G2 are abbreviations used for the male first and second gonopods respectively. The postrostral region is defined as the area at the base of the rostrum, between the orbits and gastric region. Specimens examined are deposited in the Muséum national D'Histoire Naturelle (MNHN), Paris, France; The Natural History Museum (NHM), London, England; Queensland Museum (QM), Brisbane, Australia; and Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore. The Australian Commonwealth Scientific and Industrial Research Organisation is abbreviated as CSIRO.

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TAXONOMY

FAMILY PARTHENOPIDAE

Genus *Cryptopodia* H. Milne Edwards, 1834

Cryptopodia spatulifrons Miers, 1879
(Figs. 1B, 2B, 3B, 4B, 5B, E, F, I, J)

Cryptopodia spatulifrons Miers, 1879: 26, pl. 5, fig. 10 (Shark Bay, western Australia); Ortmann, 1894: 48 (list only); Flipse, 1930: 63, 78, 82 (key only); Serène, 1968: 62 (list only); Jones, 1990: 194 (list only).

?*Cryptopodia spatulifrons* - Haswell, 1879: 454 (Port Jackson, Australia); Haswell, 1882: 37 (no new record).

Cryptopodia spatulifrons var. *laevimana* - Miers, 1884: 203-204 (Prince of Wales Channel, Australia) (not *Cryptopodia spatulifrons* var. *laevimana* Miers, 1879: 27).

Material examined. - Holotype - male, (48.8 by 31.3 mm) (NHM 1858.172), Shark Bay, Western Australia, coll. H.M.S. *Herald*, 1879.

Others - 1 female, (27.1 by 19.9 mm) (NHM 1882.7), Prince of Wales Channel, 7 fathoms, Australia, coll. R. Coppinger, 1884.

Description (Holotype). - Carapace 1.6 times broader than long, posterolateral and posterior margins longer than anterolateral margins; posterolateral angles truncated; anterolateral margins denticulate; posterolateral and posterior margins crenulated. Dorsal and ventral surfaces granulated, pitted; granules larger and denser on branchial and cardiac regions, and on lower surface of palm; branchial and cardiac regions elevated; with deep depression in centre of carapace. Ventral depression of carapace shallow. Pterygostomian region strongly pitted and eroded. Rostrum triangular in shape, lateral margins gently convex, diverging proximally, crenulated; postrostral region relatively flat. Chelipeds robust, surface strongly granulated and pitted especially on outer surface of palm; length of palm longer than height; anterior and posterior margins of palm with dentate crests; posterior expansion dilated towards distal extremity; oblique crest on anterior surface of palm with 6 prominent teeth; posterior margin tridentate. Ambulatory legs smooth; upper and lower margins of meri with 1-2 rows of longitudinal carinae. G1 with stout basal part about 2.5 times length of slender distal part, tip bulbous, with two subequal lobes; subdistal surfaces with scattered spines.

Remarks. - *Cryptopodia spatulifrons* was very briefly described from a single male specimen collected from Shark Bay, Western Australia. The holotype is re-examined and it agrees very well with the excellent figure of *C. spatulifrons* provided by Miers (1879). Miers (1879: 27) had also described a variety of *C. spatulifrons*, var. *laevimana*, on the basis of two smaller specimens from the coast of Borneo and an unknown locality. Miers (1884: 203-204) subsequently reported two female specimens of *C. spatulifrons* from Thursday Island and Prince of Wales Channel, Australia. The smaller specimen from Prince of Wales Channel was identified as *C. spatulifrons* var. *laevimana*, while the larger specimen from Thursday Island was referred to *C. spatulifrons* s. str. Haswell (1879: 454) reported a specimen of this species with numerous circular brown spots on its surface but as no figure was provided, it cannot be ascertained if it was really *C. spatulifrons*. Flipse (1930), in his review of the genus *Cryptopodia* listed *C. spatulifrons* but he had no specimens. The species has not been reported since.

