

**THE INDO-WEST PACIFIC PILUMNIDAE X.
NEW SPECIES AND RECORDS FROM THE SOUTH CHINA SEA
(CRUSTACEA: DECAPODA: BRACHYURA)**

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ABSTRACT. - Six species of pilumnid crabs are reported from the Spratly (= Nansha) Islands in the South China Sea, viz. *Pilumnus guinotae* Takeda & Miyake, 1968, and five new species, *P. comatus*, *P. rubroseta*, *P. capillatus*, *P. semilunaris* and *Viaderiana sentus*.

KEY WORDS. - Pilumnidae, new species, South China Sea, new records, taxonomy.

INTRODUCTION

In May 1996, the first author had an opportunity to examine a number of small specimens of the family Pilumnidae in the Institute of Zoology, Academia Sinica (Beijing) which had been collected from various parts of the South China Sea. Joint studies of these specimens in Singapore showed that many were new species or new records. Many of the other brachyuran crabs collected by the Multidisciplinary Oceanographic Expeditions of the Chinese Academy of Sciences (Academia Sinica) between 1985-1994 from the Spratlys (= Nansha Islands) and Paracels (= Xisha Islands) in the South China Sea have already been published (Dai & Lan, 1981; Dai & Xu, 1991; Dai & Yang, 1993; Chen & Xu, 1991; Dai et al., 1996; Chen, 1996). Of the present lot of South China Sea pilumnid specimens, a new genus and a new species from Hong Kong have already been reported (Ng & Dai, 1997).

The taxonomy of the remainder of these specimens from the Spratlys (or Nansha) form the subject of the present paper. Five new species of the genera *Pilumnus* and *Viaderiana*, and one new record of *Pilumnus* are here reported upon. The abbreviations G1 and G2 are used for the male first and second pleopods respectively. All measurements provided are of the carapace length and width respectively. Specimens examined are deposited in the Institute of Zoology, Academia Sinica (AS), Beijing; and the Zoological Reference Collection (ZRC), School of Biological Sciences, National University of Singapore.

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TAXONOMY

Family Pilumnidae

Genus *Pilumnus* Leach, 1815

Pilumnus guinotae Takeda & Miyake, 1968

(Fig. 1)

Pilumnus guinotae Takeda & Miyake, 1968: 46, Fig. 11, 12d-f, pl. 3D.

Material examined. - 1 female (ovigerous) (5.7 by 9.9 mm) (AS), 1 female (ovigerous) (ZRC), NS070, Zhubi Reef, 10°50'N 114°10'E, coll. 9 Apr.1994. - 1 female (juvenile), Huanglu Reef, 06°56'N 113°35'E, coll. 27 Mar.1994.

Diagnosis (from present specimens). - Carapace slightly broader than long; regions barely discernible; dorsal surfaces smooth, anterior half covered with scattered long, stiff, simple setae and long, brush-like setae which do not obscure surface completely; epigastric and postorbital regions with low but sharp transverse crests on which brush-like setae are attached.

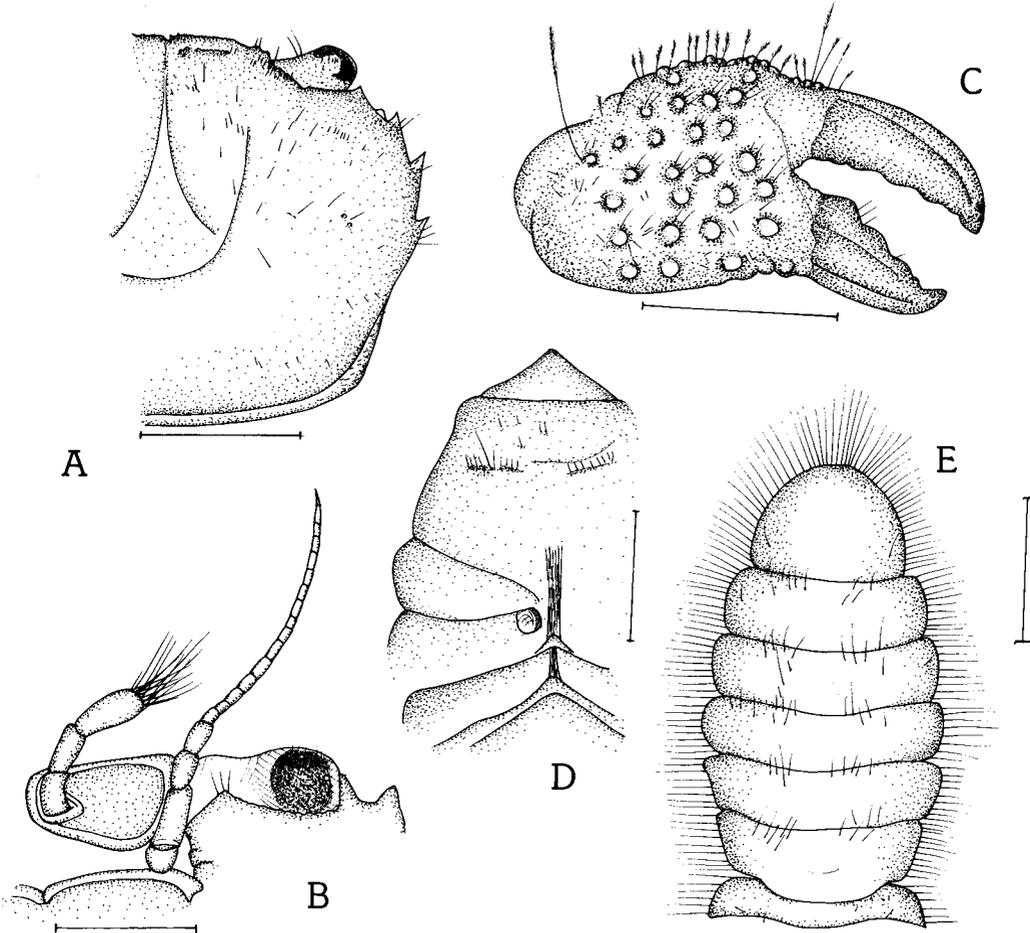


Fig. 1. *Pilumnus guinotae* Takeda & Miyake, 1968. Female (5.7 by 9.9 mm) (AS). A, right side of carapace; B, frontal regions; C, right chela; D, anterior thoracic sternites; E, abdomen. Scales: A = 3.0 mm, B = 1.0 mm, C, D, E = 2.0 mm.

