

**A NEW SPECIES OF *GEOSESARMA*
(CRUSTACEA: DECAPODA: BRACHYURA: GRAPSIDAE)
FROM PULAU TIOMAN, PENINSULAR MALAYSIA**

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ABSTRACT. - A new species of terrestrial grapsid crab of the genus *Geosesarma* is described from Pulau Tioman, Peninsular Malaysia. *Geosesarma albomita*, new species, is endemic to the island, and distinguishable from its congeners by a combination of G1, ambulatory leg and carapace characters.

KEY WORDS. - *Geosesarma*, Grapsidae, Pulau Tioman, new species.

INTRODUCTION

Faunistic surveys were conducted by staff and students of the Department of Biological Sciences, the National University of Singapore, on Pulau Tioman, Peninsular Malaysia, during three recent expeditions (1995-1997). Collections were also made from the tallest mountain on the island, Gunung Kajang. Specimens of a new species of terrestrial grapsid crab belonging to the genus *Geosesarma* were obtained through these collections, bringing the total number of freshwater or terrestrial crab species reported from Pulau Tioman to 12 (see Yeo et al., 1999).

Geosesarma albomita, new species, most closely resembles *Geosesarma tiomanicum* Ng, 1986, but may also be confused with *G. serenei* Ng, 1986, and *G. scandens* Ng, 1986. It is, however, distinguished from these congeners by various aspects of the G1, ambulatory leg form and carapace shape.

The following abbreviations are used: G1 for male first pleopod, G2 for male second pleopod. Measurements are of carapace width and length respectively. Terminology used essentially follows Ng (1988). All measurements are in millimetres. Specimens examined are deposited in the Zoological Reference Collection (ZRC) of the Raffles Museum, National University of Singapore. Malay words used in the text are 'Pulau' (island), 'Sungai' (river or stream), 'Gunung' (mountain) and 'Kampung' (village).

TAXONOMY

FAMILY GRAPSIDAE MACLEAY, 1838

Geosesarma albomita, new species

(Figs. 1-2)

Geosesarma tiomanicum - Ng & Lim, 1989: 31 (part)(not *Geosesarma tiomanica*, Ng, 1986).

Material examined. - Holotype - male (9.5 by 8.8 mm)(ZRC 1996.1717), Gunung Kajang, Pulau Tioman, Pahang, Peninsular Malaysia, 3000 ft asl., among leaf litter, coll. T. H. T. Tan et al., 27 Jun.1996. Paratypes - 2 males 1 female (largest 9.2 by 8.4 mm)(ZRC 1996.1718), same data as holotype. Others - 1 male (7.4 by 6.6 mm) (ZRC 1990.9165), Malaysia, Pulau Tioman, Gunung Kajang, 3360 ft, coll. J. A. Bullock, 19 Apr.1962.

Description of holotype. - Carapace squarish, slightly broader than long, dorsal surfaces covered with small granules; regions distinctly demarcated, with relatively deep grooves; median gastric groove deep, H-shaped; anterior grooves shallow; transverse groove separating cardiac and intestinal region distinct (Fig. 1A). Frontal margin strongly deflexed, gently sinuous, appearing weakly bilobed, subcristate, postfrontal cristae distinct, sharp, separated by deep median groove, each crista bilobed, each lobe separated by shallow groove, surface of frontal region vertically concave (Fig. 1A). External orbital angle acutely triangular, directed obliquely outwards, separated from first epibranchial tooth by distinct, deep, V-shaped cleft; first epibranchial tooth smaller than external orbital angle, triangular, with very shallow notch posterior to it, demarcating it from the lateral margin, second epibranchial tooth indistinct (Fig. 1A). Lateral margins straight to gently diverging posteriorly; posterolateral regions with low oblique striae. Eyes large, reaching or extending beyond tip of external orbital angle (Fig. 1A).

