

## On the taxonomy of *Pseudosesarma edwardsii* (De Man, 1887) and *P. crassimanum* (De Man, 1887) (Crustacea: Decapoda: Brachyura: Sesarmidae), with description of a new species from Sri Lanka

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**Abstract.** The taxonomy of two species of Southeast Asian sesarmid crabs from mangroves and lowland freshwaters, *Pseudosesarma edwardsii* (De Man, 1887) and *P. crassimanum* (De Man, 1887), is clarified, and the two species are described and figured in detail. A related new species is described from Sri Lanka, and can be separated from *P. crassimanum* by its distinctively structured male first gonopod.

**Key words.** Southeast Asia, Sri Lanka, *Pseudosesarma*, Thoracotremata, taxonomy, new species

### INTRODUCTION

During ongoing studies of the Indo-West Pacific Sesarmidae, the authors examined Sri Lankan material identified by the late Raoul Serène as *Pseudosesarma crassimanum* (De Man, 1887), a species originally described from Myanmar. The male first gonopods of the Sri Lankan specimens differ markedly from those of *P. crassimanum* from Thailand, Malaysia, Singapore, and western Borneo. The Sri Lankan material clearly belong to a new species. The taxonomy of *P. crassimanum* and *P. edwardsii* (De Man, 1887) is relatively confused, as the former species was originally described as a form of *P. edwardsii*. Both species are from back mangroves and lower stretches of freshwater streams. Alcock (1900) had also recorded *P. edwardsii* from Sri Lanka. To describe the new species from Sri Lanka, it is necessary to also clarify the taxonomy of *P. crassimanum* and *P. edwardsii*.

Serène & Soh (1970) established *Pseudosesarma* for several Indo-West Pacific sesarmid species, defining the genus primarily by its members possessing a relatively less swollen basal antennular article, a subparallel lateral carapace margin armed with one or two teeth, the adult male chela lacking pectinated ridges, with the dorsal margin of the dactylus not lined with chitin-tipped tubercles, the inner surface of the adult male chela having a transverse ridge of granules, the male telson not being inserted into the distal margin of somite 6, and the distal chitinous part of the male first gonopod being relatively short. Nine species are currently

recognised in *Pseudosesarma*: *P. bocourti* (A. Milne-Edwards, 1869) (= *Sesarma cheiragona* Targioni Tozzetti, 1877), *P. crassimanum* (De Man, 1887), *P. edwardsii* (De Man, 1887) (type species by original designation), *P. granosimanum* (Miers, 1880), *P. johorensis* (Tweedie, 1940), *P. laevimanum* (Zehntner, 1894), *P. modestum* (De Man, 1902), *P. moeschii* (De Man, 1892), and *P. patshuni* Soh, 1978 (Ng et al., 2008). However, the generic status of several of these species is unclear and the genus will need to be revised.

Material examined is deposited in The Naturalis Biodiversity Center (ex Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands (NNM); The Natural History Museum, London, United Kingdom (NHM); Senckenberg Museum und Forschungsinstitut, Frankfurt, Germany (SMF); Museum of Natural History, Geneva, Switzerland (MNHG); and the Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore (ZRC). Measurements provided, in millimetres, are of the carapace width and length, respectively. The abbreviations G1 and G2 are used for the male first and second gonopods, respectively.

### TAXONOMY

#### Family Sesarmidae Dana, 1851

#### *Pseudosesarma* Serène & Soh, 1970

**Type species.** *Sesarma edwardsii* De Man, 1887, by original designation.

#### *Pseudosesarma edwardsii* (De Man, 1887)

(Figs. 1A–C, 2A, B, 3–7, 12)

*Sesarma edwardsii* De Man, 1887: 649.

*Sesarma edwardsi* – De Man, 1888: 185, pl. 13 figs. 1–4; Lanchester, 1900: 757.

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*Sesarma* (*Sesarma*) *edwardsii* – Tesch, 1917: 147 (part?).  
*Sesarma* (*Sesarma*) *edwardsii* (sic) – Serène, 1968: 105.  
*Pseudosesarma edwardsii* (sic) – Serène & Soh, 1970: 399, 406.  
*Pseudosesarma edwardsii* – Fransen et al., 1997: 127; Ng et al., 2008: 222.  
 Not *Sesarma edwardsii* Ortmann, 1894: 721 = *Bresedium brevipes* (De Man, 1889).

**Material examined.** Lectotype (here designated), male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago, Myanmar, coll. J. Anderson, 1886. Paralectotypes: 1 female (NNM-D17b), same data as lectotype; 1 young male (7.9 × 7.0 mm), 8 females (20.3 × 17.7 mm, 14.9 × 13.2 mm, 13.8 × 12.7 mm, 13.7 × 12.5 mm, 12.3 × 11.6 mm, 12.3 × 11.3 mm, 10.9 × 10.2 mm, 8.8 × 7.9 mm) (NHM 1886.52a), same data as lectotype. Others: SINGAPORE – 1 male (19.4 × 17.3 mm) (ZRC 1971.9.24.8), Sungei Seletar, coll. C.L. Soh, 29 March 1966; 1 male (ZRC 1965.7.29.50), Pulau Aya, Merban, coll. F.N. Chasen, 1931; 1 male (ZRC 1971.9.24.9), Sungei Seletar, coll. C.L. Soh, 29 March 1966; 1 male (ZRC 2003.0083), Pulau Ubin, vicinity of Asam mangroves (pitfall trap), coll. R. Teo, 20 September 2001; 1 male, 1 female (ZRC 2000.2019), Pulau Ubin, coll. C.D. Schubart, July 2000; 3 males (ZRC), swamp along dirt road to Chek Jawa, Pulau Ubin, coll. C.D. Schubart, 25 November 2011; 1 male (ZRC 2003.0084), culvert beside reservoir, Pulau Tekong, Singapore, coll. B.Y. Lee, 16 November 2001; 1 female (11.5 × 10.0 mm) (ZRC 2013.1116), near stream, northern axis of Pulau Tekong, coll. T.M. Leong, 31 January 2002; 1 ex-ovigerous female (19.1 × 17.8 mm, first zoeae reared and preserved) (ZRC 2017.1053), in secondary forest, 300 m from coast, coll. M. Chua, 24 March 2012. PENINSULAR MALAYSIA – 1 male (ZRC 1984.8031), Pangkor Island, Straits of Malacca, coll. 13 August 1967; 1 male, 1 female (ZRC 2010.0035), Pulau Langkawi, Temurun waterfall, coll. P.K.L. Ng, 17 June 1998; 1 male (13.9 × 12.9 mm), 1 female (13.1 × 11.6 mm) (ZRC), Sungei Temurun Datai, Langkawi, Kedah, Malaysia, coll. Universiti Sains Malaysia, 1 April 2003; 1 male (19.4 × 18.2 mm), 1 female (19.3 × 17.7 mm) (SMF) Pulau Langkawi, Air Temurun waterfall and stream, coll. C.D. Schubart et al., 15 March 2006.

**Diagnosis.** Carapace almost quadrate (Figs. 1A, 2A, 3); frontal margin relatively wide, median concavity separating lobes shallow (Fig. 2A); epibranchial tooth distinct, separated from rest of margin by deep notch (Figs. 1A, 2A, 3); posterolateral margins slightly divergent to subparallel posteriorly (Figs. 1A, 2A, 3); outer surface of chela gently convex, covered with small rounded granules, ventral margin of palm sinuous, unarmed or with low granules, fingers relatively long compared to overall chela (Figs. 1B, 4, 12D, E, G); suture between male thoracic sternites 3 and 4 distinct (Figs. 5, 6C); male pleon broadly triangular (Figs. 1C, 5, 6A, B); male sternopleonal cavity with press-button of pleonal locking mechanism on sternite 5; G1 very stout, lateral margins parallel, distal part distinctly bifurcated or bilobed, with short subtruncate chitinous part between lobes (Figs. 6D, E, 7A, B, D–I).

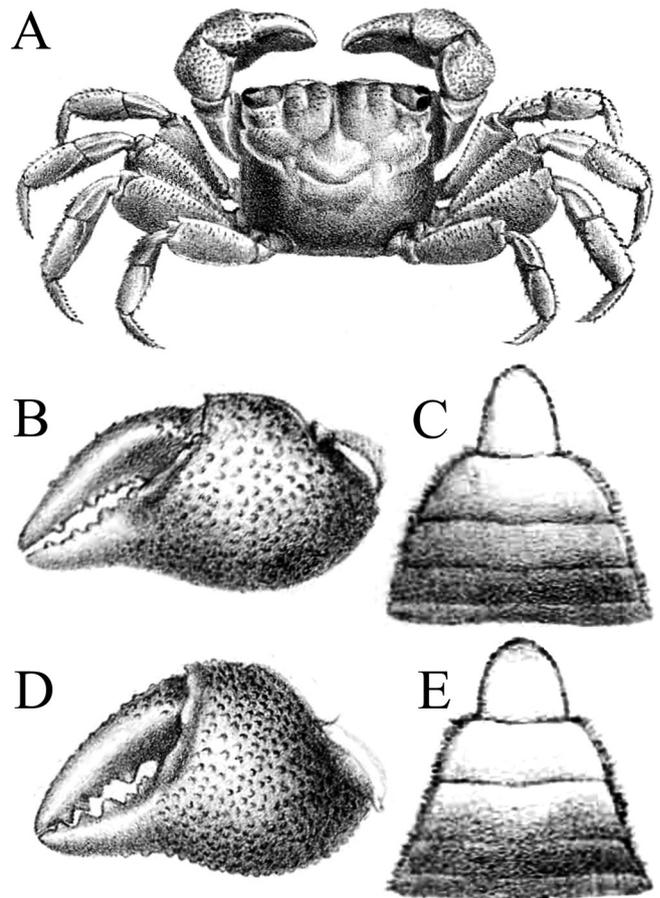


Fig. 1. A–C, *Pseudosesarma edwardsii* (De Man, 1887); D, E, *Pseudosesarma crassimanum* (De Man, 1887). A, overall habitus; B, D, chela; C, E, male pleonal somites 3–6 and telson. D, horizontally transposed (after De Man, 1888: pl. 13 figs. 1–3, 5, 6)

**Colour.** Brown to reddish-brown in life, with many specimens having the posterior part of the carapace slightly to distinctly darker in colour (Fig. 12A, C, F, G). In life, the chelae are red to dark red, with the pigmentation extending to midway or further along the finger and the distal part white (Fig. 12D, E, G).

