

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

Charmaine K. Patel, Pilar A. Haye, and Irv Kornfield

(CP) Department of Biological Sciences, University of Maine, Orono, Maine 04469, U.S.A.;

(PH) Facultad de Ciencias del Mar, Universidad Católica del Norte, Casilla 117,
Coquimbo, Chile;

(IK) School of Marine Sciences, University of Maine, Orono, Maine 04469, U.S.A.,
e-mail: irvk@maine.edu

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).

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 1008647, collected at Pulan Aman, Malaysia, (5°10'N, 100°5'E), depth 1.5 m, 21 Oct 2000. Paratypes, USNM 1008648, (1♂, 4♀♀) from same locality as holotype.

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

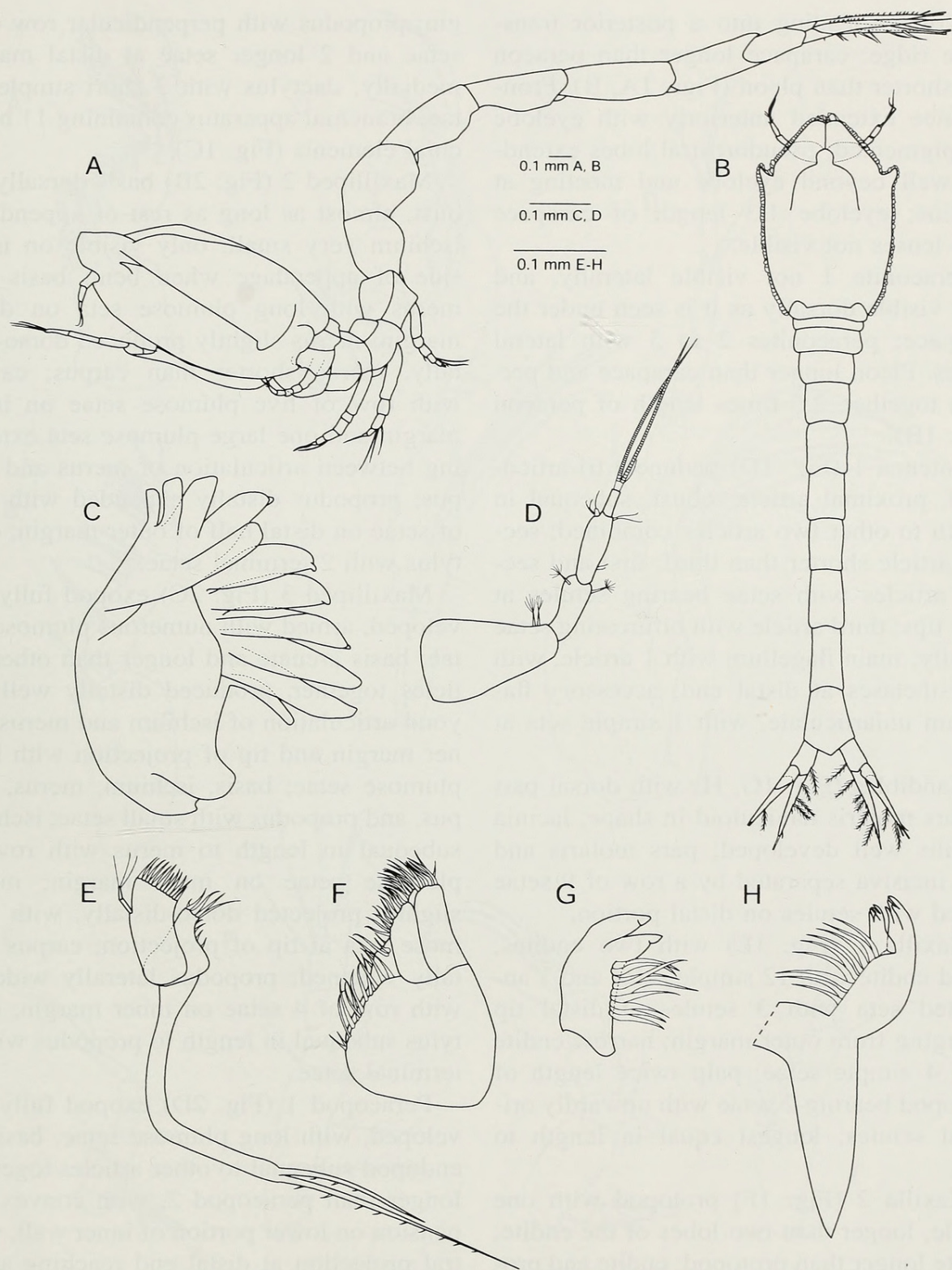


Fig. 1. *Eocuma petrescui*, new species. Paratype ♀ A, lateral view; B, dorsal view; C, branchial apparatus; D, antenna 1; E, maxilla 1; F, maxilla 2; G, left mandible, posterior view; H, right mandible, posterior view.

