

**GEOSARMA AEDITUENS, A NEW TERRESTRIAL CRAB  
(CRUSTACEA: DECAPODA: BRACHYURA: SESARMIDAE) FROM BALI, INDONESIA**

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**ABSTRACT.** – A new species of *Geosesarma* is here described from the island of Bali, Indonesia. This is the first species of this genus to be reported from the Island. *Geosesarma aedituens*, new species, is compared with its congeners, especially with the morphologically similar *G. aurantium* from Sabah, Borneo, *G. serenei* from Peninsular Malaysia and another four species occurring in the neighbouring island of Java. This species is found to be different based on the following diagnostic characters: extent of external orbital angles, movable finger on the chela, and G1 structure.

**KEY WORDS.** – *Geosesarma aedituens*, new species, taxonomy, Sesarmidae, Bali, Indonesia.

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**INTRODUCTION**

Terrestrial crabs of the genus *Geosesarma* De Man, 1892, presently number about 50 species are distributed from Southeast Asia to the islands of the Western Pacific. Although new species are continually being described, (Manuel-Santos & Yeo, 2007; Yeo & Freitag, in prep), taxonomy at the genus level is still in a state of flux (Ng, 1988; Ng et al., 2004). Specimens of an undescribed species were recently collected from tropical montane forests of Bedugul, on the island of Bali, Indonesia. There are no congeners of this species in Bali and this present study aims to describe this new species.

Specimens examined are deposited in the Muzium Zoologicum Bogoriense, Bogor, Indonesia (MZB) and the Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore (ZRC). Measurements provided are of the carapace length (CL) by the carapace width (CW) in millimeters. The abbreviations G1 and G2 are used for the male first and second gonopod respectively.

**TAXONOMY**

***Geosesarma* De Man, 1892**

***Geosesarma aedituens*, new species**  
(Figs. 1–3)

**Material examined.** – Holotype: male, 7.6 × 8.9 mm, MZB Cru 1655, Bedugul, Tabanan, Bali, Indonesia, coll. Z. Jaafar, 5 Sep.2005.

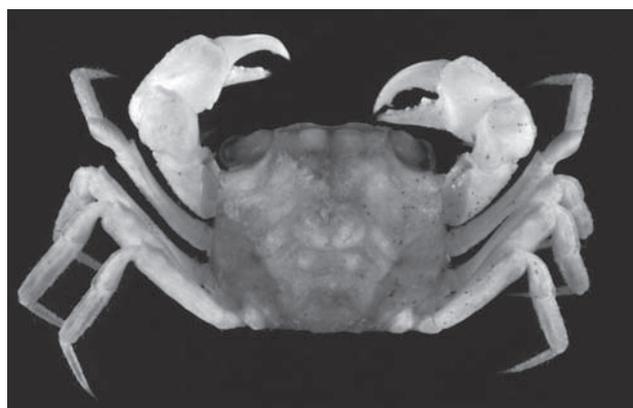


Fig. 1. *Geosesarma aedituens*, new species. Holotype, male, MZB Cru 1655.

Paratypes: 6 males, 4.0 × 4.5 – 7.4 × 8.3 mm, 2 ovigerous females, 7.2 × 8.2 mm & 7.2 × 8.6 mm, MZB Cru 1656, data as holotype; 2 males, 6.9 × 7.9 mm & 7.3 × 8.5 mm, ZRC 2007.0527, data as holotype; 3 males, 5.0 × 5.7 – 6.3 × 7.3 mm, 4 females, 3.8 × 4.2 – 6.2 × 7.1 mm, 1 ovigerous female, 7.6 × 9.0 mm, MZB Cru 1657, Pura Kayu, Sugih, Bedugul, Tabanan, Bali, Indonesia, coll. Z. Jaafar, 4 Sep.2005; 2 males, 5.7 × 6.5 mm & 6.2 by 7.0 mm, 1 female, 6.4 × 7.6 mm, 2 ovigerous females, 6.6 × 7.6 mm & 8.1 × 9.6 mm, ZRC 2007.0528, data as MZB Cru 1657; 1 male, 7.5 × 8.2 mm, ZRC 2006.0071, east of Bedugul, Mt. Bratan, Bali, Indonesia (8°16.861'S 115°10.829'E, 1240 m, within a log), coll. D. S. Sikes, 14 May 2005.