**Remarks.** The situation regarding the date of publication for *Sesarma edwardsii* is the same as that discussed for *Sesarma polita* De Man, 1887 [now *Labuanium politum* (De Man, 1887)] by Ng et al. (2015: 217). De Man (1887: 649) had credited the name to “De Man. 1886”, but this paper was not published until 1888. Although De Man (1888: 185) cited the species as new, the name was already available from his 1887 paper, and the species should be dated from then. In his 1887 paper, De Man did not indicate how many specimens he examined, but later (De Man, 1888) listed 58 specimens from Sullivan Island in the Mergui Archipelago. Although he noted the largest male and female specimens as measuring 20.33 × 18.67 mm and 19.50 × 17.33 mm, respectively (De Man, 1888: 188), no type was designated. Fransen et al. (1997: 127) listed a male and a female specimen as syntypes; and the male is here designated as the lectotype of *Sesarma edwardsii* De Man, 1887. The NHM has one small male and eight females (NHM 1886.52a) but the whereabouts of the remaining specimens are not known.

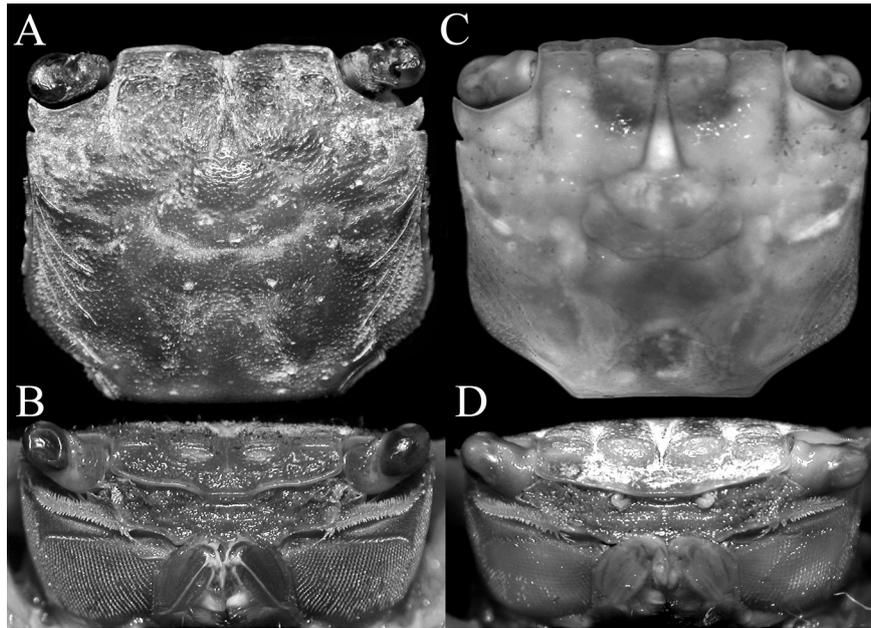


Fig. 2. A, *Pseudosesarma edwardsii* (De Man, 1887), lectotype male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago; B, *Pseudosesarma edwardsii*, male (21.3 × 18.7 mm) (ZRC 2003.84), Singapore; C, D, *Pseudosesarma crassimanum* (De Man, 1887), lectotype male (16.3 × 14.6 mm) (NHM 1886.52b), Myanmar. A, C, dorsal view of carapace; B, D, frontal view of cephalothorax.

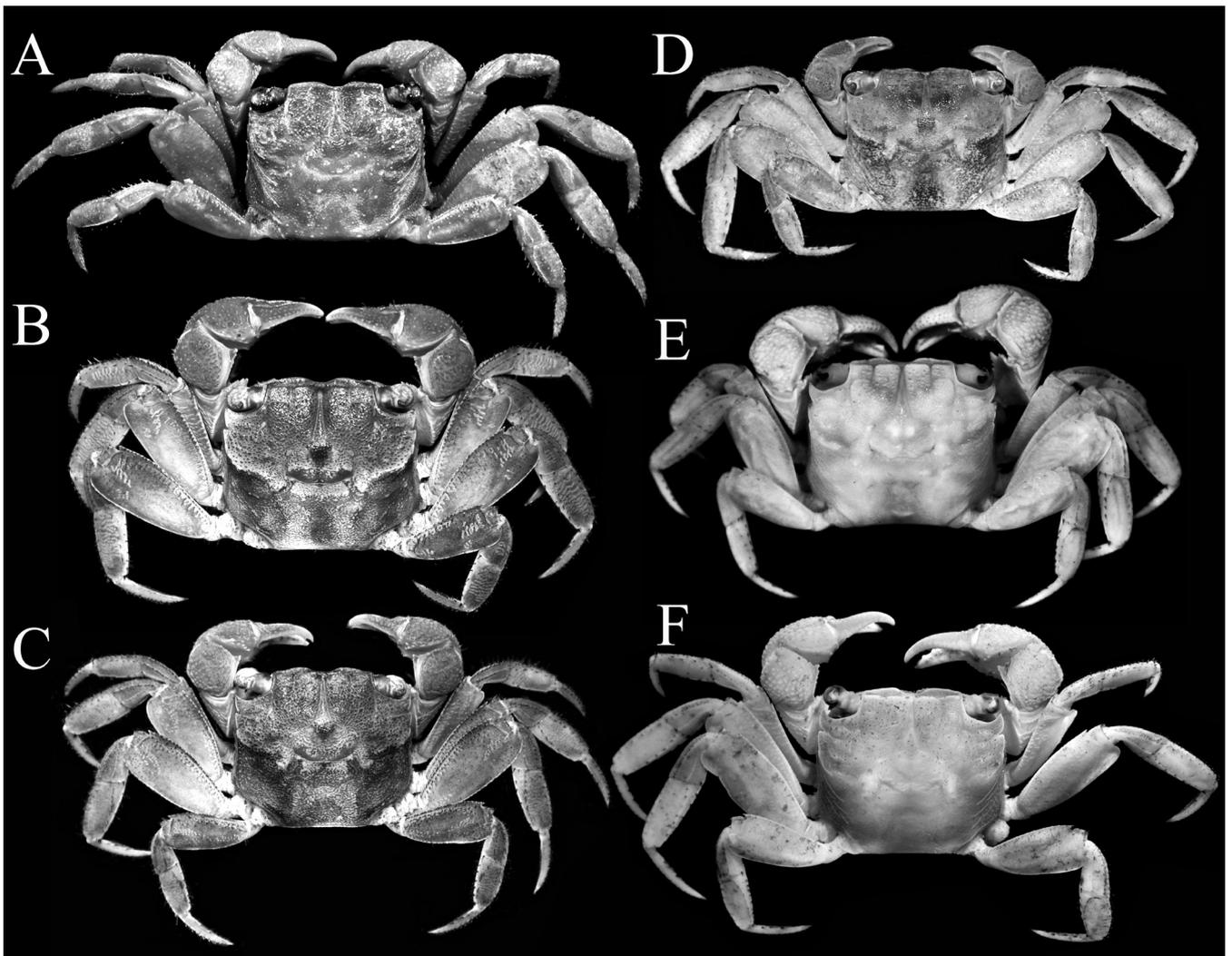


Fig. 3. *Pseudosesarma edwardsii* (De Man, 1887), overall habitus. A, lectotype male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago; B, male (20.3 × 19.0 mm) (ZRC 2016.608), Langkawi; C, male (17.8 × 16.3 mm) (ZRC 2016.608), Langkawi; D, male (12.5 × 10.4 mm) (ZRC 2016.608), Langkawi; E, male (19.4 × 17.3 mm) (ZRC 1971.9.24.8), Singapore; F, male (21.3 × 18.7 mm) (ZRC 2003.84), Singapore.

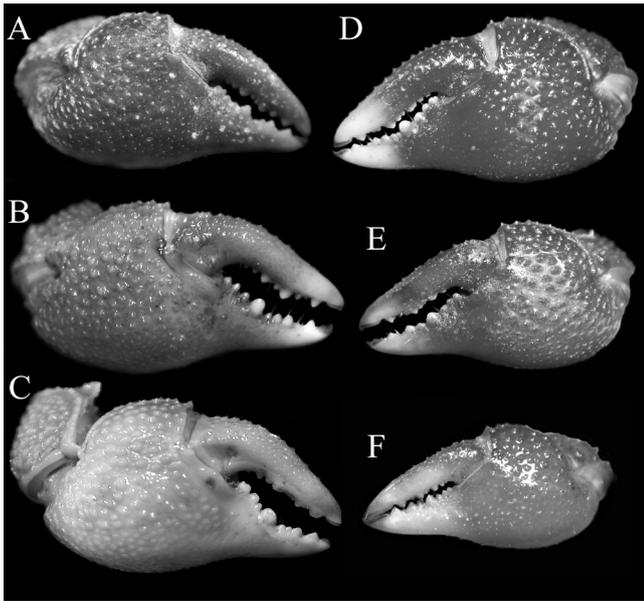


Fig. 4. *Pseudosesarma edwardsii* (De Man, 1887), chela. A, lectotype male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago; B, male (21.3 × 18.7 mm) (ZRC 2003.84), Singapore; C, male (19.4 × 17.3 mm) (ZRC 1971.9.24.8), Singapore; D, male (20.3 × 19.0 mm) (ZRC 2016.608), Langkawi; E, male (17.8 × 16.3 mm) (ZRC 2016.608), Langkawi; F, male (12.5 × 10.4 mm) (ZRC 2016.608), Langkawi.

