

The Indo-Pacific Pilumnidae XIII. On a New Species, *Pilumnus acanthosoma* (Crustacea: Decapoda: Brachyura), from Taiwan and the South China Sea, with Notes on *P. dofleini* Balss, 1933

Peter K. L. Ng

Department of Biological Sciences, National University of Singapore, Kent Ridge, Singapore 119260, Republic of Singapore
E-mail: dbsngkl@nus.edu.sg

(Accepted June 17, 2000)

Peter K. L. Ng (2000) The Indo-Pacific Pilumnidae XIII. On a new species, *Pilumnus acanthosoma* (Crustacea: Decapoda: Brachyura), from Taiwan and the South China Sea, with notes on *P. dofleini* Balss, 1933. *Zoological Studies* 39(4): 301-306. The identity of the endemic Japanese pilumnid crab *Pilumnus dofleini* Balss, 1933, is clarified, redescribed and figured in detail. A new allied species from southern Taiwan and the South China Sea, *P. acanthosoma*, is described. *P. acanthosoma*, however, can easily be distinguished from *P. dofleini* by numerous carapace, ambulatory leg, male abdominal, and male gonopodal characters.

Key words: Pilumnidae, *Pilumnus acanthosoma*, Taxonomy, Taiwan, South China Sea.

Over the last few years, the author has examined a series of very spinose *Pilumnus* specimens from southern Taiwan which superficially resemble *P. dofleini* Balss, 1933, a species first described from Sagami Bay, Japan, and which has not been reported elsewhere thus far. Compared to the descriptions and figures provided by Balss (1933) and Sakai (1939 1965 1977) of *P. dofleini*, the Taiwanese specimens seem to be even more spinulose and to have proportionately longer ambulatory legs.

Recently, the author had an opportunity to compare Japanese specimens of *P. dofleini* with the specimens from Taiwan. It is clear that the Taiwanese specimens represent a new species (here named *P. acanthosoma*) which is herein described as such. The present paper also re-describes *P. dofleini*. The abbreviations, G1 and G2, are used for the male 1st and 2nd pleopods, respectively. Measurements provided are of carapace width and length. Specimens examined are deposited in the Taiwan Museum, Taipei (TMCD); National Taiwan Ocean University, Keelung (NTOU); Beijing Natural History Museum (BNHM); National Science Museum, Tokyo (NSMT); and Zoological Reference Collection of the Raffles Museum, National Univ. of Singapore (ZRC).

TAXONOMY

Pilumnus dofleini Balss, 1933

(Figs. 1, 2)

Pilumnus dofleini Balss, 1933: 29, pl. 6, fig. 29; Sakai 1939: 538 (no specimen); Sakai 1965: 159, pl. 70, fig. 1; Sakai 1976: 489, pl. 175, fig. 2; Miyake 1983: 134, pl. 45, fig. 5; Utsumi 1990: 140; Muraoka 1999: 51.

Materials examined: 3 ♂♂ (largest 14.2 by 11.4 mm), 1 ovigerous ♀ (16.4 by 13.4 mm) (NSMT 6665), st. 4, Shunkurose, off Izu Is., Japan, 160-230 m, coll. T. Okutani, 26 Nov. 1974. One ovigerous ♀ (NSMT 6666), Hoyotanse, off Izu Is., Japan, coll. T. Okutani, 26 Jun. 1973.

Description of male: Carapace transversely ovoid, regions weakly defined, surface of regions covered with scattered rounded granules, covered with numerous scattered short, stiff setae; grooves between regions smooth, glabrous. Frontal margin granulated, separated medially by shallow, broadly V-shaped cleft; inner and outer lobes barely separated by shallow cleft; lobes low, rounded; inner supraorbital tooth low, granuliform, separated from inner frontal tooth by cleft. Supraorbital margin granulated, small cleft present on outer 1/3. Antero-lateral margin with 4 well-marked teeth (including

external orbital tooth); 1st tooth (external orbital tooth) low; 2nd to 4th teeth spiniform, subequal. Posterolateral margin almost straight, converging towards posterior carapace margin. Posterior carapace margin almost straight, finely granulated to almost smooth. Suborbital margin with 2-3 sharp teeth; outer tooth largest. Suborbital regions covered with scattered rounded granules. Basal antennal segment (= true 2nd and 3rd antennal segment) sub-rectangular, just entering orbital hiatus. Orbits large, transverse; eyes filling entire orbital space. Posterior margin of epistome with broad median lobe. Endostomial ridges distinct on anterior part, weak posteriorly. Third maxilliped completely covering buccal cavity when closed; ischium sub-rectangular, with shallow but distinct submedian oblique sulcus, inner margin serrated; merus squarish, lateral surfaces finely granulated, with 2 shallow depressions; exopod stout, distal edge just reaching anterior edge of merus, inner subdistal tooth prominent.

