

## A REVISION OF THE GENUS *CAMPTANDRIUM* STIMPSON, 1858 (CRUSTACEA: DECAPODA: BRACHYURA: CAMPTANDRIIDAE)

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**ABSTRACT.** - The mangrove crab genus *Camptandrium* Stimpson, 1858, is revised. Three new genera, viz. *Moguai*, *Nanusia* and *Takedellus*, and a new species, *Moguai aloutos*, are described. The various genera can easily be separated by various carapace features, structures of the infraorbital "cup", male first gonopod, ischium and merus of the third maxilliped, postero-median tooth of the epistome, male abdomen, as well as presence or absence of sexual dimorphism in the chelae and dark bristles on the body.

**KEY WORDS.** - Revision, Camptandriidae, *Camptandrium*, new genera, new species.

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### INTRODUCTION

The family Camptandriidae Stimpson, 1858 (sensu Ng, 1998) currently contains 39 species in 17 genera (Manning & Holthuis, 1981; Jones & Clayton, 1983; Dai & Song, 1986; Dai et al., 1986; Harminto & Ng, 1991; Manning, 1991; Tan & Huang, 1995; Tan & Humpherys, 1995; Al-Khayat & Jones, 1996). The family was originally established by Stimpson (1858) for one new genus and one new species, *Camptandrium sexdentatum* Stimpson, 1858.

The type genus, *Camptandrium*, however, is not well known. According to Manning & Holthuis (1981), the genus contains five species, viz. *C. sexdentatum* Stimpson, 1858, *C. elongatum* Rathbun, 1931, *C. ambonense* Serène & Moosa, 1971, *C. rathbunae* Takeda, 1972, and *C. starmuehlneri* Pretzmann, 1968. The present paper revises all the species in *Camptandrium* and clarifies the generic problems associated with the genus. As a result, three new genera and a new species are also described.

Specimens examined are located in the following repositories: Academia Sinica (AS), Institute of Zoology, Beijing, China; Lembaga Ilmu Pengatahuan Indonesia (Indonesian Institute of Sciences) (LIPI), Ancol Timor, Indonesia; Naturhistorisches Museum Wien (NhMW), Vienna, Austria; National Museum of Natural History, Smithsonian Institution (USNM),

Washington, D.C., U.S.A.; Phuket Marine Biological Centre (PMBC), Phuket, Thailand; Queensland Museum (QM), Brisbane; Nationaal Natuurhistorisch Museum (ex Rijksmuseum van Natuurlijke Historie, RMNH), Leiden, The Netherlands; and Zoolögisk Museum, Amsterdam (ZMA), Netherlands; Chiba Prefectural Museum (CBM), Chiba; and Zoological Reference Collection of the Raffles Museum (ZRC), Department of Biological Sciences, National University of Singapore.

In examining the structure of the male abdomen, tissue was teased away so as to expose the segments so that the suture lines could be viewed. In particular, the movement of the segments relative to one another was determined by applying gentle pressure on each segment along the plane of bending with a pair of blunt forceps whilst holding the rest of the abdomen down. This is important as segments with complete sutures which may appear free can actually possess limited or no mobility, thus being functionally fused (see Ng & Chia, 1994). Measurements (in millimeters) are of carapace length and breadth respectively. All scales on the figures are equal to 1.0 mm unless otherwise stated. The following abbreviations are used: G1 - male first gonopod; G2 - male second gonopod.

## TAXONOMY

### *Camptandriidae* Stimpson, 1858

#### *Camptandrium* Stimpson, 1858

*Camptandrium* Stimpson, 1858:106; Stimpson, 1907:137 - Tesch, 1918:58, 65. - Shen, 1932:225; Shen, 1935:29 (in key) - Sakai, 1939:612 (in key); Sakai, 1976:618. - Manning & Holthuis, 1981: 199. - Dai et al., 1986: 439. - Dai & Yang, 1991:482.

**Type species.** - *Camptandrium sexdentatum* Stimpson, 1858, by monotypy.

**Diagnosis.** - Carapace hexagonal, flattened, distinctly broader than long. Surface finely granulated without short pubescence, with some protuberances and transverse interrupted crests. Front less than one-third fronto-orbital breadth, weakly bilobed; frontomedial projection subtruncate, rounded; distinct epigastric crests placed dorsally just behind front. Infraorbital margin almost straight, inner infraorbital tooth large, triangular, suborbital ridge weakly produced, shallow depression present between infraorbital margin and ridge. Anterolateral margin with 3 obtuse teeth. Third maxilliped merus and ischium fused, suture faintly visible or completely undiscernible, merus broader and longer than ischium, with outer distal angle rounded, expanded laterally and anteriorly, inner edges of ischium and merus thickened to form distinct ridge, proximal edge of ischium bent, produced inwards, forming shelf-like structure. Male chela large, robust, movable finger with large triangular tooth, bearing oblique cutting edge, juvenile males with weaker chela, palm not as robust; female chelae small and slender, with denticles along cutting edges of fingers. Anterior thoracic sternal plastron finely granular, anterior margin broadly triangular, with ridge just posterior to region between bases of chelipeds. Male abdomen with segments 2-5 fused, fifth segment constricted; female abdomen with segment 7 free, 1-6 with limited mobility, sutures clearly visible. G1 with swelling covered with group of long setae just before recurved portion, apex with 2 distal processes, one process with bifurcated tip, other process blade-like, edge of blade-like process finely serrated.

**Remarks.** - The genus *Camptandrium* Stimpson, 1858, currently contains five species, viz. *C. sexdentatum* Stimpson, 1858, *C. elongatum* Rathbun, 1931, *C. ambonense* Serène & Moosa, 1971, *C. rathbunae* Takeda, 1972, and *C. starmuehlneri* Pretzmann, 1968 (Manning & Holthuis, 1981). Although Manning & Holthuis (1981) placed *C. starmuehlneri* in *Camptandrium*, they were cautious in considering it a true camptandriid as the G1 and shape of the male abdomen were unknown at the time. In this study, the latter structures are described for this species. Two other species, *C. anomalum* Shen, 1935, and *C. paludicola* Rathbun, 1909, have since been transferred to *Shenius* Serène, 1971, and *Ilygrapsus* Barnard, 1955, respectively. As with Manning & Holthuis (1981), we are of the opinion that *Shenius* should be removed from the Camptandriidae. Serène (1974) had in fact transferred *Shenius* (with some doubt) to the Dotillinae Stimpson, 1858. *Shenius* is certainly more closely affiliated to the Dotillinae as the male abdomen has all seven segments free (segments two and three always immovable in camptandriines). In addition to this, the G1 structure (slender and bent at tip), as well as the form of the mouthparts and orbital regions of *Shenius* differ significantly from that typically found in the Camptandriidae.

Serène (1974) had also transferred *Paraclleistostoma mcneilli* Ward, 1933, to *Camptandrium*, due to the general similarity of their G1 structures. However, there are significant differences in this species to warrant the establishment of a new genus for it. Work is currently in progress to do this, with the inclusion of two new Australian species allied to *P. mcneilli* (P. J. F. Davie, pers. comm.).

Studies of all the other nominal species of *Camptandrium* show that the genus as presently conceived is heterogeneous. Four distinct groups are easily recognisable within *Camptandrium* s. l. The first group, *Camptandrium* s. str., is monotypic, with *C. sexdentatum* as constituent. *Camptandrium* s. str. is characterised by almost complete fusion of the third maxilliped ischium and merus, with the suture either absent or only faintly visible, presence of sexual dimorphism, with the males having much larger and robust chelae than the females, absence of an infra-orbital "cup", a distinctly broader than long carapace, and the absence of stiff, dark bristles on the carapace.

A new genus, *Moguai*, is established for *C. elongatum* and *M. aloutos*, new species, which comprises the second group. This group is recognised by the distinctly longer than broad carapace, presence of an infra-orbital "cup", absence of fusion between the third maxilliped ischium and merus, presence of short, stiff, dark bristles on the carapace and legs, and presence of a Y-shaped granulated ridge on anterior half of carapace which extends posteriorly, branching transversely on either side of the cardiac region and the posteriorly on either side of the intestinal region, forming two acute angles on the posterior margin.

*Camptandrium starmuehlneri* is the only member of the third group, which is recognised here as another new genus, *Nanusia*. The primary distinguishing feature of this new genus is the form of the G1, which has a swollen and compact apex and a short bifurcated distal process, as compared to the elongated apex and long, slender distal process found in *Camptandrium* s. str. and *Moguai*.

The two remaining species, *C. rathbunae* and *C. ambonensis* are synonymised, with *C. ambonensis* having priority. This species makes up the fourth group and is here recognised as a new genus, *Takedellus*. This genus is characterised by the slightly broader than long carapace, the presence of sexual dimorphism in terms of the chelipeds, the long and stout ambulatory legs, which are thickly tomentose, the absence of an infraorbital "cup", with the

third maxilliped merus and ischium not fused, and a G1 with two distal processes, neither of which is bifurcated (as in *Camptandrium* s. str.) nor short and stubby (as in *Nanusia*). *Takedellus* bears a close resemblance to *Nanusia*, particularly in terms of the carapace proportions (about as broad as long), carapace setation and ornamentation. However, again, the G1 of *Nanusia* sets it apart from *Takedellus*, which has a G1 similar to that found in the genus *Moguai*, with two long, slender distal processes, neither of which is bifurcated. Also, *Takedellus* exhibits sexual dimorphism of the chela, with the mature males having large and robust chelae whilst the females have small, slender ones.

A new and important character used in distinguishing the groups within *Camptandrium* s. l. is the presence or absence of an infraorbital "cup" formed by the infraorbital margin and the ridge just below it (suborbital ridge). Shen (1935:31) provides figures of the infraorbital margins for *C. sexdentatum*, *C. anomalum* Shen, 1935 (currently placed in *Shenius*), and *C. elongatum*, but did not discuss its significance. This structure is present in the genus *Moguai* as a large, distinct, granular "cup", whilst in *Nanusia* and *Takedellus*, it is reduced to a shelf-like structure, and is effectively absent in *Camptandrium* s. str. The differences between the four genera are summarised in Table 1.