On a point of nomenclature, De Man (1887: 649) originally spelled the names as “*Sesarma edwardsii*” but later used only one “i” for the name, “*Sesarma edwardsi*” (cf. De Man, 1888: 185). The original spelling is here maintained.

The male pleon in *P. edwardsii* varies to some degree according to size. In the largest males (carapace width ca. 20 mm) and lectotype from Mergui (17.5 × 16.1 mm, NNM-D17), the pleon (notably somites 3–6) is wider (Figs. 1C, 6A), being less so in smaller males (Figs. 5E, F, 6B). The G1 structure does not change substantially in form from small and large specimens (Figs. 6D, E, 7A, B, D–I), although juvenile males (less than 10 mm carapace width) have a less chitinised structure.

*Pseudosesarma edwardsii* and *P. crassimanum* (De Man, 1887) are closely related and not always easy to separate. They have been generally regarded as varieties in many of the earlier works but De Man (1888: 188–189) distinguished *P. crassimanum* from *P. edwardsii* as follows: “The front is a little larger, the proportion of the distance between the extraorbital teeth to the breadth of the front being as 11 : 7 [11 : 6 in *P. edwardsii*]; the abdomen of the male is a little less enlarged, and therefore completely resembles the abdomen of *S. picta*, as figured by de Haan, the posterior



Fig. 5. *Pseudosesarma edwardsii* (De Man, 1887), male anterior thoracic sternum and pleon. A, lectotype male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago; B, male (21.3 × 18.7 mm) (ZRC 2003.84), Singapore; C, male (19.4 × 17.3 mm) (ZRC 1971.9.24.8), Singapore; D, male (20.3 × 19.0 mm) (ZRC 2016.608), Langkawi; E, male (17.8 × 16.3 mm) (ZRC 2016.608), Langkawi; F, male (12.5 × 10.4 mm) (ZRC 2016.608), Langkawi.

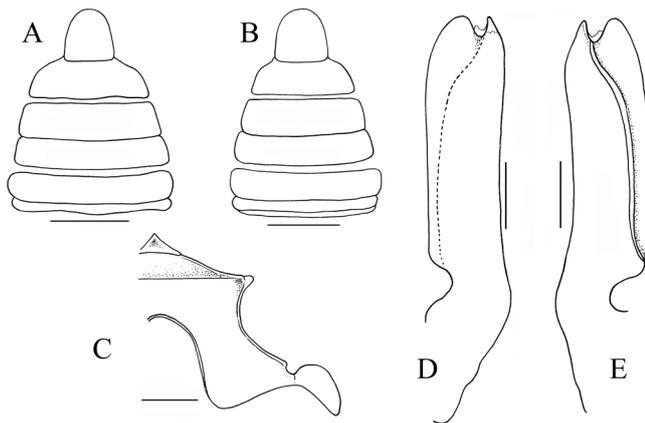


Fig 6. *Pseudosesarma edwardsii* (De Man, 1887). A, C–E, lectotype male (17.5 × 16.1 mm) (NNM-D17a), Mergui Archipelago; B, male (13.3 × 12.9 mm) (ZRC 2000.2019), Pulau Ubin, Singapore. A, B, male pleon; C, anterior thoracic sternites 1–4; D, E, left G1 (denuded). Scales: A = 5.0 mm; B, C = 2.0 mm; D, E = 1.0 mm.

margin of the penultimate joint being a little less than three times as broad as the length of the joint. The hands of the male differ from those of the type by the palm being a little larger in proportion to the fingers, the latter being quite as long as the palm. The hands are a little, higher than half length, the proportion of the latter to the height being as  $16\frac{1}{2} : 9\frac{1}{2}$ . The inner edges of the fingers are more strongly denticulated, the immobile finger being armed with three rather strong teeth, and with some smaller teeth at the base. The colouration of the hands is also somewhat different from the type. In the latter the red colour of the palm extends nearly to the tip of the fingers; but in this variety that colour is found only on the palm and at the base of the mobile finger, the fingers being of a yellowish colour.” De Man (1887, 1888) obviously felt the differences were not substantial as he treated *P. crassimanum* only as a variety. De Man (1888) did not figure the carapace of *P. crassimanum*, only its male pleon and chela (Fig. 1D, E), and these agree with the description above.

Certainly, the difference in male pleon shape is apparent, when large specimens of both species are compared, with that of *P. crassimanum* always relatively more slender, with somites 3–5 proportionately less broad (Figs. 1E, 10). Even the largest specimen of *P. crassimanum* examined (Fig. 10B) does not have a male pleon as wide as those of large adult *P. edwardsii* (Fig. 5A, B). Smaller specimens of *P. edwardsii*, however, may have male pleons (Fig. 5E, F) which resemble those of adult *P. crassimanum* (Fig. 10). As discussed earlier, the different male pleonal structures, notably in the relative width of somite 6, may be a function of size, but the largest male of *P. crassimanum* that De Man had measured (19.25 × 17.25 mm, see De Man, 1888: 189) is not markedly different from the largest male of *P. edwardsii* that he examined (20.33 × 18.67 mm). The male chela of *P. crassimanum* figured (Fig. 1D; De Man, 1888: pl. 13 fig. 6) is notably stouter, with the chela relatively shorter (hence De Man’s name for the taxon) and the ventral margin relatively more denticulate compared to that of *P. edwardsii* (Fig. 1B; De Man, 1888: pl. 13 fig. 3). This is also valid for the good

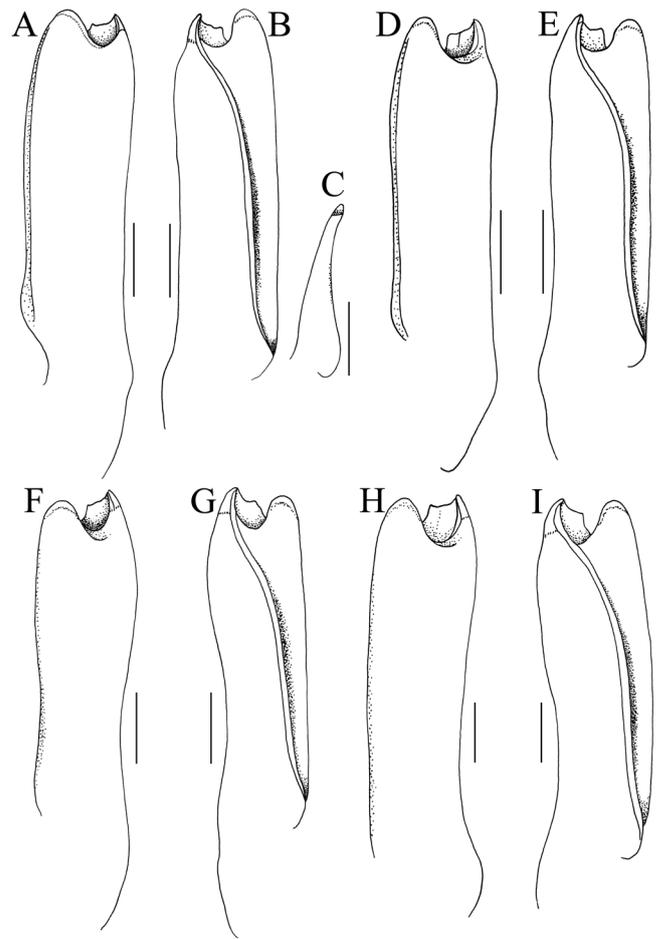


Fig. 7. *Pseudosesarma edwardsii* (De Man, 1887), gonopods. A–C, male (20.5 × 19.3 mm) (ZRC 2016.608), Langkawi; D, E, male (21.3 × 18.7 mm) (ZRC 2003.84), Singapore; F, G, male (17.8 × 16.3 mm) (ZRC 2016.608), Langkawi; H, I, male (12.5 × 10.4 mm) (ZRC 2016.608), Langkawi. A, B, D–I, left G1; C, left G2. Scales: A–E = 1.0 mm; F–I = 0.5 mm.

series of specimens of *P. crassimanum* here examined (Fig. 9), when compared to the chelae of *P. edwardsii* (Fig. 4).

Specimens from western Thailand, Malaysia, Singapore and Kalimantan have mainly been identified as *P. crassimanum* based on the description and figures provided by De Man (1887, 1888). The frontal margin of *P. crassimanum* appears to be relatively wider than that of *P. edwardsii*, mainly because the carapace shape of *P. crassimanum* is more transversely rectangular (Figs. 3C, 8) compared to the more quadrate shape of *P. edwardsii* (Figs. 1A, 2A, 3). This difference, however, is not always reliable, being less obvious in small specimens. De Man (1888) notes that the cutting margins of the fingers are more denticulate with stronger teeth in *P. crassimanum* compared to *P. edwardsii*. All the cutting edges of the fingers of adult male *P. crassimanum* have proportionately much stronger teeth (Fig. 9) than those of *P. edwardsii* (Fig. 4). In addition, the figure of the chela by De Man of *P. crassimanum* (Fig. 1D; De Man, 1888: pl. 13 fig. 6) shows a distinct large subproximal tooth on the cutting margin of the dactylus. This large tooth is absent in *P. edwardsii*, the subproximal part of the cutting margin of the dactylus possessing about three small teeth instead