Lateral surface of anterior thoracic sternites finely granulated to almost smooth. Sternites 2 and 3 separated by distinct straight groove; sternites 3 and 4 separated by distinct groove which slopes to dis-

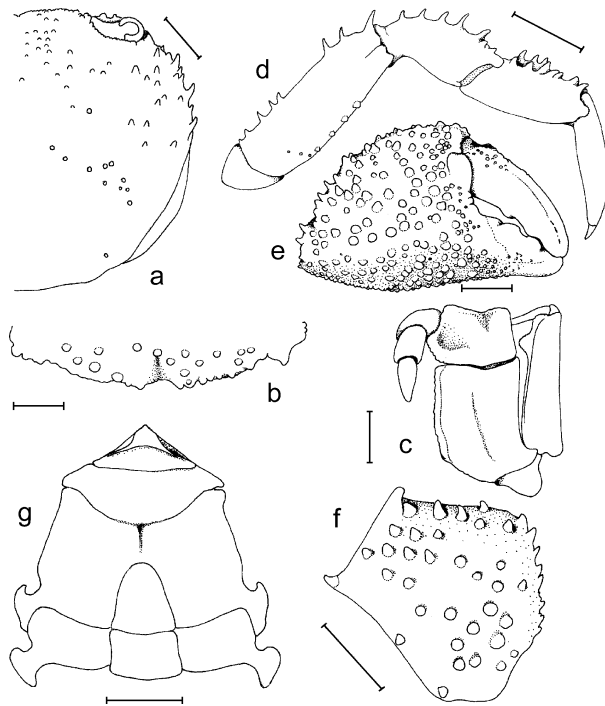


Fig. 1. *Pilumnus doffeini* Balss, 1933. Male (14.2 by 11.4 mm) (NSMT 6665). a, right side of carapace; b, frontal margin, frontal view; c, left 3rd maxilliped; d, right 4th ambulatory leg; e, right chela; f, right carpus of cheliped; g, anterior thoracic sternites. All structures denuded. Scales: a, d-g = 2.0 mm; b, c = 1.0 mm.

tinctly before abdominal cavity. Distal part of sternite 4 with shallow but distinct longitudinal median groove which extends from groove between sternites 3 and 4. Male abdominal cavity reaching about 2/3 length of sternite 4, some distance from distal margin.

Chelipeds subequal. Anterior margin of fused basis-ischium weakly serrated, appearing almost smooth. Anterior margin of merus almost smooth with 1 subdistal tooth. Outer surface of carpus covered with numerous sharp or rounded granules; inner distal angle with short, sharp tooth. Entire outer surface of palm of chela covered with numerous sharp, rounded granules, with interspersed short, stiff setae. Fingers shorter than palm; dactylus with 1 weak submedian longitudinal interrupted groove; proximal part with small granules.

Ambulatory legs not elongate, 2nd leg longest. Margins of meri, carpi, propodi, and dactyli lined with scattered short, stiff setae. Outer surface of basis-ischium covered with very fine granules to almost smooth. Dorsal margin of merus lined with scattered spiniform teeth, distal tooth largest; ventral margin with scattered granules. Carpus and propodus with numerous low spines on dorsal margin, ventral margins unarmed. Dactylus not styliform, tip tapering off suddenly.

Male abdomen with surfaces finely granulated to almost smooth. Telson triangular, tip rounded, lateral margin almost straight. Segment 6 rectangular, lateral margin gently concave. Segment 5 rectangular, lateral margin almost straight. Segment 4 trapezoidal, lateral margin gently concave. Segment 3 broadly trapezoidal, lateral margins gently convex. Segment 2 subtrapezoidal with rounded lateral margin. Segment 1 subtrapezoidal with gently concave lateral margin.

