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***Eocuma petrescui*, a new species of bodotriid cumacean  
(Crustacea: Peracarida) from Malaysia**

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*Abstract.*—The bodotriid cumacean, *Eocuma petrescui* new species, is described from western Malaysia. At least 12 congeners are known from marine waters proximate to the type locality. The new species appears to have its closest affinities to *Eocuma ferox* (Fischer, 1872), and *E. taprobanicum* (Calman, 1904).

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The cumacean fauna of the Indian Ocean, including the shallower waters surrounding India, has been studied by a number of workers, notably Kurian (1954), and Radhadevi and Kurian (1989). Studies of the water in and around Malaysia, however, are limited, and only a few species have been described from the region (Petrescu 1997). During participation in the Fall 2000 voyage of Semester-at-Sea in Malaysian waters, we (IK) were involved in collection of an undescribed bodotriid cumacean belonging to the genus *Eocuma*, Marcusen, 1894. The description of this new species is the subject of this report. Of the 27 described species of *Eocuma*, 12 are reported in areas geographically proximate to Pulan Aman, Malaysia. Among these, *Eocuma longicorne* Calman, 1907, which has a type locality in the Red Sea, is the only congener that has been found in Malaysia (Stebbing 1913). While it bears some similarity to *E. petrescui* in the proportions of the uropods, and in the ventral projection of the basis of pereopod 1, like the other 11 congeners of this region, it differs from the new species by a combination of characters. *Eocuma ferox* (Fischer, 1872), a taxon found in the Mediterranean and South China Seas, and *E. taprobanicum* (Calman, 1904), found off

the coast of Sri Lanka and India, appear to have the greatest affinities to the new species.

Methods

Samples were collected with an epibenthic sled at a depth of 1–3 m in October 2000; specimens were preserved in 95% ethanol. Full body specimens were mounted in a mixture of glycerin and ethanol, and appendages were mounted on permanent preparations using CMCP-9, a low viscosity mountant. Drawings were prepared with a camera lucida on a Wild compound microscope.

Family Bodotriidae Scott, 1901  
Subfamily Bodotriinae Scott, 1901

*Eocuma* Marcusen, 1894

***Eocuma petrescui***, new species  
Figs. 1–3

*Type material.*—Holotype, ovigerous ♀, body length 6.5 mm, USNM xxxxxx, collected at Pulan Aman, Malaysia, (5°10'N, 100°5'E), depth 1.5 m, 21 Oct 2000. Paratypes, USNM xxxxx, (1♂, 5♀) from same locality as holotype.