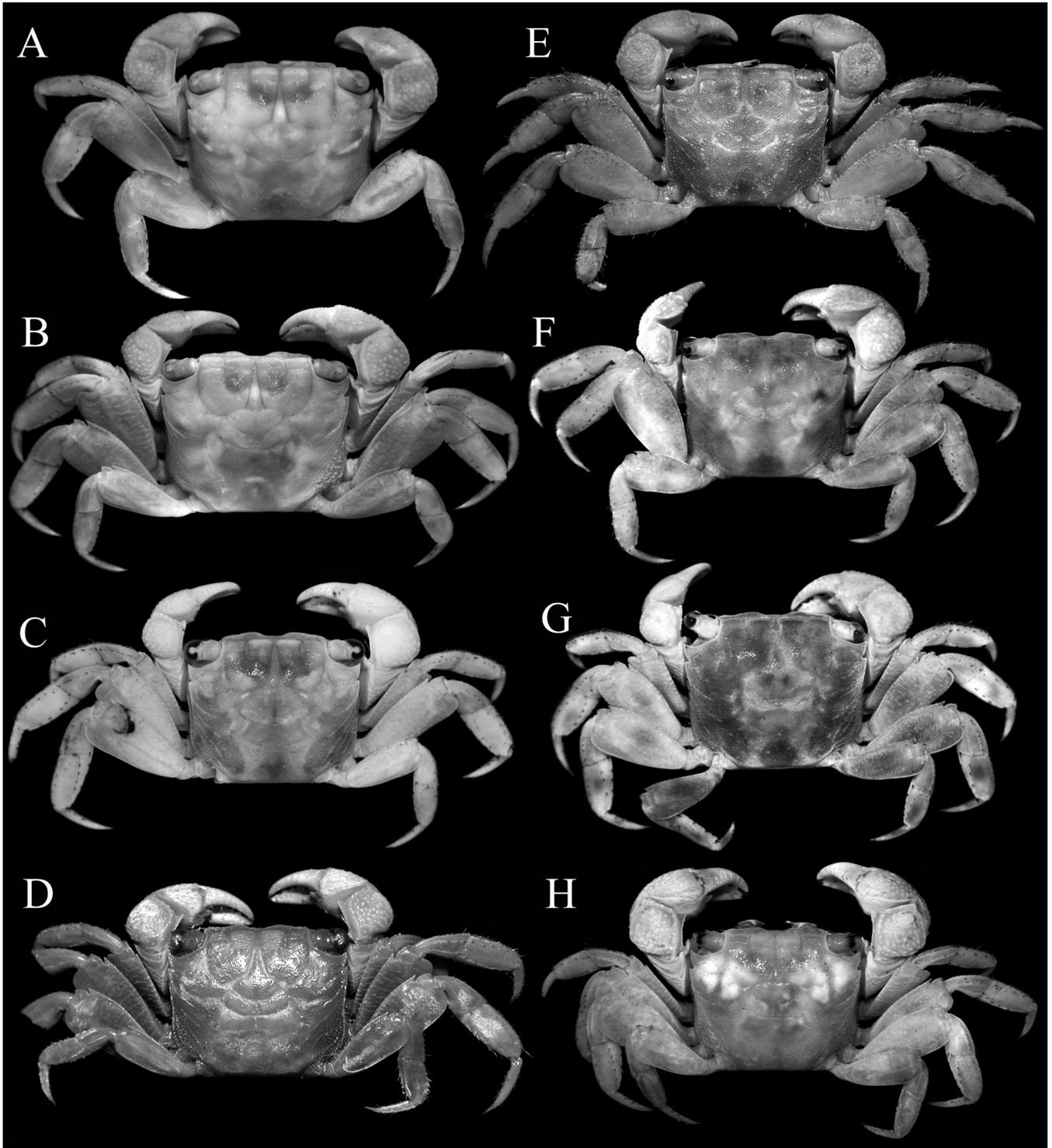


Fig. 8. *Pseudosesarma crassimanum* (De Man, 1887), overall view. A, lectotype male (16.3 × 14.6 mm) (NHM 1886.52b), Myanmar; B, paralectotype male (18.8 × 16.7 mm) (NHM 1886.52c), Myanmar; C, male (15.9 × 14.3 mm) (ZRC 2008.442), Ranong; D, male (14.0 × 11.9 mm) (MNHG), Sarawak; E, male (15.9 × 14.5 mm) (NNM D23313), Singapore; F, male (18.9 × 16.7 mm) (ZRC 1998.851), Sarawak; G, male (17.2 × 15.0 mm) (ZRC 1999.503), Kalimantan; H, male (17.5 × 15.0 mm) (ZRC 1967.7.21.4), Singapore.

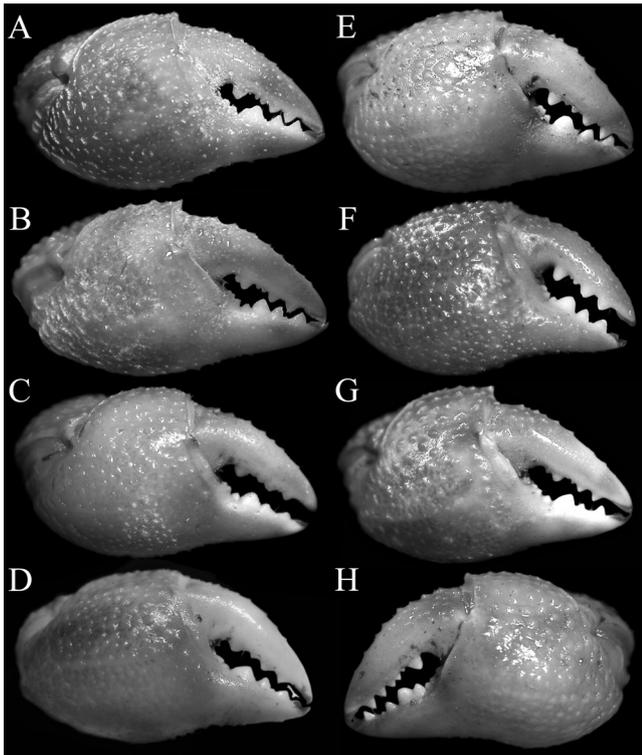


Fig. 9. *Pseudosesarma crassimanum* (De Man, 1887), chela. A, lectotype male (16.3 × 14.6 mm) (NHM 1886.52b), Myanmar; B, paralectotype male (18.8 × 16.7 mm) (NHM 1886.52c), Myanmar; C, male (15.9 × 14.3 mm) (ZRC 2008.442), Ranong; D, male (15.9 × 14.5 mm) (NNM-D23313), Singapore; E, H, male (17.5 × 15.0 mm) (ZRC 1967.7.21.4), Singapore; F, male (18.9 × 16.7 mm) (ZRC 1998.851), Sarawak; G, male (17.2 × 15.0 mm) (ZRC 1999.503), Kalimantan.

(Fig. 1B; De Man, 1888: pl. 13 fig. 3). This subproximal dactylar tooth is present in all the adult male chelae of the material of *P. crassimanum* examined here. As such, the general form of the chela, as well as the dentition of the fingers, are surprisingly reliable diagnostic characters for *P. crassimanum*. De Man (1888) was also correct about the colour of the chela in life. In fresh *P. edwardsii*, the red colour on the chela extends to the middle to three-quarters of the length of both fingers, with the distal half white (Fig. 12D, E, G). In *P. crassimanum*, the more reddish colour on the chela ends at the bases of both yellowish-white fingers (Fig. 13B, D, H, I).

Another difference between *P. crassimanum* and *P. edwardsii* is the form of the frontal margin. The median concavity separating the two lobes is usually more distinct in *P. crassimanum* (Figs. 2C) than in *P. edwardsii* (Figs. 2A). The adult ambulatory leg of *P. crassimanum*, notably the merus, are also usually proportionately shorter (Fig. 8) compared to those of *P. edwardsii* (Fig. 3), although this character is not reliable for subadults. The most effective character to separate the two species is the G1. In *P. edwardsii*, the G1 is evenly stout, with the margins parallel, and the distal part bifurcated or bilobed, with the chitinous part between the lobes short (Figs. 6D, E, 7A, B, D–I). In *P. crassimanum*, the distal half of the G1 is much wider than the proximal part, and the chitinous distal part forms a beak-like structure

(Fig. 11B–F, H–L, O–R). The carapace also appears to be differently coloured in life. In *P. edwardsii*, most of the specimens have the posterior part of the carapace relatively darker in colour, to the degree that it appears bicoloured (Fig. 12C, F). In *P. crassimanum*, the dorsal surface of the carapace is usually more uniformly coloured brown, although the posterior part is often darker (Fig. 13A, C, F).

“*Sesarma edwardsi*” and “*Pseudosesarma edwardsii*” have been reported from many parts of Burma, India, Andamans, Bangladesh, Sri Lanka by Alcock (1900: 416), Mandal & Nandi (1989: 25), Kathirasan (2000: 193), Dev Roy & Nandi (2001: 18), Dev Roy & Bhadra (2007: 143, pl. 4 fig. 5), Dev Roy (2008: 131), Paul et al. (2012: 193), Holmes et al. (2014: 160) and Shet et al. (2016: 8, 12, fig. 2); as well as Java, Sulawesi and New Guinea by Tesch (1917: 147). The material from Sri Lanka by Alcock (1900) is probably conspecific with what is described later as *P. anteactum*, new species. Specimens from Kerala in West India which are superficially similar to *P. edwardsii* have been referred to a new species, *P. glabrum* (cf. Ng et al., 2017), and many of the western Indian records are probably conspecific with it. Ng (2017) also recently described a species morphologically similar to *P. crassimanum* from Myanmar. The identities of the others can only be ascertained when the specimens are re-examined. Some may belong to *P. crassimanum* or another sesarmid species. The record of “*Sesarma edwardsi*” by Ortmann (1894: 721) from Australia is probably what is now known as *Bresedium brevipes* (De Man, 1889) (see also Laurie, 1906; McNeill, 1968).