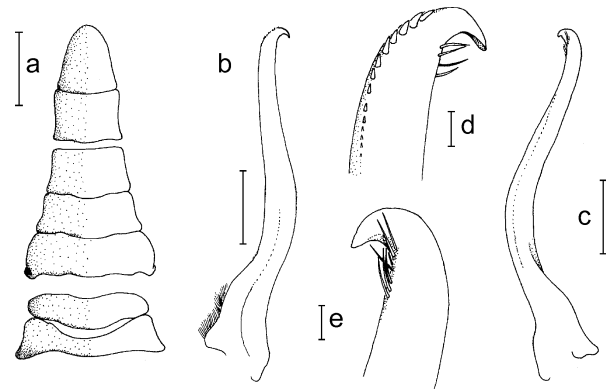


Fig. 2. *Pilumnus doffeini* Balss, 1933. Male (14.2 by 11.4 mm) (NSMT 6665). a, abdomen (denuded); b, c, left G1; d, e, distal part of left G1. Scales: a = 2.0 mm; b, c = 1.0 mm; d, e = 0.1 mm.

G1 relatively stout, gently sinuous, distal part gently hooked; inner margin with several long, stiff setae. G2 short, sigmoidal, distal part spatelliform, tip rounded.

Females: The female specimen on hand did not significantly differ from the males in non-sexual characters, with its chelipeds being subequal in size.

Color: The species has been illustrated in color by Sakai (1965 1976) and Utsumi (1990), with Miyake (1983) providing a color photograph of a fresh specimen. Sakai (1965 1976) figures an animal with the dorsal surface more or less evenly reddish brown overall, and the ambulatory legs having patches of white giving it a somewhat banded appearance. Miyake's (1983) photograph depicts an animal with a uniformly reddish brown carapace and orangish brown legs, with some of the granules on the chela red in color.

Remarks: Balss (1933) described *P. doffeini* on the basis of only 1 female specimen measuring 15.0 by 13.0 mm collected from Sagami Bay from 180 m depth. Sakai (1965 1976) subsequently reported more specimens from Sagami Bay and Wagu (Shimane Prefecture) in Japan, noting that the species was collected from substrates with sand or broken shells at depths of 85 to 120 m. The present specimens were obtained from depths of 160 to 230 m. The present specimens from the Izu Islands agree very well with Balss' (1933) brief description and photograph, as well as the figures of Sakai (1965 1976), Miyake (1983), and Utsumi (1990).

***Pilumnus acanthosoma*, n. sp.**

(Figs. 3-6)

Materials examined: Holotype: ♂ (20.3 by 17.5 mm) (ZRC 2000.112), Tungkang, Kaohsiung Co.,



Fig. 3. *Pilumnus acanthosoma*, n. sp. Fresh colors. Paratype male (17.8 by 15.2 mm) (NTOU) (photograph: T.-Y. Chan).

Taiwan, 100-400 m, by inshore trawlers, coll. P.K.L. Ng, 5 Aug. 1996. Paratypes: 2 ♂♂ (18.0 by 15.7 mm, 13.9 by 12.8 mm), 2 ♀♀ (17.2 by 14.0 mm, 15.9 by 12.8 mm) (ZRC 1997.701), 1 ♂ (17.8 by 15.2 mm) (NTOU), same data as holotype. One ♂ (17.4 by 15.1 mm) (ZRC 1997.704), Tungkang, Kaohsiung Co., Taiwan, coll. Lee, 5 Aug. 1995. One dried ♂ (TMCD 556), 1 dried ♀ (TMCD 557), Nantun, Hengchun, Pingtung Co., Taiwan, coll. C.-Y. Wei, 15 Feb. 1972. Other: 1 ♂ (12.4 by 10.9 mm) (BNHM), st. SSM IV-32, 78 m, Nansha (= Spratly) Is., South China Sea, coll. 11 May 1987.