### *Camptandrium sexdentatum* Stimpson, 1858

(Figs. 1, 2)

*Camptandrium sexdentatum* Stimpson, 1858:106. - Stimpson, 1907:138, pl. xvii, fig. 4. - Balss, 1922:146. - Shen, 1932:225, text figs. 138, pl. ix, fig. 7. - Sakai, 1934:320; Sakai, 1936:221, text fig. 118. - Shen, 1937:170, 182. - Sakai, 1939:632, text fig. 102. - Shen, 1940a:73, 93. - Shen, 1940b:234. - Sakai, 1976:618, pl. 211, fig. 4. - Manning & Holthuis, 1981: 199, fig. 47 (no new material). - Shen & Dai, 1964:116. - Dai et al., 1986: 439 (key), 440, fig. 246(2). - Dai & Yang, 1991: 483, fig. 246(2).

**Material examined.** - Neotype male (6.1 x 8.0) (AS 01912a), Hainan Island, China, 3 Nov.1959.

Others - 1 female (5.9 x 7.7) (AS 01912b), Hainan Island, China, 3 Nov.1959. - 4 males (4.7-5.4 x 5.9-6.9) (RMNH D 26497), 0-0.5 m depth, Ariake Bay, Mizoho, Kyushu, Japan, "zand en modder met stenen" (= sand and mud with stones), coll. T. Sakai & L. B. Holthuis, 8 Sep.1968. - 1 male (4.5 x 5.8) (AS 0910), Long-men, Guangxi, China, 13 May.1980. - 8 males (2.0-4.6 x 2.4-5.1), 1 female (6.1 x 7.9) (AS 0911), Long-men, Guangxi, China, 10 Apr.1981. - 1 male, 1 juvenile female (AS 01913), port, Yan Chou, Hainan Islands, China, 26 May.1958. - 2 males (8.8 x 11.4, 9.1 x 11.7) (AS 01914), Zhou Jia Jian, Zhou-san Islands, Zhejiang, China, Jul.1955. - 2 males (4.2 x 5.7, 4.8 x 6.1), 1 female (4.1 x 5.3) (AS 01915), north port, Chiong-san, Hainan Islands, China, coll. C. B. Han, 24 May.1958. - 2 males (5.7 x 7.0, 6.1 x 7.8), - 2 females (4.6 x 5.5, 4.7 x 7.1) (AS uncat.), Chin-zou, Long-men, Guangxi, China, 12 May.1980. - 1 male (10.0 x 13.0) (AS uncat.), Ma Yi Island, Zhou-san Islands, Zhejiang, 29 Jul.1962. 1 male (5.8 x 7.1), 1 female (4.9 x 6.1) (ZRC 1987.1104-1105), coll. Sagathevan, Jul.1987, Sementa, Malaysia. - 1 female (6.6 x 8.0) (ZRC 1987.1473), Sungei Nibong, Penang, Malaysia, coll. S. Harminto, 13 Jun.1987. - 2 females (5.5 x 6.6, 4.9 x 6.0) (CBM), mud flat, Ban Pa Khlok, Phuket island, Thailand, coll. T. Komai, 20 Nov.1995. - 1 male (7.8 x 9.7) (ZMA), Bay of Batavia (= Jakarta, Java, Indonesia), coll. P. Buitendijk.

**Type locality.** - Originally Hong Kong; now Hainan.

**Description** - Neotype male. - Carapace about 1.3 times broader than long, regions well-demarcated, dorsal surface finely granular, sparsely pubescent; anterolateral margin with three broad, obtuse teeth, first tooth with thickened edge, second tooth smallest, rounded and pointing upwards, third tooth broad, with pointed apex, pointing laterally; posterolateral margin convex, granulated, with row of granules located parallel to it. Epigastric crests present,

Table 1. Differences amongst *Camptandrium* Stimpson, 1858, *Moguai*, new genus, *Nanusia*, new genus, and *Takedellus*, new genus.

	<i>Camptandrium</i>	<i>Moguai</i>	<i>Nanusia</i>	<i>Takedellus</i>
Carapace	distinctly broader than long (width to length ratio ca. 1.3)	distinctly longer than broad (length to width ratio 1.1-1.2)	about as long as broad	slightly broader than long (width to length ratio ca. 1.1)
Infraorbital "cup"	absent	Distinct, sharply demarcated from margin by triangular notch	shelf-like, gradually demarcated from margin by wide notch	shelf-like, sharply demarcated from margin by triangular notch
G1 structure	apex elongate; with 2 long distal appendages, 1 appendage blade-like, 1 appendage bifurcated	apex elongate; with 2 long distal appendages bifurcated, 1 appendage blade-like	apex bulbous; with 1 short bifurcated distal appendage	apex elongate; with 2 long distal appendages, 1 appendage blade-like
Ischium and merus of third maxilliped	completely fused except for notch at inner edge; suture incomplete, faint or not visible	not fused; suture complete, visible	partially fused; suture visible along inner half	not fused; suture complete, visible, deeper along inner half
Postero-median tooth of epistome	tip drawn out to form small projection	tip broad, rounded, without projection	tip drawn out to form small projection	tip drawn out to form small projection
Sexual dimorphism in chelae	present	absent	absent	present
Male abdomen	segments 2-5 completely fused	segments 2-5 fused, but sutures between segments 1, 2 and 3 still clearly visible	segments 2-5 fused, suture between segments 2 and 3 incomplete	segments 2-5 fused, suture between segments 2 and 3 incomplete
Posterior angles of carapace	angular, not drawn out to form "prongs"	drawn out to form "prongs"	rounded, not drawn out to form "prongs"	rounded, not drawn out to form "prongs"
Dark bristles on carapace and legs	absent	present	present	present

hepatic region weakly concave, with central, small cluster of granules forming small protuberance, protogastric and mesogastric regions convex, protobranchial region with transverse ridge adjacent to mesogastric region, outer lateral boundary of ridge reaching halfway to lateral margin of carapace, mesobranchial region with oblique ridge, cardiac region with high, transverse ridge, intestinal region encircled by inverted semi-circle of irregular granules. Posterior margin almost straight, with row of fine granules parallel to it, lateral angles rounded, not produced.

Front very weakly bilobed, thickened into 2 ridges on either side, separated by shallow, triangular groove; inner orbital angle blunt, supraorbital region convex, margin with shallow notch at junction of front and orbital, followed by convexity just adjacent to outer orbital tooth, outer orbital tooth triangular, directed anteriorly; infraorbital margin granular, moderately convex outwards, with large, rounded inner infraorbital tooth, suborbital ridge not conspicuous, visible as short row of granules below median region of infraorbital margin. Anterolateral angles of epistome directed upwards, anterior and posterior portions separated by transverse ridge, posterolateral margins separated from inner pterygostomian edge by shallow groove, postero-medial tooth broadly triangular, posterior margin weakly sinuous on either side.

Third maxilliped ischium and merus fused, completely immobile, suture very faintly visible, shallow; ischium broadened and rounded distally, inner distal edge with rounded notch for placement of palp, inner lateral edge thickened, merus longer than ischium, inner lateral and proximal edges thickened, proximal edge with long setae, outer proximal angle with tuft of long setae.

Cheliped robust, fingers of cheliped shorter than palm, tips spatulate, proximal cutting edge of movable finger with large, triangular tooth, edge of tooth finely denticulate, distal cutting edge with rounded teeth, cutting edge of immovable finger lined with small denticles, with row of short setae on outer surface parallel to cutting edge, inner surface of palm swollen, with cluster of irregular granules close to proximal end, inner edge of carpus with small pointed granules.

Ambulatory legs slender, elongate, thickly pubescent, granulated, second and third legs subequal in length, merus with line of granules on dorsal surface parallel to anterior edge, dactylus long, flattened, pointed.

Anterior thoracic sternal plastron finely granular, anterior margin broadly triangular, with ridge just posterior to region between bases of chelipeds.

Abdominal segment 1 not reaching bases of last pair of ambulatory legs, suture between segments 3-4 visible as small incisions on lateral margin of abdomen on either side, segment 6 broadly rectangular, with lateral expansions distally, telson about as broad as long.

G1 distal process with bifurcated tip shorter than blade-like process.

**Female.** - Chelipeds slender, smooth, fingers longer than palm. Abdominal segment sutures complete and clearly visible. Other non-sexual characters similar to male.

**Remarks.** - We were fortunate to be able to examine a large number of specimens of this species from China. These match well the descriptions and figures given by Stimpson (1858,