Frontal margin with deep median cleft; lateral lobule small; margin gently serrated. Supraorbital margin granulated, with 2 low clefts. Infraorbital margin granulated, inner angle with distinct but low tooth which is partially visible when carapace viewed dorsally. External orbital tooth with acute tooth; anterolateral margin with 3 evenly spaced spine-tipped teeth, last smallest. Posterolateral margin almost straight, distinctly converging towards posterior margin of carapace. Pterygostomial and suborbital regions with scattered small granules. Subhepatic region with several small but distinct granules which are partially visible when carapace viewed dorsally. Outer surface of chelipeds with numerous granules of varying sizes; brush-like setae long but not dense enough to completely obscure surfaces; inner distal angle of carpus with 1 sharp tooth; pollex gently bent downwards. All ambulatory segments unarmed.

Colour. - Overall beige-brown in 70% alcohol.

Taxonomic remarks. - The present specimens (all females) agree best with the detailed descriptions and figures of Takeda & Miyake (1968) of *P. guinotae*, especially with regards to the brush-like setae on the anterior half of the carapace and chelipeds, carapace shape, shape of the front and anterolateral margin, and structure of the chelipeds. The only discrepancy is that for the type series of *P. guinotae* (two males and one female from Palau Islands), Takeda & Miyake (1968: 47) noted that there is a very small spinule on the merus of the ambulatory legs. No such spinule is present on the legs of the present specimens. In the present specimens, the subdistal edge of the dorsal margin of the ambulatory meri are usually rounded but in a few legs, it appears somewhat angular and this may be regarded as a small, low tooth. In any case, this difference (if indeed valid) is too minor to warrant separating the Nansha specimens as a distinct species, especially since the present series is represented only by females.

The present Nansha specimens also somewhat resemble *P. neglectus* Balss, 1933, with regards to its general carapace shape, unarmed ambulatory legs, the outer surfaces of the chelae being covered with conical granules with the fingers being bent downwards. *Pilumnus neglectus*, however, was only briefly described and is a poorly known species. The first author has examined the type male of *P. neglectus* in the Amsterdam Museum (unpublished data), and it differs from the present Nansha specimens in having a more squarish carapace, the external orbital tooth being more acutely triangular and the fingers of the chelae are more strongly bent.

***Pilumnus comatus*, new species**

(Fig. 2)

Material examined. - Holotype - male (3.7 by 4.1 mm) (AS), Huayang Reef, 08°51'N 112°50'E, coll. 7 Apr. 1994.

Paratypes - 3 males, 2 females (1 ovigerous [3.9 by 5.5 mm], 1 juvenile) (AS), 2 males (ZRC), same data as holotype.

Diagnosis. - Carapace broader than long, appearing rectangular; regions not discernible; dorsal surface smooth, covered with some long, stiff, simple and numerous long, soft, brush-like setae (especially on anterior margins, regions and chelipeds) which partially to completely obscure surfaces and margins; epigastric and postorbital regions with low but distinct transverse crests on which many brush-like setae are attached. Frontal margin with distinct

median cleft; lateral lobule very low, hardly discernible. Supraorbital margin with 2 clefts. Infraorbital margin appearing serrated, inner angle low. External orbital tooth with small sharp tooth; anterolateral margin with 2 distinct, spines, third anterolateral spine very small, sometimes absent. Posterolateral margin almost straight, converging towards posterior margin of carapace. Pterygostomial and suborbital regions almost smooth. Subhepatic region with 1 small granule which is just visible when carapace viewed dorsally. Outer surface of chelipeds with numerous small granules; setae long, brush-like, partially to completely obscure margins and surfaces; inner distal angle of carpus with 1 sharp tooth; merus with 1 strong dorsal spine; basis-ischium with 2 smaller spines or sharp granules. Ambulatory meri relatively short, with 1 very small, sharp, submedian granule on dorsal margin (sometimes absent), other segments unarmed. G1 sinuous, distal part almost straight, gently tapering towards sharp tip.

Variation. - The female specimens agree with the male holotype in most aspects. The last anterolateral tooth, however, already very small in the holotype male, is sometimes even smaller in the other paratypes, and in a few specimens, completely absent. The small sharp granule on the dorsal margin of the ambulatory merus is present on all the legs of the holotype in varying degrees. In the paratypes, this granule is often completely absent, the merus appearing unarmed.

Colour. - In 70% alcohol, the colour of the anterior part of the carapace was reddish-brown, the rest being beige. The pterygostomial and suborbital regions have a pattern of reddish-brown lines.

Etymology. - The name is derived from the Latin for shaggy, alluding to the appearance of the crab caused by the brush-like setae.

Taxonomic remarks. - Ng (1988) recognised a group of species allied to *Pilumnus cursor* A. Milne Edwards, 1873 (type locality New Caledonia), in which the carapace is broader than long; the dorsal surface of the carapace and outer surface of the chelipeds and ambulatory legs are covered with short, dense pubescence, with scattered long, brush-like setae lining the anterior part of the carapace, chelipeds and legs; the anterolateral margin is armed with sharp teeth or spines (the last usually being smaller); the dorsal margin of the ambulatory meri is lined with several short spines; and the G1 is relatively stout. Ng (1988) clarified the identity of *P. cursor* and described three new species previously confused with this species.