*Diagnosis.*—Carapace with lateral horns extending outwards, with marked lateral

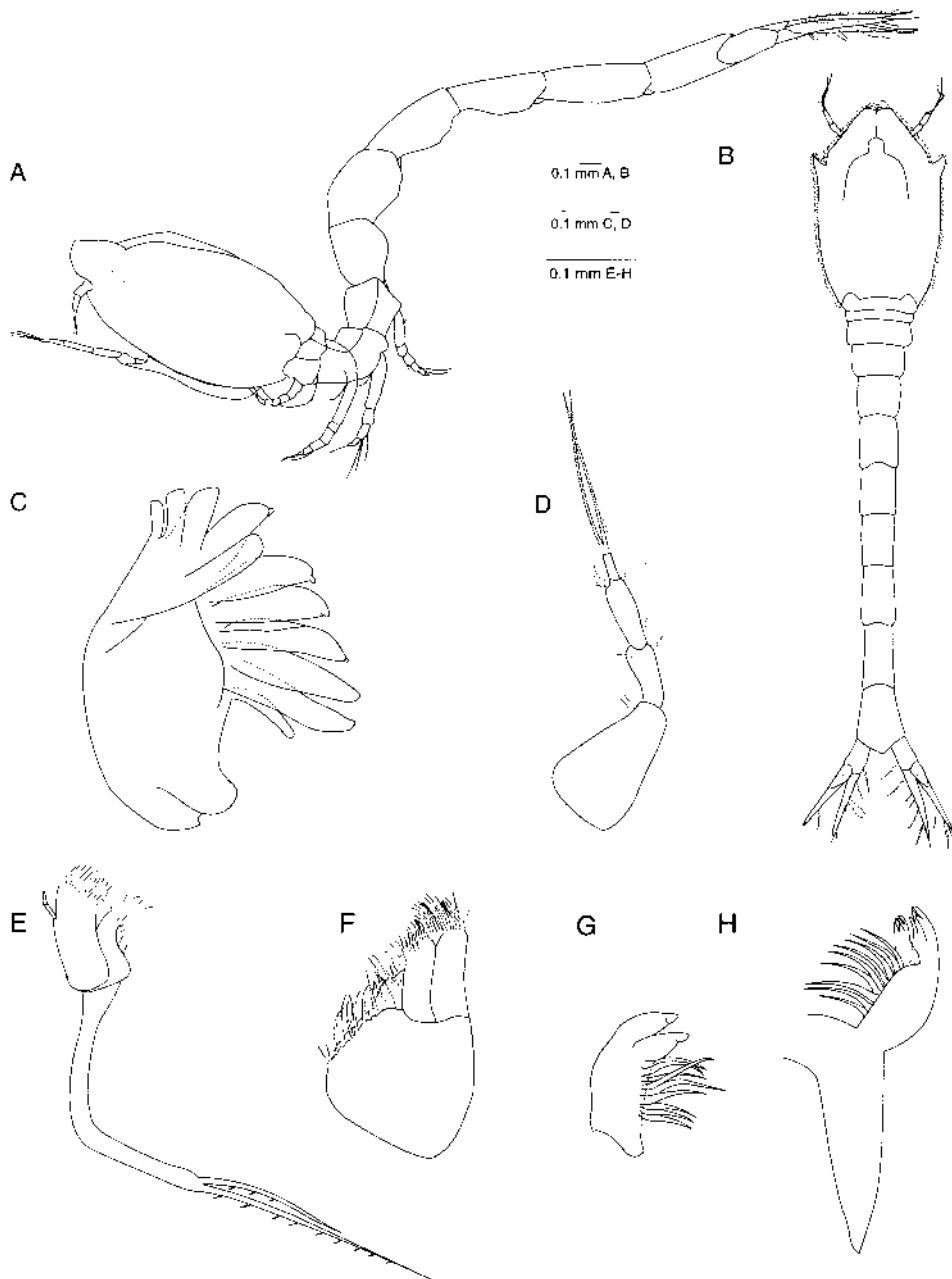


Fig. 1. *Eocuma petrescui*, new species. Paratype ♀ A, lateral view; B, dorsal view; C, branchial apparatus; D, antenna 1; E, maxilla 1; F, maxilla 2; G, left mandible, posterior view; H, right mandible, posterior view.

ridges; antennal notch narrow and deep; pereiopod 1 with ventral projection on basis; rami of uropods equal in length to pleonite 6. Male pleopods with developed process on the endopod.

*Description.*—Adult female, body length 3–6.5 mm; carapace longer than wide, ornamented (Fig. 1B) and textured (Fig. 3E); 1/4 of total body length, with marked lateral horns, antennal notch narrow and deep, lat-

eral ridge leading into a posterior transverse ridge; carapace longer than peraeon and shorter than pleon (Figs. 1A, B). Frontal lobe extended anteriorly with eyelobe not pigmented; pseudorostral lobes extending well beyond eyelobe and meeting at midline; eyelobe 1/3 length of carapace with lenses not visible.

Peraeonite 1 not visible laterally, and only visible dorsally as it is seen under the carapace; peraeonites 2 to 5 with lateral ridges. Pleon longer than carapace and peraeon together, 2.5 times length of peraeon (Fig. 1B).

Antenna 1 (Fig. 1D) peduncle tri-articulated, proximal article robust, subequal in length to other two articles combined; second article shorter than third; first and second articles with setae bearing setules at their tips; third article with bifurcating setae distally; main flagellum with 1 article, with 2 aesthetascs at distal end; accessory flagellum uniaarticulate, with 1 simple seta at tip.

Mandibles (Fig. 1G, H) with dorsal part to pars molaris naviculoid in shape; lacinia mobilis well developed; pars molaris and pars incisiva separated by a row of 9 setae armed with setules on distal portion.