Merus of third maxilliped with mid-portion of lateral margin slightly produced as blunt angle, widest point about two times greater than proximal margin width, with strong median oblique ridge; ischium with shallow median sulcus and distinct outer ridge; exopod slender, not reaching midlength of merus, lacking flagellum, with numerous long setae distally (Fig. 1D).

Chelipeds subequal: outer surface of palm granulose, covered with low, scattered granules, especially on upper and lower margins; fingers subequal to length of palm, proximal part of upper margin of left chela dactylus lined with 12 low, forward-directed granules (ten granules on right chela dactylus), cutting edge lined with numerous teeth and denticles, distal part of finger pectinated to form blade-like cutting edges; carpus inner margin gently serrated, inner distal spine weak but distinct, with scattered low granules on dorsal surface; outer surface of merus slightly rugose, inner surface smooth, with serrated inner margin, without subdistal spine (Fig. 1C, E).

Second pair of ambulatory legs longest; merus broad, with low, truncated subdistal dorsal tooth, upper margin very gently serrated; dactylus shorter than propodus, straight, gently curved distally; segments lined with numerous short, stiff spiniform hairs (Fig. 2E, F).

Abdomen triangular, lined with numerous short setae; seventh segment with rounded tip, longer than sixth, lateral margins of sixth and seventh segments convex (Fig. 1B).