Of the members of the *P. cursor* group, *P. comatus* is perhaps closest to *P. cursor* s. str. with regards to the strong anterolateral spines, but the two species differ in several aspects. In *P. cursor* s. str., the carapace is proportionately broader, the dorsal surface of the carapace is covered with small granules (smooth in *P. comatus*), the lateral lobule of the frontal margin is more prominent (very low in *P. comatus*), the granules on the outer surface of the chela larger and more prominent, and the dorsal margins of the ambulatory meri are armed with several sharp spines (one weak granule or unarmed in *P. comatus*). The type specimen of *P. cursor* s. str. in the Paris Museum, examined by the first author (unpublished data), is a female 16.0 by 12.0 mm, and as such, the G1 structures are not available for comparisons.

Pilumnus comatus is also quite similar to *P. longipes* A. Milne Edwards, 1873 (type locality New Caledonia), especially with regards to the rectangular-shaped carapace and presence of two main anterolateral spines. The first author has examined the types of *P. longipes* (which includes males) in the Paris Museum (unpublished data). In *P. longipes*, the

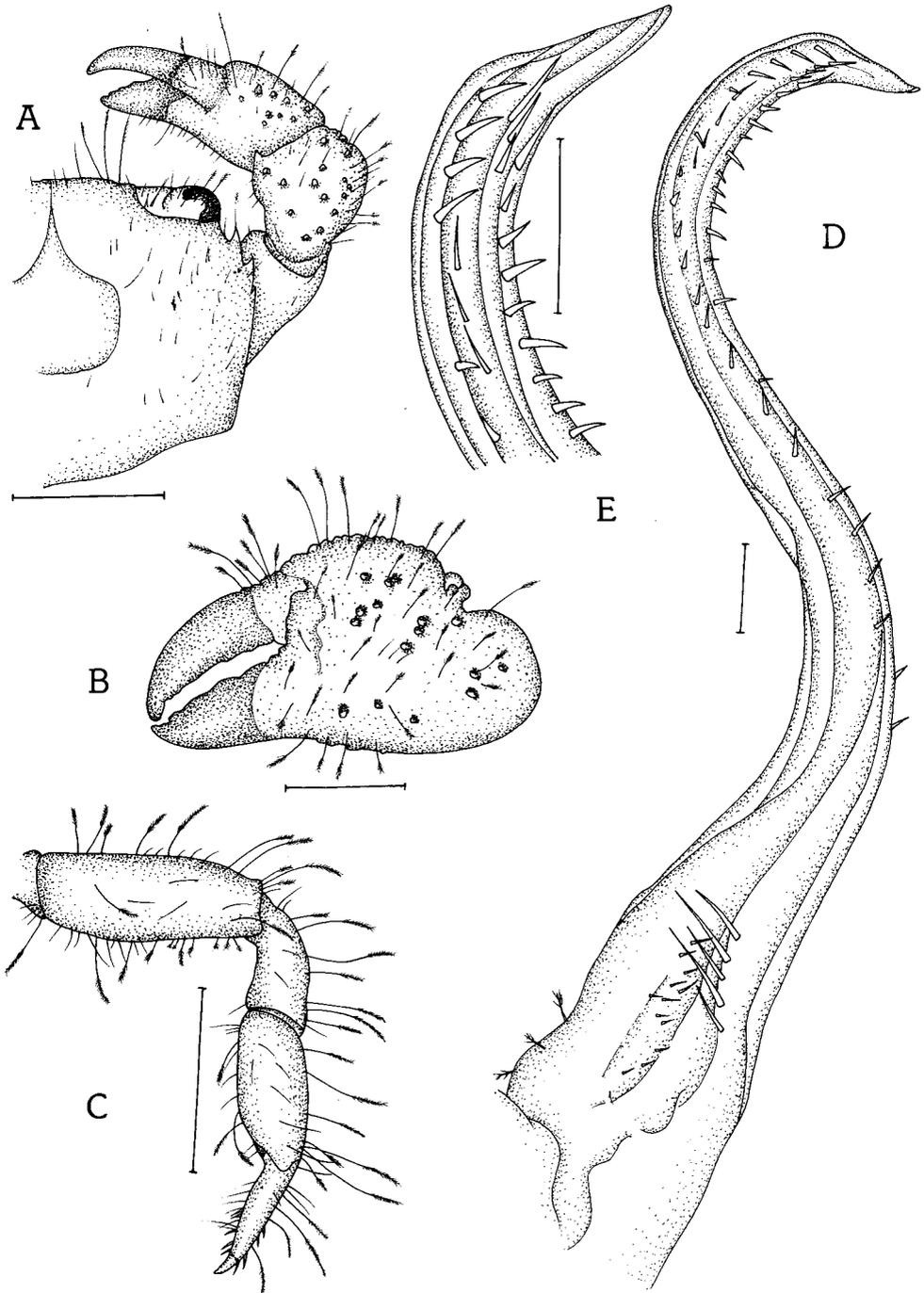


Fig. 2. *Pilumnus comatus*, new species. Holotype male (3.7 by 4.1 mm) (AS). A, right side of carapace; B, left chela; C, right last ambulatory leg; D, left G1 (ventral view); E, distal part of left G1 (ventral view). Scales: A, C = 2.0 mm, B = 1.0 mm, D, E = 0.1 mm.

last (third) spine is also reduced and sometimes absent. The two species differ, however, in that *P. longipes* has a more pronounced lateral lobule on the frontal margin, the outer margin and dorsal surface of the carpus of the chelipeds have distinct spines, the ambulatory meri have one to two distinct spines, and the distal part of the G1 is strongly recurved (against gently curved).