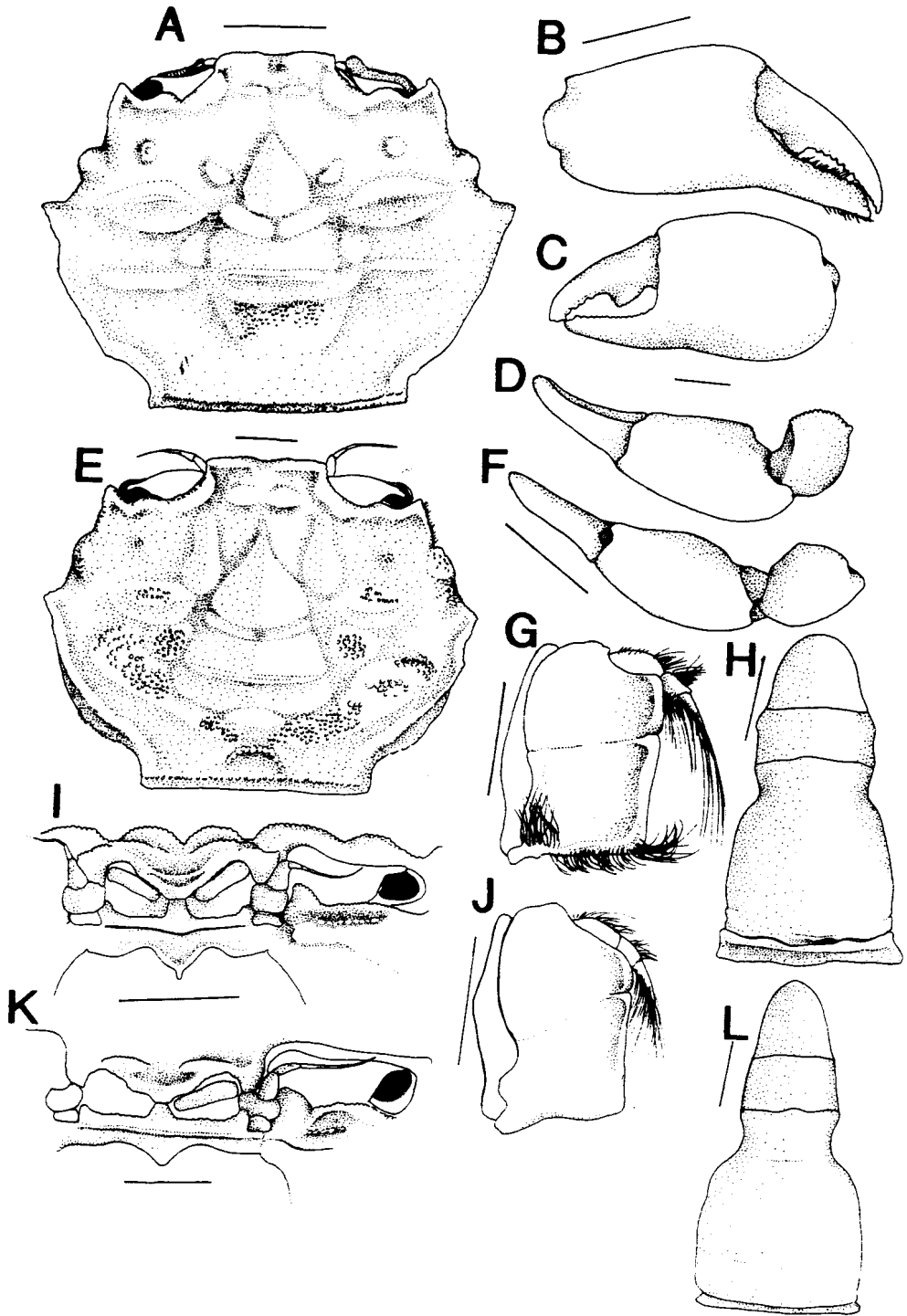


Fig. 1. *Camptandrium sexdentatum* Stimpson, 1858. Male (5.8 x 7.1) (ZRC 1987.1104): A, carapace; B, inner surface of left chela; D, dorsal view of left chela; I, frontal view of carapace; J, right third maxilliped; L, abdomen. Neotype male (6.1 x 8.0) (AS 01912): C, outer surface of left chela; D, dorsal view of left chela; E, carapace; G, right third maxilliped; H, abdomen; K, frontal view of carapace.

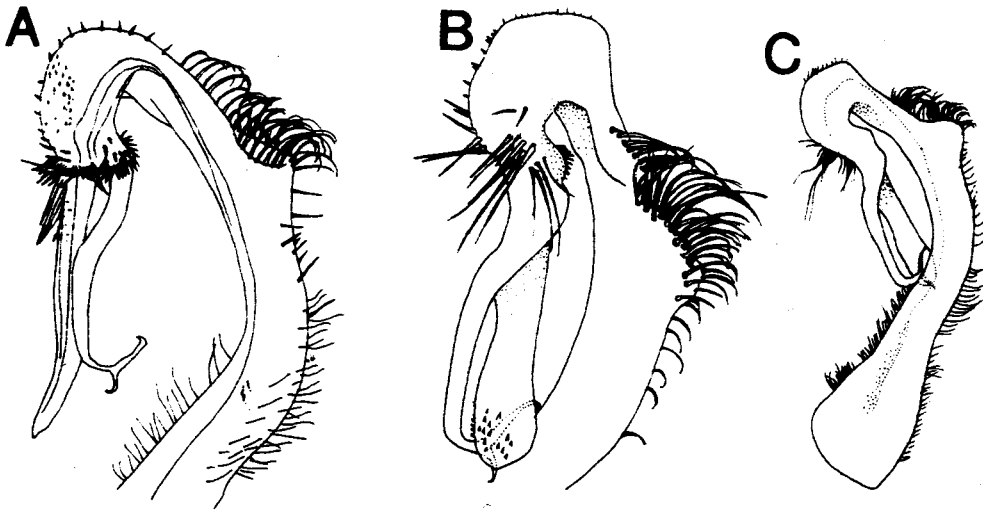


Fig. 2. *Camptandrium sexdentatum* Stimpson, 1858. A, G1 apex, from Shen (1932: Fig. 140e); B, C, G1 apex, male (5.8 x 7.1) (ZRC 1987.1104).

1907) and Shen (1932). Moreover, considering the proximity of the current Chinese localities to Hong Kong, we are confident that all the specimens examined are conspecific. The absence of a type specimen for *C. sexdentatum* is a serious problem. *Camptandrium sexdentatum* is the type species of the genus and there is a need to fix the identity of the type genus of the family. In addition, at least two species previously assigned to *Camptandrium* are known from Chinese seas (leading to possible confusion as both are now placed in different genera), and *C. sexdentatum* itself has a very wide Indo-West Pacific distribution. As almost all the species currently assigned to *Camptandrium* are here transferred to new genera, it is important that the taxonomy of the genus *Camptandrium* itself is stabilised. As Stimpson's (1858) original specimen of *C. sexdentatum* is clearly lost, a male specimen measuring 6.1 by 8.0 mm (AS 01912a) from Hainan, China, is herein designated the neotype. The neotype site is very close to Hong Kong.

Shen's figure (Shen, 1940a: text fig. 140a) of the male abdomen is misleading as it shows all the sutures between the segments as distinct and extending along the entire width of the abdomen. Nevertheless, in his description, he states that the third to fifth segments are fused and that the sutures are "scarcely indicated". A point to note is that all previous authors described the abdomen as having segments 3-5 fused. Upon closer examination of the specimens of *C. sexdentatum*, we found that, in fact, it is segments 2-5 which are fused.

Due to the good number of specimens available, it was possible to note the variation exhibited by specimens of different sizes. Very small specimens tend to have generally less crisply sculptured carapaces and more glabrous, more slender ambulatory legs. Very large specimens (largest male examined 10.0 x 13.0 mm, As), in which the ridges are probably worn off, have less distinct sculpturation. In smaller specimens, the posterior-most anterolateral tooth is more acute than in larger specimens, which have a more rounded tooth. In the former, the lobe in the middle of the supraorbital margin (from dorsal view) is larger and more distinct, whilst in the latter, it appears less well developed. Young males also differ from larger mature males in having the bifid process of the G1 as long as, or slightly longer than the other process. In mature males, the bifid distal process is shorter than the other process. In addition,



in larger males, the abdomen is broader relative to the length and the distal portion of segment 6 is slightly expanded laterally to form obtuse angles. In smaller males, however, the abdomen is narrower relative to the length and segment 6 has the lateral edges straighter. There are also variations in the chela structure. For larger males, the inner surface of the palm of the chela is swollen and has a patch of irregular granules close to the proximal end. This is absent or indistinct in small males. The chela fingers in larger males are shorter than the palm and the inner edge of the carpus has pointed granules, whereas the fingers in smaller males are as long as or slightly longer than the palm and the carpus edge is generally smoother.

Kemp (1915) recorded two young males and a large female from the outer channel of the Chilka Lake, Bay of Bengal, and two small specimens from the Ennur backwater, near Madras. He did not provide any description of the G1. Kemp (1918:229) later records two additional female specimens from the channel "... opposite Singgora on a bottom of mud and dead shells at a depth of 4 1/2 metres and in the middle of the outer lake, N. of Koh Yaw, on a bottom of sticky mud at a depth of 2 1/2 metres". He states that the later specimens were smaller than those reported in Kemp (1915) and "... the sculpture of the carapace is crisper, the transverse ridge on the branchial and cardiac regions being more sharply defined and the anterolateral teeth more prominent". We have not been able to examine any of his specimens nor any from similar localities but the differences observed by him are within the range of variation exhibited by the species as discussed earlier. As his description is adequate, we have accepted his record for this species for India.

Tesch's (1918) specimen from Bay of Batavia is also included here as he provided a relatively good description. Like Kemp (1915, 1918), he did not describe the male gonopods.

Sakai (1934) reported a male specimen from Ohmura, Japan. He did not provide any description nor figures. However, we have examined specimens from Kyushu, Japan, collected and identified by T. Sakai and found that their features match exactly those of the Chinese specimens of *C. sexdentatum*.

Kim & Kim (1982) merely provide the species name in a list. No description or figure is given. Their record is regarded here as indeterminate.

Tantichodok (1981:94) recorded *C. sexdentatum* from Ko Maphrao, Thailand. We were, however, unable to examine his specimen. However, we examined a specimen (PMBC 4385) from Ao Nam Bor mangroves, Phuket, Thailand, but cannot confirm its identity because the specimen is in very poor condition. We have, however, examined two female specimens from Phuket (CBM) which agree with *C. sexdentatum* in all respects.

**Habitat and Biology.** - Stimpson's (1907:139) specimens were dredged from a muddy bottom "... in bays of the coast near Hong Kong". Shen (1937) reported that this species was found on muddy bottoms. According to Shen (1940a), this species was occasionally found with another camptandriid, *Deiratonotus cristatum*. Sakai (1939:633) remarked that the species "... inhabits muddy bottoms not far from the shore line". Sundowo Harminto (pers. comm.) comments that this species "... inhabits mudflats, between high and low tidal marks". Dai Ai Yun collected specimens from soft, clayey rocks with holes in them (probably lateritic) (pers. comm.).

**Distribution.** - Hong Kong; China; Japan; South Korea (?), Thailand; Peninsular Malaysia (new record); Indonesia; India.

***Moguai*, new genus**

*Camptandrium* - Serène, 1968:101 (part).

