

**CRABS OF THE *DEMANIA ROTUNDATA* SPECIES GROUP
(CRUSTACEA: DECAPODA: BRACHYURA)
FROM EAST AND SOUTH CHINA SEAS,
WITH DESCRIPTION OF A NEW SPECIES**

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ABSTRACT. - A new species of *Demania*, *D. unispinosa*, is described from China. *Demania japonica* Guinot, 1977, previously synonymised with *D. rotundata* Serène, in Guinot, 1969, is recognised as a distinct species. *Demania unispinosa* differs from allied congeners, *D. rotundata*, *D. rotundata* and *D. wardi* Garth & Ng, 1985, in the form of its last anterolateral tooth, structure of the ambulatory legs and form of the male abdomen.

KEY WORDS. - Taxonomy, *Demania*, Xanthidae, new species, East and South China Seas.

INTRODUCTION

The genus *Demania* Laurie, 1906, currently contains 14 species (Garth & Ng, 1985; Deb, 1987; Ng & Yang, 1989; Ng, 1996; Davie, 1989, 1993). Of these species, Ng & Yang (1989: 47) noted that there was one group of species in which the frontal margin is distinctly sinuous, lobulated and extends well beyond the orbits; an anterolateral margin armed with low, rounded lobes; glabrous chelae; and the meri of the ambulatory legs are distinctly crested. Two species currently are recognised from this group, *D. rotundata* Serène, in Guinot, 1969, and *D. wardi* Garth & Ng, 1985 (Garth & Ng, 1985; Ng & Yang, 1989). Garth & Ng (1985) had synonymised *D. japonica* Guinot, 1977, with *D. rotundata*.

Recently, the authors had an opportunity to examine a good series of specimens which had been identified as *D. rotundata* in our respective institutes from various parts of China.

These studies show that three species can be recognised from the East and South China Seas. *Demania japonica* Guinot, 1977, is here regarded as a distinct species from *D. rotundata* Serène, in Guinot, 1969, contrary to Garth & Ng's (1985) supposition. A new species, *D. unispinosa*, is also described. The terminology, including the nomenclature of the carapace regions, follows that by Garth & Ng (1985). Measurements provided are of the carapace width (to base of spines if lateral angle spiniform) and length respectively. The abbreviation G1 is used for the male first pleopod. Specimens examined are deposited in the Institute of Oceanology, Chinese Academy of Sciences (IOCAS), Qingdao, China; Beijing Natural History Museum (BNHM), Beijing; National Science Museum, Tokyo (NSMT); Kanagawa Prefectural Museum (KPM), Odawara; and Zoological Reference Collection (ZRC) of the Raffles Museum, National University of Singapore.

TAXONOMY

Demania Laurie, 1906

Demania rotundata Serène, in Guinot, 1969

(Figs. 1, 2, 4A, 7a, d, 8a)

Xantho rotundatus Serène, in Guinot, 1969: 235.

Demania rotundata - Guinot, 1977: xx, pl. 6 fig. 5; Guinot, 1979: 58, pl. 4 fig. 5; Serène, 1984: 188; Garth & Ng, 1985: 296 (part), pl. 2C, D, fig. 3D-E; Dai et al., 1986: 269, fig. 153, pl. 37(1); Ng & Yang, 1989: 48 (part); Dai & Yang, 1991: 289, fig. 153, pl. 37(1).

Material examined. - Paratypes - Keelung, northern Taiwan: coll. Fisheries Research Station, 1963: 1 male, 34.9 by 27.4 mm; 1 female, 38.5 by 30.0 mm (ZRC 1968.3.2.1-2).

Other material. - East China Sea, 32°30'N, 126°00'E, 120 m, on fine sand, coll. 29 May.1978: 1 male 22.2 mm by 18.1 mm; 1 female, 18.0 mm by 15.1 mm (IOCAS). — East China Sea, 29°40'N, 127°00'E, 117 m, on fine sand, coll. 29 Jun.1978: 1 juv. Male, 8.0 mm by 6.4 mm (IOCAS). — South China Sea, 19°00'N, 111°30'E, 144 m, on soft mud, coll. 11 Apr.1959: 2 males, 26.0 mm by 21.0 mm, 23.0 mm by 18.0 mm (IOCAS). — South China Sea, 20°30'N, 112°30'E, 80 m, on muddy sand. coll. 6 Apr.1960: 1 female, 23.5 mm by 19.0 mm (IOCAS). — Nansha (= Spratly) Islands, South China Sea 4°12.76'N, 110°26.68'E, 97 m, on muddy sand, coll. 3 May.1986: 1 juvenile female, 12.0 mm by 10.5 mm (IOCAS). — Nansha (= Spratly) Islands, South China Sea, 5°19.68'N, 112°05.54'E, 127 m, on muddy sand, coll. 31 Jul.1988: 1 juvenile female, 10.3 mm by 8.9 mm (IOCAS). — Tung Kang fishing port, Ping Tung County, southern Taiwan, coll. P. K. L. Ng, 12 May.1998: 1 male, 40.1 by 33.3 mm (ZRC 1998.455). — Tung Kang fishing port, Ping Tung County, southern Taiwan, coll. P. K. L. Ng, 12 May.1998: 1 male, 20.6 by 16.9 mm (ZRC 1998.410). — Jahai, Taiwan, coll. S.-H. Wu, Dec.1997: 1 male, 25.1 by 19.9 mm (ZRC 1998.441). — Tashi fishing port, Ilan County, northeastern Taiwan, coll. P.-H. Ho, 28 Jun.1990: 1 female, 47.1 by 37.6 mm (ZRC 1998.50).