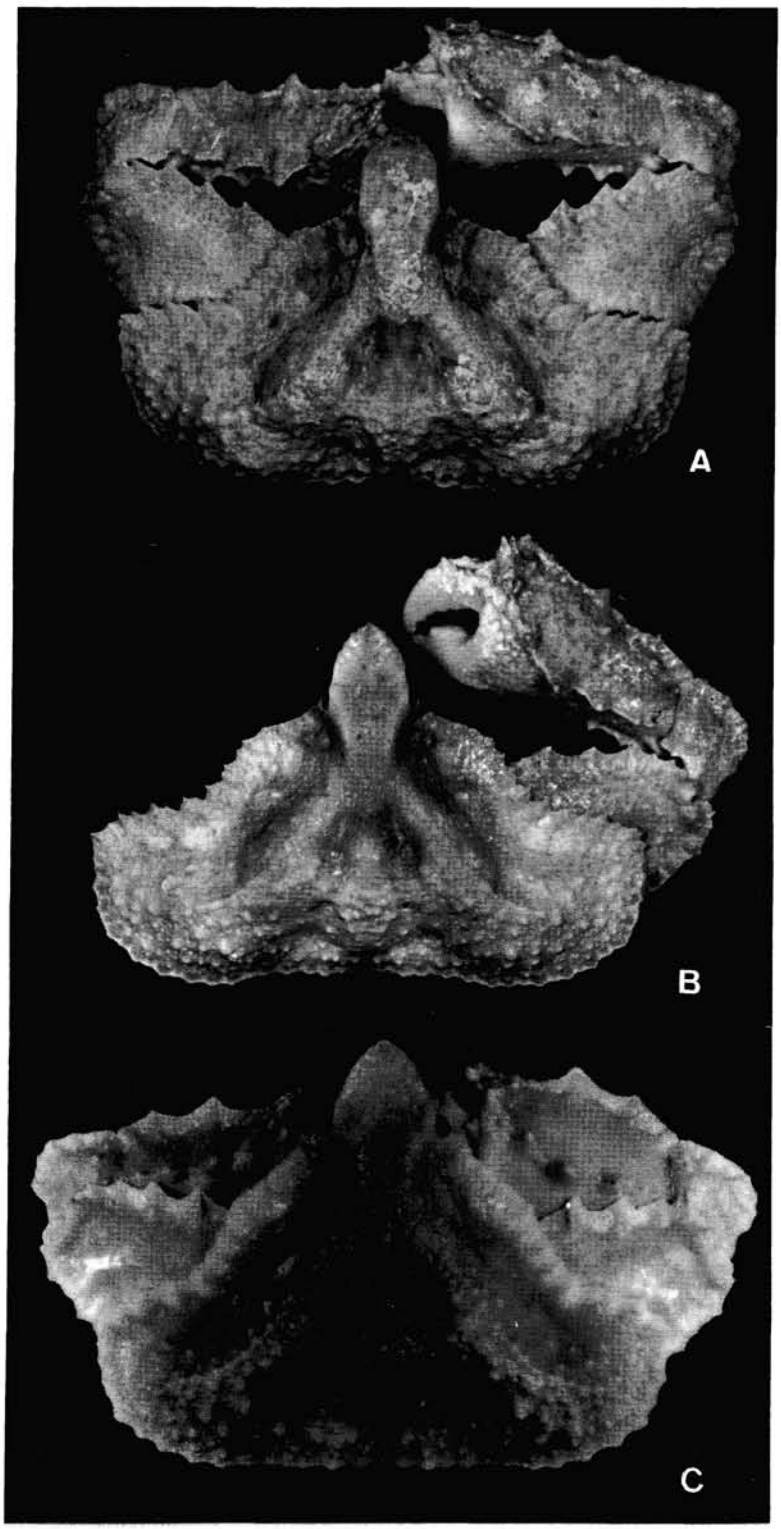

Fig. 1. Dorsal view of carapace. A, *Cryptopodia fistulosa*, new species, holotype male (55.6 by 34.6 mm, MNHN B8563); B, *Cryptopodia spatulifrons*, holotype male (48.8 by 31.3 mm, NHM 1858.172); C, *Cryptopodia laevimana*, female (34.4 by 23.6 mm, ZRC 1965.114).

The authors have examined all of Miers' specimens, as well as a good series of other specimens in the NHM, MNHN and QM which had been identified to *C. spatulifrons* or *C. spatulifrons* var. *laevimana*. We now consider *C. spatulifrons* var. *laevimana* to be a good species, differing from *C. spatulifrons* s. str. in many characters (see ***Remarks*** for *C. laevimana*) and that it is a wholly Southeast Asia species not found in Australia. The Australian specimens previously referred to *C. spatulifrons* and *C. spatulifrons* var. *laevimana* in fact belong to two separate species, one of which is new. The new species, *C. fistulosa*, differs from *C. spatulifrons* s. str. in characters of the carapace, rostrum and G1 (Table 1). The specimens reported by Miers (1884) contain both *C. spatulifrons* and *C. fistulosa*. Contrary to Miers's (1884) report, both specimens are females, not males. The smaller specimen from Prince of Wales Channel he identified as *C. spatulifrons* var. *laevimana* is actually a young female of *C. spatulifrons* s. str. whilst the larger specimen from Thursday Island is an adult female *C. fistulosa*.