***Pilumnus rubroseta*, new species**

(Fig. 3)

Material examined. - Holotype - male (4.0 by 6.1 mm) (AS), Huayang Reef, 08°51'N 112°50'E, coll. Y. X. Cai, 7 Apr.1994.

Diagnosis. - Carapace broader than long, appearing rectangular; regions not discernible; dorsal surface smooth, covered with some long, stiff, simple and numerous long, soft, subplumose setae (especially on anterior margins, regions and chelipeds) which partially obscure surfaces and margins; epigastric and postorbital regions with low but distinct transverse crests on which subplumose setae are attached. Frontal margin with distinct median cleft; lateral lobule very low, hardly discernible. Supraorbital margin with 2 clefts. Infraorbital margin appearing serrated, inner angle low. External orbital tooth with small sharp tooth; anterolateral margin with 2 distinct, spines, third anterolateral spine very small. Posterolateral margin almost straight, converging towards posterior margin of carapace. Pterygostomial and suborbital regions almost smooth. Subhepatic region with 2-3 small granules which are partially visible when carapace viewed dorsally. Outer surface of chelipeds with numerous small granules; setae long, subplumose, partially obscure margins and surfaces; inner distal angle of carpus with 1 sharp tooth; merus with 1 strong dorsal spine; basis-ischium with 2 smaller spines or sharp granules. Ambulatory meri relatively long; all segments unarmed. G1 sinuous, distal part almost straight, gently tapering towards sharp tip.

Colour. - The carapace is an overall beige in 70% alcohol. The setae on the anterior part of the carapace and chelipeds are unusual in that the proximal one-third to half is bright red, the distal part being brown.

Etymology. - The name is derived from the Latin for red and hair, with reference to the red setae on the carapace and chelipeds. The name is used as a noun in apposition.

Taxonomic remarks. - The most characteristic feature of *P. rubroseta*, new species, is surely the bicoloured setae on the anterior part of the carapace and chelipeds. The structure of these setae differ markedly from the brush-like setae of *P. comatus*, new species, with which *P. rubroseta* appears to be closely related.

Other than their different setae, *P. rubroseta* can also easily be separated from *P. comatus* by the proportions of its ambulatory meri (distinctly shorter in *P. comatus*), absence of any granule on the dorsal margins of the ambulatory meri (occasionally present in *P. comatus*) and lateral margins of the male telson being gently convex (almost straight in *P. comatus*) (see also discussion for *P. comatus*).

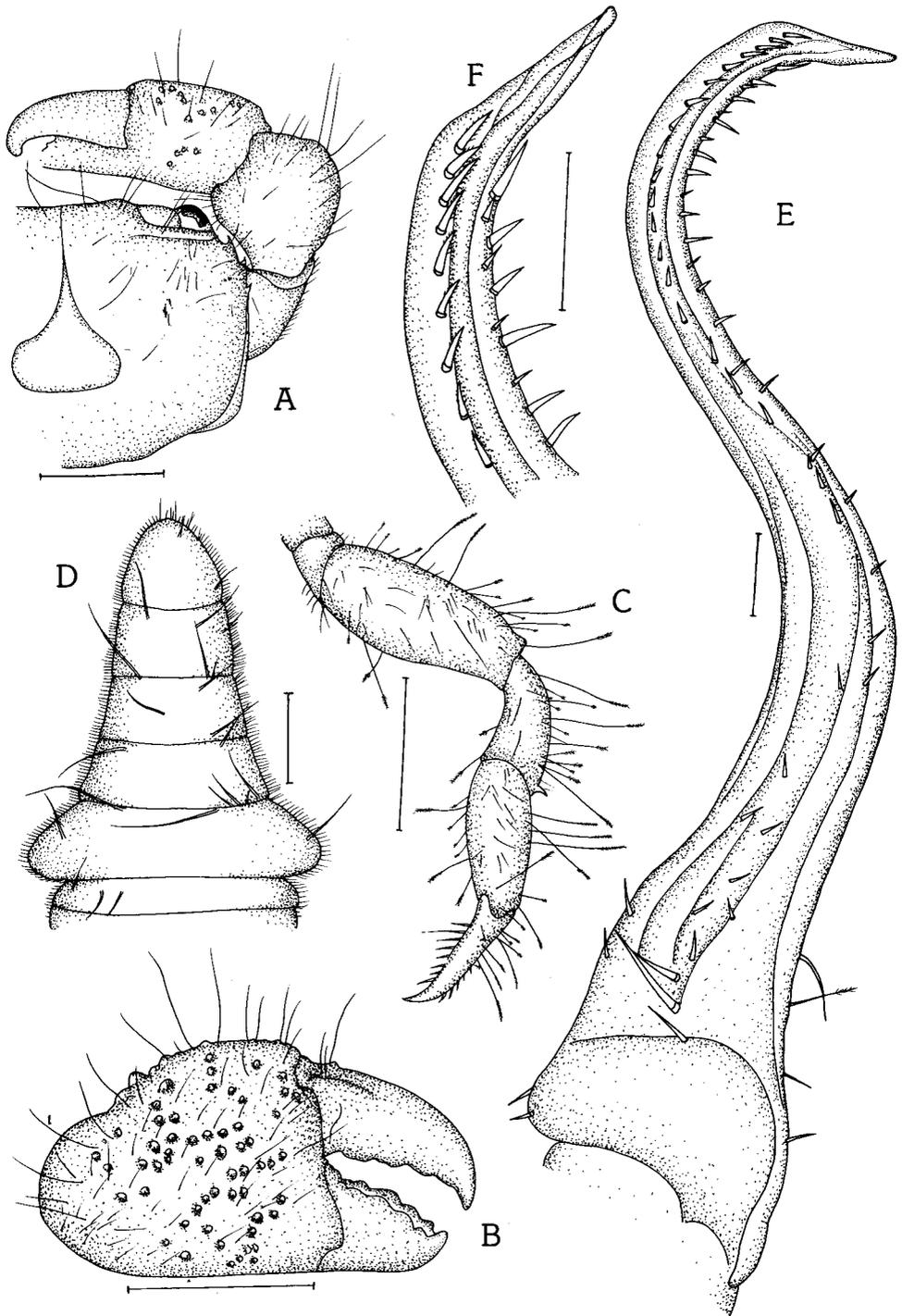


Fig. 3. *Pilumnus rubroseta*, new species. Holotype male (4.0 by 6.1 mm) (AS). A, right side of carapace; B, right chela; C, right last ambulatory leg; D, abdomen; E, left G1 (ventral view); F, distal part of left G1 (ventral view). Scales: A-C = 2.0 mm, D = 1.0 mm, E, F = 0.1 mm.

