

Two New Cumacean Crustaceans, *Vemakylindrus multiuncifer* and  
*V. gymnocephalus* (Diastylidae) from the Bathyal Depth  
in Suruga Bay

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**Abstract** Two new cumacean crustaceans, *Vemakylindrus multiuncifer* and *V. gymnocephalus* (Diastylidae) from the bathyal depth in Suruga Bay are described, illustrated and compared with related species.

**Keywords:** Cumacean Crustaceans, *Vemakylindrus*, two new species, bathyal depth, Suruga Bay.

The diastylid genus *Vemakylindrus* Băcescu of the Cumacea is represented by ten described species, most of which were taken from depths exceeding 400 m, except only one species, *V. doryphora* (Fage) from 63 m in the Mediterranean (Jones, 1969).

Specimens of two new species, *V. multiuncifer* and *V. gymnocephalus*, which are described in this paper, were obtained during the cruise of the R/V *Tansei-Maru* (KT 73-15) of the Ocean Research Institute, University of Tokyo (25 October to 1 November, 1973) by means of beam-trawl of 2 m span from the bathyal depth in Suruga Bay. Type specimens are preserved in the National Science Museum, Tokyo (NSMT).

Family Diastylidae

*Vemakylindrus multiuncifer* sp. nov.

(Figs. 1–4)

*Type specimens.* Holotype (NSMT-Cr 12401), juvenile male, length 6.2 mm (including telson), combined length of pereon, pleon and telson about 3.8 mm; allotype (NSMT-Cr 12402), juvenile female with anterior portion of carapace damaged, combined length of pereon, pleon and telson about 3.3 mm; paratypes (NSMT-Cr 12403), 2 juvenile males, about 3.3 mm (one of them damaged); St. D (KT 73-15), 34°45.97'N, 138°42.32'E–34°46.45'N, 138°42.40'E, west off Matsuzaki, Suruga Bay, 314–320 m depth; 29 October, 1973.

*Description.* Holotype: Carapace (Fig. 1 A–D) about 5 times as long as total body,  $1\frac{1}{3}$  as long as greatest width across middle portion and as wide as depth; integument thin, calcified and brittle; carapace covered with many hook-shaped spinules and provided with 12 large spines arranging in circles. Pseudorostral lobes pro-

jected forward in front of eyeless ocular lobe, upturned at about  $10^\circ$  and meet for a distance, much longer than rest of carapace (from ocular lobe to hind edge); each lobe bears many hook-shaped spinules arranging in 3 rows. Antennal notch (Fig. 1 A–C) shallowly concave with several spinules inward and its anterolateral angle inconspicuous and entire lower edges of carapace strongly crenulated.

Pereon (Fig. 1 A–D) nearly  $\frac{3}{4}$  as long as carapace, almost rectangular in shape, a little narrower posteriorly; a pair of dorsal spines on pereonites 2–4, 2 pairs of similar spines on pereonite 5; pereonites 3 and 4 coalesced dorsally. Pereonites 2–5 armed with prominent mid-ventral spine on each sternite. Pleon (Fig. 1 A, E–F) about  $\frac{1}{2}$  as long as total body length, almost cylindrical in shape, and spinose. Pleonite 5 a little longer than pleonites 4 or 6. Pleonites 1 and 2 provided with a strong midventral spine; 1st and 2nd pairs of pleopods not yet appearing (Fig. 1 E, p) and pleonite 2 with a pair of ventral additional spines near front edge. Telson (Fig. 1 D) twice as long as last pleonite and about as long as uropodal peduncle; pre-anal part a little more than twice as long as post-anal, with 6 pairs of hook-shaped lateral spines; post-anal part with 2 pairs of lateral and a pair of stout end spines.