Both *C. spatulifrons* and *C. fistulosa* are easily separated from all congeners by their very granulated and pitted carapaces (see ***Remarks*** for *C. fistulosa*). Although only two specimens of *C. spatulifrons* are known, they agree excellently with each other, although in the smaller female, the carapace is less strongly granulated.

Cryptopodia fistulosa, new species
(Fig. 1A, 2A, 3A, 4A, 5A, C, D, G, H)

Cryptopodia spatulifrons - Miers, 1884: 203-204 (Thursday Island, Australia) (not *Cryptopodia spatulifrons* Miers, 1879: 26).

Material examined. - Holotype - male, (55.6 by 34.6 mm) (MNHN B8563), near areas of 8th passage of Shark Bay, Western Australia, coll. R. W. George on R.V. *Davena*, 14.v.1960.

Paratypes - 2 males, (36.3 by 24.0 mm, 45.2 by 28.9 mm) (NHM 1932.11.30.97-98), Roebuck Bay, northwest Australia. — 1 male, (16.1 by 11.3 mm) (QM W18994), North West Shelf, Western Australia, 20°00.2'S, 117°00.5'E, epibenthic sledge, 52m, station 04B17S, coll. CSIRO, R.V. *Soela*, 4.ix.1983. — 1 male, (33.3 by 21.3 mm) (QM W18980), North West Shelf, Western Australia, 19°28.4'S, 118°55.2'E, trawled, 39m, station 04B09BT, coll. CSIRO, R.V. *Soela*, 31.viii.1983. — 1 male, (37.0 by 23.3 mm) (MNHN B8558), between Onslow and Point Samson, northwest Australia, Honolulu dredge, coll. B. R. Wilson on R.V. *Davena*, vi.1960. — 1 male, (25.5 by 17.7 mm) (MNHN B8553), west of Gordon Bay, northwest Australia, 37m, corals and sponge, coll. R. W. George on R.V. *Dorothea*, 14.x.1962. — 1 female, (23.8 by 16.1 mm) (QM W18995), North West Shelf, Western Australia, 19°55.2'S, 117°56.0'E, trawled, 40m, station 05B03BT, coll. CSIRO, R.V. *Soela*, 26.x.1983. — 1 female, (52.1 by 35.7 mm) (NHM 1882.7), Thursday Island, 3-4 fathoms, Australia, coll. R. Coppinger, 1884. — 1 female, (49.5 by 34.3 mm) (MNHN B8548), Shark Bay, Western Australia, trawled, coll. R.V. *Bluefin*, 1.ix.1963. — 1 female, (46.4 by 30.5 mm) (MNHN B8561), Maho's Landing, northwest Australia, Honolulu dredge, 18m, weed, sand, coll. Royce on R.V. *Davena*, 20.v.1960.

Description (Holotype). - Carapace broadly triangular in shape, 1.6 times broader than long, posterolateral and posterior margins longer than anterolateral margins; anterolateral angles truncated; posterolateral and posterior margins crenulated. Dorsal and ventral surfaces strongly granulated and pitted; granules larger and denser on branchial and cardiac regions and lower surface of palm; branchial and cardiac regions elevated; deep depression present in centre of carapace. Ventral depression of carapace very deep. Pterygostomian region pitted. Rostrum broad, margins subparallel proximally, crenulated; postrostral region very depressed. Chelipeds very robust, surface granulated and pitted especially on palm; length of palm longer than height; anterior and posterior margins of palm with dentate crests; posterior expansion