Remarks. - Garth & Ng (1985) redescribed this species in detail and there is no need to do so again here. The taxonomy of this species has been discussed in depth by Garth & Ng (1985) and the good series of present specimens agree well with most of their interpretations. The main difference is that *D. japonica* Guinot, 1977, synonymised by them with *D. rotundata*, is here regarded as a valid species (see later).

The anterolateral teeth of the carapace of *D. rotundata* do vary with size somewhat. In the two paratypes (34.9 by 27.4 mm, 38.5 by 30.0 mm, ZRC 1968.3.2.1-2) the anterolateral teeth are relatively prominent and large (Fig. 1A, B, 7a). In another large specimen (40.1 by 33.3 mm, ZRC 1998.455), the anterolateral teeth are much lower but still discernible. In two small specimens (20.6 by 16.9 mm, ZRC 1998.410; 25.1 by 19.9 mm, ZRC 1998.441),

the anterolateral teeth are all relatively low with the lateral carapace angle appearing almost rounded (Fig. 2A). One large female specimen (47.1 by 37.6 mm, ZRC 1998.50) is especially noteworthy - its left last anterolateral tooth is very low but discernible with the lateral carapace angle relatively sharp, while the right last anterolateral tooth is very low, with the last tooth undiscernible and the lateral carapace angle almost rounded (Fig. 2B)!

The structure of the ambulatory merus is variable. The single dorsal and two ventral crests vary considerably in height and degree of serration, and the foliaceous lobe on the inner proximal ventral margin varies from prominent to barely visible. In smaller specimens (20.6 by 16.9 mm, ZRC 1998.410; 25.1 by 19.9 mm, ZRC 1998.441), the crest tends to be prominent and the margin is relatively smoother. In the paratype male (34.9 by 27.4 mm, ZRC 1968.3.2.1), the crests (and the foliaceous lobe) are relatively low (Fig. 4A), while in one male (40.1 by 33.3 mm, ZRC 1998.455), the crests are very low, with the foliaceous lobe almost undiscernible. As a result, the merus of this latter specimen appears very slender. In smaller specimens, the dorsal crest on the palm is more entire with the triangular lobes less well separated. The inner distal angle of the carpus of the cheliped of these small specimens is also distinctly more lamelliform with the accessory basal tooth longer and more prominent. Smaller specimens also appear to have relatively more swollen carapaces because the granules on the carapace are relatively higher, more rounded and prominent. This is especially for region 4R which in small specimens appear especially inflated.

Demania rotundata is known from the East China Sea (including Taiwan), South China Sea and Japan. It is most closely related to *D. wardi* Garth & Ng, 1985, from the central Pacific and Australia (Garth & Ng, 1985; Davie, 1989).

Demania japonica Guinot, 1977

(Figs. 3, 4B, 7b, e, 8b)

Xantho reynaudi cultripes - Sakai, 1939: 461, Pl. 90 fig. 2.

? *Xantho cultripes* - Takeda & Miyake, 1968: 553.

Demania rotundata - Sakai, 1976: 422, pl. 152 fig. 2; Serène, 1984: 188 part); Garth & Ng, 1985: 296 (part); Ng & Yang, 1989: 48 (part); Muraoka, 1998: 40.

Demania japonica Guinot, 1977: xx, pl. 7 fig. 2; Guinot, 1979: 58, pl. 4 fig. 6.

(not *Xantho (Lophoxanthus) cultripes* Alcock, 1898: 117).

Material examined. - Japan, Tosa Bay, coll. K. Sakai, no data: 1 male, 29.0 mm by 23.5 mm, 1 female 35.0mm by 27.5 mm (dried and mounted) (KPM 106019). — East China Sea, 29°23.2'N 126°29.2'E to 29°23.7'N 126°29.5'E, 97 m, coll. Oceanographic Research Institute, University of Tokyo, 22 May.1968: 1 young female, 24.5 by 19.4 mm (NSMT). — East China Sea, 28°00'N, 122°30'E, 74 m, on muddy sand, coll. 5 April 1959: 1 male, 32.5 mm by 26.5 mm; 1 female, 39.5 mm by 31.0 mm (IOCAS). — East China Sea, 29°30'N, 123°30'E, 69 m, on muddy sand, coll. 10 Jul.1959: 1 female, 28.9 mm by 23.0 mm (IOCAS). — East China Sea, 29°30'N, 124°00'E, 80 m, on muddy sand, coll. 27 Jul.1976: 2 males, 30.5 mm by 25.0 mm, 21.0 mm by 17.0 mm; 2 females, 23.0 mm by 19.0 mm, 21.0 mm by 17.0 mm (IOCAS). — East China Sea, coll. Haijiao Fishery, Apr.1980: 1 male, 38.0 mm by 30.0 mm (IOCAS). — South China Sea, 17°30'N, 109°30'E, 115 m, on soft mud, 14 May.1960: 1 male, 24.0 mm by 20.0 mm. — Nansha Islands, South China Sea, 116 m, 15 May.1993: 1 male, 29.0 mm by 25.0 mm (IOCAS). — Tashi fishing port, Ilan County, northeastern Taiwan, coll. C.-C. Lin, 6 May.1985: 1 male, 36.8 by 30.3 mm (ZRC 1995.598).