**Comparative material.** – *Geosesarma aurantium* Ng, 1995: holotype male, 10.6 × 11.7 mm, ZRC 1995.0283, in montane forest on ground, Bukit Silam, ca. 760 m above sea level, ca. 20 km west-

southwest of Lahad Datu, eastern Sabah, ca. 4°58'S 118°10'E, East Malaysia, Borneo, coll. M. Manjaji, J. Payne & B. Perumal, 10 Jul.1994. *Geosesarma bicolor* Ng & Davie, 1995: holotype male, 10.5 × 11.0 mm, ZRC 1995.0279, Citerjun, in creeks, under stones, Ujung Kulon, West Java, Indonesia, coll. C. Stewart, Jul.1993. *Geosesarma serenei* Ng, 1986: holotype male, 8.0 × 8.2 mm, ZRC 1964.9.8.1, Larut Hill, Maxwell Hills, Perak, Malaysia, coll. M. W. F. Tweedie, 1950.

**Description.** – Carapace (Figs. 1, 2a) almost squarish to slightly trapezoidal, widest at bases of second ambulatory legs, CW 1.09–1.20 CL (n = 25, mean = 1.15); dorsal surface weakly convex longitudinally and transversely, rough, partially granulated, metagastric region laterally demarcated by shallow grooves, three pairs of relatively