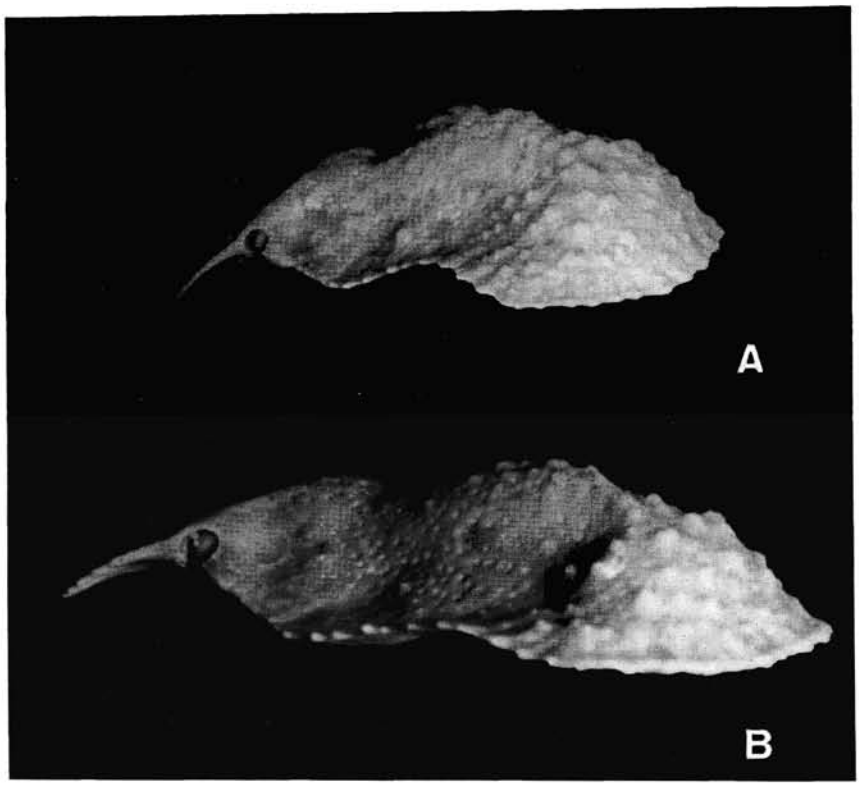

Fig. 2. Side view of carapace. A, *Cryptopodia fistulosa*, new species, holotype male (55.6 by 34.6 mm, MNHN B8563); B, *Cryptopodia spatulifrons*, holotype male (48.8 by 31.3 mm, NHM 1858.172).

Table 1. Differences between *Cryptopodia fistulosa* and *C. spatulifrons*

Characters	*C. fistulosa*	*C. spatulifrons*
Carapace surface	Heavily eroded, with numerous granules and pits (Fig. 1A)	Slightly eroded, granulation less, with fewer pits (Fig. 1B)
Branchial, cardiac and gastric regions	Strongly inflated (Fig. 2A)	Not strongly inflated (Fig. 2B)
Postrostral region	distinctly depressed (Fig. 3A)	slightly depressed (Fig. 3B)
Rostrum	proximal margins subparallel (Fig. 3A)	triangular, margins diverging proximally (Fig. 3B)
Ventral carapace depression	Deep (Fig. 4A)	Shallow (Fig. 4B)
G1	stout basal part about 2 times length of slender distal part, tip tapering, not bulbous; inner distal lobe larger, numerous spines on subdistal surface (Fig. 5A, C, D)	stout basal part about 2.5 times length of slender distal part, tip rounded, bulbous; lobes subequal in size, scattered spines on subdistal surface (Fig. 5B, E, F)

dilated towards distal extremity; oblique crest on anterior surface of palm armed with 6 prominent teeth; posterior margin tridentate. Ambulatory legs smooth; upper and lower margins of meri with 1-2 longitudinal carinae. G1 with stout proximal part about two times length of slender distal part; tip tapering, bilobed, inner lobe distinctly larger; subdistal surfaces with numerous spines.

Remarks. - Despite the similarity in general appearances of *C. fistulosa* and *C. spatulifrons*, the various characters used here to separate the two species (Table 1) are quite reliable and