Maxilla 1 (Fig. 1E) with two endites; broad endite with 12 simple setae and 1 annulated seta with 3 setules at distal tip emerging from outer margin; narrow endite with 4 simple setae; palp twice length of protopod bearing 2 setae with upwardly oriented setules; longest equal in length to palp.

Maxilla 2 (Fig. 1F) protopod with one article, longer than two lobes of the endite; endite longer than protopod; endite and protopod heavily setose at distal margin.

Maxilliped 1 (Fig. 2A) basis short and stout with two plumose setae merging from mid-area, with large endite extending beyond articulation of merus with carpus; ischium hidden under basis; carpus as long as propodus and dactylus together; armed with row of simple setae on inner margin and one plumose seta distally on outer mar-

gin; propodus with perpendicular row of 4 setae and 2 longer setae at distal margin medially; dactylus with 3 short simple setae; branchial apparatus containing 11 branchial elements (Fig. 1C).

Maxilliped 2 (Fig. 2B) basis dorsally robust, almost as long as rest of appendage; ischium very small, only visible on inner side of appendage when bent; basis and merus with long plumose seta on distal margin; merus slightly produced dorso-distally, merus shorter than carpus; carpus with row of five plumose setae on inner margin and one large plumose seta extending between articulation of merus and carpus; propodus distally expanded with row of setae on distal half of outer margin; dactylus with 2 terminal setae.

Maxilliped 3 (Fig. 2C) exopod fully developed, armed with numerous plumose setae; basis arcuate and longer than other articles together, produced distally well beyond articulation of ischium and merus, inner margin and tip of projection with long plumose setae; basis, ischium, merus, carpus, and propodus with small setae; ischium subequal in length to merus with row of plumose setae on inner margin; merus slightly projected dorso-distally, with plumose seta at tip of projection; carpus distally widened; propodus laterally widened with row of 4 setae on inner margin; dactylus subequal in length to propodus with 5 terminal setae.

Peraeopod 1 (Fig. 2D) exopod fully developed, with long plumose setae; basis of endopod other subequal to articles together, longer than peraeopod 2, with convex expansion on lower portion of inner wall, ventral projection at distal end reaching articulation of ischium and merus, with 1 small simple seta at tip of projection, basis and ischium with small setae; merus longer than ischium and subequal in length to carpus, propodus, and dactylus; propodus with 2 setae at distal margin; dactylus with 4 terminal setae and 3 subterminal setae.