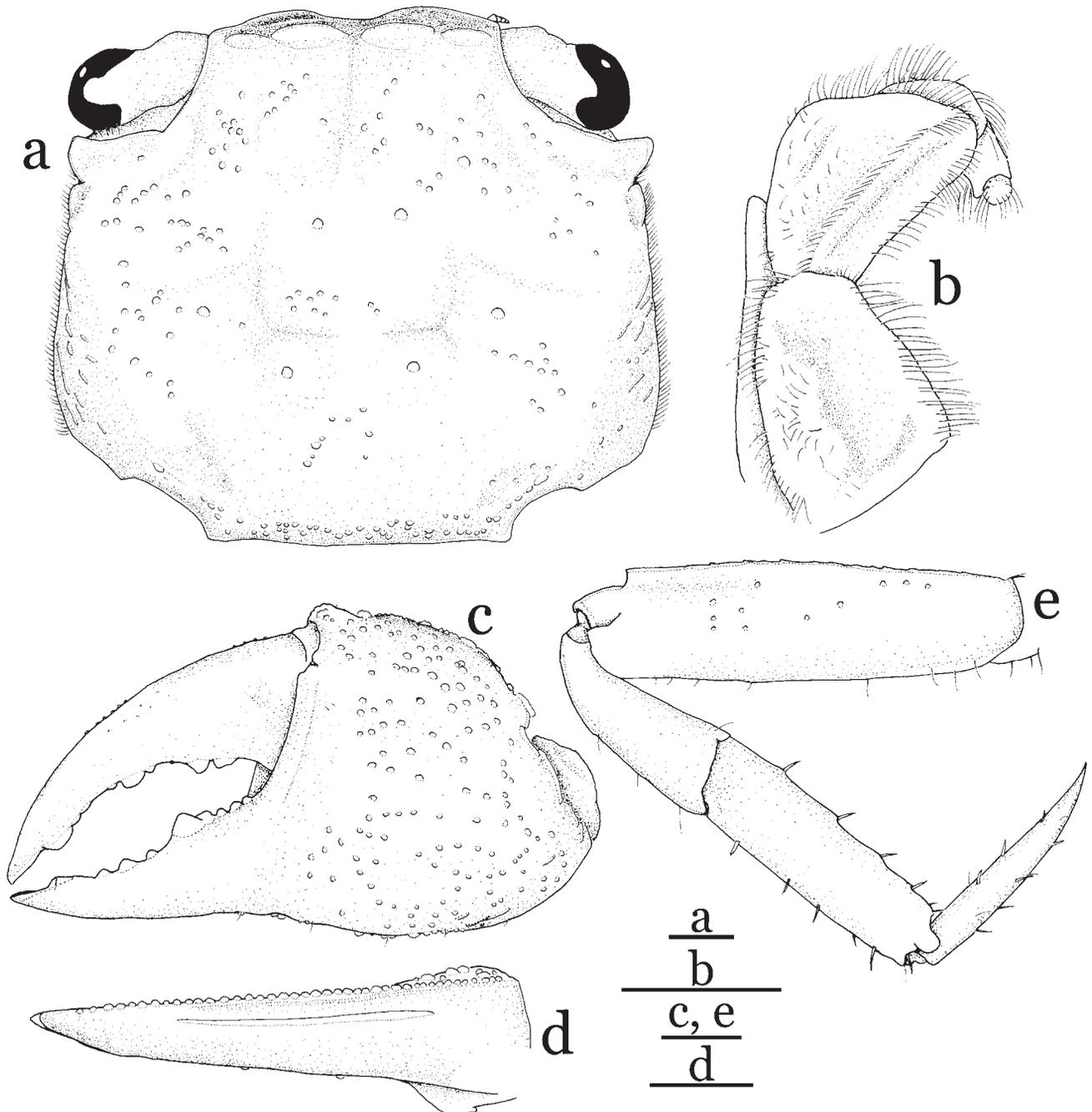


Fig. 2 *Geosesarma aedituens*, new species. Holotype, male, MZB Cru 1655: a, carapace; b, right third maxilliped; c, left chela; d, movable finger of left chela, dorsal view; e, left third ambulatory leg. Scale bars = 1 mm.

large granules present on anterior part of metagastric region and outer-posterior part of H-shaped gastric groove. Front wide, frontal width 0.44–0.51 fronto-orbital width (n = 24, mean = 0.49), strongly deflexed at level of anterior margin of ocular peduncle, frontal margin bilobed, median region concave, shallow, wide, lobe convex on inner third; two pairs of epigastric cristae on deflexed part of front, median pair wider than lateral ones. Supraorbital margin diverging posteriorly, curve shallow. External orbital angle (= first anterolateral tooth) blunt, directed laterally, but with tip slightly curved anteriorly and upturned dorsally; second anterolateral tooth separated from first tooth by V-shaped cleft, upturned, blunt, smaller than first tooth, sometimes followed posteriorly by granules. Lateral margins slightly divergent posteriorly, almost subparallel, posterolateral surface sloping outwards, posterior margin as wide as front. Epistome with posterior margin cristate, granulated, trilobed, median lobe longest.

Antennule with swollen basal article, each antennular fossa occupying one-third width of front; antennal basal article swollen laterally, basal article and endopod filling gap between lateral margin of front and inner margin of inner orbital tooth; eyes moderately developed, diverging posteriorly when set in orbits. Third maxillipeds (Fig. 2b) leaving rhomboidal gap when closed, merus as long as ischium; exopod short, reaching proximal third of merus, without flagellum.

Chelipeds (Fig. 1) equal; male chelipeds more robust than those of female, merus with triangular cross-section, ventral outer margin rimmed, slightly corneous, lined with granules in small specimens, eroded in large specimens, ventral inner margin granulated, dorsal margin incurving, outer surface sparsely granulated, inner surface with two longitudinal lines of stiff setae, ventral one denser; carpus slightly rather granulated, inner angle broad, not projected, proximal inner