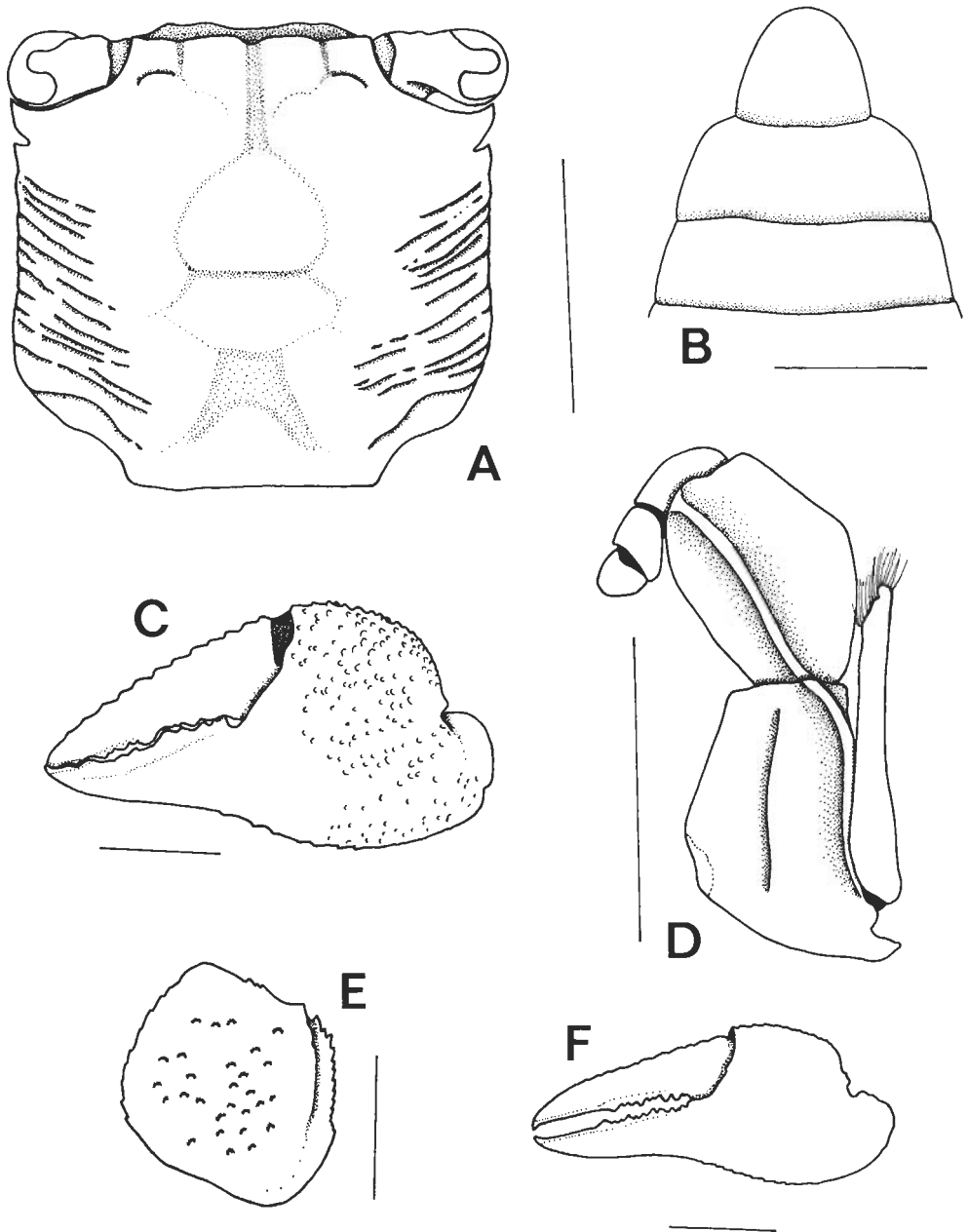


Fig. 1. *Geosesarma albomita*, new species. A-E, Holotype male (9.5 by 8.8 mm)(ZRC 1996.1717), Gunung Kajang, Pulau Tioman, Peninsular Malaysia; F, Paratype female (9.2 by 8.4 mm)(ZRC 1996.1718), same locality. A: carapace; B: abdominal segments 5-7; C, F: left chela; D: left third maxilliped; E: carpus of left cheliped. B with marginal setae not drawn in. Scales = 5.0 mm in A; 2.0 mm in B-F.