**Type species.** - *Moguai aloutos*, new species, by present designation.

**Diagnosis.** - Carapace elongated, about 1.1-1.2 times longer than broad. Surface coarsely granulated with short, curved, dark setae, particularly on carapace protuberances and crests. Front about half fronto-orbital breadth, indistinctly bilobed; frontomedial projection indistinct, subtruncate; distinct epigastric crests dorsally placed just behind front. Suborbital ridge well-developed, forming infraorbital "cup" with infraorbital margin, inner infraorbital tooth large, triangular. Anterolateral margin bearing 3 teeth, middle one being smallest and least produced, sometimes scarcely noticeable. Lateral angles of posterior margin subrectangular or acute, may be produced to form "prongs". Third maxilliped surface coarsely granular, merus and ischium freely articulating, suture complete, clearly visible, merus broad, about as long as ischium, with outer distal angle rounded, expanded laterally and anteriorly, inner distal margin scooped out for placement of palp, inner edges of ischium and merus slightly thickened, inner distal angle of ischium acutely produced. Male chela small, slender, as broad or more slender than ambulatory legs, cutting edges blade-like; female chelae similar. Ambulatory legs moderately broad, sparsely covered with short, dark setae, merus with distal angles drawn out to form prongs. Anterior thoracic sternal plastron granular, anterior margin broadly triangular, with ridge just posterior to region between bases of chelipeds. Male abdomen with segments 3-5 fused, distal portion of fifth segment constricted before distal margin, segment 6 trapezoidal; female abdomen with segments 3-6 fused, sutures invisible except for suture between segment 6-7, more clearly visible in larger specimens. G1 with swelling covered with group of long, curved setae just before recurved portion, apex with 2 distal processes, longer process with curved, elongated tip covered with sharp, curved setae, shorter process broader, straight, blade-like, with robust spines close to tip.

**Etymology.** - The genus named is derived from the Cantonese words "Mo Guai", which means "devil", alluding to the animals horned carapace and somewhat frightening appearance. The gender is neuter.

**Remarks.** - *Moguai*, new genus, appears to be closely related to *Camptandrium* in terms of the dorsal carapace ornamentation, the presence of three lobes or teeth on the anterolateral margin of the carapace, general shape of the mouth parts (anterior edge of merus expanded to form lobe), and in particular, the structure of the male G1, which bears two distal processes. However, members of *Moguai* have a more "squat" appearance, with the carapace being distinctly longer than broad and the legs shorter relative to the carapace width. The front in this genus is about half the fronto-orbital breadth whilst in *Camptandrium* s. str., the front is only about a third the fronto-orbital breadth. The infraorbital "cup" formed by the infraorbital margin and the suborbital ridge is large, deep and distinct in *Moguai*. In *Camptandrium*, such a "cup" is indistinct and is here considered as absent.

Furthermore, in *Moguai*, the third maxilliped merus and ischium are not fused as in *Camptandrium* s. str. The suture between them is clear and complete. In addition, the inner distal angle of the ischium is acutely produced. In *Camptandrium*, such this angle is distinctly less acute.

All specimens of *Moguai*, both males and females examined, had small, slender chelipeds. Males of the genus do not have any large molariform tooth on the immovable finger. Males

of species of *Camptandrium* s. str. on the other hand, have large robust chelipeds, with a large tooth on the immovable finger.

Although the G1 of *Moguai* bears two distal processes as in *Camptandrium* s. str., there is a distinct difference in that both these processes are simple and blade-like, whilst one of the processes in *Camptandrium* is bifurcated.

At present, *Moguai* consists of only two species: *M. elongatum* (Rathbun, 1931) and *M. aloutos*, new species, described herein.

***Moguai aloutos*, new species**

(Figs. 3A, E, F, 4A-C, F)

*Camptandrium elongatum* - Serène, 1968:101 (in list). - Serène & Moosa, 1971:6, figs. 2, 3. - Serène & Umali, 1972:95, figs. 127-129. - Yang, 1979:39 (in list). - Tan & Ng, 1994:83 (in list) (nec *C. elongatum* Rathbun, 1931).

**Material examined.** - Holotype - male (5.2 x 4.5) (USNM 71768), Pandan Forest Reserve, Singapore, leg. M. W. F. Tweedie, 1934.

Paratypes - 2 females (5.4 x 4.9, 6.5 x 5.6), same data as holotype. - 8 females (4.6-5.7 x 4.2-5.1) (ZRC 1965.7.15.25-34), coll. M. W. F. Tweedie, Jul.1934. - 1 female (5.1 x 4.3) (ZRC), Lim Chu Kang mangrove, Singapore, coll. C. G. S. Tan, 6 Mar.1996.

Others - 1 male, 13 females (ZRC 1965.7.15.35-44), Kuantan, Pahang, Jun.1935. - 8 females (ZRC 1965.7.15.45-52), Johore Straits, Pulau Seletar, Singapore, coll. M. W. F. Tweedie, Jun.1934. - 8 males, 16 females (ZRC 1965.10.5.1-3), Sungei Buloh, Johore, Malaysia. - 1 male (ZRC 1965.7.9.21), Kuantan, Pahang, Malaysia, coll. R. Serène. - 1 female (ZRC 1977.7.25.38), Jurong River, Singapore, 1934.

**Type locality.** - Singapore.

**Description.** - Holotype male. Carapace about 1.2 times longer than broad, dorsal surface coarsely granular, covered with short, dark, stiff, curved setae, particularly on ridges and protuberances; anterolateral margin with three teeth, first tooth (outer orbital angle) large, triangular, pointing antero-laterally, second tooth much smaller than first and third teeth, acute, rounded, pointing laterally, closer to first tooth than third, third tooth broad, triangular, extending laterally further than first tooth; posterolateral margin convex, uneven, with broad, triangular protuberance just posterior to third anterolateral tooth. Coarsely granular epigastric crests present, hepatic region gently concave, with central, cluster of coalesced granules forming rounded protuberance, mesogastric region raised to form thick, longitudinal, broad, granular ridge, ridge branching anteriorly to form Y-shaped granular ridge which reaches frontal horn formed by supraocular eave, metagastric region depressed, forming short, transverse groove separating metagastric and cardiac regions, cardiac region raised to form rhomboidal protuberance with 2 lateral, short, transverse ridges, mesobranchial region with short, oblique ridge extending from posterolateral protuberance, metabranchial region with similar, shorter ridge, narrow ridge present on intestinal, branching posteriorly, each branch extending to lateral angles of carapace posterior margin. Posterior margin almost straight, lateral angles acutely produced to form prongs.

Front thickened, granular, very weakly bilobed, with lobes inconspicuously truncate, weakly convex; inner orbital angle squarish, supraocular eave well-developed into "horn", directed

upwards from carapace, on same level as epigastric crests, supraorbital region granular, margin almost straight, outer orbital broadly triangular, directed anterolaterally; infraorbital margin coarsely granular, almost straight, with large, rounded inner infraorbital tooth, suborbital ridge conspicuous, produced, forming large, granular infraorbital "cup" with infraorbital margin. Basal segment enlarged, coarsely granular.

Anterolateral angles of epistome directed anterolaterally, anterior and posterior portions separated by transverse ridge, posterolateral margins separated from inner pterygostomial edge by shallow groove, postero-medial tooth broadly triangular, with convex lateral margins, posterior margin convex on either side.

Outer surface of third maxilliped merus with low, rounded ridge on outer portion, 2 oblique, granular ridges present on outer surface of ischium.

Cheliped weak, fingers slender, cutting edges blade-like.

Ambulatory legs coarsely granular, merus with outer distal angles distinctly produced to form acute "prongs", dactylus longer than propodus, cylindrical, pointed.

Sutures between abdominal segments 3-5 completely undiscernible, submarginal row of large granules close to proximal margin of fused piece, proximal half with rounded convexity on either side, segment 6 trapezoidal, lateral margins weakly concave, distal end constricted, telson slightly longer than broad.

G1 distal process with curved tip longer than blade-like process.

**Female.** - Abdominal segments 3-5 fused, segment 6 with clear proximal suture but no mobility, such suture not clear in juveniles. Other non-sexual characters similar to male.

**Etymology.** - The Greek "aloutos" means "unwashed, filthy", alluding to the animals' appearance, particularly when they are covered in mud. The name is used as a noun in apposition.

**Remarks.** - *Moguai aloutos*, new species, is distinguished from *M. elongatum* largely in the carapace ornamentation. The supraocular eave is more well-developed, being larger and more acute in *M. aloutos*. In *M. elongatum*, the supraocular eave is not as produced, being distinctly more flattened from frontal view (figs. 3C, E). The posterior margin lateral angles in *M. aloutos* are acute and produced to form "prongs", as extensions of the inverted Y-shaped ridge on posterior third of carapace. In *M. elongatum*, the angles are more obtuse, being barely produced. In addition, *M. aloutos* generally appears to be more granular than *M. elongatum*, particularly on the carapace ridges. The distal end of the ambulatory legs in *M. elongatum* does not bear the extended "prongs" as in *M. aloutos*. Instead, only the "prong" on the posterior margin is produced.

Serène & Moosa (1971:6) compared the G1 of their new species, *C. ambonense* (referred to the genus *Takedellus* in this study), with that of a male specimen which they assumed to be *C. elongatum* from Singapore (ZRC 1965.7.15.35). We have re-examined the ZRC specimen and found it to be conspecific with the present new species. However, as the G1s of both *Moguai* species are nearly identical, their G1 comparisons are still valid.

Serène & Umali (1972) recorded this species as *Camptandrium elongatum*. We have examined some of the specimens which they listed as such in the ZRC and these are conspecific with *M. aloutos*.

**Habitat and Biology.** - Specimens of *Moguai aloutos* collected from Bintan Island, Indonesia, were found under damp pieces of drift wood, around the high mangrove area, with a sandy-muddy substrate. They are slow-moving, being "clingers" rather than "runners", grasping the substrate with the well-developed spines on their short ambulatory legs. They are well-camouflaged, with their bodies covered by a layer of mud. When their covering is removed, they would make themselves look less conspicuous by flattening themselves against the substrate. Specimens hold their legs close to their bodies when disturbed, feigning death. This phenomenon has also been observed in another camptandriid species, *Tylodiplax tetratylophora* de Man, 1895 (unpublished data). The carapace ornamentation in *M. aloutos* (usually encrusted with mud) makes them difficult to detect in the mud. It appears that the numerous setae on the carapace help to gather mud that provides camouflage to some extent.