ridges; antennal notch narrow and deep; peraeopod 1 with ventral projection on basis; rami of uropods equal in length to pleonite 6. Male pleopods with developed internal 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 ridges 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 uniarticulate, 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 subequal to other 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

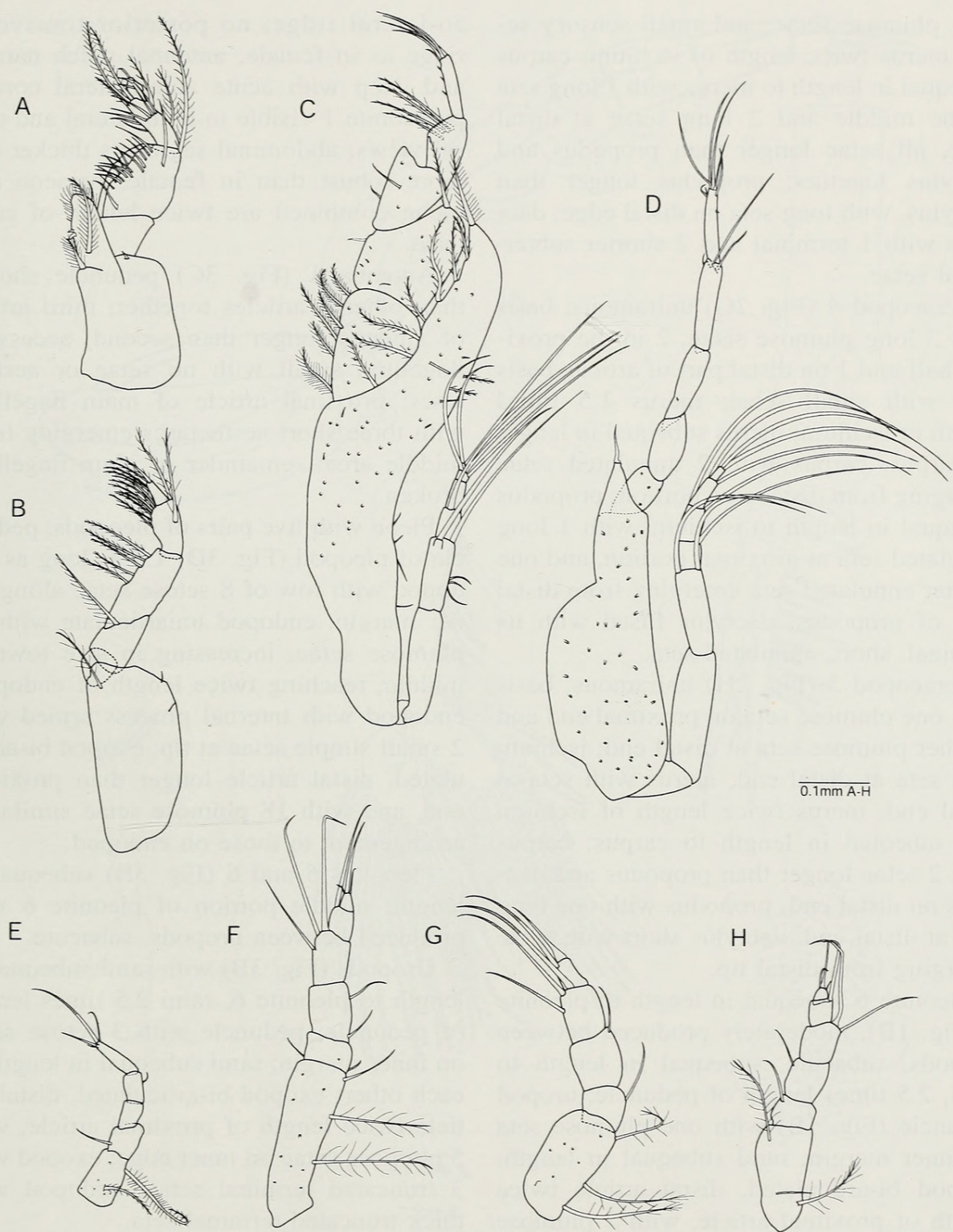


Fig. 2. *Eocuma petrescui*, new species. Paratype ♀ A, maxilliped 1; B, maxilliped 2; C, maxilliped 3; D–H, pereopod 1–5 (plumose exopod setae of maxilliped 3 and pereopod 1 are omitted).