Description of male holotype: Carapace transversely quadrate, regions defined, surface of raised regions covered with numerous both sharp and rounded granules of various sizes, covered with numerous scattered short, stiff setae; grooves between regions generally smooth, glabrous. Frontal margin

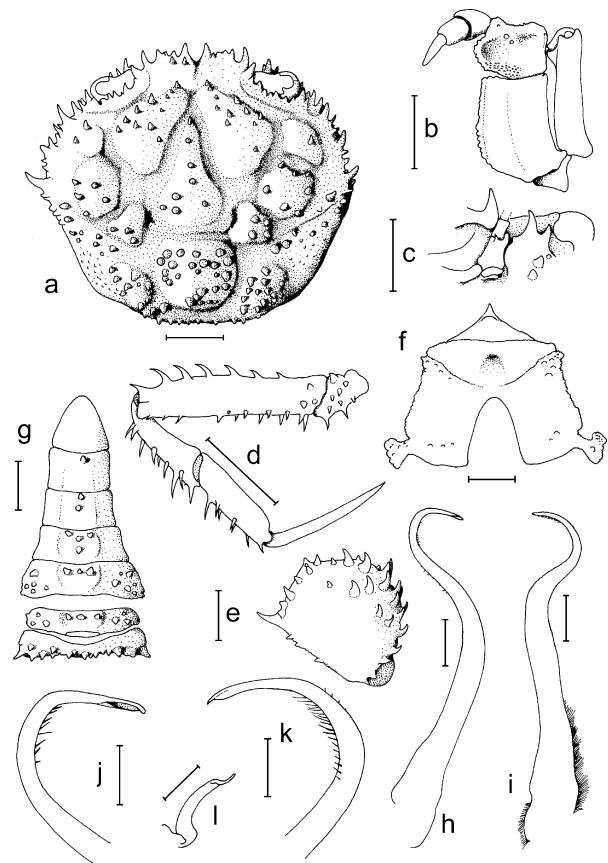


Fig. 4. *Pilumnus acanthosoma*, n. sp. Holotype male (20.3 by 17.5 mm) (ZRC 2000.112). a, carapace; b, left 3rd maxilliped; c, antennae and suborbital margin; d, left 4th ambulatory leg; e, right carpus of cheliped; f, anterior thoracic sternites; g, abdomen; h, i, left G1; j, k, distal part of left G1; l, left G2. All structures (except G1 and G2) denuded. Scales: a, b, c, e-g = 2.5 mm; d = 5.0 mm; h, i, l = 1.0 mm; j, k = 0.5 mm.

distinctly separated medially by deep, V-shaped cleft; inner and outer lobes separated by U-shaped cleft but not easily discernible due to strong spination; inner lobe with 1 very strong, sharp inner tooth and 3-4 granules/teeth; outer lobe acute, sharp; inner supraorbital tooth well developed, clearly separated from inner frontal tooth. Supraorbital margin denticulated, no marked cleft discernible. Anterolateral margin strongly spinate/denticulate, with 4 teeth (including external orbital tooth), but not easily discernible; last (4th) tooth most prominent, spiniform, gently curved anteriorly. Posterolateral margin almost straight to slightly concave, converging towards posterior carapace margin. Posterior carapace margin almost straight, lined with numerous prominent, posteriorly directed granules. Suborbital margin with 2 large, sharp teeth; inner

tooth larger, with small basal granule at its base. Suborbital regions covered with scattered rounded granules. Basal antennal segment (= true 2nd and 3rd antennal segment) sub-rectangular, just entering orbital hiatus. Orbits large, transverse; eyes filling entire orbital space. Posterior margin of epistome with broad median lobe. Endostomial ridges distinct on anterior part, weak posteriorly. Third maxilliped completely covering buccal cavity when closed; ischium sub-rectangular, with very shallow, almost undiscernible submedian oblique sulcus, inner margin serrated; merus squarish, lateral surface finely granulated, with 2 shallow depressions; exopod stout, distal edge just reaching anterior edge of merus, inner subdistal tooth prominent.

Lateral surface of anterior thoracic sternites finely granulated. Sternites 2 and 3 separated by dis-