**Distribution.** - Singapore and Bintan Island, Indonesia.

***Moguai elongatum* (Rathbun, 1931), new combination**

(Figs. 3C, D, G, 4D, E)

*Camptandrium elongatum* Rathbun, 1931:95, pl. 13, figs. 40-43. - Shen, 1935:33, fig. 10A-C. - Shen, 1940a:73, 93 (no new material). - Shen, 1940b:234 (Kowloon, Hong Kong). - Shen & Dai, 1964:115. - Manning & Holthuis, 1981:199 (no new material). - Dai & Yang, 1991:482, pl. 61(3), fig. 246(1).

**Material examined.** - Holotype - female (7.2 x 6.8) (USNM 61876), Liuwutien, China, coll. S. F. Light, 28 May.1924.

Others - 1 female (6.9 x 6.4) (USNM 62013), coll. S. F. Light. - 3 males (3.4-4.0 x 3.0-3.6), 8 females (3.7-5.4 x 3.4-4.8) (USNM 62014), tide flats, Tsimei, China, coll. S. F. Light, Jun.1923. - 1 female (4.9 x 4.6) (AS 01907), Xing-yin, Hainan, China, 2 May.1958. - 1 male (4.2 x 3.8), 1 female (6.1 x 5.6) (AS C 1902), no other data.

**Type locality.** - Liuwutien (on mainland near Xiamen), Fukien, China.

**Description.** - Male. Carapace about 1.1-1.2 times longer than broad, dorsal surface uneven, with coalesced granules, ridges and protuberances covered thickly with short, dark, stiff, curved setae, other areas on carapace sparsely covered with setae; anterolateral margin with three teeth, first tooth (outer orbital angle) acutely triangular, slightly curved, pointing anterolaterally, second tooth much smaller than first and third teeth, lobiform, third tooth weak, broadly triangular; posterolateral margin convex, almost even. Coarsely granular epigastric crests present, hepatic region gently concave, with oblique cluster of coalesced granules forming rounded, flat protuberance, mesogastric region raised to form thick, longitudinal, broad, granular ridge, ridge branching anteriorly to form Y-shaped granular ridge, cardiac region raised to form rhomboidal protuberance with 2 lateral, short, transverse ridges, mesobranchial region with short, oblique ridge extending to posterolateral margins, metabranchial region with similar, shorter ridge, narrower ridge, ridge present on intestinal region branching posteriorly, each branch extending to lateral angles of carapace posterior margin. Posterior margin almost straight, lateral angles subrectangular, not extended to form "prongs".

Front thickened, granular, very weakly bilobed, with lobes inconspicuously truncate, dorsal surface depressed; inner orbital angle squarish, supraocular eave flat, not produced to form "horn", junction between base of front and supraorbital margin with shallow excavation, supraorbital region finely granular, margin almost straight, outer orbital broadly triangular, directed anterolaterally; infraorbital margin finely granular, almost straight, with large, pointed inner infraorbital tooth, suborbital ridge conspicuous, produced, forming large, granular infraorbital "cup" with infraorbital margin. Basal segment enlarged, coarsely granular.

Anterolateral angles of epistome rounded, anterior and posterior portions separated by transverse groove, posterolateral margins separated from inner pterygostomian edge by open sulci, postero-medial tooth broadly triangular, lateral margins straight, posterior margin convex on either side.

Outer surface of third maxillipeds relatively smooth, proximal edge of ischium granular.

Cheliped weak, fingers slender, cutting edges blade-like.

Ambulatory legs coarsely granular, merus with anterior distal angle not produced to form acute "prong", posterior distal angle produced to form acute "prong", dactylus about as long as propodus, cylindrical, pointed.

Sutures between abdominal segments 3-5 completely invisible, submarginal row of large granules close to proximal margin of fused piece, distal end constricted, proximal half with rounded convexity on either side, surface finely pitted, segment 6 trapezoidal, lateral margins weakly concave, telson slightly longer than broad.

G1 distal process with curved tip longer than blade-like process.

**Female.** - Abdominal segments 3-5 fused, segment 6 with clear proximal suture but no mobility, such suture not clear in juveniles. Other non-sexual characters similar to male.

**Remarks.** - A good series of specimens from Tsimei (three males, eight females) examined here were listed under "Additional localities" by Rathbun (1909). Their characters agree well with her original description (Rathbun, 1909). Rathbun (1909) placed this species in the genus *Camptandrium* but did not give reasons for doing so. She did, however, mention the longer than broad carapace, the "... strongly marked longitudinal median elevation, the well delimited concave areas at either end of the carapace" and the shorter and broader legs as characters distinguishing her species from *C. sexdentatum*. Indeed, these are some of the characters that are used here to distinguish *Moguai* from *Camptandrium* s. str.

The differences between *M. elongatum* and *M. aloutos*, new species, have been discussed under the remarks for the latter species.

Shokita's (1990:313) record of this species from Iriomote Island, Ryukyu Islands, Japan, is regarded as indeterminate, as he provides neither description nor figure, and as such, the identity of his specimens cannot be confirmed.

**Habitat and Biology.** - Specimens from Tsimei, Fukien, China, were collected from tidal flats, whilst those from Poahlan were from a sandy beach. Other aspects of the habitat and biology of this species are unknown.

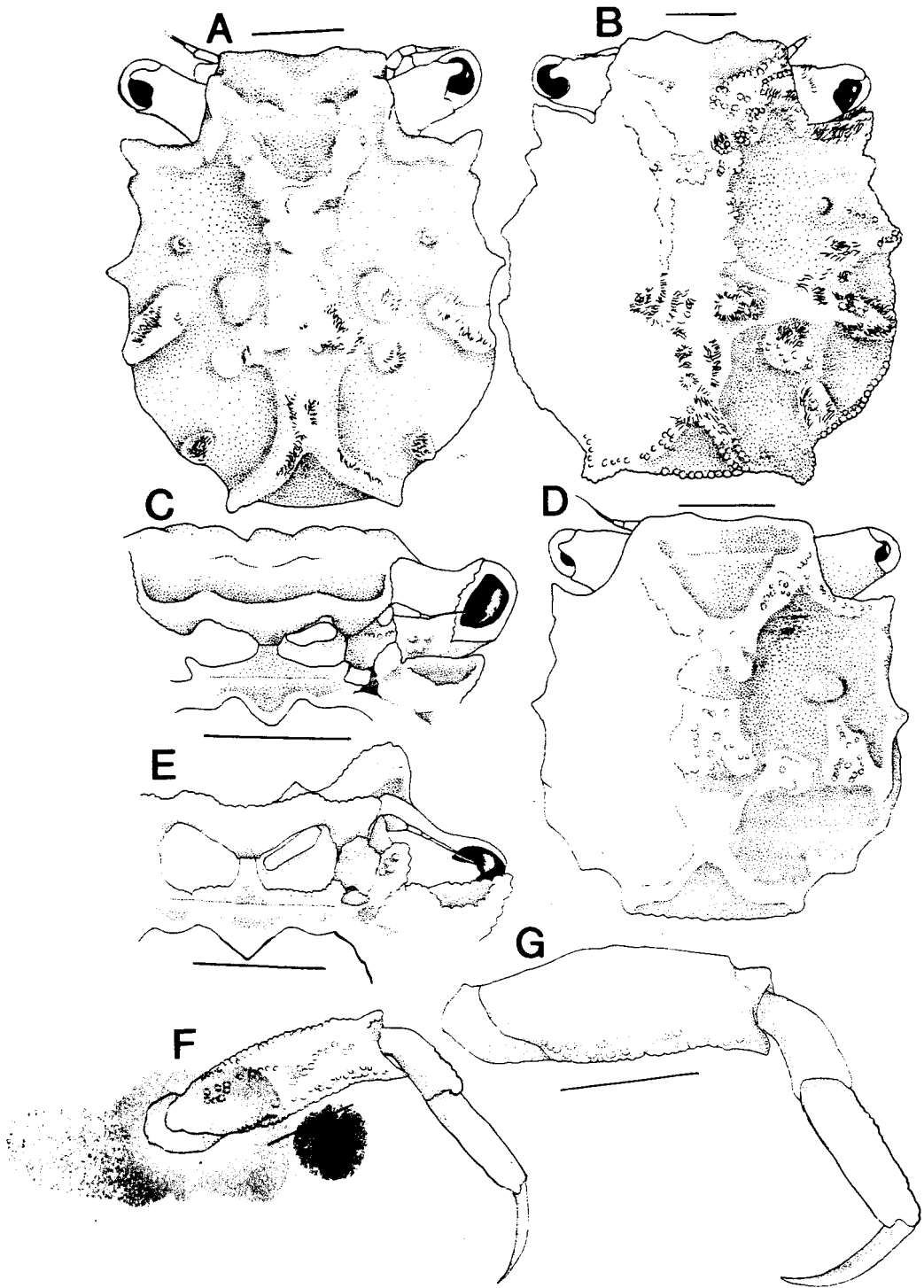


Fig. 3. *Moguai aloutos*, new species. Holotype male (5.2 x 4.5) (USNM 71768). A, carapace; E, frontal view of carapace; F, right third ambulatory leg. Paratype female (6.0 x 5.0) (ZRC 1965.7.15.25). B, carapace. *Moguai elongatum* (Rathbun, 1931). Male (4.0 x 3.6) (USNM 62014). C, frontal view of carapace; D, carapace; G, right third ambulatory leg.