**Biology.** *Pseudosesarma edwardsii* is typically found in well forested lowland freshwater or brackish water habitats behind of coastal areas and seashores. They are semiterrestrial living at the banks of streams and swamps, and are often found under rocks and vegetation. They are sometimes several hundred metres from the sea, even at the base of waterfalls. They have small eggs (Fig. 12B) and it is clear that their larval development remains associated to the open sea and as such, they belong to the supratidal-limnic life form as characterised by Schubart et al. (2000).

**Distribution.** Mergui Archipelago to Peninsular Malaysia and Singapore for certain; other records need to be confirmed.

#### *Pseudosesarma crassimanum* (De Man, 1887)

(Figs. 1D, E, 2C, D, 8–11, 13)

*Sesarma edwardsii* var. *crassimana* De Man, 1887: 649.

*Sesarma edwardsii* var. *crassimana* – De Man, 1888: 188, pl. 13 figs. 5, 6; Zehntner, 1894: 180; Lanchester, 1900: 757.

*Sesarma* (*Episesarma*) *edwardsii* var. *crassimana* – De Man, 1895: 174.

*Sesarma* (*Sesarma*) *edwardsii crassimana* – Tesch, 1917: 148; Ingle & Fernando, 1963: fig. 2c, d.

*Sesarma crassimana* – Tweedie, 1940: 92; Tweedie, 1950: 343, fig. 2b.

*Sesarma* (*Sesarma*) *crassimanum* – Serène, 1968: 105.

*Pseudosesarma crassimanum* – Serène & Soh, 1970: 399, 406; Naiyanetr, 1998: 102; Naiyanetr, 2007: 115; Rademacher & Mengedoht, 2011: 29.

“*Pseudosesarma*” *crassimanum* – Ng et al., 2008: 222.

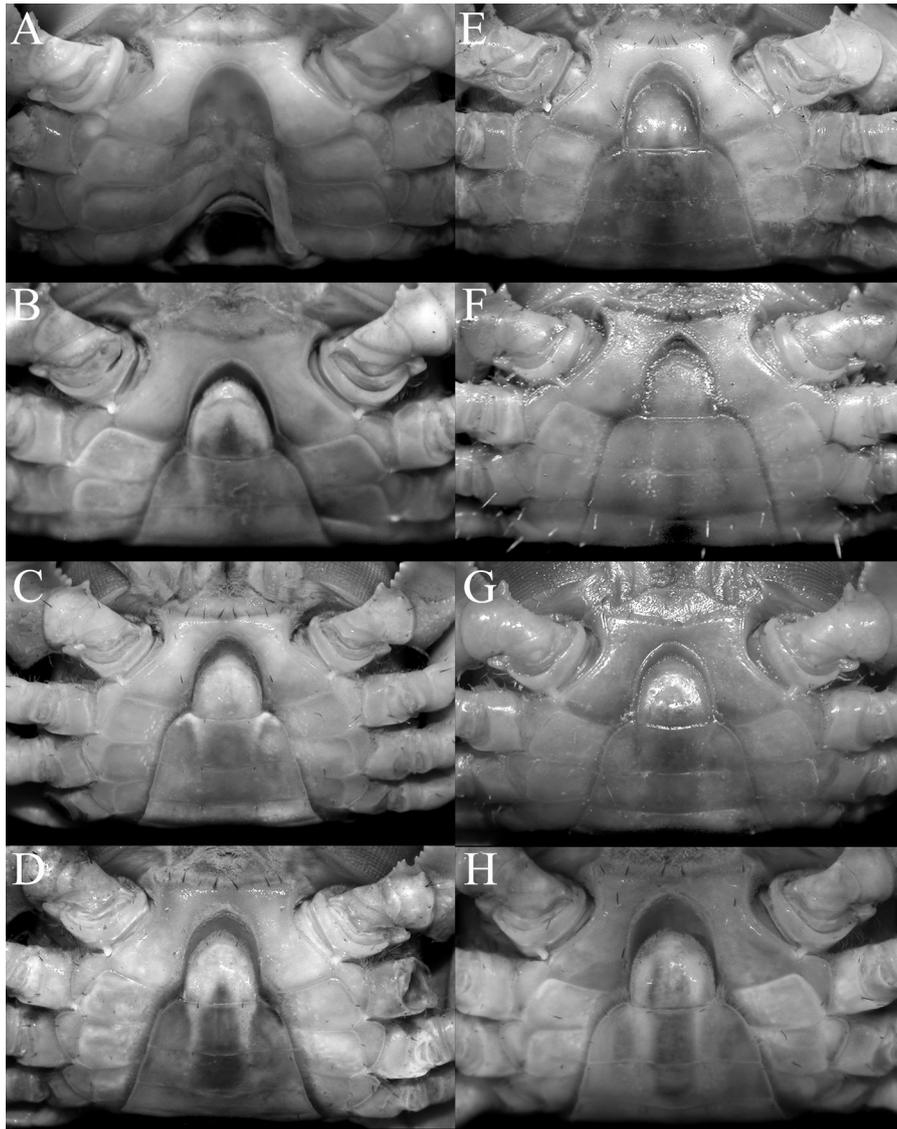


Fig. 10. *Pseudosesarma crassimanum* (De Man, 1887), male anterior thoracic sternum and pleon. A, lectotype male (16.3 × 14.6 mm) (NHM 1886.52b), Myanmar; B, paralectotype male (18.8 × 16.7 mm) (NHM 1886.52c), Myanmar; C, male (15.9 × 14.3 mm) (ZRC 2008.442), Ranong; D, male (18.9 × 16.7 mm) (ZRC 1998.851), Sarawak; E, male (17.5 × 15.0 mm) (ZRC 1967.7.21.4), Singapore; F, male (15.9 × 14.5 mm) (NNM-D23313), Singapore; G, male (15.1 × 13.3 mm) (ZRC 2000.1768), Peninsular Malaysia; H, male (17.2 × 15.0 mm) (ZRC 1999.503), Kalimantan.

**Material examined.** Others: Lectotype (here designated), male (16.3 × 14.6 mm) (NHM 1886.52b), mangrove swamps at Zediwon, Mergui Archipelago, Myanmar [= Burma], coll. J. Anderson, 1886. Paralectotypes: 1 male (18.8 × 16.7 mm), 2 females (16.6 × 14.3 mm, 12.5 × 11.0 mm) (NHM 1886.52c), same data as lectotype. THAILAND – 1 male (15.9 × 14.3 mm) (ZRC 2008.0442), Ranong Province, King Amphoe Suk Sam Lan, Ton Roi waterfall, 9°27'29.2"N 98°30'31"E, Thailand, coll. D.C.J. Yeo et al., 12 August 1997; 2 males (21.9 × 19.5 mm, 18.5 × 16.3 mm), 2 females (larger 18.0 × 15.9 mm) (ZRC 2017.0169), Gulf of Thailand, coll. aquarium trade, April 2017. SINGAPORE – 1 male, 2 females (ZRC 1985.422–424), Sungei Seletar, coll. C.L. Soh, 23 September 1959; 1 male (17.5 × 15.0 mm) (ZRC 1967.7.21.4), Sungei Seletar, coll. C.L. Soh, 31 December 1966; 1 male (15.9 × 14.5 mm) (NNM-D23313), probably from Singapore, don. R. Serène; 1 female (ZRC 1967.7.10), Sungei Seletar, coll. C.L. Soh, 6 May 1966; 2 males (ZRC

1967.7.10.40), Sungei Seletar, coll. C.L. Soh, 18 July 1966; 1 male (ZRC number), Simpang River, Mak Wai, coll. C.L. Soh, 18 February 1966; 2 females (ZRC 1973.11.2.493–494), Sungei Seletar, 29 March 1966; 1 male (ZRC 1967.7.10.39), coll. C.L. Soh; 1 male (ZRC 1971.9.22.10), no other data, coll. C.L. Soh; 1 male, 3 females (ZRC), no other data. PENINSULAR MALAYSIA – 1 male (ZRC 2003.0054), Johor, Mawai, Sungei Ulu Sedili, coll. T.M. Leong, 30 August 2002; 4 males, 3 females (ZRC 2010.1768), Johor, Sungei Benut Cintom, coll. C.D. Schubart et al., 30 September 1999; 2 males, 1 female (ZRC 1964.9.25.210–212), Sedili River, Johor, coll. M.W.F. Tweedie, 1938; 1 male (ZRC 1999.0990), Pulau Tioman, Sungei Keliling, coll. H.H. Tan, 25 June 1999; 1 male, 8 females (largest 20.2 × 17.0 mm) (ZRC 2011.1012), Pulau Tioman, Sungei Keliling, coll. P.K.L. Ng et al., 27–28 January 1996; 1 male (12.6 × 10.5 mm) (ZRC), 1 female (ZRC 2016.276), small freshwater stream at beginning of mangroves, Pulau Tioman, Sungei