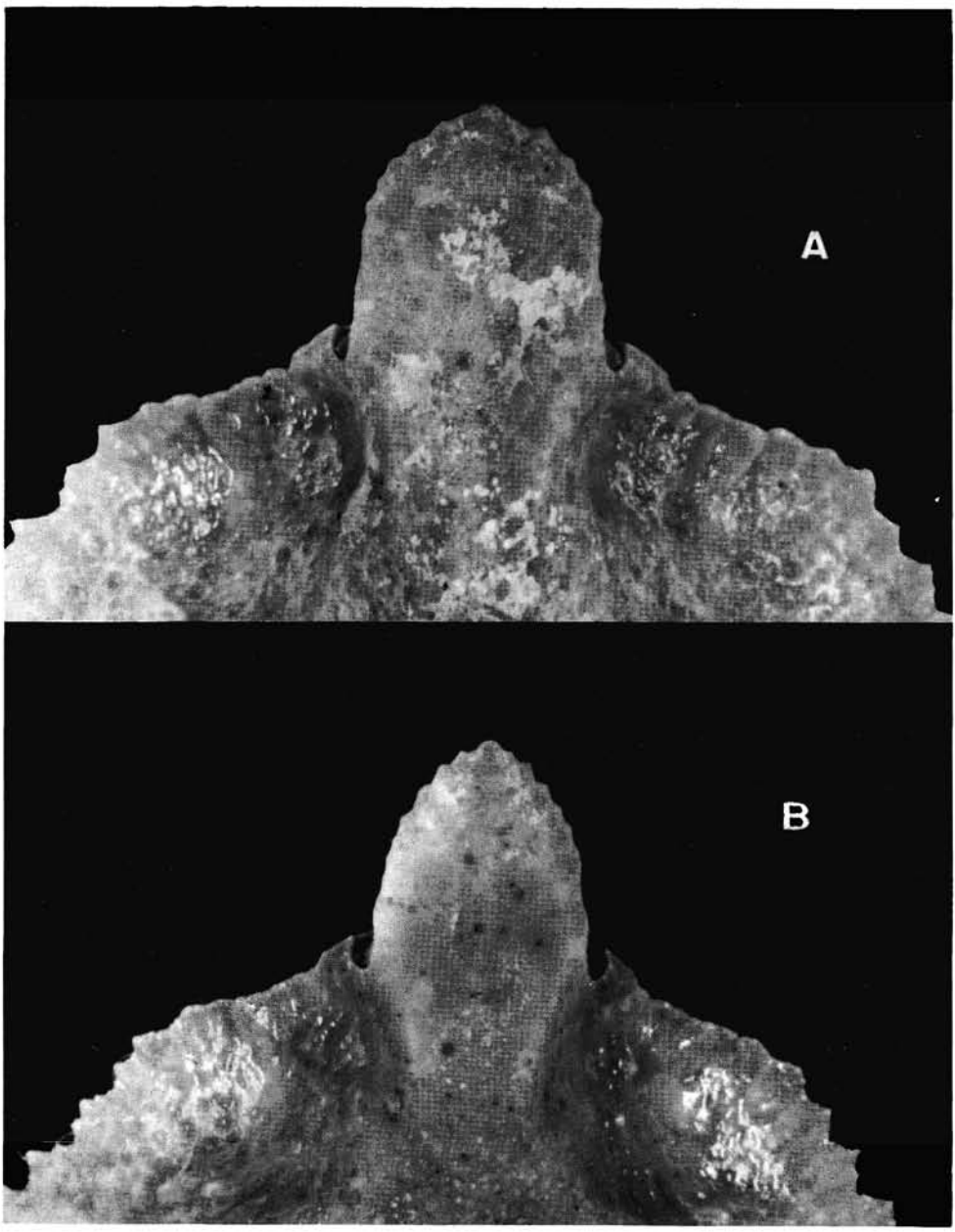

Fig. 3. Dorsal view of rostrum. A, *Cryptopodia fistulosa*, new species, holotype male (55.6 by 34.6 mm, MNHN B8563); B, *Cryptopodia spatulifrons*, holotype male (48.8 by 31.3 mm, NHM 1858.172).