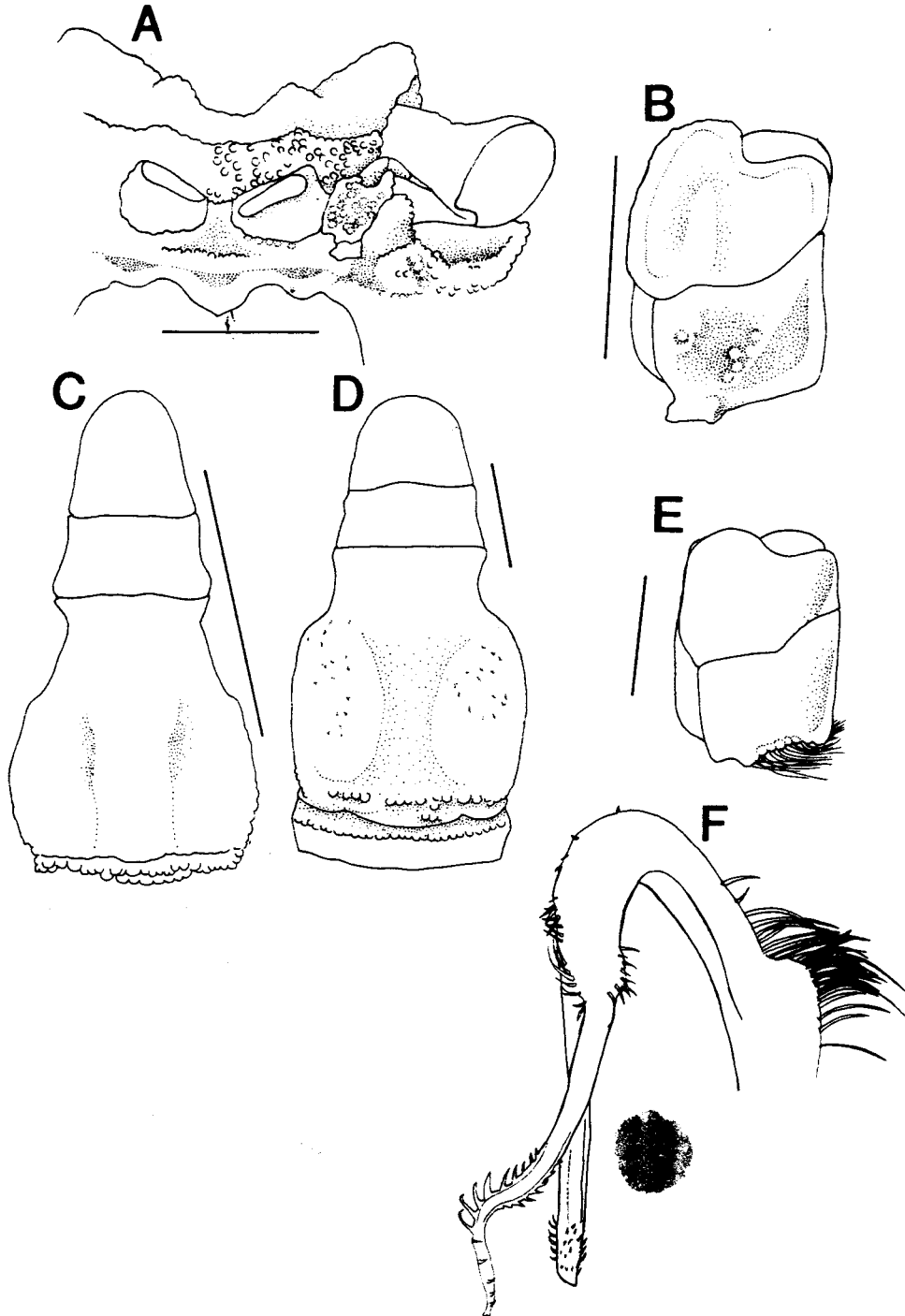


Fig. 4. *Moguai aloutos*, new species. Male (5.1 x 4.2) (ZRC). A, frontal view of carapace; B, right third maxilliped; C, abdomen; F, G1 apex. *Moguai elongatum* (Rathbun, 1931). Male (4.0 x 3.6) (USNM 62014). D, abdomen; E, right third maxilliped.



**Distribution.** - Only known for certain from China.

***Nanusia*, new genus**

*Camptandrium* - Serène, 1974:65 (part).

**Type species.** - *Camptandrium starmuehlneri* Pretzmann, 1968, by present designation.

**Diagnosis.** - Carapace squarish, almost as broad as long. Surface uneven, with short, curved, dark setae, particularly defining carapace protuberances and crests. Front about half fronto-orbital breadth, indistinctly bilobed from dorsal view, frontomedial projection truncate; epigastric crests placed dorsally just behind front. Infraorbital margin almost straight, inner infraorbital tooth large, conical, suborbital ridge indistinct, region just below infraorbital margin convex. Anterolateral margin bearing 3 teeth, middle one being smallest and least produced. Lateral angles of posterior margin subrectangular or rounded. Third maxilliped merus and ischium with limited mobility, suture complete, deeper along inner half, clearly visible, merus broad, shorter than ischium, with outer distal angle expanded laterally and anteriorly, rounded, inner distal margin scooped out for placement of palp, inner edges of ischium and merus thickened, inner distal angle of ischium acutely produced. Male chela small, slender, as broad or more slender than ambulatory legs, cutting edges blade-like, with sparse setae, tips spatulate; female chelae similar. Ambulatory legs moderately broad, sparsely covered with short, dark setae, merus distal angles may be drawn out to form prongs. Anterior thoracic sternal plastron granular, anterior margin broadly triangular. Male abdomen with segments 2-5 fused, segment 2 may have sparse long setae, distal portion of fifth segment constricted before distal margin, segment 6 with lateral margins weakly convex; female abdomen sutures clear, complete. G1 with swelling covered with group of long, curved setae just before recurved portion, apex bulbous, distal process short, with bifid tip.

**Etymology.** - The genus name is an arbitrary noun derived from the Latin "nanus", which means "a dwarf", alluding to the animal's small size and short G1 distal appendage. The gender is feminine.

**Remarks.** - *Nanusia*, new genus, is at present monotypic, with *Camptandrium starmuehlneri* Pretzmann, 1968, designated herein as type species. Both Serène & Moosa (1971) and Manning & Holthuis (1981) were uncertain as to the generic position of *C. starmuehlneri*. The former authors suggested that the species be placed in either *Shenius* Serène, 1974, or *Ilyograpsus* Barnard, 1955, an opinion which the latter authors disagree. Manning & Holthuis (1981:199) felt, instead, that *C. starmuehlneri* was probably "... a good *Camptandrium*, near *C. elongatum*". The results of the present study show that there is a valid suite of characters (discussed above) that sets *C. starmuehlneri* apart from *Camptandrium* s. str., *Moguai* and *Takedellus*, and as such, a new genus, *Nanusia*, is established for it. For additional discussion of the affinities of this new genus, see remarks for *Camptandrium* above.

The most peculiar character of this genus is certainly the structure of the G1, which is quite unlike that of other species in *Camptandrium* s. str., *Moguai*, *Nanusia* and *Takedellus*. In *Nanusia*, the G1 apex is compact and bulbous, not elongate, as in the other genera. There is only one subapical appendage which is very short and bifid. In the other genera, there are two or more subapical appendages and these are long and slender. The only similarity in the G1 between *Nanusia* and the other genera is the presence of a swelling before the recurved portion. This swelling is covered with long, curved setae.

Another unique feature in *Nanusia* is the absence of an infraorbital "cup" formed by the infraorbital margin and suborbital ridge. Instead, a convexity is present just below the infraorbital margin. The ischium and merus of the third maxillipeds in *Nanusia* have limited mobility. The suture is completely visible, but deeper only on the inner half.

***Nanusia starmuehlneri* (Pretzmann, 1968), new combination**  
(Figs. 5, 6C)

*Camptandrium starmuehlneri* Pretzmann, 1968:3, 4 pls.

*Camptandrium rathbunae* Takeda, 1972:200, fig. 4, pl. 6 (part).

**Material examined.** - Holotype - female (4.8 x 4.9) (NhMW 3266), coll. Starmühlner, 8 Sep.1965, New Caledonia.

Others - 1 male (3.7 x 3.8), 1 female (4.4 x 4.6), coll. M. Takeda, 24 Jan.1993, Negeri Lama, Ambon, Indonesia. - 1 male (3.2 x 3.1) (QM W14826), coll. P. Davie & J. Short, 23 Feb.1987, under rocks, in mud along tidal creek, Boat port, Lindeman Island, Melbourne, Queensland.

**Type locality.** - New Caledonia.

**Description.** - Male. Carapace about 1.02 times broader than long, dorsal surface sparsely covered with short, stiff, brown setae, particularly defining ridges and edges; anterolateral margin with 3 teeth, posterolateral margin moderately convex; posterior margin almost straight, outer angles rounded, not produced. Epigastric ridges well-developed, cardiac, gastric and intestinal regions with pattern of ridges and tubercles, branchial regions each with oblique ridge. Front broadly bilobed, thickened. Orbit narrower than front; supraorbital margin with distinct notch at junction with front, infraorbital margin smooth, almost straight, median region moderately swollen, but not forming cup-shaped structure appearing shelf-like, inner infraorbital tooth large, broadly triangular, suborbital ridge absent. Interantennular septum truncate; anterolateral angles of epistome directed upwards, anterior and posterior portions separated by transverse ridge, posterolateral margins separated from inner pterygostomial edge by fissure ending approximately below midline of infraorbital margin, posterior medial tooth ending in small, pointed extremity, posterior margin distinctly sinuous on either side, being particularly concave just adjacent to posterior medial tooth.

Third maxilliped ischium with rounded, expanded outer margin, inner margin half length of merus, merus with inner distal angle projecting anteriorly, ischium and merus fused along outer half, suture line between ischium and merus clear.

Fingers of cheliped slender, as long as palm, with moderately spatulate tips.

Ambulatory legs short and moderately stout, dorsoventrally flattened, covered with stiff, brown setae as on carapace; anterior, distal end of merus with well developed acute tooth.

Anterior thoracic sternal plastron smooth, being granular only around the anterior edge of sternal concavity, anterior margin broadly triangular, margin posterior to groove between sternites 3 and 4 lined with coarse granules, anterolateral margins of sternite 4 truncate, directed anteriorly, anterior margin of sternal concavity located close to groove separating sternites 3 and 4.