Remarks. - Guinot (1977, 1979) named this species without examining any specimens but instead referred to Sakai's (1939) text on the species (as "*Xantho reynaudi cultripes* Alcock"). She also reproduced Sakai's (1939) figure of a male from Tosa Bay, Japan. In his 1939

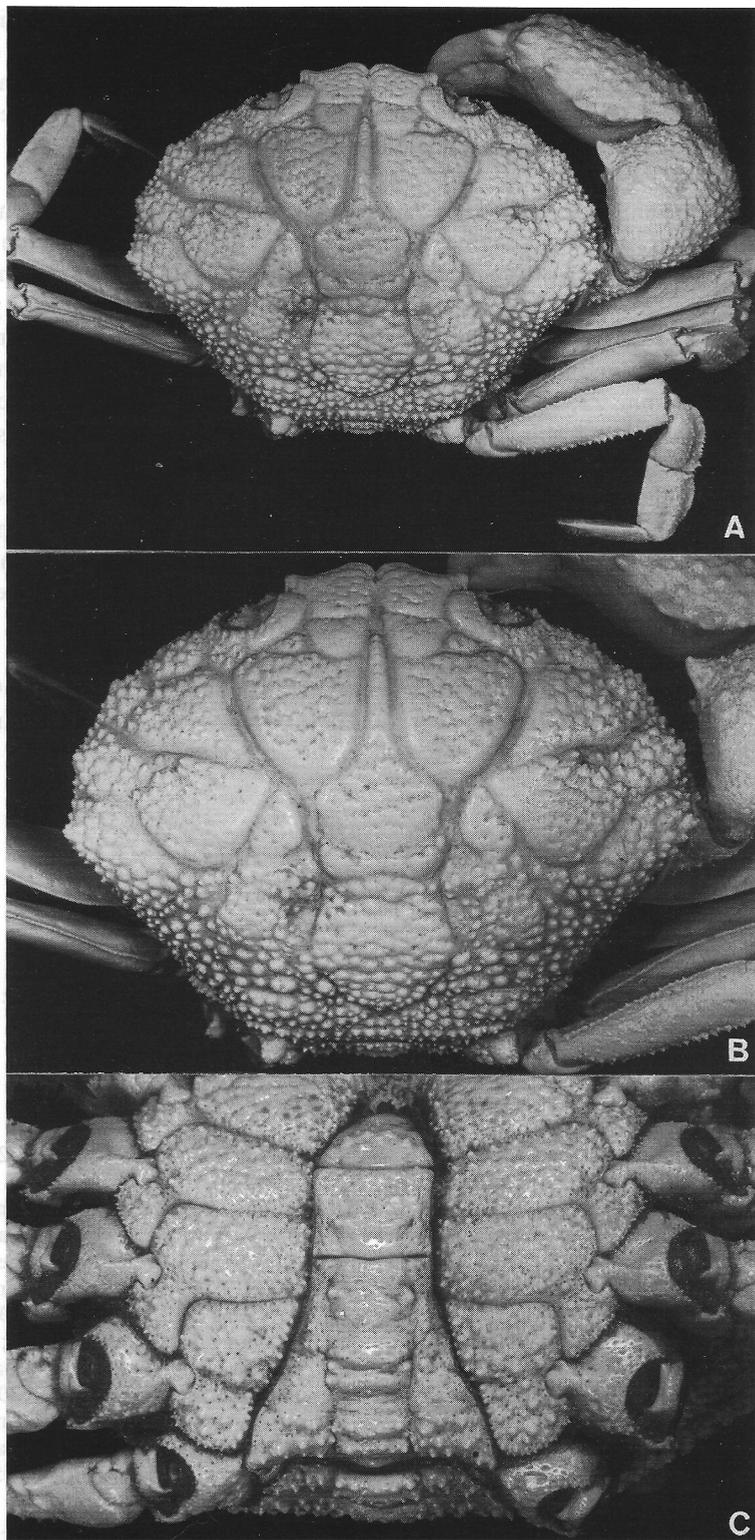


Fig. 1. *Demania rotundata* (Serène, in Guinot, 1969). Paratype male, 34.9 by 27.4 mm (ZRC 1968.3.2.1). A, overall view; B, carapace; C, ventral surface.

paper. Sakai stated that he examined three males (largest presumably 33.0 by 27.3 mm) and one female (sic) collected by one Mr. M. Minato from Tosa Bay. All these specimens are from the same locality. The other part of these specimens is not known (Guinot 1969: 1070).



Fig. 2. *Demania rotundata* (Serène, in Guinot, 1969). Carapaces. A, male, 25.1 by 19.9 mm (ZRC 1998.441); B, female, 47.1 by 37.6 mm (ZRC 1998.50)

paper, Sakai stated that he examined three males (largest presumably 33.0 by 27.3 mm) and one female (sic) collected by one Mr. M. Mitihiro from Tosa Bay. All these specimens are thus syntypes. The whereabouts of these specimens is not known. Guinot (1977, 1979) distinguished *D. japonica* from the similar *D. rotundata* by its very low last anterolateral tooth, with the angle between the antero- and posterolateral margins rounded, giving the carapace a rotund appearance, as well as the shorter and wider, somewhat foliaceous carpi and propodi of the last ambulatory merus. Garth & Ng (1985) argued that these characters were not reliable to distinguish *D. japonica* and synonymised both species.