Pilumnus capillatus, new species (Fig. 4)

Material examined. - Holotype - male (5.7 by 7.7 mm) (AS), Wufang Reef, 10°30'N 115°45'E, NS062, coll. 2 Apr.1994.

Paratypes - 3 males (AS), 2 males (1 juvenile) (ZRC), NS044, Yongshu Reef, 09°50'N 112°45'E, coll. 25 Mar.1994. — 1 male (AS), NS950, coll. Y. X. Cai, 27 Mar.1994.

Diagnosis. - Carapace slightly broader than long; regions barely discernible; dorsal surface slightly convex transversely, anterior half with very small, pearl-like granules; dorsal surface covered with numerous long, stiff, simple setae which do not obscure surface completely; epigastric and postorbital regions with low but distinct transverse crests. Frontal margin with deep median cleft; lateral lobule low. Supraorbital margin granulated, with 2 low clefts. Infraorbital margin granulated, inner angle with prominent granule-lined tooth which is partially visible when carapace viewed dorsally. External orbital tooth with sharp spine; anterolateral margin with 3 acute, subequal, evenly spaced spines. Posterolateral margin almost straight, distinctly converging towards posterior margin of carapace. Pterygostomial and suborbital regions with scattered small granules. Subhepatic region with small but well developed spine which is visible when carapace viewed dorsally. Outer surface of chelipeds with numerous conical granules of varying sizes; simple, stiff setae long but not dense enough to obscure surfaces; inner distal angle of carpus with 1 sharp granule. Ambulatory carpi usually with distinct distal vertical spine; other segments unarmed. Lateral margins of male telson gently convex. G1 sinuous, distal part almost straight, gently tapering towards rounded tip.

Variation. - There is no substantial variation in non-sexual characters among the various specimens. The subhepatic tooth varies slightly in strength, but is always clearly visible when the carapace is viewed dorsally. The strength of the spine on the ambulatory carpus is usually distinct, but is sometimes weak to almost absent. In smaller specimens, the setae on the carapace are also less dense and slightly shorter. The length of the distal part of the G1 varies slightly, but we do not regard this as significant as it depends on how folded the tip is.

Colour. - In 70% alcohol, the specimens vary in colour from brown, beige- to golden-brown overall.

Etymology. - The name is derived from the Latin for hairy.

Taxonomic remarks. - *Pilumnus capillatus*, new species, belongs to a group of species which has a carapace with a granulated dorsal surface, strong anterolateral spines which are subequal in size, a strong spine on the subhepatic region which is visible from dorsal view between the first and second anterolateral spines, a well developed spine or sharp tooth on the infraorbital margin which is at least partially visible from dorsal view, and strong granules on the outer surface of the carpus and palm of the cheliped.

Pilumnus capillatus, new species, most closely resembles *P. parableekeri* Ng & Tan, 1984, in the general carapace morphology. *Pilumnus capillatus*, however, differs distinctly in having proportionately smaller granules on the carapace surface, surface of the margins and outer surfaces of the chelipeds, a more rounded male telson which has more convex lateral margins, and the distal part of the G1 is less strongly hooked with the tip less acute (cf. Ng & Tan, 1994). Although the type specimens of *P. capillatus* are all slightly smaller

than the types of *P. parableekeri*, we regard these differences as sufficiently significant to recognise the Nansha specimens as belonging to a separate species. *Pilumnus parableekeri* is only known from two specimens collected off Sabah in northeastern Borneo.

Pilumnus capillatus also resembles *P. ceylonicus* Deb, 1987, from Sri Lanka (= Ceylon) in general carapace features, but the ambulatory meri of *P. ceylonicus* possess a sharp spine (absent in *P. capillatus*). No other comparisons are possible as *P. ceylonicus* was described on the basis of only one female.