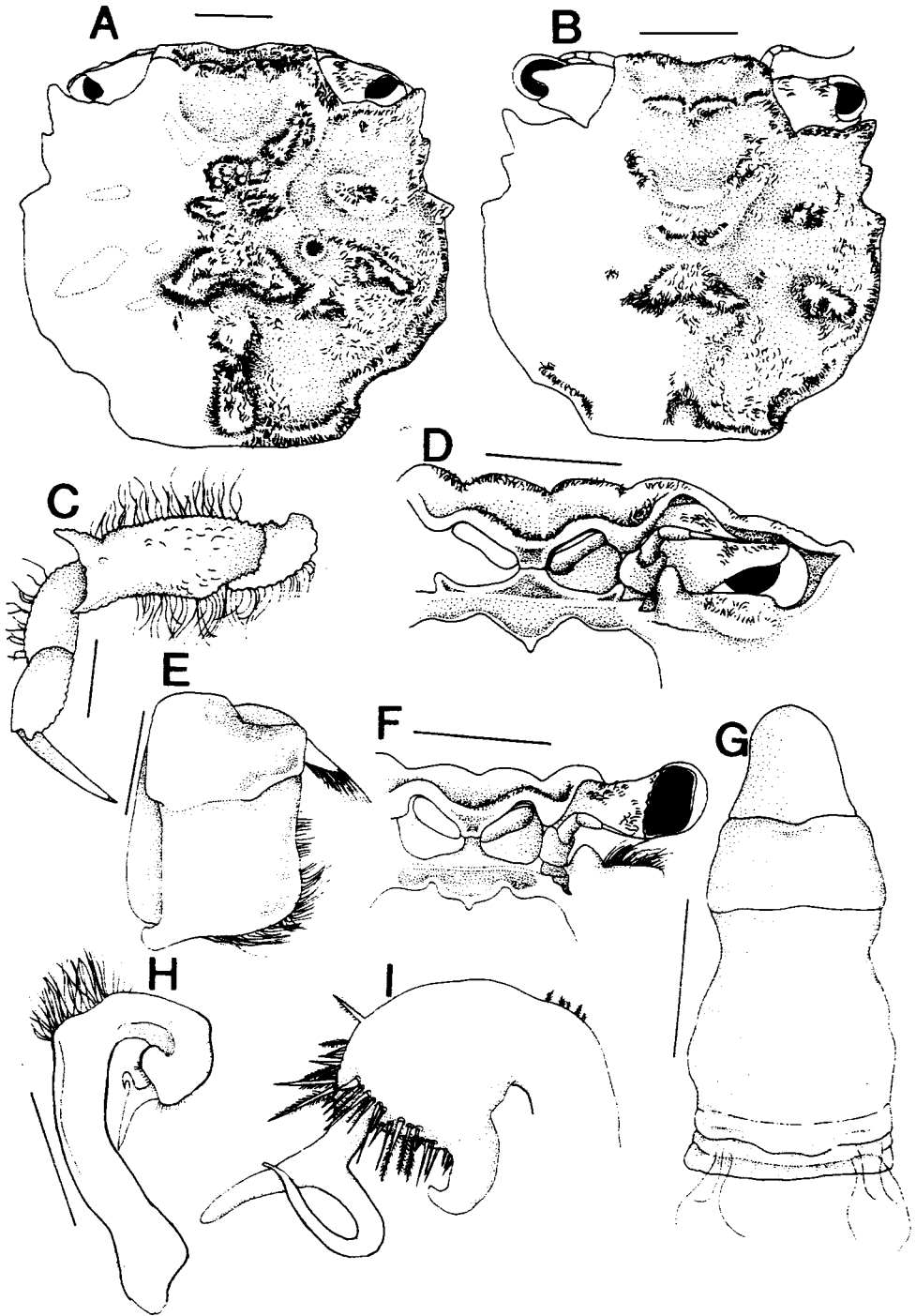


Fig. 5. *Nanusia starmuehlneri* (Pretzmann, 1968). Holotype female (4.8 x 4.9) (NhMW 3266). A, carapace; C, left last ambulatory leg; D, frontal view of carapace. Male (3.7 x 3.8) (NSMT). B, carapace; E, right third maxilliped; F, frontal view of carapace; G, abdomen; H, G1; I, G1 apex.

Abdominal segments 2-5 fused, sutures invisible, fused piece constricted subdistally, telson longer than broad.

G1 with bulbous apex, covered with plumose setae, inner edge of apex produced to form large, lobe with bifurcated distal appendage, distal appendage naked, with one branch tapered at tip, other branch with rounded tip.

**Remarks.** - Serène (1974) suggested that *C. starmuehlneri* did not belong to *Camptandrium*, but gave no reasons for this. In his listing of the species of *Camptandrium*, he cited the species as “= ? *Ilyograpsus*”. Serène & Moosa (1971) were of the opinion that the species was not a true *Camptandrium* due to the presence of spines on the anterior border of the ambulatory meri and suggested that the species was perhaps conspecific with *Shenius anomalum* Shen, 1935, or *Ilyograpsus paludicola* (Rathbun, 1909). The present study shows that *C. starmuehlneri* is indeed distinct from the above two species and is certainly a valid species of camptandriid. A new genus, *Nanusia*, however, needs to be established for it.

A male specimen conspecific with *Nanusia starmuehlneri* is recorded from Ambon, Indonesia, for the first time. The shape of the carapace in the male is similar to that of the female, except that in the former, the stiff, brown setae on the carapace are more sparse than in the female, being distinct only on the branchial ridges. A smaller male specimen from Australia was also examined. This specimen appears relatively more elongated than the Indonesian and New Caledonian specimens, and the carapace frontal lobes are more truncate and produced than in the larger specimens, which have broad, rounded lobes. However, the G1 is identical in both males from the two different localities. The distal end of the G1 is swollen, with a short bifid distal appendage.

The infraorbital margin in *Nanusia starmuehlneri* is not modified into a deep cup-shaped structure as in *Moguai*. Instead, it is weakly lobed close to the inner infraorbital tooth appearing shelf-like.

Takeda's (1972) new species, *Camptandrium rathbunae*, from Palau, is partially synonymised under *Nanusia starmuehlneri* (see remarks under *Takedellus ambonensis* for discussion).

This is the first record of a male for *C. starmuehlneri* and the present specimens also represent new records of the species for Australia and Ambon, Indonesia.

The G1 of *P. mcneilli* bears a striking resemblance to that of *N. starmuehlneri*, with the swollen apex and the presence of two distal processes (one bifid process in *N. starmuehlneri*). However, there are other morphological features that distinguish *P. mcneilli* from *T. starmuehlneri*, one of the most obvious being the presence of sexual dimorphism of the chelipeds in the former species. In fact, the differences are significant enough to warrant the establishment of a new genus for *P. mcneilli* and work is currently in progress to do so (P. Davie, pers. comm.).

**Habitat and Biology.** - The label accompanying the Australian male specimen (QM W14826) records the specimen as having been found “under rocks, in mud along tidal creek”.

**Distribution.** - Ambon (new record); New Caledonia; Australia (new record).

***Takedellus*, new genus**

*Camptandrium* - Takeda, 1972:199 (part). - Serène & Moosa, 1971:5. - Serène, 1974:65.

**Type species.** - *Camptandrium ambonense* Serène & Moosa, 1971, by present designation.

**Diagnosis.** - Carapace squarish, slightly broader than long. Surface granular, with short, curved, dark setae, particularly defining carapace protuberances and crests. Front less than half fronto-orbital breadth, weakly bilobed, with 1 pair of epigastric crests dorsally just behind front. Supraorbital margin almost straight, with small, shallow notch separating margin from base of front. Infraorbital margin almost straight, shelf-like inner infraorbital tooth large, region just below infraorbital margin convex. Anterolateral margin bearing 3 teeth, middle one being smallest and least produced. Lateral angles of posterior margin subrectangular or rounded. Third maxilliped merus longer and broader than ischium, with outer distal angle expanded laterally and anteriorly, rounded, inner distal margin scooped out for placement of palp. Male chela large, robust, distinctly broader than ambulatory legs, more slender in young males, cutting edge of movable finger with large molariform tooth, cutting edge of tooth denticulate; female chelae much weaker, as slender as ambulatory legs. Ambulatory legs moderately broad, thickly tomentose, merus distal angles may be strongly produced. Male abdomen with segments 2-5 fused, distal portion of fifth segment constricted before distal margin. G1 with swelling covered with group of long, curved setae just before recurved portion, apex elongate, distal processes long and slender, one central process blade-like, other process with curved tip.

**Etymology.** - The name is derived arbitrarily from Masatsune Takeda, whose contributions to carcinology over the years have been very substantial. The gender is masculine.

**Remarks.** - *Takedellus*, new genus, differs from *Camptandrium* s. str. in the following: the third maxilliped merus and ischium are not fused, the carapace is relatively not as broad, none of the G1 distal processes has a bifid tip, the ambulatory legs are broader and more setose, and an infraorbital convexity is present. In addition, *Takedellus* differs from *Moguai* by the absence of a distinct infraorbital "cup", the slightly broader than long carapace (longer than broad in *Moguai*), and the carapace sculpturation (Figs. 6A, D against 3A-E). The genus that seems to be most similar to *Takedellus* is *Nanusia*. Nevertheless, the two genera can be differentiated by the structure of the G1 (bulbous apex, with one short, bifurcated subdistal process in *Nanusia* versus elongate apex, with two subdistal appendages, neither of which is bifurcated in *Takedellus*), the infraorbital region (inner infraorbital tooth distinctly demarcated from the rest of the margin by a notch in *Takedellus* versus inner infraorbital tooth only gradually separated from rest of margin by wide notch in *Nanusia*), and the presence of sexual dimorphism of the chelae (absent in *Nanusia*).

The genus is monotypic with *C. ambonensis* Serène & Moosa, 1971, being the only species. *Camptandrium ambonensis* was found to be the senior subjective synonym of *Camptandrium rathbunae* Takeda, 1972 (see remarks for *Takedellus ambonensis*).

***Takedellus ambonensis* (Serène & Moosa, 1971), new combination**  
(Fig. 5A, B, D-J)

*Camptandrium ambonense* Serène & Moosa, 1971:5, text fig. 1, pl. 1. - Manning & Holthuis, 1981: 199 (no new material). - Serène et al., 1974:25 (in list).

*Camptandrium rathbunae* Takeda, 1972:200, fig. 4, pl. 6 (part). - Takeda & Iwasaki, 1983: 89. - Nagai & Nomura, 1988:60.

**Material examined.** - Holotype - male (4.8 x 5.2) (LIPI CB 170), mouth of Galaga River, in front of the bridge, middle low tide, in swamps, Ambon, Indonesia, coll. R. Serène, 24 Sep.1970.