Peraeopod 2 (Fig. 2E) uniramous with ischium missing; basis shorter than half

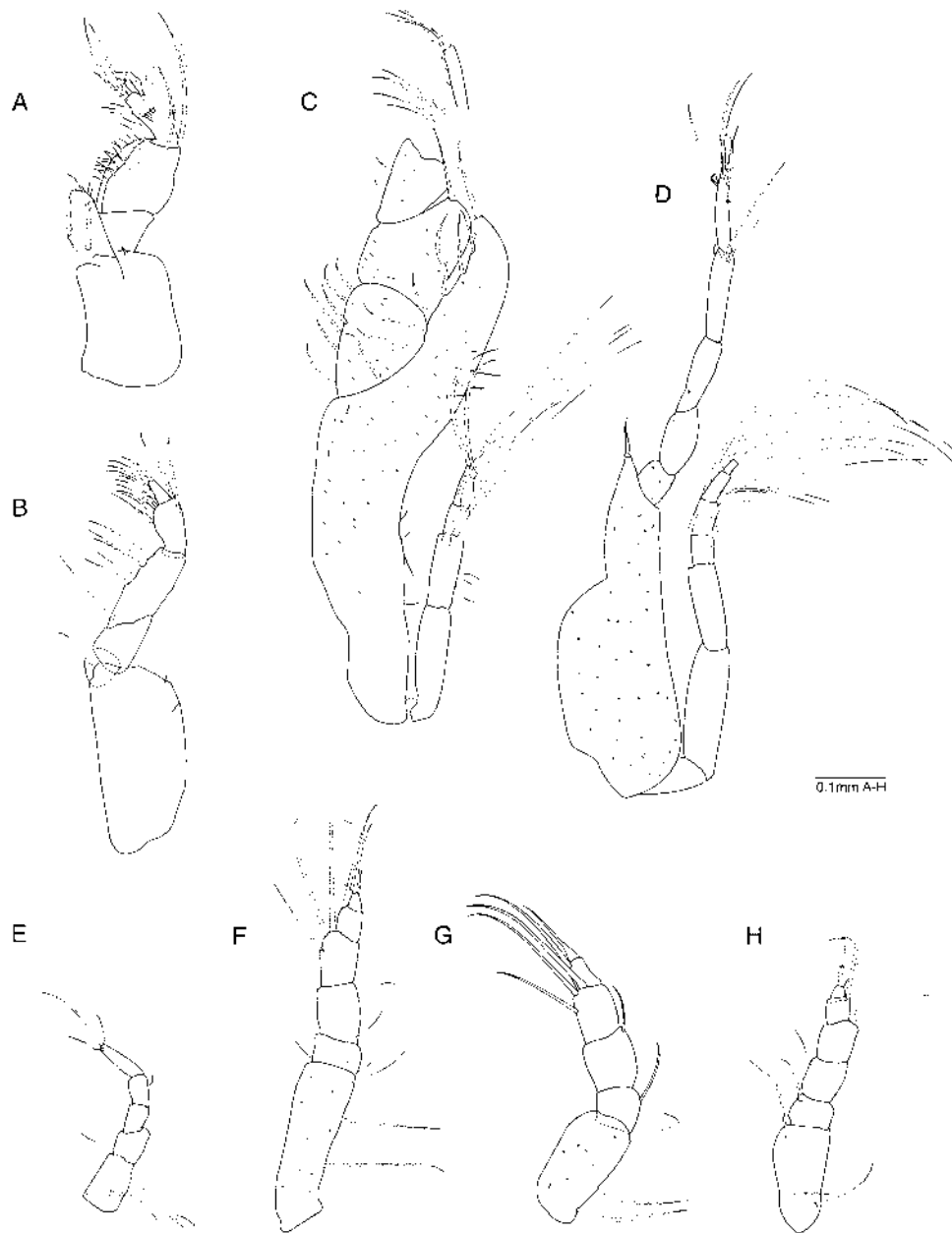


Fig. 2. *Eocuma petrescui*, new species. Paratype ♀ A, maxilliped 1; B, maxilliped 2; C, maxilliped 3; D–H, pereopod 1–5 (plumose exopod setae of maxilliped 3 and pereopod 1 are omitted).

length of appendage, subequal in length to dactylus, with 2 long plumose setae emerging from middle of basis, setae twice length of basis, basis with small setae; merus, carpus, and propodus subequal in length; merus subequal in width to basis, wider than

other articles; dactylus with one long terminal simple seta and 2 shorter simple setae.

Pereopod 3 (Fig. 2F) uniramous; basis equal in length to other articles together, shorter than length of pereopod 2, with 2

long plumose setae, and small sensory setae; merus twice length of ischium; carpus subequal in length to merus with 1 long seta in the middle and 2 long setae at distal edge, all setae longer than propodus and dactylus together; propodus longer than dactylus, with long seta on distal edge; dactylus with 1 terminal and 2 shorter subterminal setae.

Peraeopod 4 (Fig. 2G) uniramous; basis with 3 long plumose setae, 2 in the proximal half and 1 on distal part of article, basis also with small setae; merus 1.5 times length of ischium; merus subequal in length to carpus, carpus with 2 annulated setae emerging from distal area portion; propodus subequal in length to ischium, with 1 long annulated seta at proximal portion, and one shorter annulated seta emerging from distal area of propodus; dactylus fused with its terminal, short, annulated seta.

Peraeopod 5 (Fig. 2H) uniramous; basis with one plumose seta on proximal end and another plumose seta at distal end; ischium with seta at distal end; merus with seta at distal end, merus twice length of ischium and subequal in length to carpus; carpus with 2 setae longer than propodus and dactylus on distal end; propodus with one long seta at distal end; dactylus short with setae emerging from distal tip.