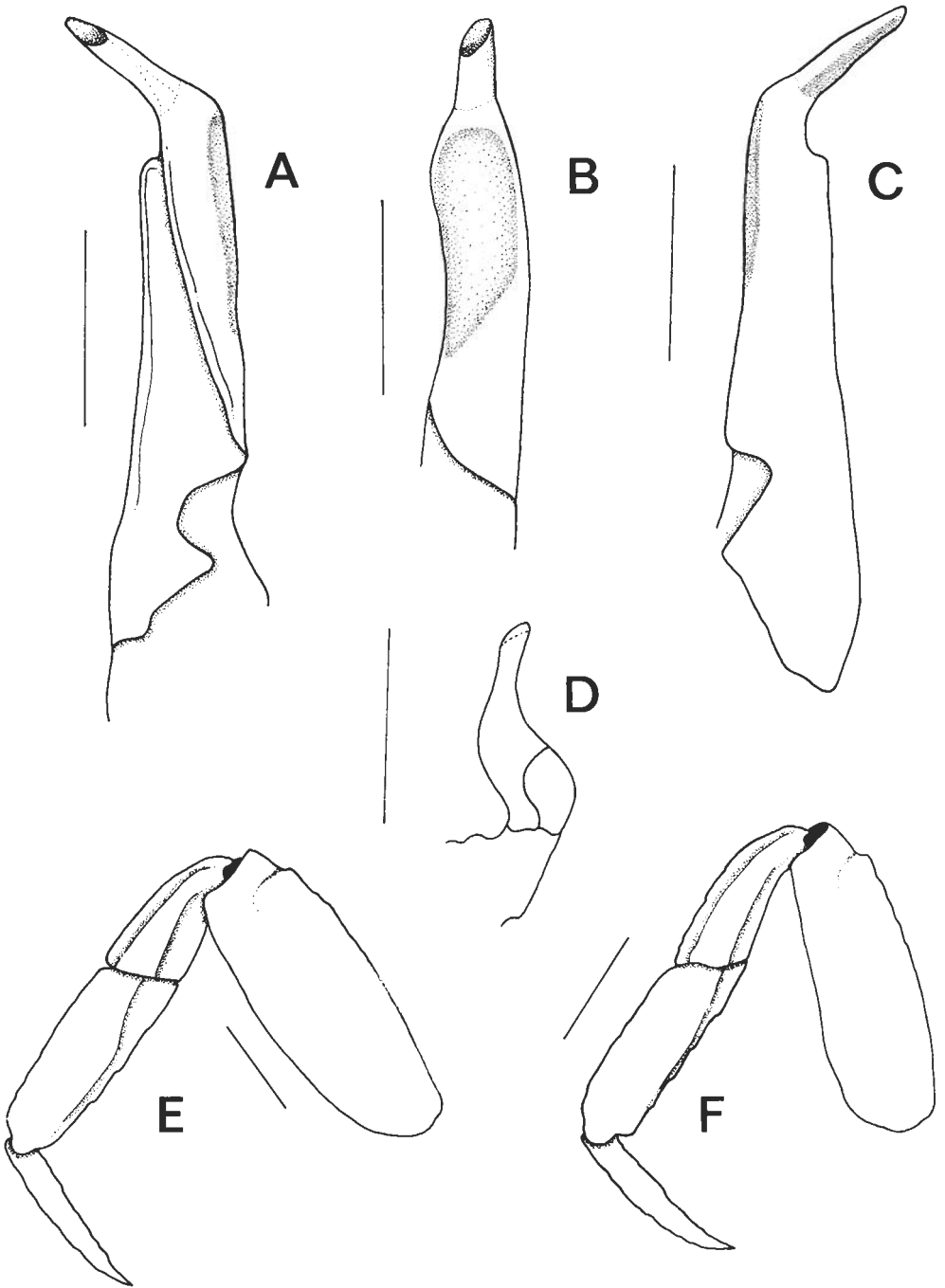


Fig. 2. *Geosesarma albomita*, new species. Holotype male (9.5 by 8.8 mm)(ZRC 1996.1717), Gunung Kajang, Pulau Tioman, Peninsular Malaysia. A: dorsal view of left G1; B: median view of left G1; C: ventral view of left G1; D: left G2; E: left second ambulatory leg; F: left fourth ambulatory leg. A-C, E-F with setae not drawn in. Scales = 1.0 mm in A-D; 2.0 mm in E-F.

G1 relatively slender; distal part directed obliquely outwards, pectinated, elongated, straight, gently tapering, upper margin slightly convex, tube-like, with distal opening on dorsal side, laterally flattened towards ventral side; proximal part with deep distal cleft on outer margin, inner margin slightly produced as a weak, barely distinct hump distally, inner surface flattened to slightly concave distally, subdistal non-pectinated portion with numerous setae obstructing view of distal part of G1 (Fig. 2A-C). G2 very short, lacking flagellum, expanded proximally, tapered distally, curved, with distal part directed outwards (Fig. 2D).

Paratypes. - The paratype males are slightly smaller than the holotype but agree in all other major aspects. The paratype female agrees with the males in most non-sexual characters except that the fingers of the female chelae appear more slender and relatively longer than those of the males, with the distal pectinated cutting edges extending further posteriorly to approximately one third of the finger length (Fig. 1F).

Etymology. - From Latin words *albus* meaning white and *mita* meaning mitten, alluding to the unique white colouration of the chelae. Used as a noun in apposition.

Colour. - In live specimens, the dorsal carapace is dark brown gradually becoming tinged with light purplish-grey from anterior to posterior. The eyes are bright yellowish. The carpi of the chelipeds are light purplish dorsally and dark brown on the outer face, while the chelae are white. The ambulatory legs are generally brownish in colour except for the inner face of the meri being light purplish-grey.

Remarks. - *Geosesarma albomita*, new species, belongs to the *Geosesarma malayanum* group of species, in that it is a highland species; the third maxilliped exopod lacks a flagellum; the G1 distal part is short, bent and tapered; and the ambulatory meri are broad (sensu Ng, 1988). Other species from Peninsular Malaysia belonging to this group which closely resemble *G. albomita*, especially in terms of superficial similarity of the G1, include *Geosesarma tiomanicum* Ng, 1986, *G. serenei* Ng, 1986, and *G. scandens* Ng, 1986.