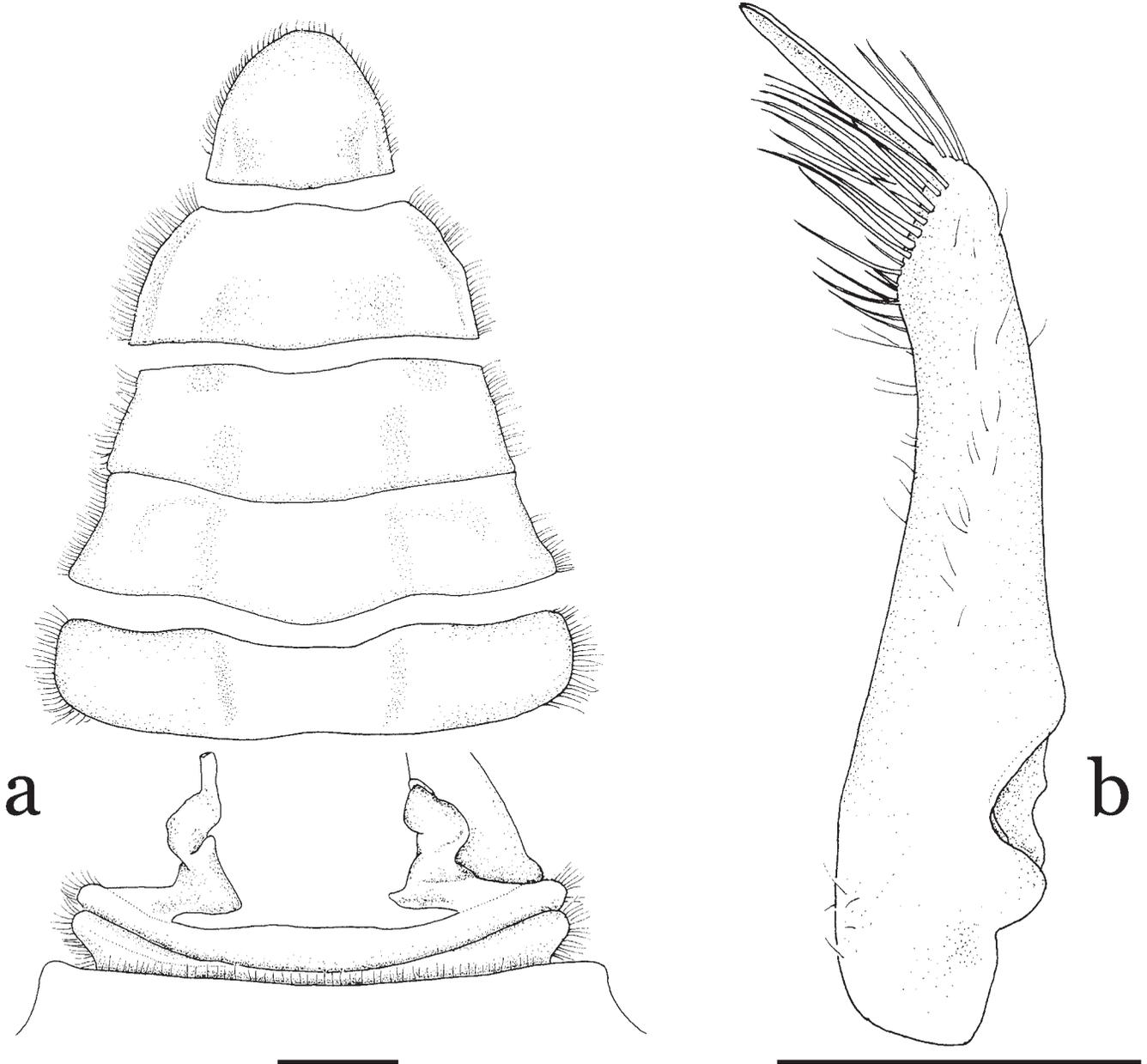


Fig. 3 *Geosesarma aedituens*, new species. Holotype, male, MZB Cru 1655: a, abdomen and telson; b, right G1, ventral view. Scale bars = 1 mm.

margin lined with stiff setae. Chela (Fig. 2c) massive, inner and outer surfaces of palm swollen, outer surface sparsely granulated, except for bases of fingers, inner surface with a crest from dorsal part of base of movable finger to base of immovable finger, granules lined along crest; movable finger as long as palm, slender, slightly curving downwards, dorsal surface (Fig. 2d) with two cristae, outer without granules, inner lined with numerous tiny granules, cutting edge with four prominent white teeth, two on proximal fifth, one on middle, one on distal fifth, distal tip corneous; immovable finger with cutting edge slightly raised on proximal third, distal two-thirds concave, forming narrow oblong gape. Ambulatory legs slender, third ambulatory leg (Fig. 2e) longest, distal end of merus slightly exceeding external orbital angle when folded anteriorly; tufts of setae present between coxae of cheliped and ambulatory legs, denser at between first and second ambulatory legs and second and third ambulatory legs; meri with anterior and posterior margins slightly raised at edges, subparallel, anterior margin rough, subdistal tooth almost right angle; propodi with outer and inner margins subparallel, dactyli terminated in sharp tooth, propodi to dactyli sparsely lined with black stiff setae.