The present study of *D. rotundata* shows that the structure of the the last ambulatory merus varies too substantially to be a useful taxonomic character (see Remarks for *D. rotundata*). In a male specimen of *D. japonica* examined (36.8 by 30.3 mm, ZRC 1995.598), the dorsal and ventral crests of the ambulatory meri are very prominent and the merus appears proportionately shorter and wider (Fig. 4B). The anterolateral lobes of *D. japonica*, however, are clearly lower (Figs. 3A, B, 7b) (cf. present specimen; Sakai, 1976; Guinot, 1977, 1979) than any of the specimens of *D. rotundata* presently examined. This is especially so for the last lobe which is so low that the junction between the antero- and posterolateral margins is not clearly discernible (Figs. 3B, 7b). In *D. rotundata*, the anterolateral lobes may be very low, especially in the smallest and largest specimens, but are usually still discernible (Figs. 1A, B, 2, 7a). In one large female specimen of *D. rotundata* (47.1 by 37.6 mm, ZRC 1998.50), however, the right last anterolateral lobe approaches the condition in *D. japonica*, but the left last anterolateral lobe is still dentiform (Fig. 2B).

On the basis of the specimens of the two species at hand, there are several other characters which seem to be able to separate them, notably in the structure of the male abdomen and form of the granules on the carapace (Table 1). In *D. japonica*, the proximal margin of male abdominal segment 3 is almost straight (Figs. 3C, 7e) whereas in *D. rotundata*, the proximal margin appears concave, with the lateral edges distinctly obliquely produced (Figs. 1C, 7d). The granules on the surfaces of the posterior part of the carapace and anterior thoracic sternites of *D. japonica* are very prominent with pearliform tips (Figs. 3B, C), whereas in *D. rotundata*, even in small specimens, these granules are more conical (Figs. 1B, C, 2).

The record of "*Xantho cultripes*" by Takeda & Miyake (1968) is difficult to ascertain. From their descriptions, their specimens can be referred to either *D. japonica* or *D. rotundata*.

Demania japonica is known at present from the East China Sea (including Taiwan), South China Sea and Japan.

***Demania unispinosa*, new species**

(Figs. 5, 6, 7c, f, 8c)

Material examined. - Holotype - South China Sea, 19°00'N, 111°30'E, 160 m, on soft mud, coll. 16 July 1959: male, 31.4 mm by 26.6 mm (IOCAS-N74B-32a).

Paratypes - Same data as holotype: 1 male, 31.0 mm by 25.0 mm (ZRC); 1 male, 17.0 mm by 14.0 mm (IOCAS-N74B-32b). — Shan-Wei, Guangdong, China, coll. 3 May.1982: 1 male, 34.7 mm by 28.2 mm (BNHM). — South China Sea, 18°30'N 108°30'E, 182 m, on sandy mud, coll. 11 Apr.1959: 1 female, 23.0 by 19.0 mm (IOCAS-L43B-21). — South China Sea, 18°00'N, 111°00'E, 173 m, on soft mud, coll. 8 Apr.1960: 1 female, 25.5 mm by 20.0 mm (IOCAS-N173B-26). — Nansha Islands, South China Sea, 5°15.46'N, 114°09.57'E, 173 m, on sandy mud, coll. 9 May.1987: 1 female, 33.9 mm by 27.5 mm (IOCAS-SSBIV-6).