Geosesarma albomita can easily be distinguished from *G. serenei* (known only from Perak, Malaysia) by the presence of one epibranchial tooth (versus two); the broad ambulatory leg merus (versus narrow); the distal part of the G1 being more stout, having no distinct hump on the inner margin and being more obliquely bent (versus G1 distal part being more slender, having a gentle but distinct hump on the inner margin and being less obliquely bent). *Geosesarma albomita* differs from *G. scandens* (known only from Selangor, Malaysia) in having a less sinuous frontal margin (versus more sinuous) and a slightly more slender G1 with a weak hump on the inner margin of the proximal part distal portion (versus a stouter G1 with strong, distinct hump on the inner margin of the proximal part distal portion). However, *G. albomita* is most likely to be mistaken for *G. tiomanicum* (see Fig. 3), as they are very closely related, with almost identical external characters, and both are found on Pulau Tioman (but as far as is known, on adjacent mountains). The former species can be separated from the latter species primarily by the following differences: i) G1 more slender; ii) distal part of G1 proportionately longer; iii) inner margin of proximal part of G1 produced as a hardly distinct, weak hump distally (versus gentle but distinct hump); iv) rectangular cleft on outer margin of G1 subterminal part with more angular corners (versus more rounded corners); v) merus of ambulatory leg with low, truncated subdistal dorsal tooth (versus well developed, acute subdistal tooth); and vi) carapace more squarish with width subequal to length (versus more rectangular with width greater than length)(see Figs. 1-3). A re-examination of the G1 of the small male specimen (ZRC 1990.9165) from Gunung Kajang,