Antennule (Fig. 2 A) with 3 robust peduncular segments; basal segment as long as distal 2 segments combined, bears several spinules and 2 stout spines: 2nd segment a little less than  $\frac{1}{2}$  as long as basal and about  $\frac{2}{3}$  as long as 3rd segment. Main flagellum with 3 segments, together a little shorter than 2 peduncular distal segments combined; 2nd segment longest, 3 times as long as 1st, and  $1\frac{1}{3}$  as long as 3rd segment, which bears a segment-like protuberance and 2 long aesthetascs. Accessory lash 3-segmented, about  $\frac{1}{3}$  as long as main lash. Antenna (Fig. 2 B) remains in rudimentary condition. Mandible (Fig. 2 C) with 10 setae and lacinia mobilis on left incisor process. Maxillule (Fig. 2 D) with palp bearing 2 filaments. Maxilla and labium as shown in Fig. 2 E–F. Maxilliped 1 (Fig. 2 G) with many branchial lobulus on epipod. Maxilliped 2 (Fig. 2 H) with merus set with 4 spines and carpus armed with a few spinules on each upper edge. Maxilliped 3 (Fig. 2 I) with basis much more than  $1\frac{1}{2}$  as long as remaining segments together, fairly broad distally and its outer angle produced to about middle of ischium; ischium and merus subequal in length and a little longer than dactylus; basis and ischium with a strong spine on each inner angle; merus and carpus each with a pair of similar spines distally. Pereopod 1 (Fig. 3 A) with basis curved, narrowed distally, about  $\frac{2}{3}$  as long as remaining segments together, armed with a row of spines along upper and lower edges and a strong spine distally; ischium a little shorter than merus and each has strong spine on upper edge; carpus nearly twice as long as ischium and merus together; propodus slightly shorter than carpus and subequal to dactylus. Pereopod 2 (Fig. 3 B–C) with basis broad,  $\frac{2}{3}$  as long as remaining segments together; it has 4 rows of strong spines on entire lower edges, extending over most of its length; ischium about  $\frac{1}{2}$  as long as merus, with a strong spine on inner distal end; merus about  $\frac{1}{3}$  as long as carpus, and bears 2 pairs of large spines on inner and outer edges and a similar spine on lower edge; carpus much