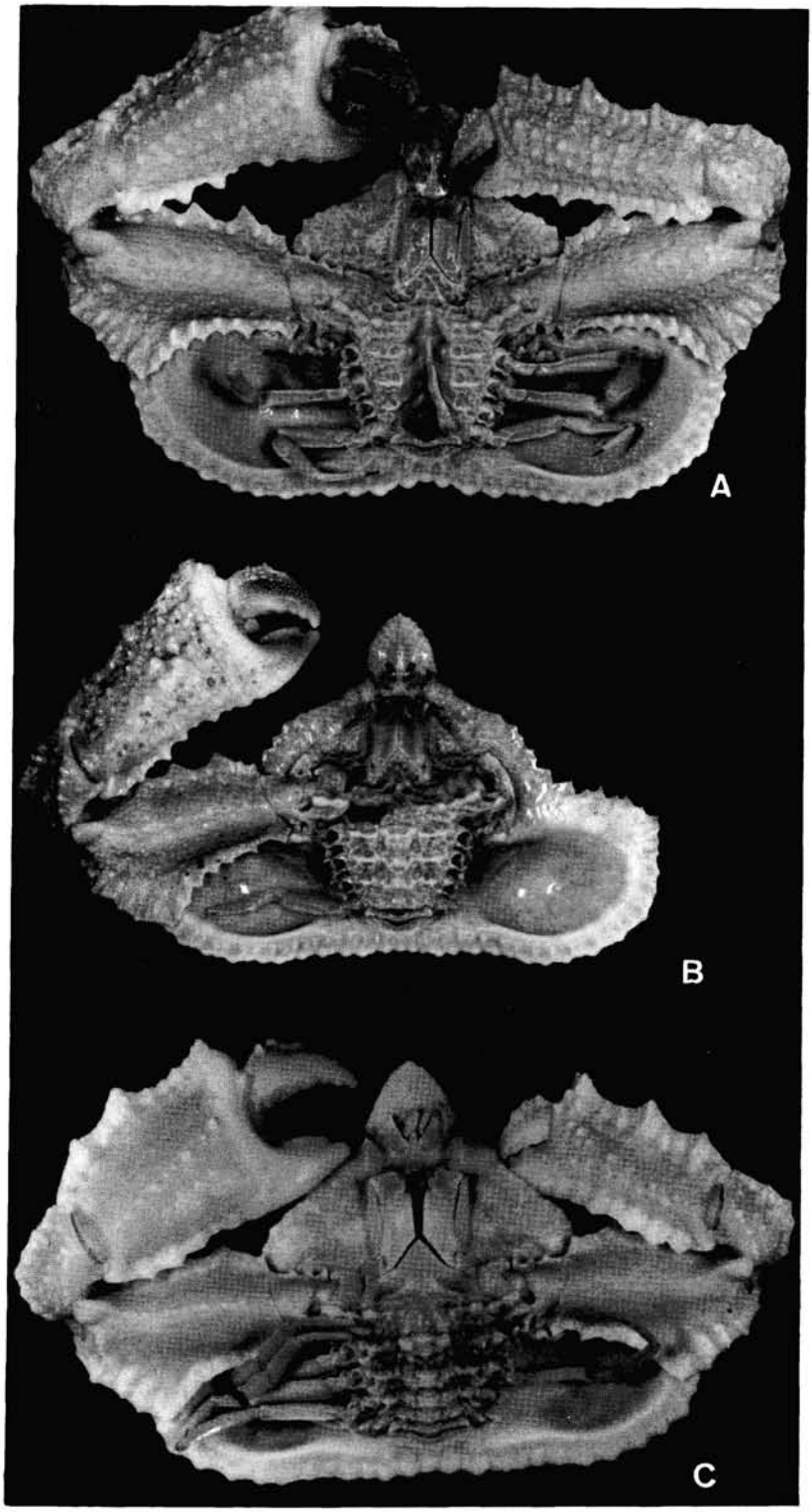

Fig. 4. Ventral view of carapace. A, *Cryptopodia fistulosa*, new species, holotype male (55.6 by 34.6 mm, MNHN B8563); B, *Cryptopodia spatulifrons*, holotype male (48.8 by 31.3 mm, NHM 1858.172); C, *Cryptopodia laevimana*, female (34.4 by 23.6 mm, ZRC 1965.114).