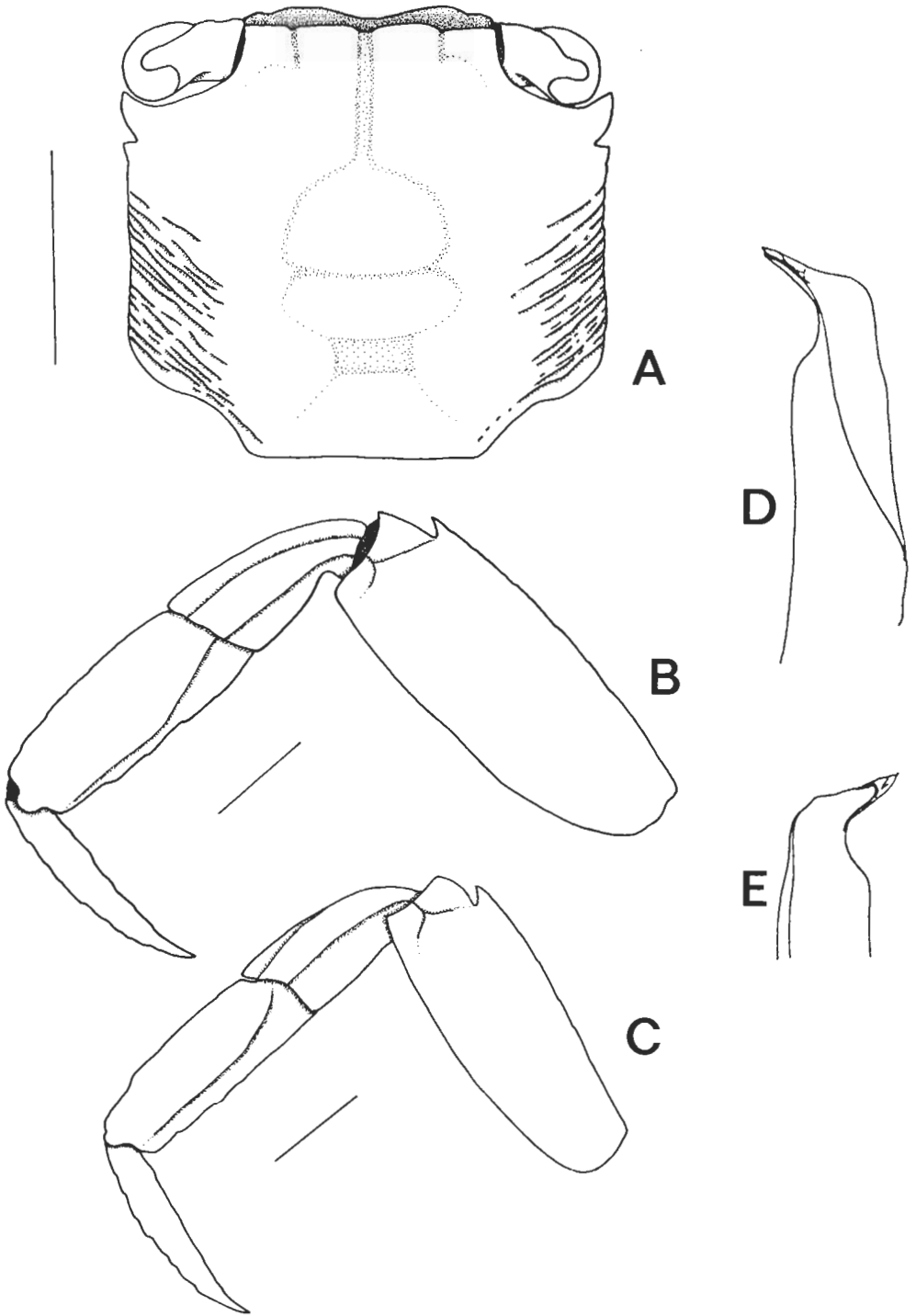


Fig. 3. *Geosesarma tiomanicum* Ng, 1986. Holotype male (10.7 by 10.2 mm)(ZRC 1965.7.29.13), "Tanah Runtuh", north of Gunung Rokam, Pulau Tioman, Peninsular Malaysia. A: carapace; B: left second ambulatory leg; C: left fourth ambulatory leg; D: dorsal view of left G1; E: ventral view of distal portion of left G1. B-E with setae not drawn in. Scales = 5.0 mm in A; 2.0 mm in B-C. (D, E, after Ng, 1986).

identified as *G. tiomanicum* by Ng & Lim (1989), has shown that it clearly belongs to *G. albomita* instead.

The G1 of *Geosesarma albomita*, new species, also bears close resemblance to *Geosesarma insulare* Ng, 1986, and *G. katibas* Ng, 1995, from Anambas Islands and Borneo respectively. However, the G1s of *G. insulare* and *G. katibas* are more stout than that of *G. albomita*. In addition, *Geosesarma albomita* is also differentiated from these two species by the low, truncated subdistal dorsal tooth on the ambulatory leg merus (versus well developed, acute subdistal tooth). Furthermore, in the G1 of *G. albomita*, the subdistal outer margin cleft is distinctly rectangular (versus rounded in *G. katibas*), the distal part is more obliquely bent (versus more horizontally bent in *G. insulare*). The first epibranchial tooth of *G. albomita* also differs from that of *G. katibas* in that it is strong and triangular in shape (versus weak, rounded).

Geosesarma albomita, like other members of this terrestrial genus, probably bears relatively large eggs from which fully developed juvenile crabs hatch out (see Ng & Tan, 1995). This dispenses with the need to return to water to release larvae, making this group truly well adapted to life on land.

Distribution. - Gunung Kajang, Pulau Tioman, Pahang, Peninsular Malaysia.

Comparative material. - *Geosesarma tiomanicum* Ng, 1986 - Holotype male (10.7 by 10.2 mm)(ZRC 1965.7.29.13), "Tanah Runtuh", north of Gunung Rokam, ca. 2°52'39"N 104°11'48"E, coll. N. Smedley, May.1929. Paratype male (ZRC 1965.7.29.14), same data as holotype.

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