Male abdomen (Fig. 3a) seven segmented including telson; base of first segment placed below posterior margin of carapace; second segment narrower than first, short; third segment widest, third segment to telson bell-shaped; telson slightly longer than sixth segment. G1 (Fig. 3b) slender, gently curving outwards, chitinous distal process long, about one-quarter of G1 length, compressed laterally, straight, bent outwards at ca. 30°.

Eggs large, subcircular in shape, long axis 1.42–1.62 mm (mean 1.51 mm, n = 10). One female (MZB Cru 1657, 7.6 by 9.0 mm) brooded only 17 eggs.

**Colouration.** – Live colouration of dorsal carapace reddish-brown to deep purple. Chelipeds and ventral region orange-red. Legs with dark transverse bands. Eggs deep red.

**Habitat and Ecology.** – This species is found in montane forests in the interior region of Bali, Indonesia. There are no known streams in the area, although Lake Bratan is within 3 km distance within all sites from which this species were collected. Individuals were collected from burrows excavated in raised soil banks near an abandoned temple and along footpaths and mounds within vegetated and forested areas. Banks and mounds were heavily-covered with bryophytes and the substrate was often moist. Burrows appeared to be excavated by the crabs and were found at about one metre above the ground level upwards. Juveniles tended to reside within the lower strata and mature males and females were most often found in burrows higher up on the bank. Burrow entrances were clean and well-maintained, sometimes covered or sheltered with mats of bryophytes. When live, these animals appeared cautious and shy. No individuals were found outside of their burrows. They can be seen near the burrow entrances quickly retreating at any perceived signs of threat (Z. Jaafar, pers. obs.).

**Etymology.** – The specific epithet “*aedituens*” is Latin for “keeper of a temple” as many specimens were collected from banks around an abandoned temple. The name is used as a noun in apposition.

**Remarks.** – *Geosesarma aedituens*, new species, has a relatively wide carapace and front and lacks a flagellum on the exopod of the third maxilliped, characters that are shared with *G. aurantium* Ng, 1995, from Sabah, Borneo and *G. serenei* Ng, 1986, from Peninsular Malaysia. *Geosesarma aedituens* can be easily differentiated from *G. aurantium* by the distinct bilobed frontal margin of its carapace (vs frontal margin not distinctly bilobed); laterally-directed external orbital angle (vs external orbital angle anteriorly-directed); dorsal surface of the movable finger of the male chela with an outer low ridge and an inner row of densely-set granules (ca. 41) (vs. dorsal surface of movable finger with 4–5 teeth near proximal end); and narrow terminal process of the G1 being less strongly bent (ca. 30°) [vs. broad, spade-like terminal process of the G1 being more strongly bent outwards (ca. 90°)] (present study; Ng, 1995: Figs. 1A, C, 3). *Geosesarma aedituens* can be distinguished from *G. serenei* by the convex dorsal surface of the carapace (vs. dorsal surface of the carapace not convex); slightly divergent lateral margins of the carapace (vs. lateral margins of the carapace parallel); laterally-directed external orbital angle (vs. external orbital angle produced anterolaterally); dorsal surface of the movable finger of the male chela with an outer low ridge and an inner row of densely-set granules (ca. 41) (vs. dorsal surface of the movable finger with a few teeth (ca. 5) near proximal end) and narrow terminal process of the G1 (vs. terminal process of G1 dorso-ventrally flattened and broader) (present study; Ng, 1986: Fig. 2; Ng, 1988: Fig. 55A, D, F).

*Geosesarma aedituens* is the first species of this genus to be reported from the island of Bali. Four of its congeners are recorded from the neighbouring island of Java viz.; *G. bicolor* Ng & Davie, 1995; *G. confertum* (Ortmann, 1894); *G. noduliferum* (De Man, 1892) and *G. rouxi* (Serène, 1968). *Geosesarma aedituens*, is distinguished from *G. confertum*, *G. noduliferum*, and *G. rouxi* by its blunt external orbital angles (vs. acute in *G. confertum*, *G. noduliferum*, and *G. rouxi* [present study; De Man, 1892: 342, Pl. 20, Fig. 16; Serène, 1968: Pl 2(4)]). *Geosesarma aedituens* can also be distinguished from *G. bicolor* by the absence of flagellum of the exopod of the third maxilliped in the former (vs. present in the latter) (Ng & Davie, 1995: Fig. 2C).

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