Pleonite 6 moderately produced between uropods, subacute, subequal in length to rami, 2.5 times length of peduncle; uropod peduncle (Fig. 1B) with one plumose seta on inner margin; rami subequal in length; exopod bi-articulated, distal article twice length of proximal article, with 2 plumose setae on inner edge, and 2 truncated setae distally; endopod uniaarticulate with 6 plumose setae in a row along inner margin; one thick, long truncated terminal seta.

Adult male paratype (Fig. 3A). Body length 5.9 mm. Carapace longer than wide, flattened and shorter when compared to female, also less bulbous in anterior area than female; one lateral ridge along middle portion of carapace joined posteriorly to a dorso-lateral ridge; no posterior transverse

ridge as in female; antennal notch narrow and deep with sub-acute anterolateral corner; peraeonite 1 visible in both lateral and dorsal views; abdominal segments thicker and more robust than in female; peraeon and pleon combined are twice length of carapace.

Antenna 1 (Fig. 3C) peduncle shorter than other 2 articles together; third article of antenna longer than second; accessory flagellum small with no setae or aesthetascs; proximal article of main flagellum with three short aesthetascs emerging from middle area; remainder of main flagellum broken.

Pleon with five pairs of pleopods; peduncle of pleopod (Fig. 3D) 1.5 as long as endopod with row of 8 setose setae along inner margin; endopod uniaarticulate with 20 plumose setae, increasing in size towards middle, reaching twice length of endopod, endopod with internal process armed with 2 small simple setae at tip; exopod bi-articulated, distal article longer than proximal one, and with 18 plumose setae similar in arrangement to those on endopod.

Pleonites 5 and 6 (Fig. 3B) subequal in length; middle portion of pleonite six well produced between uropods, subacute.

Uropods (Fig. 3B) with rami subequal in length to pleonite 6, rami 2.5 times length of peduncle; peduncle with 3 setose setae on inner margin; rami subequal in length to each other; exopod bi-articulated, distal article twice length of proximal article, with 5 plumose setae on inner edge; exopod with 3 truncated terminal setae; endopod uniaarticulate with 13 plumose setae and one thick truncated terminal seta.

*Etymology.*—This species is named in honor of Iorgu Petrescu, a crustacean taxonomist who has made numerous contributions to cumacean systematics, and has described other species found in Malaysia.

*Remarks.*—*Eocuma petrescui* is closely related morphologically to both *E. ferox* (Fischer, 1872), and *E. taprobanicum* (Calman, 1904). Differences among the three species are summarized in Table 1. Simi-