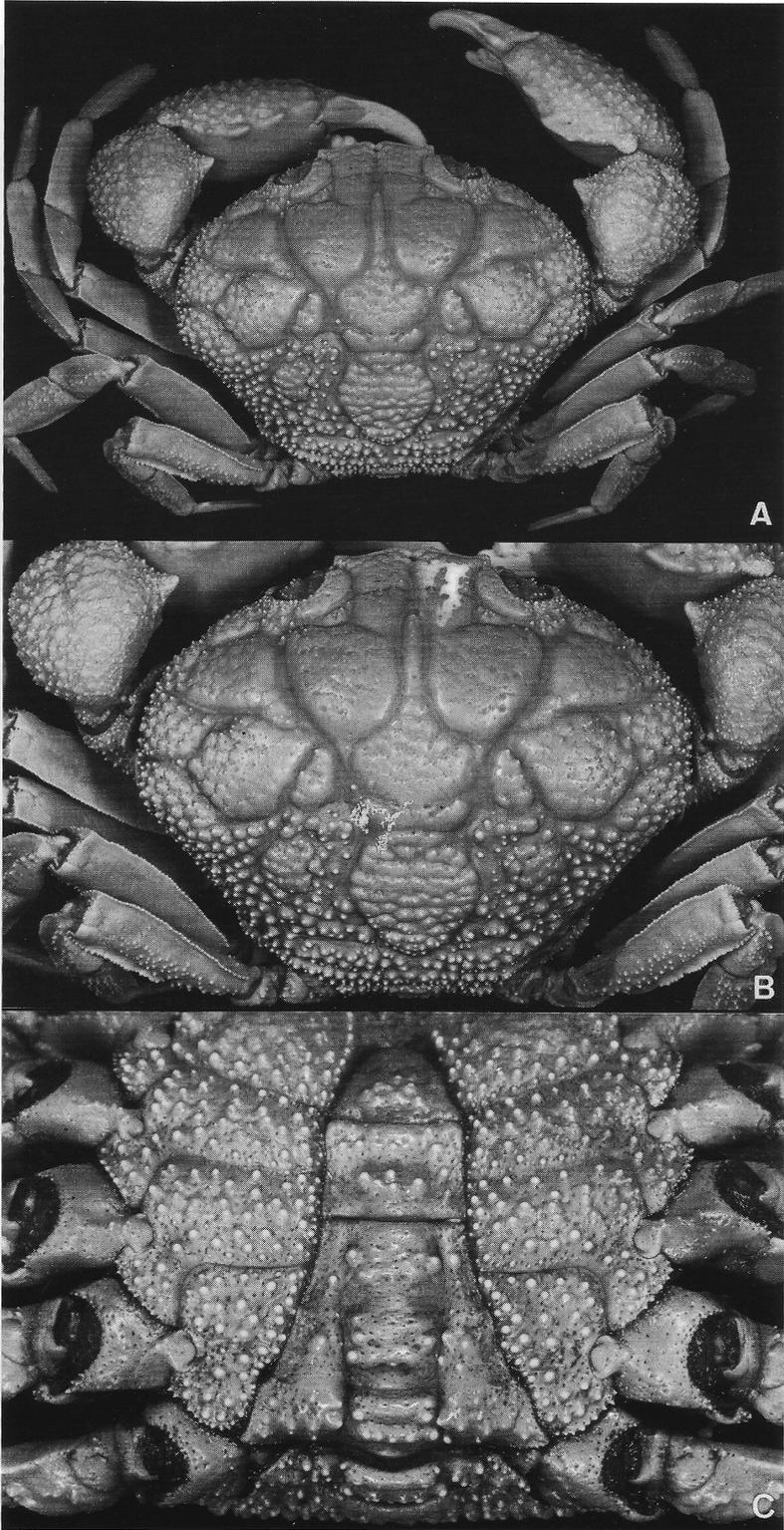


Fig. 3. *Demania japonica* Guinot, 1977. Male, 36.8 by 30.3 mm (ZRC 1995.598). A, overall view; B, carapace; C, ventral surface.