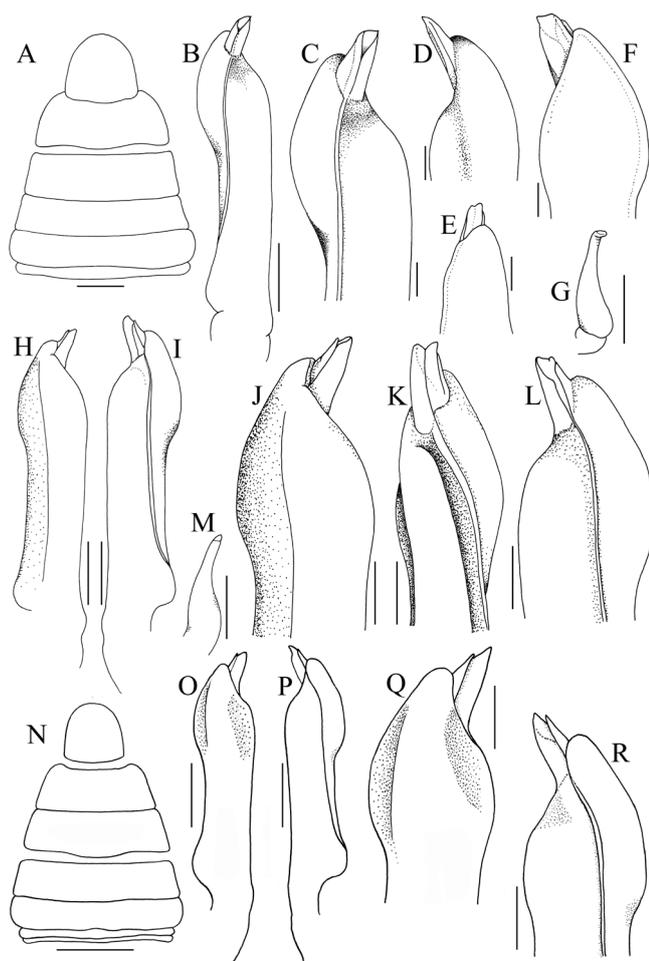


Fig. 11. *Pseudosesarma crassimanum* (De Man, 1887). A–G, lectotype male (16.3 × 14.6 mm) (NHM 1886.52b), Myanmar; H–M, male (15.9 × 14.3 mm) (ZRC 2008.442), Ranong; N–R, male (15.9 × 14.5 mm) (NNM-D23313), Singapore. A, N, pleon; B–F, right G1; G, right G2; H–L, O–R, left G1; M, left G2. Scales: A = 2.0 mm; B, G, H, I, M, O, P = 1.0 mm; N = 5.0 mm; C–F, J–L, Q, R = 0.5 mm.

Keliling, coll. P.K.L. Ng, 19 August 2003; 1 male (ZRC 1985.425), coll. D.S. Johnson, 31 July 1959; 5 males, 3 females (ZRC 1999.0957), Pulau Tioman, Sungei Keliling, coll. H.H. Tan et al., 25 June 1998. SARAWAK – 1 male (14.0 × 11.9 mm) (MNHG), coll. Bedot & Pichet, 1800s; 14 males, 10 females (ZRC 1964.9.25.368–379), Kuching, coll. M.W.F. Tweedie, 1950; 1 male (18.9 × 16.7 mm) (ZRC 1999.851), stream 3 km before turn off to Cape Pelandok and Kampung Pandan, after Landa town, drains from Sungei Gading, coll. H.H. Tan, 2 September 1996; 3 males (ZRC 1964.9.28.14–16), Stambak, Saribas, coll. L.K. Charles, 1950. INDONESIA – 2 males (17.2 × 15.0 mm, 14.3 × 12.3 mm) (ZRC 1999.503), Tanjung Reolep, Sungai Berau, riverbank, Kalimantan, coll. R. Diesel, 2 September 1995. CAMBODIA – 1 male, 1 female (ZRC 1965.7.29.52), Tonle Sap, Siam, coll. N. Annandale, 1918.

**Diagnosis.** Carapace transversely rectangular (Figs. 2C, 8); frontal margin relatively wide, median concavity separating lobes distinct (Fig. 2C); epibranchial tooth distinct, separated from rest of margin by deep notch (Figs. 2C, 8); posterolateral

margins subparallel (Figs. 2C, 8); outer surface of chela gently convex, covered with small rounded granules, ventral margin of palm sinuous, denticulate, fingers relatively short compared to overall chela (Figs. 1D, 9, 13B, D, H, I); suture between male thoracic sternites 3 and 4 distinct (Fig. 10); male pleon broadly triangular (Figs. 1E, 10, 11A, N); male sternopleonal cavity with press-button of pleonal locking mechanism on sternite 5; distal half of G1 gently swollen, much wider than proximal part, chitinous part forming beak-like structure (Fig. 11B–F, H–L, O–R).

**Colour.** In life, smaller specimens have a dark brown carapace with somewhat more purplish-red chelae and yellowish fingers (Fig. 13). Larger specimens have carapaces which are lighter brown, with the chelae dull red to yellow (see Rademacher & Mengedocht, 2011: 29).

**Remarks.** In naming *Sesarma edwardsii*, De Man (1887: 649) noted that “Eine Varietät dieser Art, *crassimana* genannt, unterscheidet sich hauptsächlich durch verhältnismässig kürzere Scheerenfinger.” This short sentence validates the name *Sesarma edwardsii* var. *crassimana*. De Man (1888: 188) states this variety as new, but it was first described in his 1887 paper (see above discussion for *Pseudosesarma edwardsii* and Ng et al., 2015: 217).

De Man (1887) did not specify how many specimens he had or where they were from, but later (De Man, 1888: 189) stated he had five males and three females from Zediwon, a location just east of Mergui. No types were designated, but he provided the measurements of the largest male, 19.25 × 17.25 mm. Ingle & Fernando (1963: 102, fig. 2c, d) noted that they had four syntype specimens in the NHM and they figured the distal part of the G1 of one of the males. The whereabouts of the remaining specimens is not known; they are not in Leiden or Amsterdam, or any of the German museums where his extant material is retained. The specimen figured by Ingle & Fernando (1963), a male measuring 16.3 × 14.6 mm (NHM 1886.52b) (Fig. 8A) is here designated as the lectotype of *Sesarma edwardsii* var. *crassimana* De Man, 1887.

Originally described as *Sesarma edwardsii* var. *crassimana*, the species name was used as an adjective, on the incorrect assumption the gender of *Sesarma* is feminine. As the gender of *Pseudosesarma* is neuter, the name should be spelled as “*crassimanum*”.

The differences between *P. edwardsii* and *P. crassimanum* have been discussed under the former species.

**Biology.** This species is not uncommon at the banks of freshwater streams that are leading to the sea, although specimens have been found in back mangroves. They are typically hiding under small rocks and vegetation. They appear to be mainly nocturnal. On Pulau Tioman in Peninsular Malaysia, they have been observed to climb shrubs and small trees at night, apparently foraging on young shoots and buds.

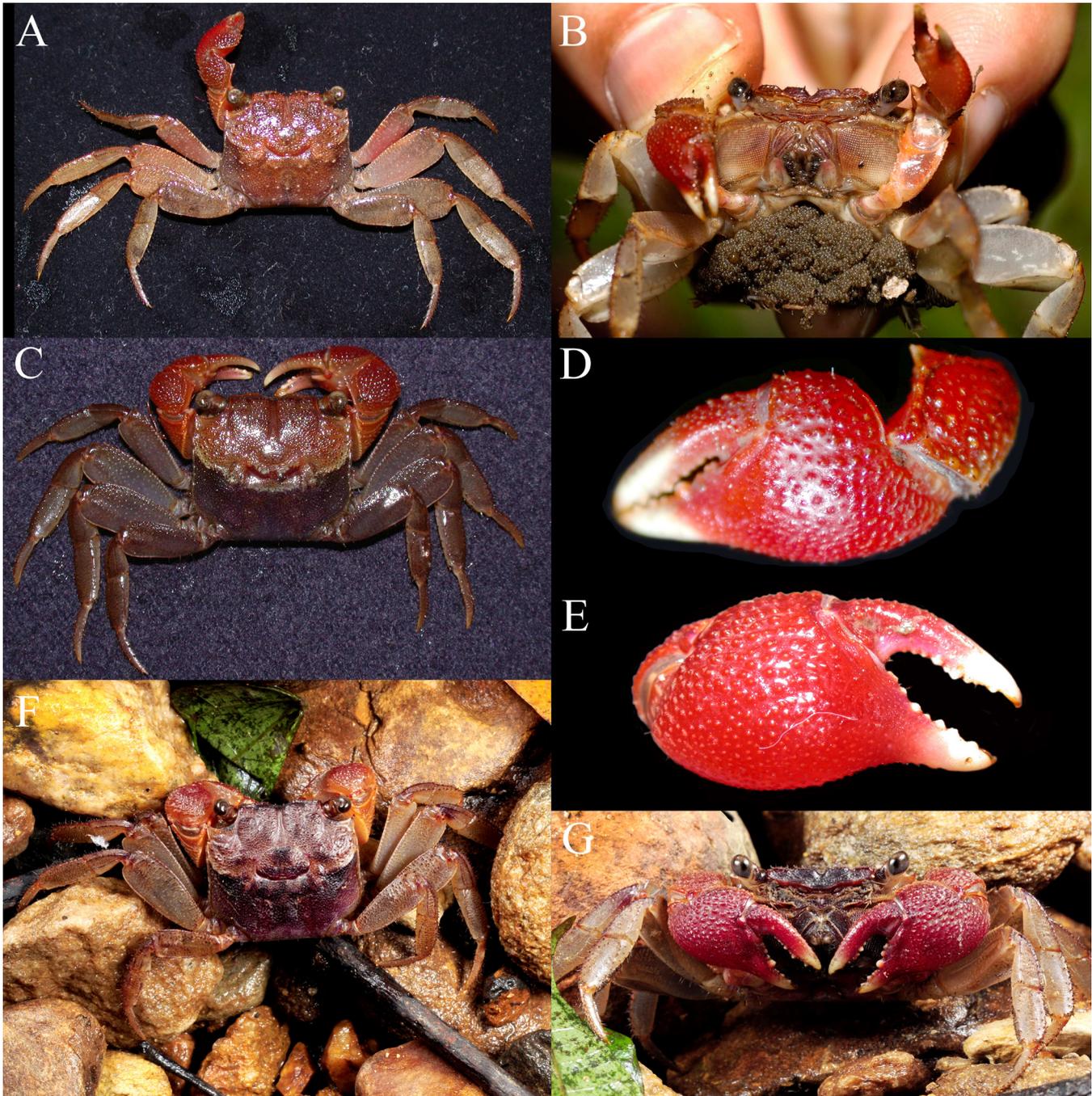


Fig. 12. *Pseudosesarma edwardsii* (De Man, 1887), colour in life. A, male, specimen not collected, Tekong, Singapore [photograph: Robert Teo]; B, oviparous female, specimen not collected, Tekong, Singapore [photograph: Robert Teo]; C–E, male (19.4 × 18.2 mm) (SMF) Langkawi, Peninsular Malaysia [photograph: Christoph Schubart]; F, G, male (20.5 × 19.3 mm) (ZRC 2016.608), Langkawi [photograph: Paul Ng].