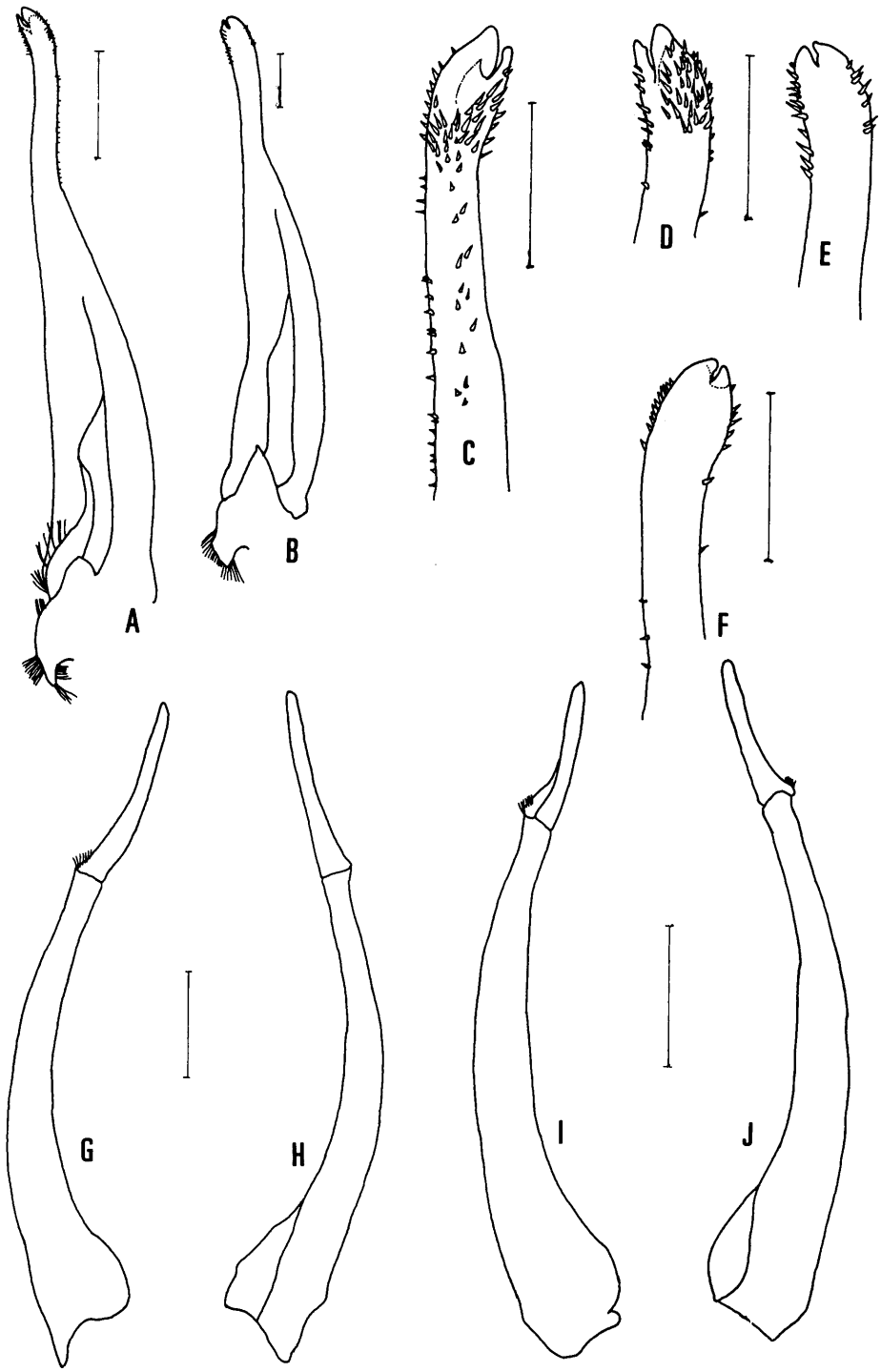

Fig. 5. A, C, D, G, H, *Cryptopodia fistulosa*, new species, holotype male (55.6 by 34.6 mm, MNHN B8563); B, E, F, I, J, *Cryptopodia spatulifrons*, holotype male (48.8 by 31.3 mm, NHM 1858.172). A, B, left G1; C, F, distal part of left G1; D, E, distal part of left G1; G, I, left G2; H, J, left G2. A, B, D, E, H, J, dorsal view; C, F, G, I, ventral view. Scales = 1.0 mm.

independent of sizes. *Cryptopodia fistulosa* is represented by a good series of specimens, ranging from 16.1 to 55.6 mm in carapace width. The characters listed in Table 1 are valid for all sizes. There is slight variation in the sharpness and shape of the distal part of the rostrum (from very sharp to blunt) but all have subparallel proximal margins and the general shape is constant. The degree of granulation and swelling of the posterior regions of the carapace also varies somewhat, but even the least granulated and least swollen individual of *C. fistulosa* is still more strongly granulated and swollen than the holotype of *C. spatulifrons*. The same is true of the G1, which even in the smallest male (16.1 by 11.3 mm, QM W18994) is almost identical to that of the much larger holotype (55.6 by 34.6mm, MNHN B8563).

Cryptopodia fistulosa appears to be distributed mainly on the northwestern and northern coasts of Australia, and is sympatric with *C. spatulifrons* (e.g. in Shark Bay). Although both species are sympatric, there is insufficient data to indicate if they are also syntopic.