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. Peraeopod 3 (Fig. 2F) uniramous; basis equal in length to other articles together, shorter than length of peraeopod 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 subequal in length to pleonite 5 (Fig. 1B), 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 uniarticulate 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 dor-

so-lateral ridge; no posterior transverse ridge as in female; antennal notch narrow and deep with 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 uniarticulate 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 6 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 with 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-

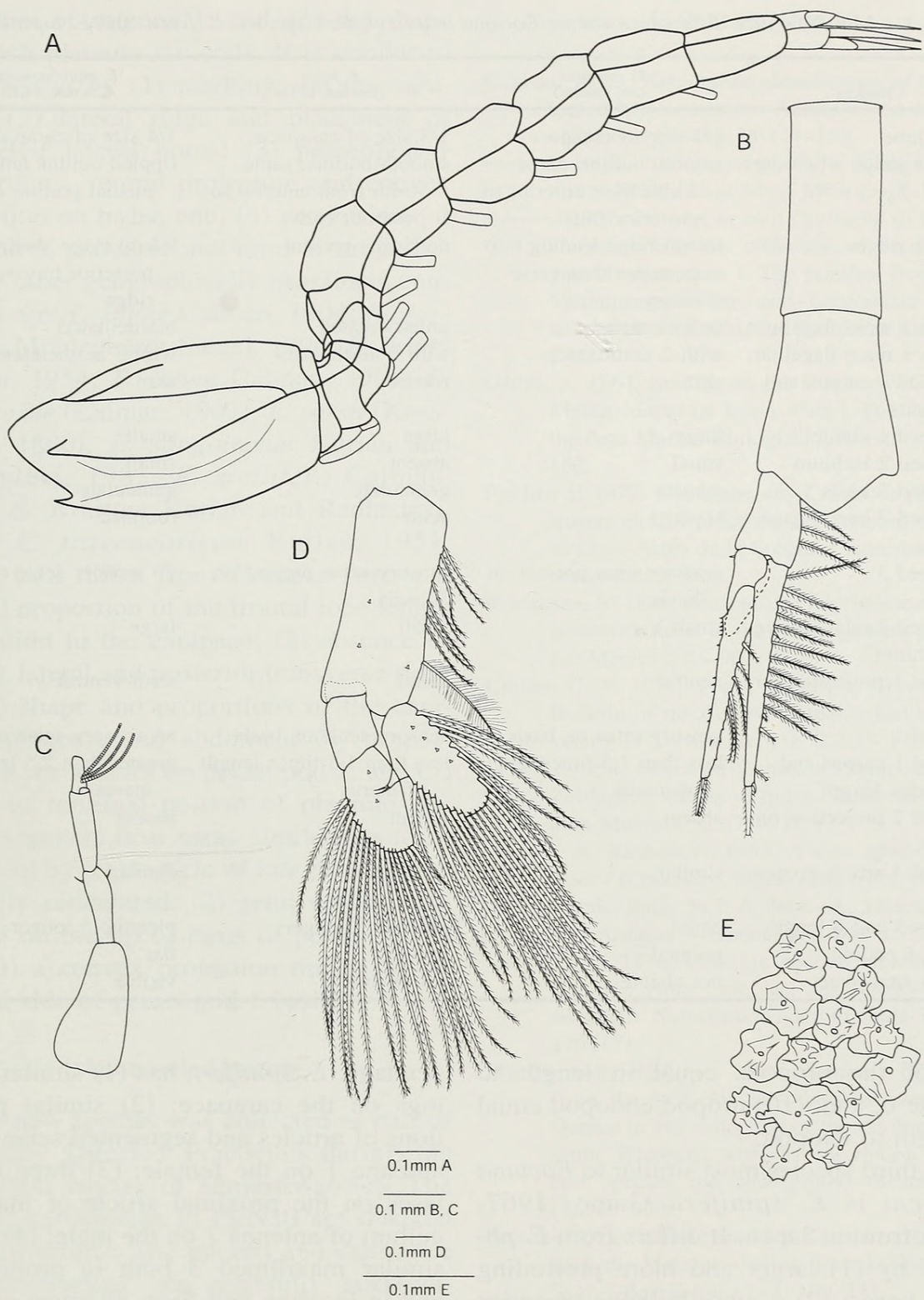


Fig. 3. *Eocuma petrescui*, new species. Paratype ♂ A, latero-ventral view, body length 5.9 mm; B, pleonites 5, 6 and uropods; C, antenna 1; D, pleopod; E, portion of textured carapace surface.