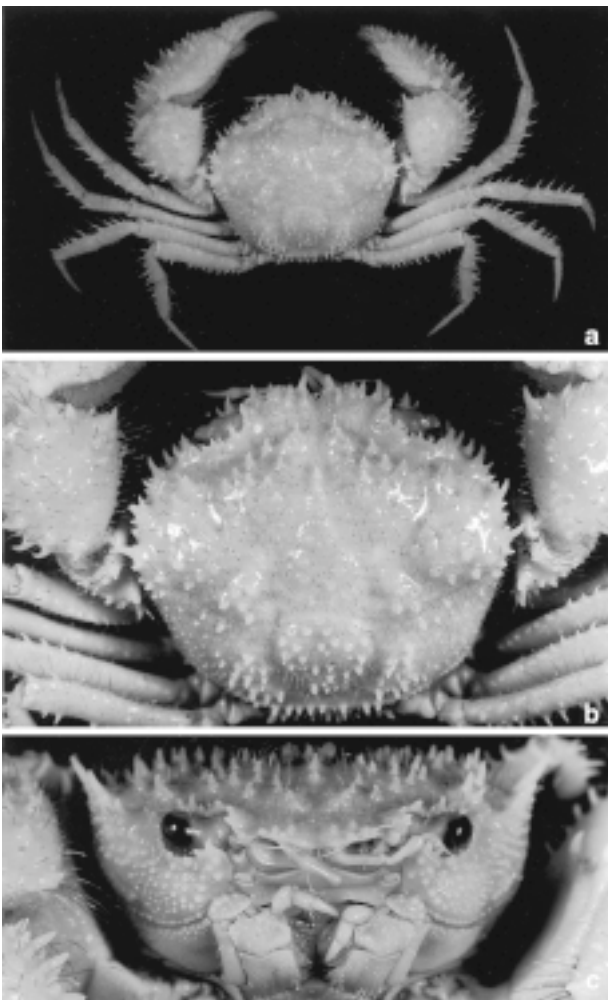


Fig. 5. *Pilumnus acanthosoma*, n. sp. Holotype male (20.3 by 17.5 mm) (ZRC 2000.112). a, overall view; b, carapace; c, frontal view.

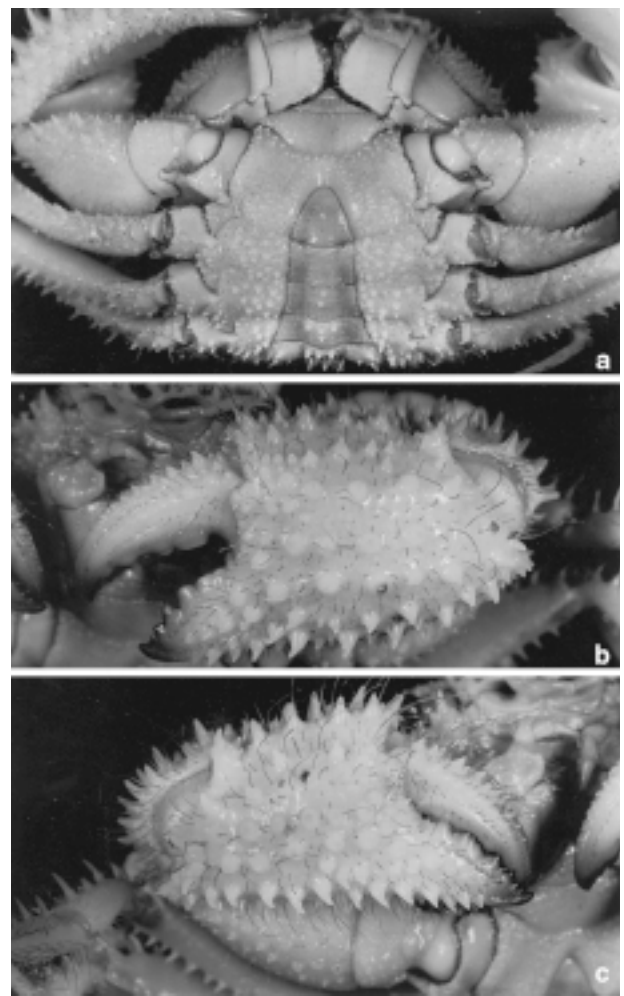


Fig. 6. *Pilumnus acanthosoma*, n. sp. Holotype male (20.3 by 17.5 mm) (ZRC 2000.112). a, abdomen and anterior thoracic sternum; b, left chela; c, right chela.

tinct straight groove; sternites 3 and 4 separated by distinct groove which slopes to just before abdominal cavity. Male abdominal cavity near but not reaching distal margin of sternite 4.

Chelipeds subequal. Anterior margin of fused basis-ischium gently serrated. Anterior margin of merus gently serrated, with 1 subdistal tooth. Outer surface of carpus covered with numerous sharp, curved spines; inner distal angle with long, slender spine. Entire outer surface of palm of chela covered with numerous both sharp and rounded granules, with interspersed short, stiff setae. Fingers shorter than palm; dactylus with 1 weak submedian longitudinal interrupted groove; proximal part with small granules.