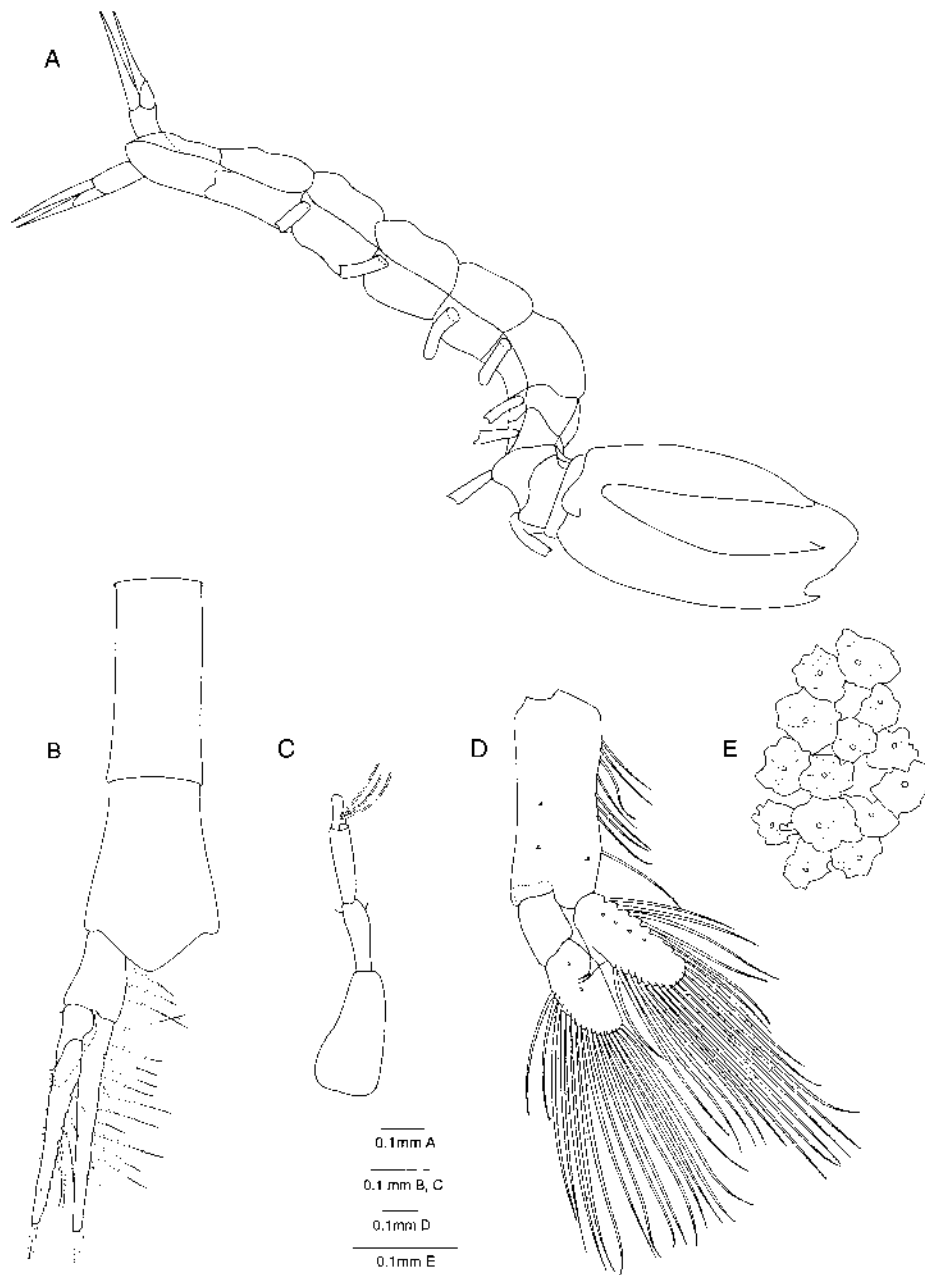


Fig. 3. *Eocuma petrescui*, new species. Paratype ♂ A, latero-ventral view, body length 5.9 mm; B, pleonites 5, 6 and uropods; C, antenna 1; D, pleopod; E, portion of textured carapace surface.

larities among all three species include (1) lateral horns on the carapace; (2) a hidden ischium in maxilliped 1; (3) a distal projection of basis and merus on maxilliped 3; (4) a distally expanded carpus and propodus on

maxilliped 3; (5) setae on ventral side of maxilliped 3 in a row; (6) setae on margin of basis projection on maxilliped 3; (7) a convex projection on the basis of pereopod 1; (8) an ischium missing on pereopod 2;

Table 1.—Morphological differences among *Eocuma petrescui*, new species, *E. ferox*, and *E. taprobanicum*.