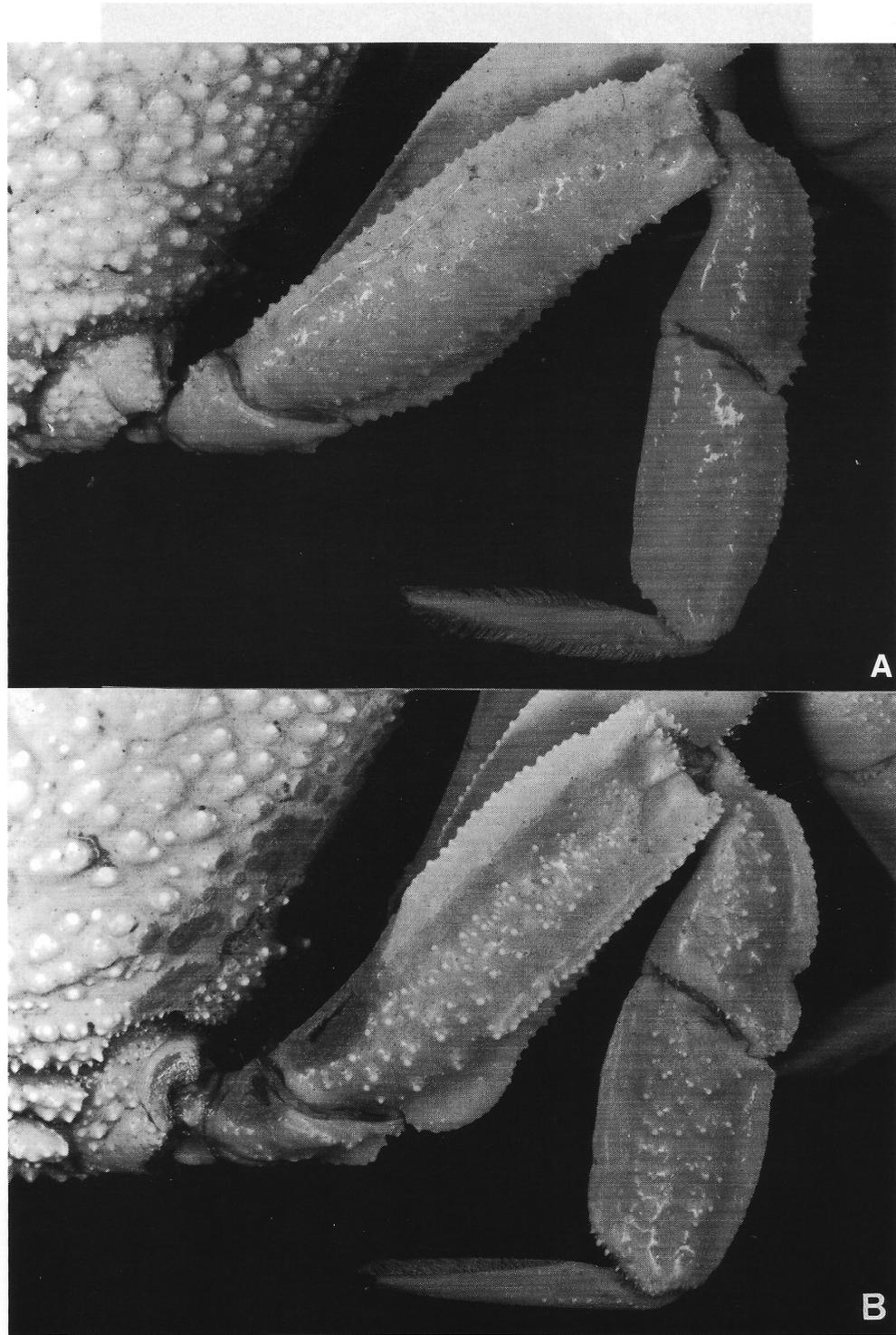


Fig. 4. Right fourth ambulatory legs. A, *Demania rotundata* (Serène, in Guinot, 1969), paratype male, 34.9 by 27.4 mm (ZRC 1968.3.2.1); B, *D. japonica* Guinot, 1977, male, 36.8 by 30.3 mm (ZRC 1995.598).

Table 1. Differences between *Demaniya rotundata*, *D. japonica* and *D. unispinosa*

	<i>D. rotundata</i>	<i>D. japonica</i>	<i>D. unispinosa</i>
Granules on carapace and thoracic sternum	rounded to sharp (Figs. 1A-C)	rounded with pearliform tips especially on branchial regions and sternum (Figs. 3A-C)	rounded to sharp (Figs. 5A-C)
Junction at antero- and posterolateral margins	angled (Figs. 1B, 7a)	rounded (Figs. 3B, 7e)	angled (Figs. 5B, 7c)
Anterolateral teeth (D, E, N, T, S)	teeth low, rounded; S low, not spiniform (Figs. 1B, 2, 7a)	teeth hardly to not discernible (Figs. 3B, 7e)	D, E, N, T low, rounded; S distinct, spiniform (Figs. 5B, 7c)
Ambulatory meri	with dorso-distal angle, not spiniform (Fig. 4A)	with dorso-distal angle, not spiniform (Fig. 4B)	dorso-distal angle with distinct spine (Fig. 6C)
Ambulatory propodus	broad (Fig. 4A)	relatively broader (Fig. 4B)	relatively ovate (Fig. 6C)
Ambulatory dactylus	styliform (Fig. 4A)	styliform (Fig. 4B)	very styliform (Fig. 6C)
male abdomen	lateral margins of segments 4-5 gently concave; lateral margins of segment 3 almost straight, proximal edges rounded, extending posteriorly to segment 2; segment 6 squarish; lateral margins of telson gently concave to almost straight (Figs. 1C, 7d)	lateral margins of segments 3-4 gently concave; lateral margins of segment 3 gently concave, proximal edges sharp, not extending posteriorly to segment 2; segment 6 squarish; margins of telson straight to gently convex (Figs. 3C, 7e)	lateral margins of segments 3-4 distinctly concave; lateral margins of segment 3 gently convex, proximal edges sharp, not extending posteriorly to segment 2; segment 6 broadly rectangular; lateral margins of telson strongly concave (Figs. 5C, 7f)
G1	relatively slender (Figs. 8a, d)	relatively stout (Figs. 8b, e)	relatively stout (Figs. 8c, f)

Description of male holotype. - Carapace pentagonal. Front bilobed, with deep, narrow median sulcus; frontal margin of each lobe sinuous, inner part more produced anteriorly than outer part, outer angle subdentiform, outer margin sloping sharply towards inner supraorbital lobe; margins smooth. Regions of carapace well defined, separated by deep grooves; surfaces of anterolateral, margins, 1-3R, 2P covered with small, rounded to blunt granules; 2M region entire, covered with squamate granules; 5L region relatively most swollen; 2-4M, 2-5L, 1P, uniformly covered with distinct squamate to flattened granules; 2F, 1M, O with very low, flattened to squamate granules. Anterolateral margin strongly arcuate, lobe D undiscernible; lobes E-G increasingly more dentate gradually but all very low; lobe S produced into distinct spiniform tooth, directed laterally. Posterolateral margins almost straight to gently convex, strongly converging towards gently convex posterior carapace margin. Outer surfaces of third maxillipeds punctate to distinctly granulose; ischium with deep, submedian oblique sulcus, inner surfaces more strongly granulated, inner margin unevenly dentate; merus subquadrate, strongly granulated; exopod long, reaching to distal edge of merus.

Chelipeds almost symmetrical; outer surfaces of palm, carpus and merus distinctly granulose. Merus with margins, especially dorsal margin, distinctly cristate. Carpus with strong sharp tooth on inner distal angle, with small but distinct basal granule. Dorsal margin of palm with 4-6 lamelliform teeth which are more acute on proximal margin. Fingers laterally compressed, gently curved, non-pigmented, cutting edges with several teeth and denticles; dactylus with dorsal ridge; pollex gently but distinctly deflexed downwards.