Cryptopodia laevimana Miers, 1879, new status
(Fig. 1C, 4C)

Cryptopodia spatulifrons var. *laevimana* Miers, 1879: 27 (coast of Borneo and an unknown locality).

Material examined. - Lectotype - male, (18.6 by 13.7 mm) (NHM 1847.21), coast of Borneo.
Paralectotype - 1 female, (27.3 by 20.4 mm) (NHM 1939.5 8.11), locality unknown.
Others - 1 female, (26.1 by 18.7 mm) (ZRC 1984.7855), west of Pulau Pawai, Singapore, dredge, 9m, haul on shell, gravel, coll. D.S. Johnson, xii.1952. 1 female, (34.4 by 23.6 mm) (ZRC 1965.114), west of Pulau Pawai, Singapore, dredge, 9m, haul on shell, gravel, coll. D.S. Johnson, xii.1952.

Description (Lectotype). - Carapace triangular in shape, 1.4 times broader than long, posterolateral and posterior margins subequal in length to anterolateral margins; anterolateral angles truncated; posterolateral and posterior margins crenulated. Dorsal surface more granulated than ventral surface; granules larger and denser on branchial and cardiac regions; branchial and cardiac regions elevated; with deep depression in centre of carapace. Ventral depression of carapace deep. Pterygostomian region slightly eroded, appearring almost smooth. Rostrum triangular, lateral margins gently convex, diverging proximally, crenulated; postrostral region relatively flat. Chelipeds short, very robust, surface slightly granulated; length of palm subequal to height; anterior and posterior margins of palm with dentate crests; posterior expansion dilated towards distal extremity; oblique crest on anterior surface of palm armed with 6 prominent teeth; posterior margin tridentate. Ambulatory legs smooth; upper and lower margins of merus without distinct longitudinal carinae.

Remarks. - Miers (1879) did not designate a holotype for *C. spatulifrons* var. *laevimana*. Of his two syntypes, the smaller male (18.6 by 13.7 mm, NHM 1847.21) is here designated as the lectotype, the larger female being broken, in poor condition and does not have any associated locality data. The male lectotype is still juvenile and its gonopods have not yet developed properly.

Miers (1879: 27) noted that *C. spatulifrons* var. *laevimana* was very similar to the type of *C. spatulifrons* s. str. except that "... the carapace is tuberculated only upon the elevated parts of the branchial and cardiac regions ... as the specimens are of smaller size, they probably represent the younger condition of the species." This variety was neither described or figured. Examination of the two types as well two other female specimens from Singapore (which agree very well with the types) however, show that Miers' *C. spatulifrons* var. *laevimana*

Table 2. Differences between *Cryptopodia spatulifrons* and *C. laevimana*

Characters	*C. spatulifrons*	*C. laevimana*
Carapace shape	broadly triangular, posterior margin much longer than lateral margins (Fig. 1B)	evenly triangular, posterior margin subequal in length to lateral margins (Fig. 1C)
Carapace surface	granulated to various degrees all over dorsal surface (Fig. 1B)	granulated only on ridges of branchial, cardiac and posterior regions (Fig. 1C)
Pterygostomian region	very rough, eroded (Fig. 4B)	slightly eroded, almost smooth (Fig. 4c)
Ambulatory legs	margins of merus with 1 or 2 longitudinal carinae (Fig. 4B)	margins of merus without distinct longitudinal carinae (Fig. 4C)
Surface of palm	heavily granulated, with numerous pits (Fig. 4B)	almost smooth, with low, scattered granules (Fig. 4C)
Length of palm	distinctly longer than high (Fig. 4B)	as long as high (Fig. 4C)

actually differs from *C. spatulifrons* in many characters (Table 2) and should be regarded as a separate species. The specimen reported as *C. spatulifrons* var. *laevimana* by Miers (1884: 203) from Prince of Wales Channel is not *C. laevimana* as currently understood but *C. spatulifrons* s. str. instead (see ***Remarks*** for *C. spatulifrons*).

The differences observed between *C. laevimana* and *C. spatulifrons* are independent of size or sex. All the specimens of *C. laevimana* (including the small ones) differ markedly from similar-sized or even smaller *C. spatulifrons* or *C. fistulosa*.

The distribution of *C. spatulifrons* (and *C. fistulosa*) and *C. laevimana* are quite distinct. *Cryptopodia spatulifrons* and *C. fistulosa* are known thus far only from Australia, whereas *C. laevimana* is retricted to the Sunda Shelf.

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