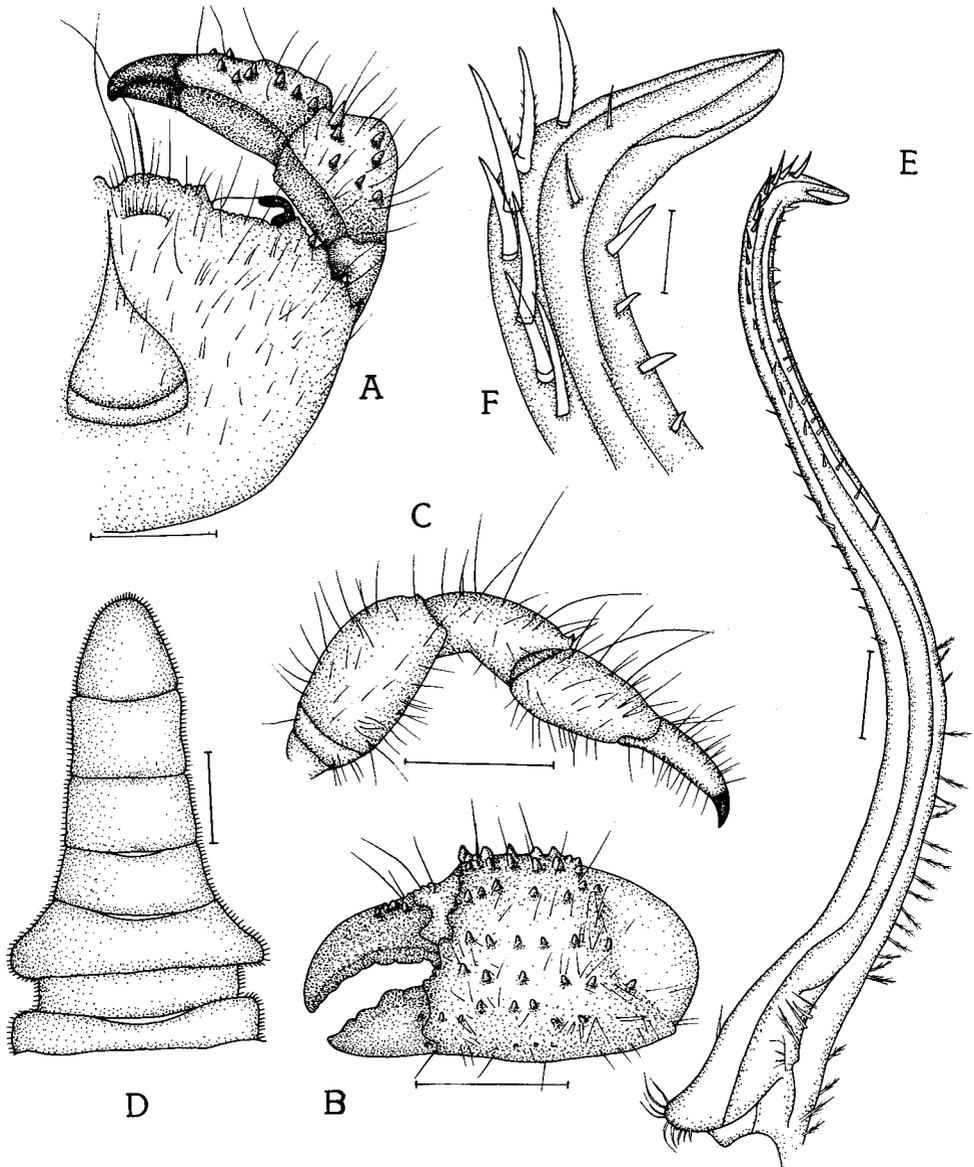


Fig. 4. *Pilumnus capillatus*, new species. Holotype male (5.7 by 7.7 mm) (AS). A, right side of carapace (only some setae shown, otherwise anterior part of carapace obscured); B, left chela; C, right last ambulatory leg; D, abdomen; E, left G1 (ventral view); F, distal part of left G1 (ventral view). Scales: A-C = 2.0 mm, D = 1.0 mm, E = 0.05 mm, F = 0.2 mm.

Pilumnus semilunaris, new species

(Fig. 5)

Material examined. - Holotype - male (4.1 by 5.9 mm) (AS), Banyue Reef, 08°50'N 116°20'E, coll. Y. X. Cai, 30 Mar.1994.

Paratype - 1 male (juvenile) (ZRC), same data as holotype.

Diagnosis. - Carapace slightly broader than long; regions barely discernible; dorsal surface slightly convex transversely, anterior half with very small, pearl-like granules; dorsal surface covered with numerous long, stiff, simple setae which do not obscure surface completely; epigastric and postorbital regions with low but distinct transverse crests. Frontal margin with deep median cleft; lateral lobule low. Supraorbital margin granulated, with 2 low clefts. Infraorbital margin granulated, inner angle with low, granule-lined tooth which cannot be seen when carapace viewed dorsally. External orbital tooth with sharp tooth, right tooth with broad base, tip directed obliquely outwards, right tooth acutely triangular, tip directed forwards; first anterolateral tooth with broad base, positioned obliquely, anterior edge not continuous with external orbital tooth; second and third anterolateral teeth strong with spine-tip. Posterolateral margin almost straight, distinctly converging towards posterior margin of carapace. Pterygostomial and suborbital regions with scattered small granules. Subhepatic region unarmed. Outer surface of chelipeds with numerous conical granules of varying sizes; simple, stiff setae long but not dense enough to obscure surfaces; inner distal angle of carpus with 1 sharp slightly recurved granule. Ambulatory carpi with distinct distal vertical spine; other segments unarmed. Lateral margins of male telson almost straight. G1 sinuous, distal part almost straight, gently tapering towards rounded tip.

Colour. - In 70% alcohol, the anterior two-thirds of the carapace is greyish, with the other parts beige.

Etymology. - The name is a Latin translation of the Chinese name of the type locality of the species (which means half-moon reef). Used as a noun in apposition.

Taxonomic remarks. - *Pilumnus semilunaris*, new species, is perhaps closest to *P. parableekeri* Ng & Tan, 1994, and *P. capillatus*, new species. Most of the differences discussed earlier between *P. parableekeri* and *P. capillatus* also apply, with exception of the spine on the subhepatic region, structure of the first anterolateral tooth and shape of the male telson. The most obvious difference between *P. semilunaris* and *P. capillatus* is that there is no spine or granule on the subhepatic region of *P. semilunaris*. In *P. semilunaris*, the first anterolateral tooth is also positioned obliquely, with the external orbital tooth and first anterolateral tooth clearly disjunct (margins of both structures continuous in *P. capillatus*). The male telson of *P. semilunaris* is similar to that of *P. parableekeri*, differing from that of *P. capillatus* by having straighter lateral margins. The G1s of *P. semilunaris* and *P. capillatus* are, however, very similar.