Ambulatory legs laterally compressed; second pair longest. Merus relatively slender, surfaces smooth to minutely granulose; dorsal margin with a low but distinct crest, ending in small but distinct sharp distal tooth, margin almost gently serrate; ventral margin with 2 low, subparallel crests, margin gently serrate, proximal part of inner crest dilated, appearing subfoliaceous. Carpus with dorsal margin cristate, gently serrate; surfaces gently granulose. Propodus foliaceous, margins cristate. Dactylus short, gently curved, densely covered, short, stiff setae.

Anterior thoracic sternites covered with flattened granules to strongly punctate. Surface of abdomen with numerous scattered rounded granules and tubercles; those on proximal margin generally sharper, more prominent; segments 1 and 2 narrow; segments 3-5 completely fused, immovable, trapezoidal, lateral margins concave; segment 6 quadrate, lateral margins gently concave; telson subcircular. G1 with dilated basal part, median part almost straight, distal part gently curved, surfaces lined with scattered small sharp granules, dorsal margin with numerous long, plumose setae; tip with expanded flap.

Remarks. - *Demania unispinosa*, new species, can easily be distinguished from *D. rotundata* and *D. japonica* by several main characters, viz. the form of the last anterolateral spine, armature of the ambulatory merus, structure of the ambulatory propodus and the form of the male abdomen. The distinctly produced and spiniform last anterolateral tooth of *D. unispinosa* is very pronounced (Figs. 5A, B, 7c) and quite unlike that of any known species of *Demania*. The ambulatory merus of *D. unispinosa* always has a distinct and sharp distal tooth on the dorsal margin (Fig. 6C) while in *D. rotundata* and *D. japonica*, the merus, although crested, never has a distinct distal tooth (Fig. 4A, B). The last ambulatory propodus of *D. unispinosa* is also proportionately more elongate (Fig. 6C) compared to those of *D. rotundata* (Fig. 4A) and *D. japonica* (Fig. 4B). The male abdomen of *D. unispinosa* is quite distinct in that fused segments 3-5 are proportionately shorter (even for similarly sized specimens), with the lateral

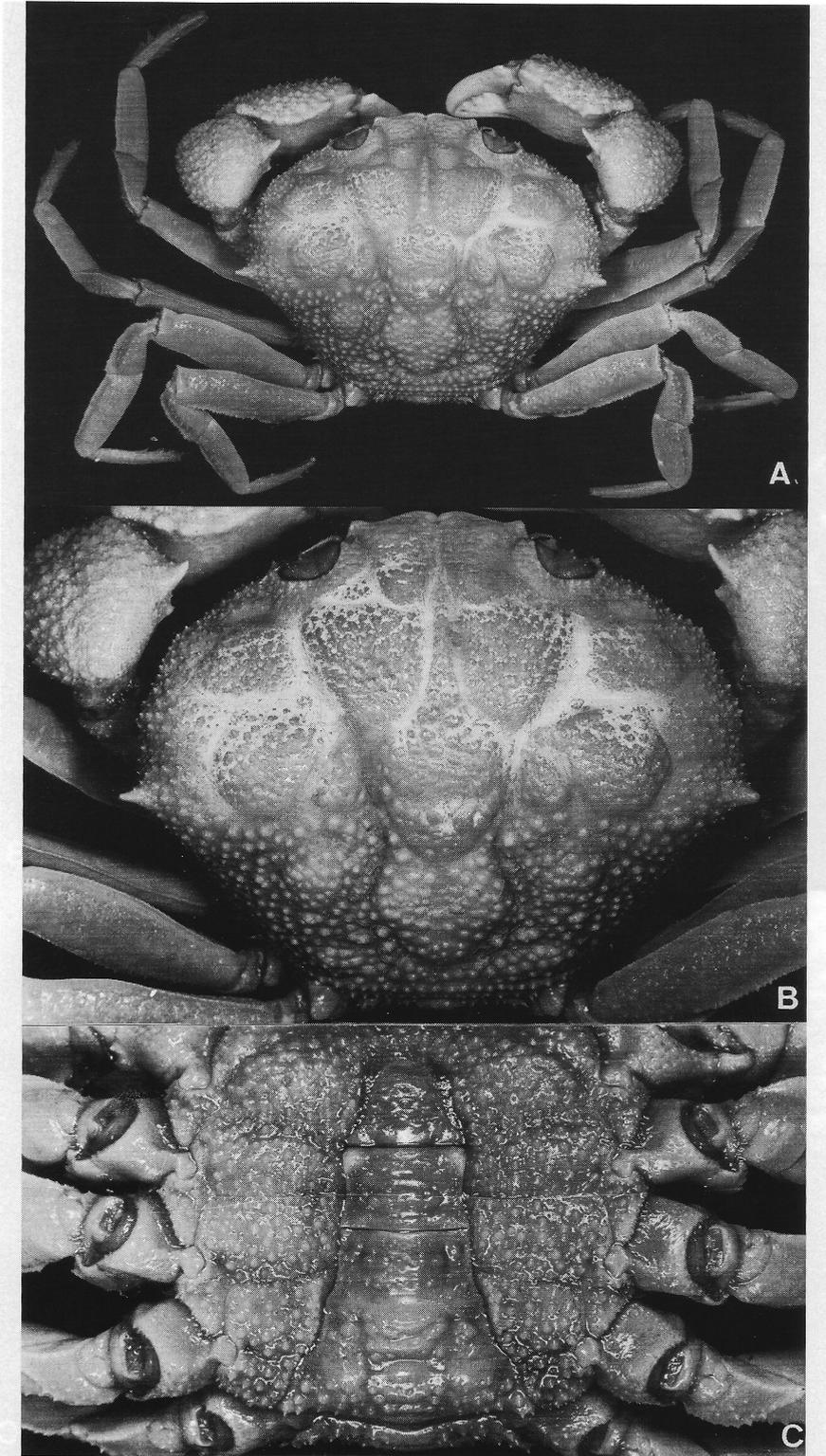


Fig. 5. *Demania unispinosa*, new species. Holotype male, 31.4 by 26.6 mm (IOCAS). A, overall view; B, carapace; C, ventral surface.