**Distribution.** Known only from Thailand, Cambodia, Peninsular Malaysia, Singapore and Borneo (Tweedie, 1940, 1950; present data).

***Pseudosesarma anteactum*, new species**  
(Figs. 14–17)

*Sesarma edwardsii* – Alcock, 1900: 416 (part) (not *Sesarma edwardsii* De Man, 1887).

*Sesarma (Sesarma) edwardsii crassimana* – Ingle & Fernando, 1963: 101, figs. 1, 2a, b (not *Sesarma edwardsii* var. *crassimana* De Man, 1887).

*Pseudosesarma crassimanum* – Bouillon et al., 2004: 84; Dahdouh-Guebas et al., 2011: 192 (not *Sesarma edwardsii* var. *crassimana* De Man, 1887).

**Material examined.** Holotype, male (16.7 × 14.7 mm) (ZRC 2016.0602), Colombo, Sri Lanka, coll. R. Serène, 12 October 1972. Paratypes: 3 males (21.2 × 19.7 mm, 17.2 × 15.9 mm, 14.1 × 12.2 mm), 2 females (17.5 × 15.4 mm, 15.7 × 14.2 mm) (ZRC 2016.0603), same data as holotype.

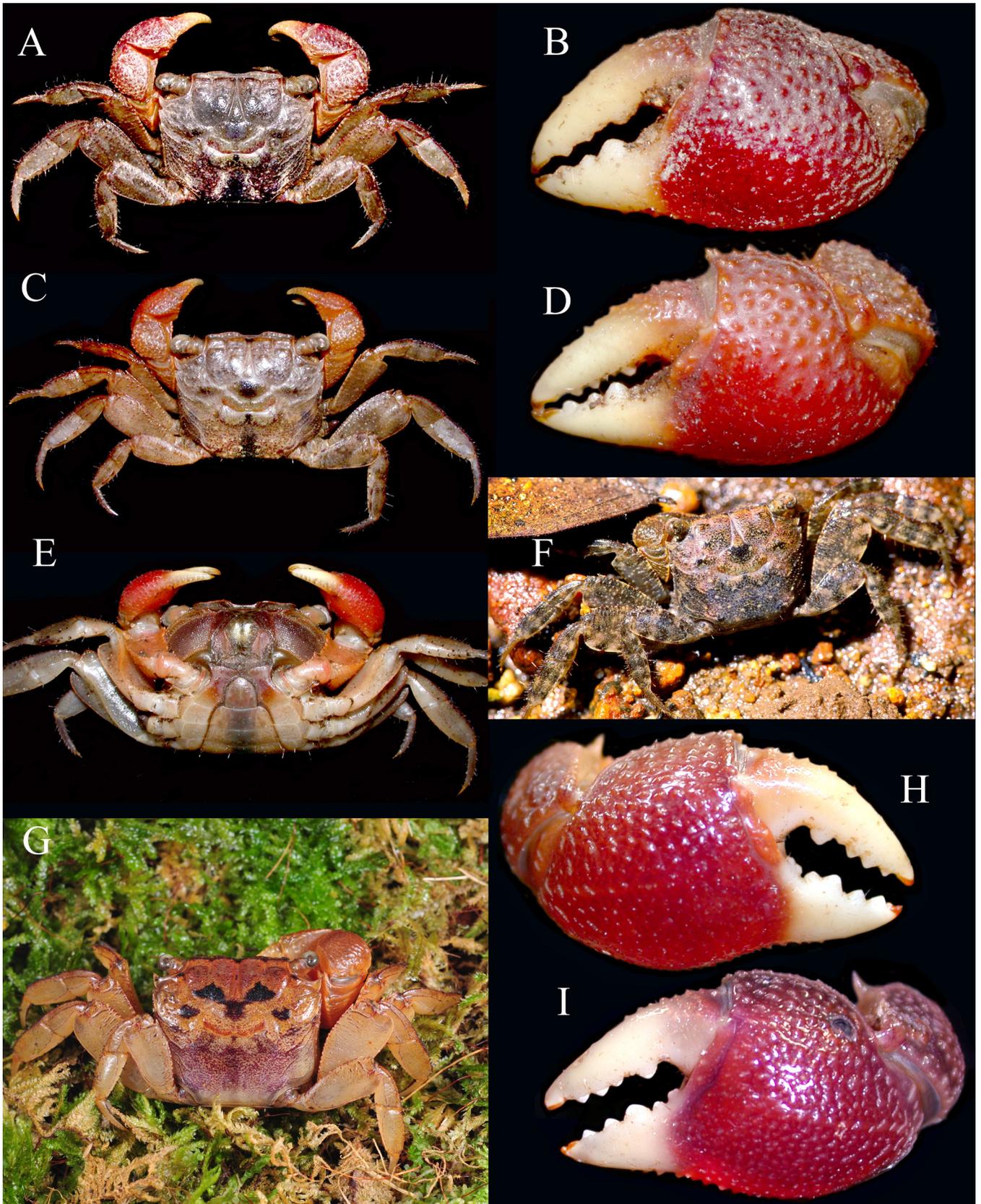


Fig. 13. *Pseudosesarma crassimanum* (De Man, 1887), colour in life. A, B, male (not preserved); C–E, male (12.6 × 10.5 mm) (ZRC); F, male (not preserved). All specimens from Sungai Keliling, Tioman, Peninsular Malaysia; G, H, male (21.9 × 19.5 mm) (ZRC 2017.0169), Thailand; I, male (18.5 × 16.3 mm) (ZRC 2017.0169), Thailand. [photographs: A–E: PKL Ng; F, EK Chua; G–I, Paul Ng]

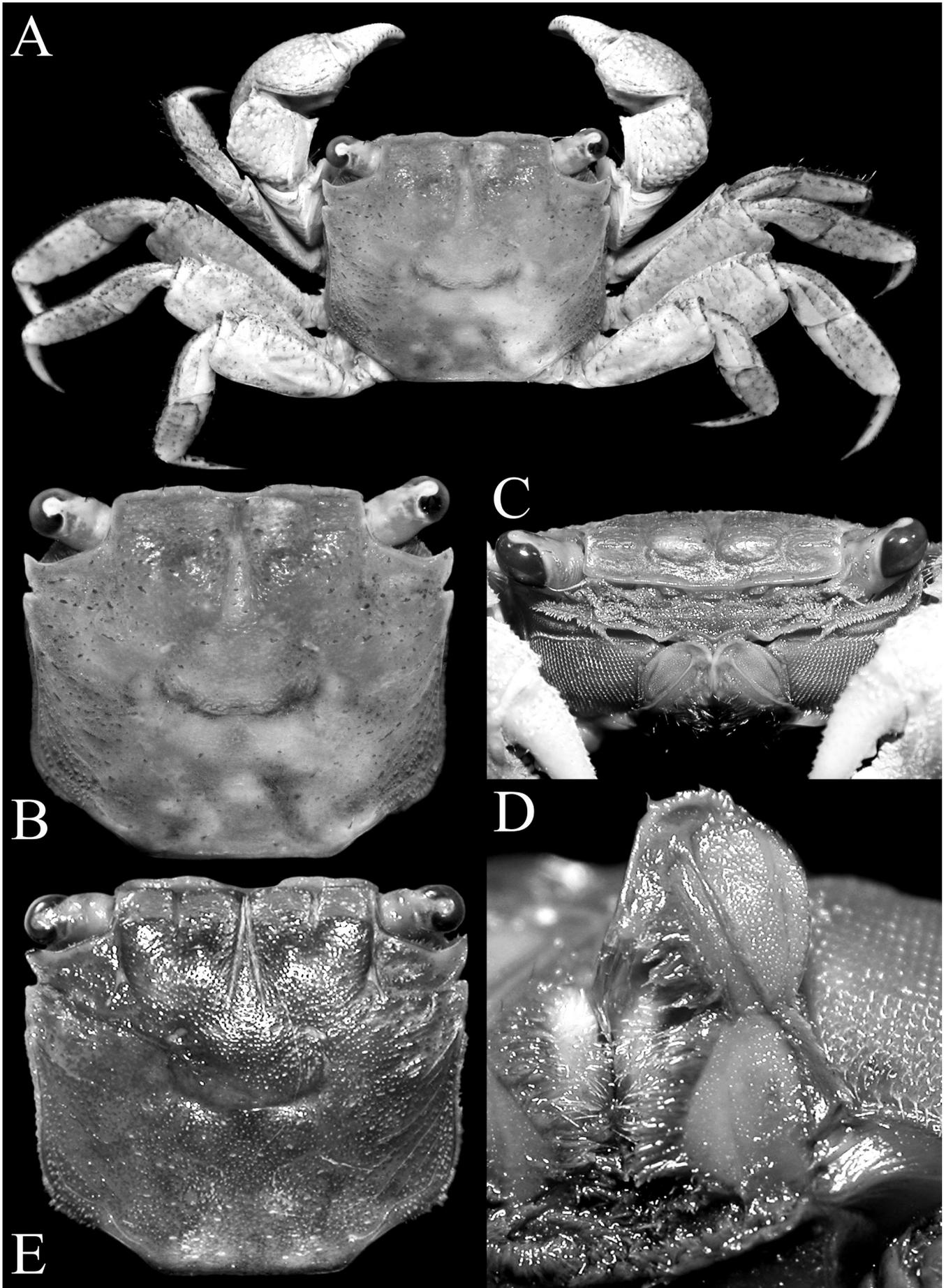


Fig. 14. *Pseudosesarma anteactum*, new species. A–D, holotype male (16.7 × 14.7 mm) (ZRC), Sri Lanka; E, paratype male (21.2 × 19.7 mm) (ZRC), Sri Lanka. A, overall dorsal view; B, E, dorsal view of carapace; C, frontal view of cephalothorax; D, left third maxilliped.