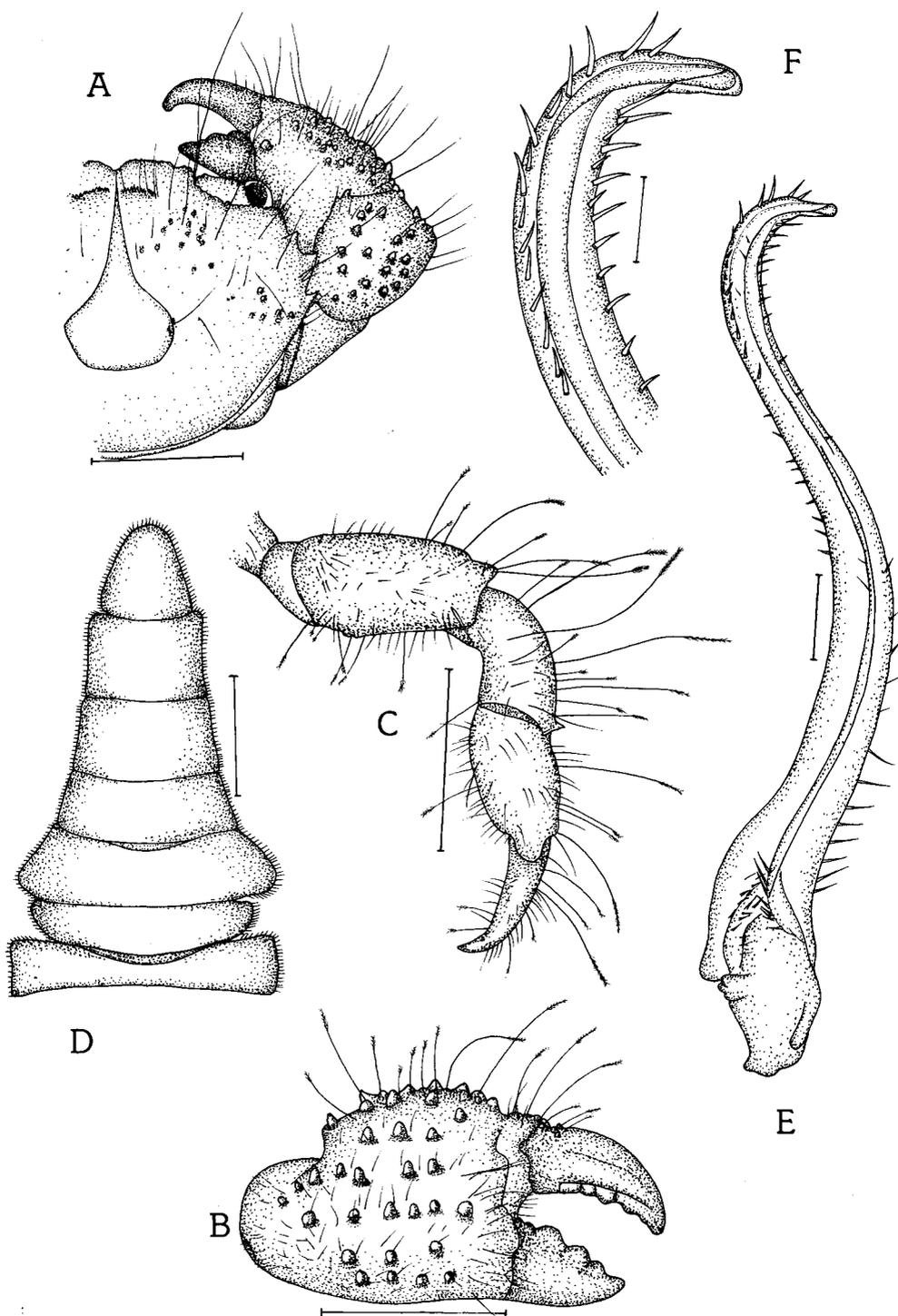


Fig. 5. *Pilumnus semilunaris*, new species. Holotype male (4.1 by 5.9 mm) (AS). A, right side of carapace; B, right chela; C, right last ambulatory leg; D, abdomen; E, left G1 (ventral view); F, distal part of left G1 (ventral view). Scales: A-C = 2.0 mm, D = 1.0 mm, E = 0.2 mm, F = 0.1 mm.

Genus *Viaderiana* Ward, 1942

***Viaderiana sentus*, new species**

(Fig. 6)

Material examined. - Holotype - male (6.1 by 8.0 mm) (AS), NS059, coll. 2 Apr. 1994.

Diagnosis. - Carapace distinctly broader than long, appearing rectangular; regions not discernible; dorsal surface slightly convex transversely, smooth, without trace of granules, scattered simple, long, stiff setae present only on areas near margins. Frontal margin with deep median cleft; lateral lobule small. Supraorbital margin with 2 median clefts, margin outside of first cleft lined with granules, appearing serrated. Infraorbital margin with 1 large black-tipped spine on inner angle which is visible when carapace viewed dorsally, rest of margin with 3 smaller sharp spines. External orbital tooth with a sharp, well produced black-tipped spine; anterolateral margin with 3 evenly spaced sharp black-tipped spines, first and second spines large, relatively much smaller. Posterolateral almost straight, gently converging towards posterior margin of carapace. Pterygostomial and suborbital regions with scattered, small granules. Subhepatic region unarmed. Outer surfaces of chelipeds with scattered long, stiff, simple setae; outer surface of chela with several sharp black-tipped spines (especially on dorsal half) and scattered granules; carpus with 2 black-tipped spines on outer margin, 2 black-tipped spines on dorsal surface and 1 strong black-tipped spine on inner distal angle; merus with a strong subdistal black-tipped spine each on granular dorsal and ventral margins; basis-ischium with 1 spine. Dorsal margins of ambulatory meri armed with 3 spines on distal half and 1 subdistal spine, ventral margins with 2-3 sharp granules and several denticles on proximal half; carpus with 1 strong, vertically directed distal spine. G1 sinuous, distal part gently curved, tapering towards sharp tip.