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) row of setae on ventral side of maxilliped 3; (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; (9)

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

Character	<i>E. petrescui</i> new species	<i>E. ferox</i> (Fischer, 1872)	<i>E. taprobanicum</i> (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

rami of the uropods equal in length to pleonite 6; and, (10) uropod endopod 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 merus; (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 basis of peraeopod 1; and (3) a convex projection on the lower ventral side of peraeopod 1 basis.

Acknowledgments

The new species was collected as part of a Faculty Directed Practicum during the Fall, 2000 voyage of Semester-at-Sea. The student participants in PEN30 are thanked for their efforts. The interest and assistance of Les Watling are gratefully acknowledged. The comments of three anonymous reviewers greatly improved the manuscript; we thank them for their efforts. IK thanks Maryhaven for encouragement. This research was supported by DEB97-07853 and DEB01-18804 from the U.S. National Science Foundation.

Literature Cited

- Calman, W. T. 1904. On the classification of the Crustacean Malacostraca.—*Annals of the Magazine of Natural History* 13:144–158.
- . 1905. The Cumacea of the Siboga Expedition.—*Siboga Expedition Monograph* 36:1–23.
- . 1907. On new or rare Crustacea of the order Cumacea from the collection of the Copenhagen Museum, part I. The families Bodotriidae, Vauvantiidae, and Leuconidae.—*Transactions of the Zoological Society of London* 18: 1–58.
- Gamô, S. 1967. Studies on the Cumacea (Crustacea, Malacostraca) of Japan. Part I. Publications of the Seto Marine Biological Laboratory 17:175–182.
- Fischer, P. 1872. Catalogue des Crustacés podophtalmiques et Cirripides du département de la Gironde.—*Actes de la Société Linneenne de Bordeaux* 28:22–24.
- Kossmann, R. 1880. Zoologische Ergebnisse einer ausgeführten Reise in die Küstengebiete des Rother Meeres 2:88–90.
- Kurian, C. V. 1951. The Cumacea of Travancore.—*Bulletin of the Central Research Institute, University of Travancore*, ser. C 2:77–118.
- . 1954. Notes on Cumacea (Sympoda) in the Zoological Survey of India.—*Records of the Indian Museum* 52:275–312.
- , A. Radhadevi. 1983. A new species of Cumacea (Crustacea, Peracarida) from Vizhinjam, Kerala, India. In P. A. John ed., *Selected papers on Crustacea*.—Trivandrum: 149–153.
- Marcusen, J. 1894. Über ein neues Cumaceen genus *Eocuma*, Fam. Cumidae, aus Japan.—*SB Gesellschaft Naturforschender Freunde Berlin* 7: 170–171.
- Mühlenhardt-Siegel, U. 1996. Cumacea (Crustacea) from the Red Sea and the Maldives (Indian Ocean) in the collection of the Zoological Museum, Hamburg, with the description of seven new species and new genus.—*Beaufortia* 46 (7):105–134.
- Petrescu, I. 1997. Nannastacidae (Crustacea: Cumacea) from the Malayan shallow waters (South China Sea).—*Beaufortia* 47 (4):109–151.
- Radhadevi, A., C. V. Kurian. 1989. A collection of Cumacea from the South West and south east coasts of India.—*Records of the Zoological Survey of India, Occasional Paper*, number 121.
- Scott, T. 1900–1901. Notes on Scottish cumaceans.—*Annals of Scottish Natural History*: 215–224.
- Stebbing, T. R. R. 1913. Cumacea (Sympoda).—*Das Tierreich*. R. Fiedlander and Son, 21 pp.



Patel, C K, Haye, P A, and Kornfield, I. 2003. "Eocuma Petrescui, A New Species Of Bodotriid Cumacean (Crustacea : Peracarida) From Malaysia." *Proceedings of the Biological Society of Washington* 116, 978–985.

View This Item Online: <https://www.biodiversitylibrary.org/item/107523>

Permalink: <https://www.biodiversitylibrary.org/partpdf/44521>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Biological Society of Washington

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.