Ambulatory legs elongate, 2nd leg longest. Margins of meri, carpi, propodi, and dactyli lined with scattered short, stiff setae. Outer surface of basis-ischium covered with sharp granules, ventral margin with 2 distinct spines. Dorsal margin of merus lined with curved spiniform teeth, distal tooth largest; ventral margin with almost straight spiniform teeth, those on proximal part largest. Carpus and propodus with numerous spines on dorsal margin, ventral margin unarmed. Dactylus styliform.

Male abdomen with surface granulated to differing degrees. Telson triangular, tip rounded, lateral margin almost straight. Segment 6 rectangular, lateral margin gently concave to almost straight; with sharp median granule on distal margin. Segment 5 rectangular, lateral margin gently concave; with 2 sharp, longitudinally arranged median granules, one centrally and the other distally. Segment 4 trapezoidal, lateral margin concave; median surface with 4 prominent granules. Segment 3 broadly trapezoidal, lateral margin gently convex; median surface with 3 large, transversely arranged granules, lateral one larger; lateral surface with several sharp granules, distal one larger. Segment 2 subtrapezoidal with rounded lateral margin; median surface with 3 transversely arranged granules, lateral one larger; lateral surface with 3-4 sharp granules. Segment 1 trapezoidal with uneven lateral margins, proximal margin lined with numerous large, sharp granules, those on edges directed obliquely outwards.

G1 slender, sinuous, basal 2/3 relatively straight, distal 1/3 hooklike; distal-most part very slender, tapering to a point; inner margin with numerous short, stiff setae. G2 short, sigmoidal, distal part spatelliform, tip rounded.

Females: The female specimens do not significantly differ from the males in non-sexual characters, with their chelipeds subequal in size.

Color: Freshly dead specimens have reddish

brown to orange anterior dorsal carapace region, with posterior region and grooves between all regions dirty white. The outer surfaces of the chelipeds and ambulatory legs (except the pale reddish white dactylus) are reddish brown to orange with scattered patches of white, with the legs appearing indistinctly banded (Fig. 3). The ventral surface is dirty white. All carapace and pereopodal setae are golden brown.

Etymology: The species name is derived from the Greek for “spiny body”, alluding to the spinose carapace and legs. The name is used as a noun in apposition.

Remarks: Although *P. acanthosoma* is superficially similar to *P. dofleini*, the 2 species differ in numerous characters. *P. acanthosoma* can be distinguished by its dorsal carapace region having numerous sharp granules (vs. with less and lower granules); the frontal margin with a deep median cleft (vs. shallow cleft); more spiniform frontal and antero-lateral margins; the anterior margin of the cheliped merus being gently serrated (vs. almost smooth); the presence of spiniform teeth on the carpus of the cheliped elongate (vs. granules present); the surface of the male abdomen having numerous sharp granules (vs. almost smooth); the ambulatory merus, carpus, and propodus being proportionately more slender and longer; the ventral margin of the ambulatory merus having numerous sharp spines (vs. only granules); the ambulatory dactyli being elongate and styliform (vs. normal, not styliform); the male abdominal cavity reaching near the distal margin of thoracic sternite 4 (vs. some distance away); and the G1 being more slender (versus relatively stout), with the distal part elongate (vs. short, hooked). In addition, their live colors also appear to differ, with *P. acanthosoma* having only the anterior carapace regions red (vs. all dorsal carapace regions uniformly reddish brown).

Pilumnus acanthosoma also bears a general resemblance to *P. izuogasawarensis* Takeda and Ng, 1997, from the Izu-Ogasawara Is., especially with regards to the general carapace shape and relatively long ambulatory legs. *P. izuogasawarensis*, however, has a much smoother carapace and pereopods, without the numerous strong spines which characterize *P. acanthosoma* (see Takeda and Ng 1997).

The present specimens were collected from soft substrates, possibly with mud and sand. The freshly collected specimens were covered with patches of sticky dark brown or black mud, and species collected with them include *Heteronucia laminata* (Leucosiidae), *Cyrtomaia murrayi* (Majidae), *Om-*

matocarcinus pulcher (Goneplacidae), and *Pulcratis reticulatus* (Xanthidae) (Ng and Huang 1997).