Colour. - Colour beige overall in 70% alcohol.

Etymology. - The name is derived from the Latin for bramble, alluding to the spiky appearance of the crab. Used as a noun in apposition.

Taxonomic remarks. - *Viaderiana* Ward, 1942 (type species *V. typica* Ward, 1942, type locality Mauritius) is a pilumnid genus in which members have the carapace rectangular in shape (broader than long), the third (last) anterolateral tooth or spine small, highly reduced or sometimes absent, strong spines present on the margins and/or surfaces of the chelae and carpus of the chelipeds, spines obvious on the dorsal and/or ventral margins of the ambulatory meri, and usually with a relatively stout G1 in which the distal part is strongly recurved (cf. Serène, 1971; Ng, 1987).

Viaderiana sentus, new species, is closest to *V. demani* (Ng & Tan, 1984) (cf. Ng, 1987) but differs in having the lateral lobe of the frontal margin not spine-tipped, the lateral margins of the anterolateral spines smooth and not armed with small, sharp granules, the male telson being more rounded, and the distal part of the G1 being not strongly recurved. Although the type locality of *V. demani* (Vietnam) is relatively close to that of *V. sentus* (Nansha), and the type male of *V. demani* is larger than that of *V. sentus* (9.0 by 10.5 mm vs. 6.1 by 8.0 mm), we do not think the differences observed at present can be attributed merely to intraspecific variation.

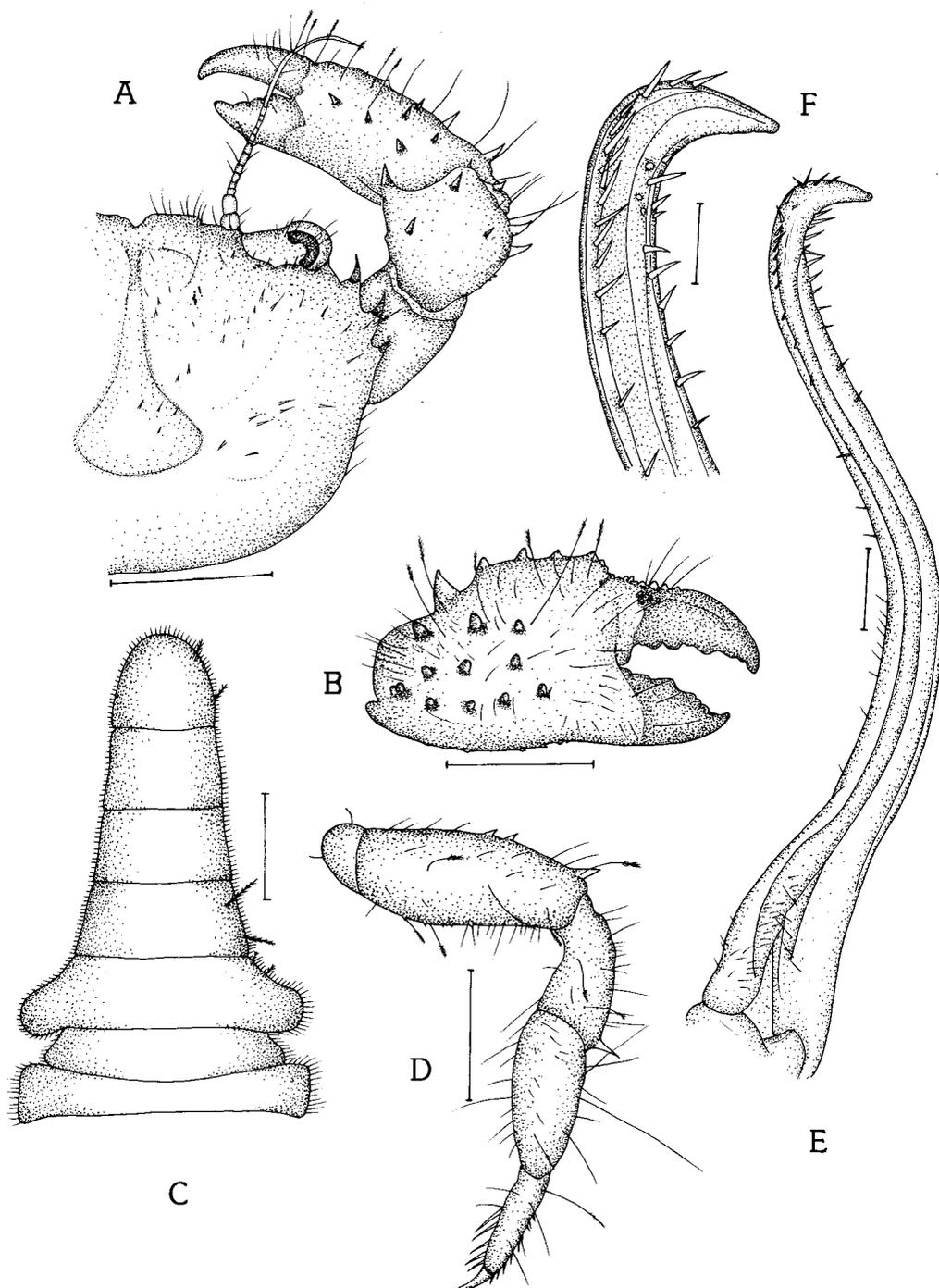


Fig. 6. *Viaderiana sentus*, new species. Holotype male (6.1 by 8.0 mm) (AS). A, right side of carapace; B, left chela; C, abdomen; D, right last ambulatory leg; E, left G1 (ventral view); F, distal part of left G1 (ventral view). Scales: A, B, D = 2.0 mm, C = 1.0 mm, E = 0.2 mm, F = 0.1 mm.

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