**Type locality.** - Ambon, mouth of Galala River, Indonesia.

**Description.** - Holotype male. Carapace subquadrate, about 1.1 times broader than long, anterolateral margin with three teeth, first tooth (outer orbital angle) acuminate and directed anterolaterally, second tooth flat and indistinct, much closer to first than third (or at base of first), third tooth acuminate, larger than first tooth; dorsal surface with raised regions, short, dark setae prominent on regions, 1 pair of transverse epigastric ridges present, supraocular eave moderately well-developed, protogastric region with oblique ridge along shallow outer furrow, mesogastric region with median anterior pair and posterior transverse pair of protuberances, cardiac region with pair of rhomboidal protuberances, protuberances indistinctly separated medially and strongly angular anteriorly and laterally, intestinal region with longitudinal protuberance, small portion of posterior median part devoid of short setae, hepatic region outside of mesogastric region with short, transverse protuberance; lateral angles of posterior border of carapace subrectangular, posterior margin straight, broader than front.

Front about one-third fronto-orbital width, with deep concavity on dorsal surface separating frontal lobes; supraorbital margin convex on inner portion, infraorbital margin shelf-like, coarsely granular, produced on outer half, inner infraorbital tooth large, rounded, separated from rest of infraorbital margin by acute, triangular notch.

Third maxillipeds with sparse setae, lateral border of ischium weakly concave, inner distal angle produced, angular.

Chelipeds much more robust than in female, with palm swollen; cutting edge of immovable finger convex, leaving wide gape, with large, molariform tooth proximally, cutting edge of tooth denticulate, tips spatulate, chitinous.

Ambulatory legs broad, merus, carpus, propodus covered with short, dark setae, margins with long setae, second and third pairs longer than first and fourth, merus of all pairs armed with terminal tuberculated tooth on anterior border, distal end of posterior border strongly produced, carpus and propodus more slender than merus, dactylus as long as propodus, weakly curved in first 3 pairs.

Abdomen with segments 2-5 fused, subdistal portion of fused piece constricted.

G1 with 2 distal processes, longer process with curved tip.

**Remarks.** - The distinguishing feature in this species as reported by Serène & Moosa (1971:fig. 1), was the presence of three distal processes on the G1 instead of two. The additional distal process were shown to be slender and having a curved tip. We have examined the holotype male and was only able to find the G1 of the right side. The left G1 is missing. The right G1 has only two subdistal processes and not three as reported by the original authors. Detailed examination after clearing of the G1 showed no evidence of breakage. It is interesting to note that the combined width of the two curved distal processes of the G1 figured by Serène & Moosa (1971) is equivalent to the width of the single curved distal process of the holotype

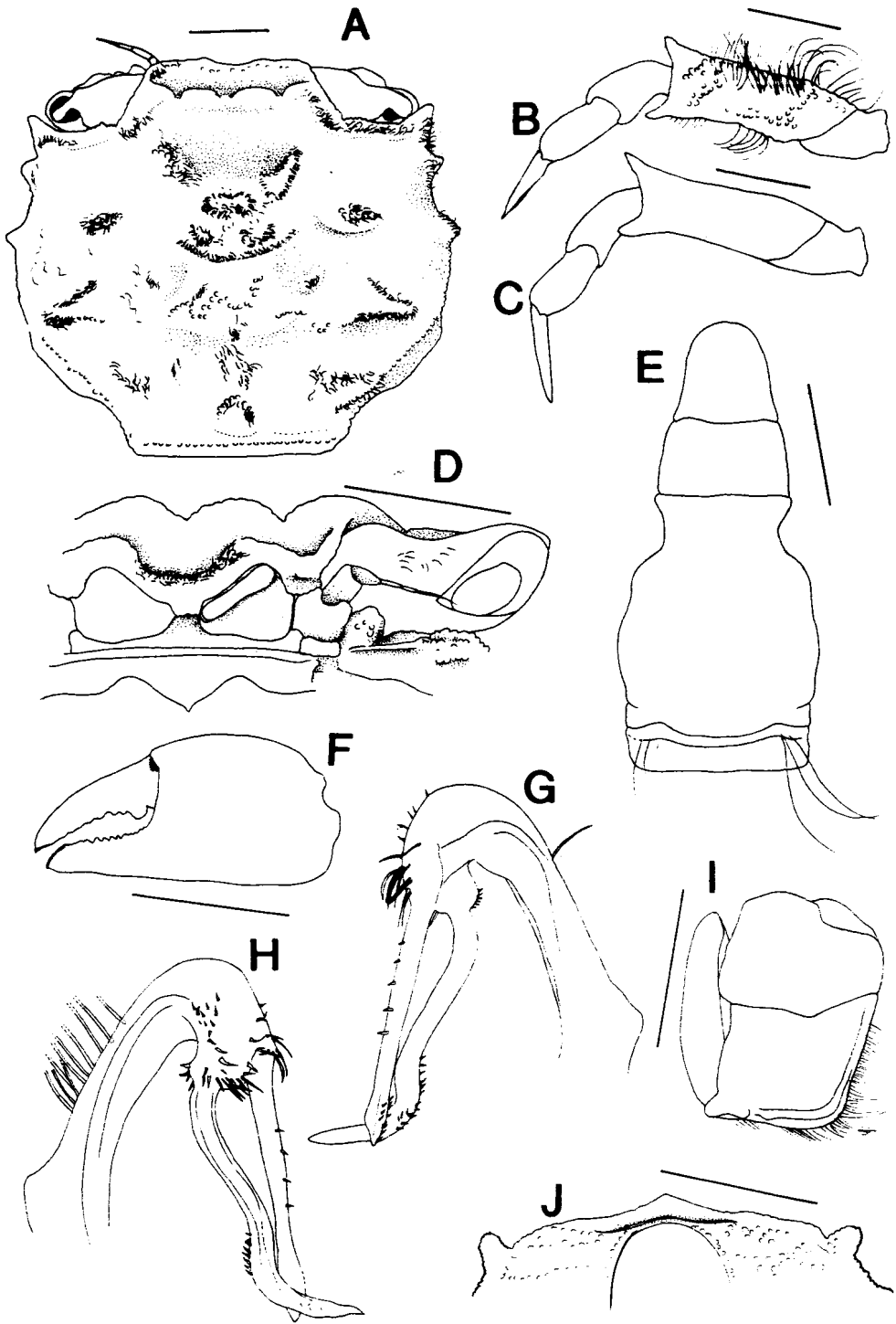


Fig. 6. *Takedellus ambonensis* (Serène & Moosa, 1971). Holotype male (4.8 x 5.2) (LIPI CB 170). A, carapace; B, left last ambulatory leg; D, frontal view of carapace; E, abdomen; F, outer view of left chela; G, H, G1 apex; I, right third maxilliped; J, anterior thoracic sternum. *Nanusia starmuehlneri* (Pretzmann, 1968). C, left last ambulatory leg (after Takeda, 1972).

G1 figured herein. It is likely that the single curved distal process of the G1 figured by Serène & Moosa (1971) had accidentally split into two, giving the impression of the presence of two processes.

The original description of this species given by Serène & Moosa (1971:5) is inadequate. The chelipeds are merely described as “small” and the third maxillipeds and abdomen are stated to be “those of *Camptandrium*”. The chelipeds in the male specimen were found, in this study, to be of the normal, robust type and not the weak, feeble type found in males of the genus *Moguai* or *Nanusia*.

Takeda’s (1972) description of the holotype female (and photograph of the paratype female) of *C. rathbunae*, from Goréör Island, Palau, fits that of *N. starmuehlneri* well, particularly the description of the infraorbital margin (see fig. 5D): “... the infraorbital border is very deeply and widely concave just below the external orbital angle, transverse in the median greater part and then strongly produced at the inner angle; the lateral end of the transverse part is only rounded ...”. Also, the dactyli of the last pair of legs in *N. starmuehlneri* are longer than the propodi whilst that in *T. ambonensis* are equal in length to the propodi. The figure of the paratype female of *C. rathbunae* provided by Takeda (1972: pl. 6, fig. 3) shows the last leg dactyli to be of the *N. starmuehlneri* type (present fig. 6C).

On the other hand, Takeda’s (1972) description and photograph of the allotype male, matches the holotype of *T. ambonensis* very well. In fact, Takeda & Iwasaki (1983) remarked that *C. rathbunae* may be conspecific with *C. ambonensis*, but gave no reason to support their statement. According to these authors, the actual date of issue of *Micronesica*, volume 7, nos. 1 and 2, in which *C. rathbunae* was first described, was 20 July, 1972. The actual issue date of Serène & Moosa (1971) is not known, but assuming it was issued in 1971 and if the two species were conspecific, *C. rathbunae* would be the junior subjective synonym of *C. ambonensis*. Thus, the holotype and paratype females of *C. rathbunae* Takeda, 1972, is conspecific with *N. starmuehlneri*, while the allotype male is conspecific with *T. ambonensis*. As a result, *Camptandrium rathbunae* Takeda, 1972, becomes a junior subjective synonym of *Camptandrium starmuehlneri* Pretzmann, 1968.

The situation in which a female specimen of a particular species is mistaken for that of another is not an uncommon one, particularly if both species are found in the same locality. This is because females of closely affiliated genera, such as *Takedellus* and *Nanusia*, are very similar in appearance. In this case, however, the infraorbital tooth can be used as a distinguishing feature. In *Nanusia*, the inner infraorbital tooth is gradually separated from the rest of the infraorbital margin by a wide triangular notch. In *Takedellus*, the infraorbital tooth is sharply separated from the rest of the margin by an acute triangular notch. Compared to *N. starmuehlneri*, *T. ambonensis* appears to be a more granular species, with distinct granules on the margins of the carapace, on the carapace protuberances and on the ambulatory legs. In describing *C. ambonense*, Serène & Moosa (1971) included figures (figs. 2-3) of the G1 of what they presumed to be *C. elongatum* from Singapore. We have examined this specimen and found it to be a specimen of *M. aloutos*, new species, instead. Nevertheless, the G1 of *M. aloutos* is similar to that of *C. elongatum* (also here transferred to the new genus, *Moguai*) and thus Serène & Moosa’s (1971) comparisons are still valid.

**Habitat and Biology.** - Serène & Moosa’s (1971) specimens were collected from “... mouth of Galala River, at middle low tide in swamps upstream nearby the bridge”. At present, nothing else is known of the biology of this species.



**Distribution.** - Ambon, Indonesia, and Goréor Island, Palau.

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