Pilumnus acanthosoma is now known only from southern Taiwan and the Nansha or Spratly Is. in the South China Sea. These areas are poorly explored as far as the pilumnid fauna is concerned, with recent studies increasing the number of species known from there (Ng et al. 1997, Ho et al. 2000a 2000b).

Acknowledgments: The author is most grateful to Chia-Hsiang Wang (Taiwan Museum) and Tin-Yam Chan (National Taiwan Ocean University) for their tremendous hospitality during the author's visits to Taiwan. Masatsune Takeda kindly hosted the author during his visit to the Tokyo Museum. Si-Liang Yang kindly passed me the specimen of *P. acanthosoma* from the South China Sea for study. Tin-Yam Chan kindly took the photograph of the fresh specimen. The author's work has been facilitated by travel grants from the Taiwan Museum and Tokyo Museum to their respective institutes, and partially supported by a research grant from the National University of Singapore.

REFERENCES

- Balss H. 1933. Beitrage zur Kenntnis der Gattungen Pilumnus (Crustacea Dekapoda) und verwandter Gattungen. *Capita Zool.* **4**: 1-47, pls. 1-7.
- Ho PH, HP Yu, PKL Ng. 2000a. New records of Eriphiidae, Pilumnidae and Xanthidae (Crustacea: Decapoda: Brachyura) from Taiwan. *Raffles Bull. Zool.* **48**: 111-122.
- Ho HP, HP Yu, PKL Ng. 2000b. The Indo-Pacific Pilumnidae XIV. On a new species of *Actumnus* (Crustacea: Decapoda: Brachyura) from Taiwan. *Proc. Biol. Soc. Wash.* (in press).
- Miyake S. 1983. Japanese crustacean decapods and stomatopods in color. Vol. II. Brachyura (Crabs). Osaka: Hoikusha Publishing, 277 pp.
- Muraoka K. 1999. Special exhibition. Variety of the crabs from the Sakai Collection. Odawara, Japan: Kanagawa Prefectural Mus. Nat. Hist., 63 pp.
- Ng PKL, AY Dai, SL Yang. 1997. The Indo-Pacific Pilumnidae X. New species and records from the South China Sea (Crustacea: Decapoda: Brachyura). *Raffles Bull. Zool.* **45**: 145-159.
- Ng PKL, JF Huang. 1997. Unrecorded crabs (Crustacea: Decapoda: Brachyura) from Taiwan and Tungsha Islands, with description of a new genus and species of Xanthidae. *Zool. Stud.* **36**: 261-276.
- Sakai T. 1965. The Crabs of Sagami Bay. Tokyo, Maruzen. English text, 206 pp.; Japanese text, 92 pp.; 100 pls.
- Sakai T. 1976. Crabs of Japan and the adjacent Seas. Tokyo: Kodansha. In 3 volumes; English text, 773 pp.; Japanese text, 461 pp.
- Takeda M, S Miyake. 1969. Pilumnid crabs of the family Xanthidae from the West Pacific. II. Twenty-one species of four genera, with descriptions of four new species. *Occasional Papers, Zool. Lab., Faculty Agric., Kyushu Univ.* **2**: 93-156.
- Takeda M, PKL Ng. 1997. The Indo-Pacific Pilumnidae XI. An unusual new species of *Pilumnus* (Crustacea, Decapoda, Brachyura) from Japan. *Bull. Nat. Sci. Mus., Tokyo, Ser. A* **23**: 185-190.
- Utsumi F. 1990. Gakken illustrated nature encyclopedia. The aquatic lower animals of Japan. Tokyo: Gakken, 340 pp.

印度 - 太平洋毛刺蟹科 XIII. 臺灣和南中國海域產一新種多刺毛刺蟹 並記述道氏毛刺蟹

黃禎麟¹

本文重新鑑定日本特有種道氏毛刺蟹 *Pilumnus dofleini* Balss, 1933, 並作詳細分類描述。於臺灣和南中國海域發現一新近緣種多刺毛刺蟹 *P. acanthosoma*, 它與道氏毛刺蟹的差異, 可以容易地從其頭胸甲、步足、雄性的腹部和生殖足的特徵上區分出來。

關鍵詞: 毛刺蟹科, 多刺毛刺蟹, 分類學, 臺灣, 南中國海。

¹Department of Biological Sciences, National University of Singapore, Kent Ridge, Singapore 119260, Republic of Singapore