Fig. 6. *Demanina unispinosa*, new species. Holotype male, 31.4 by 26.6 mm (IOCAS). A, right chela; B, left chela; C, right ambulatory leg.

margins more deeply concave and when viewed in situ, the proximal margin of segment 3 being distinctly straighter (Figs. 5C, 7f) (cf. *D. rotundata*: Figs. 1C, 7d) and *D. japonica*: Figs. 3C, 7e). The male abdominal segment 6 of *D. unispinosa* is also more rectangular in shape, being distinctly broader than long (Figs. 5C, 7f) (cf. *D. rotundata*: Figs. 1C, 7d; and *D. japonica*, Figs. 3C, 7e).

The good series of specimens available show that these characters are quite reliable and can be used to separate both species easily (Table 1). The characters used to separate *D. unispinosa* from *D. rotundata* and *D. japonica* are also valid for *D. wardi* (cf. Garth & Ng, 1985; Ng & Yang, 1989; Davie, 1989, 1997).

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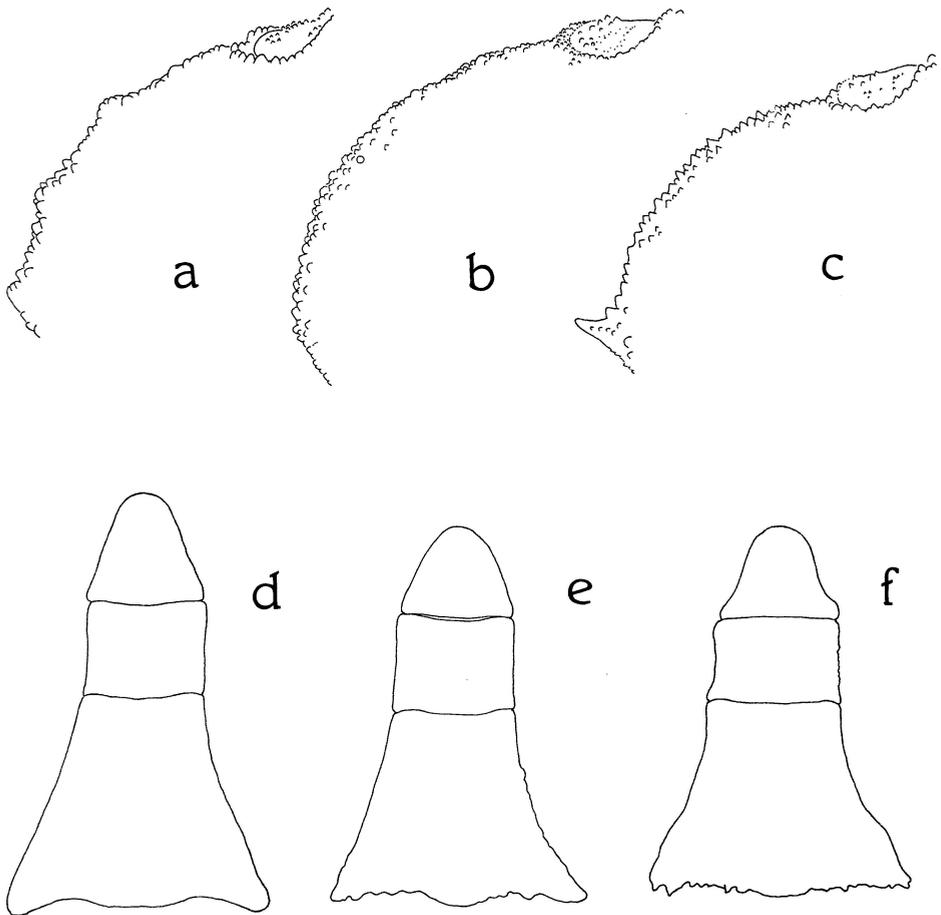


Fig. 7. a-c, Schematic figures of left carapace margins; d-f, schematic figures of male abdomens. a, d, *Demania rotundata* (Serène, in Guinot, 1969), paratype male, 34.9 by 27.4 mm (ZRC 1968.3.2.1); b, e, *D. japonica* Guinot, 1977, male, 36.8 by 30.3 mm (ZRC 1995.598); c, f, *D. unispinosa*, new species, holotype male, 31.4 by 26.6 mm (IOCAS).



Fig. 8. Left G1s. A, D, *Demania rotundata* (Serène, in Guinot, 1969), paratype male, 34.9 by 27.4 mm (ZRC 1968.3.2.1); B, E, *D. japonica* Guinot, 1977, male, 36.8 by 30.3 mm (ZRC 1995.598); C, F, *D. unispinosa*, new species, holotype male, 31.4 by 26.6 mm (IOCAS).

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