| Character                             | <i>E. petrescui</i><br>new species                         | <i>E. ferox</i><br>Fischer, 1872                           | <i>E. taprobanicum</i><br>Calman, 1904                |
|---------------------------------------|--|--|---|
| Frontal lobe                          | 1/3 size of carapace                                       | 1/3 size of carapace                                       | 1/4 size of carapace                                  |
| Carapace shape when dorsal            | smooth outline, same width from anterior to posterior ends | smooth outline, same width from anterior to posterior ends | rippled outline anteriorly, medial portion expanded   |
| Carapace ridges                       | lateral ridge leading into posterior transverse ridge      | no ridges present  | lateral ridge leading into posterior transverse ridge |
| Antenna 1 main flagellum              | uniarticulated   | uniarticulated   | biarticulated   |
| Antenna 1 main flagellum              | with 2 aesthetascs   | with 2 aesthetascs   | with 3 aesthetascs                                    |
| Maxilliped 1 carpus and propodus      | slim   | robust   | slim  |
| Maxilliped 1 endite                   | large  | large  | small   |
| Maxilliped 2 ischium                  | small  | absent   | small   |
| Maxilliped 3 basis                    | arcuate  | geniculate   | geniculate  |
| Maxilliped 3 basis shape at tip       | acute  | acute  | rounded   |
| Maxilliped 3                          | sensory setae present on basis                             | sensory setae present on basis                             | no sensory setae on basis                             |
| Maxilliped 3 relative size of ischium | small  | small  | large   |
| Pereopod 1 projection on basis        | ventral  | distal   | semi-ventral  |
| Pereopod 1                            | sensory setae on basis                                     | sensory setae on basis                                     | no sensory setae on basis                             |
| Pereopod 1 carpus and propodus length | less than 1.5 times length of merus                        | less than 1.5 times length of merus                        | greater than 2.5 length of merus                      |
| Pereopod 2 projection on merus        | absent   | absent   | absent  |
| Pereopod 3 article proportions        | similar  | dissimilar   | similar   |
| Pleonites 5 and 6 length              | equal  | pleonite 5 longer  | pleonite 5 longer                                     |
| Pleonite 6 ending                     | pointed  | rounded  | flat  |
| Uropods anal plate                    | not visible  | not visible  | visible   |

(9) rami of the uropods equal in length to pleonite 6; and, (10) uropod endopods equal in length to exopod.

The third species most similar to *Eocuma petrescui* is *E. spinifera* Gamo, 1967, known from in Japan. It differs from *E. petrescui* by (1) larger and more protruding lateral horns; (2) a more bulbous posterior portion of the carapace when viewed dorsally; (3) a dorso-distal projection on the basis of maxilliped 3 that extends beyond the meru; (4) several long setae emerging from the distal end of propodus on peraeopod 1; (5) an extremely small almost rudimentary peraeopod 2; and (6) longer basis on all peraeopods when compared proportionally with the other articles of the ap-

pendage. *E. spinifera* has (1) similar markings on the carapace; (2) similar proportions of articles and segmented setae on the antenna 1 on the female; (3) three aesthetascs on the proximal article of main flagellum of antenna 1 on the male; (4) a very similar maxilliped 3 both in proportions, and in location and form of setae; and, (5) setae at the tip of projection on maxilliped 3 and projection on peraeopod 1.

The only other *Eocuma* species that was found in Malaysia is *E. longicorne* (Calman, 1905). It differs from *E. petrescui* in (1) shape of carapace both laterally and dorsally; (2) projection of merus on peraeopod 2; (3) relative proportions of articles on antenna 1; (4) bunch of aesthetascs on main

flagellum of antenna 1; and, (5) the shape in which pleonite six ends. It is similar to *E. petrescui* by (1) markings on the carapace; (2) lateral ridge and placement of connected lateral horns; (3) peraeopod 1 proportions, ventral projection and convex projection on basis; and, (4) proportions of pleonite 6, peduncle and rami of uropods.

The other geographically proximate congeners are: *E. affine* Calman, 1904; *E. gorgasiae* Mühlenhardt-Siegel, 1996; *E. kempi* Kurian, 1954; *E. latum* Calman, 1907; *E. longicorne* (Calman, 1907); *E. sarsii* (Kossmann, 1880); *E. sanguineum* Kurian and Radhadevi, 1983; *E. stellifera* Calman, 1907; *E. striatum* Kurian and Radhadevi, 1983; *E. travancoricum* Kurian, 1951. These taxa differ from *Eocuma petrescui* by: (1) proportion of the frontal lobe length in relation to the carapace; (2) absence of similar lateral and posterior transverse ridges; (3) shape and proportions of the carapace, peraeon, and abdomen; (4) proportions of the articles on peraeopod 1; and (5) shape of terminal portion of pleonite six. The congeners bear some similarities to *E. petrescui* by: (1) cuticle of integument hexagonally reticulated, (2) semi-ventral projection on the tip of peraeopod 1 basis; and (3) a convex projection on the lower ventral side of peraeopod 1 basis.

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