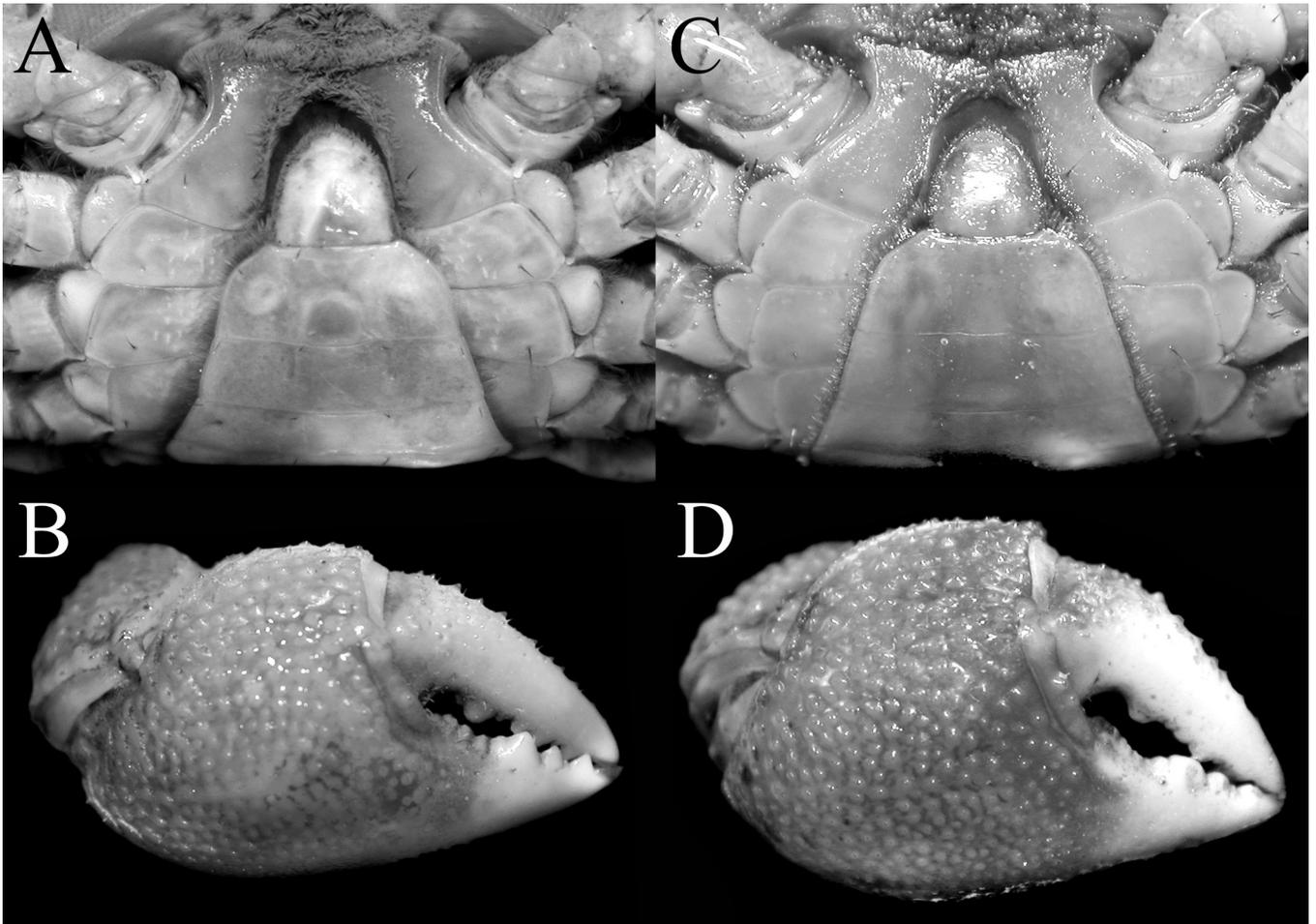


Fig. 15. *Pseudosesarma anteactum*, new species. A, B, holotype male (16.7 × 14.7 mm) (ZRC 2016.602), Sri Lanka; C, D, paratype male (21.2 × 19.7 mm) (ZRC 2016.603), Sri Lanka. A, C, anterior thoracic sternum and pleonal somites 4–6 and telson; B, D, outer view of right chela.

**Diagnosis.** Carapace transversely rectangular (Figs. 14A, B, E, 16A); frontal margin relatively wider, median concavity separating lobes distinct (Fig. 14A, B, E, 16A); epibranchial tooth distinct, separated from rest of margin by deep notch (Figs. 14B, E, 16A); posterolateral margins subparallel (Figs. 2C, 8); outer surface of chela gently convex, covered with closely packed rounded granules, ventral margin of palm gently convex, lined with rounded granules, not denticulate, fingers relatively short compared to overall chela (Figs. 15B, D); suture between male thoracic sternites 3 and 4 distinct (Fig. 15A, C); male pleon broadly triangular (Fig. 15A, C); male sternopleonal cavity with press-button of pleonal locking mechanism on sternite 5; distal half of G1 gently swollen, wider than proximal part, median part appears gently constricted, chitinous part forming relatively wide beak-like structure (Fig. 17A–F). Colour of chelae in life not known.

**Etymology.** From the Latin “for the past”, alluding to the fact that the type material was collected by noted carcinologist Raoul Serène in the early 1970s, but still is of substantial systematic value to researchers over 40 years later.

**Remarks.** In the carapace shape, structure of the frontal margin, shape of the male pleon and proportions of the male chelae, *P. anteactum*, new species (Figs. 14A, B, E,

15A–D, 16A) closely resembles *P. crassimanum* (Figs. 8–10). The chela of *P. anteactum*, however, has the ventral margin of the palm gently convex (Fig. 15B, D) rather than concave (Fig. 9). Most significantly, the G1 structures are quite different. In *P. anteactum*, the median part of the G1 appears gently constricted with the proximal and subdistal parts dilated, and the distal chitinous part is relatively wider and more truncate (Fig. 17A–F). In *P. crassimanum*, the subdistal part of the G1 is more dilated than the relatively more slender proximal parts, and the distal chitinous part is proportionately narrower, more acute and beak-like (Fig. 11B–F, H–L, O–R).

#### ACKNOWLEDGEMENTS

The authors are grateful to Charles Fransen (NNM) for checking on the condition of the G1 structure of *P. edwardsii* to confirm the chitinous part is still present on the lectotype male. Thanks are also due to Peter Schwendinger (MNHG) for sending his specimens to us for our study. We are especially grateful to Paul Clark (NHM) for arranging the loan of his material at short notice. Paul Clark and Jose Mendoza kindly provided many useful comments. We are also grateful to Chua Ee Kiam and Paul Ng for photographs of some of the fresh specimens.

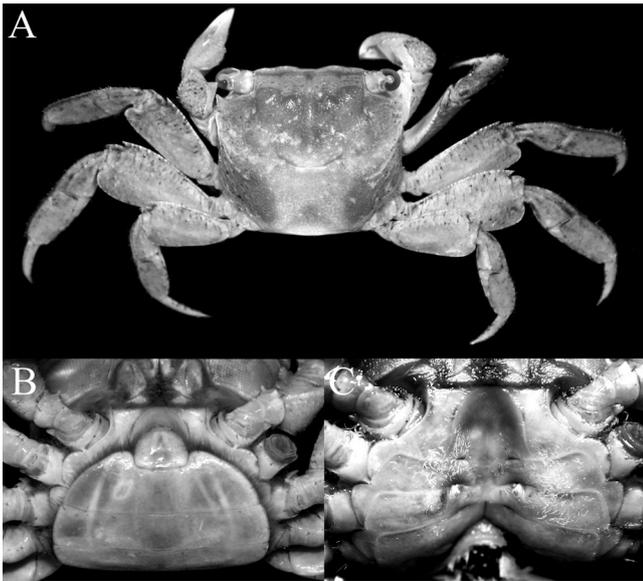


Fig. 16. *Pseudosesarma anteactum*, new species, paratype female (17.5 × 15.4 mm) (ZRC 2016.603), Sri Lanka. A, overall dorsal view; B, pleon; C, sternopleonal cavity showing vulvae.

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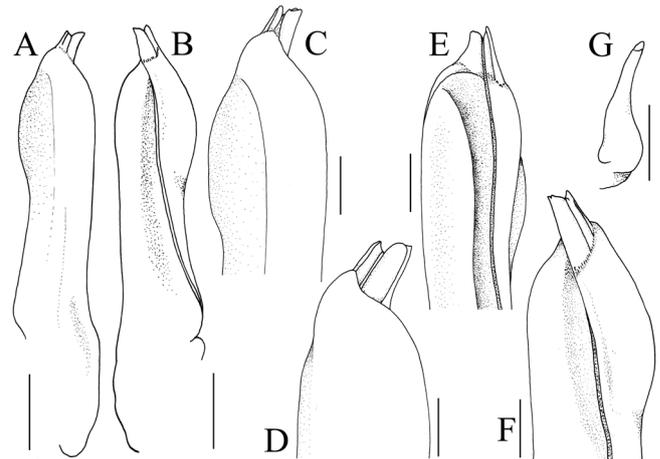


Fig. 17. *Pseudosesarma anteactum*, new species, holotype male (16.7 × 14.7 mm) (ZRC 2016.602), Sri Lanka. A, dorsal view of left G1; B, ventral view of left G1; C, D, dorsal views of distal part of left G1 (slightly different angles); E, ventro-mesial view of distal part of left G1; F, ventral view of distal part of left G1; G, left G2. Scales: A, B, G = 1.0 mm; C–F = 0.5 mm.

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