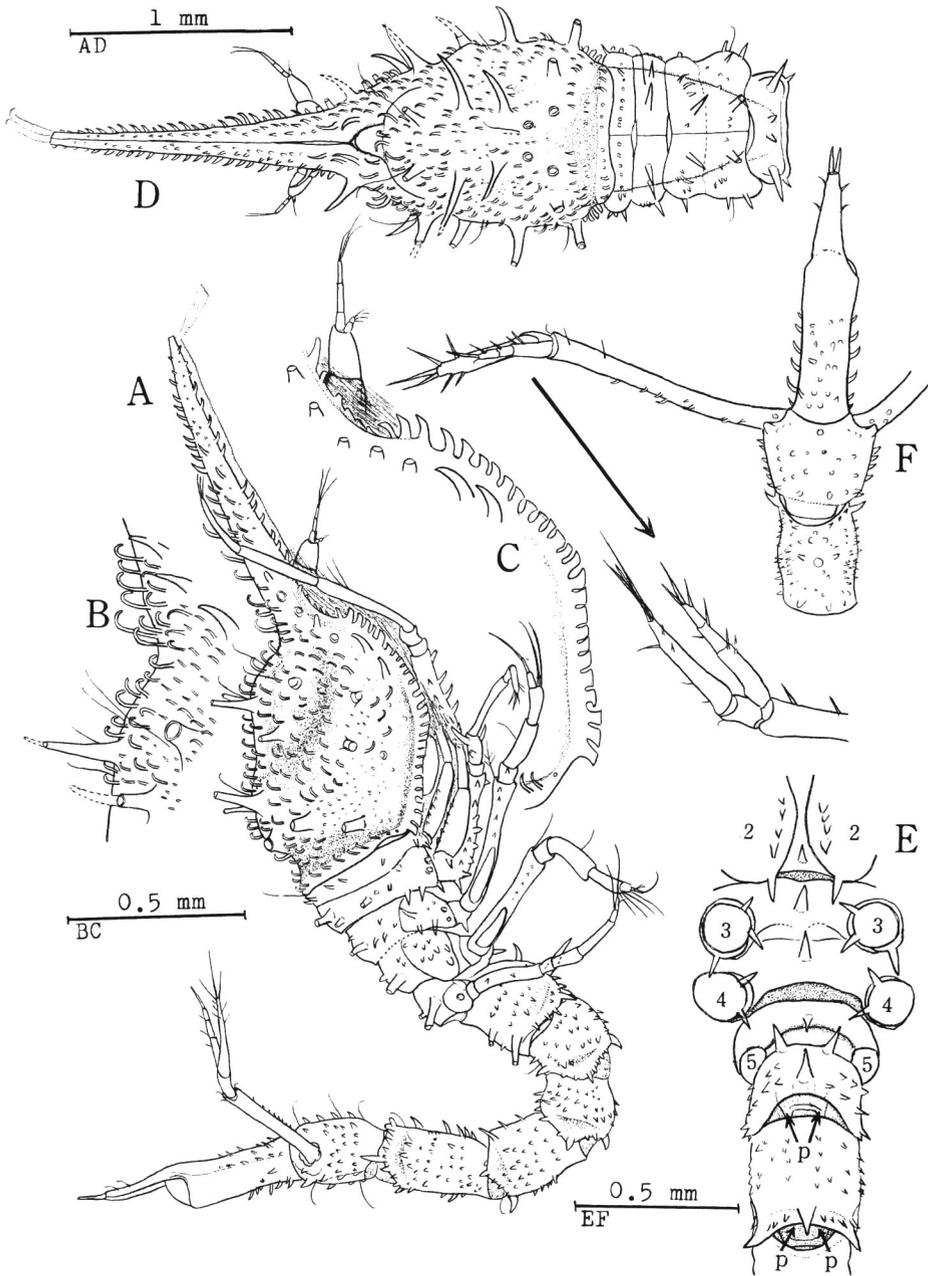


Fig. 1. *Vemakylindrus multiuncifer* sp. nov., holotype, juvenile male. A, Lateral view; B, spination on anterior carapace, lateral; C, antennal notch and lower edge of carapace, lateral; D, anterior portion of body, dorsal; E, last 4 pereonites and first 2 pleonites, ventral (2, basis of pereopod 2; 3-5, sockets of pereopods 3-5; p, sites of buds of pleopods 1-2). F, last 2 pleonites with telson and right uropod.

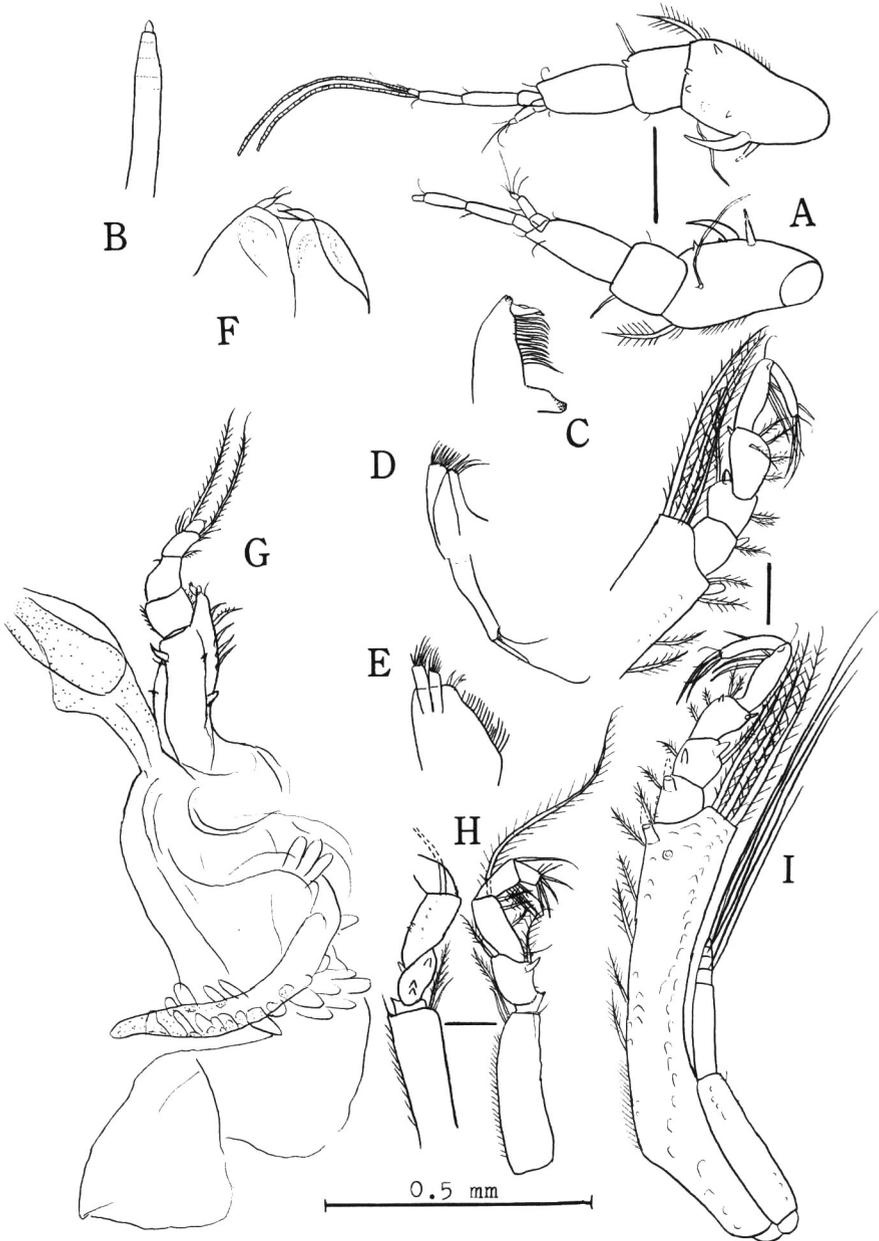


Fig. 2. *Vemakylindrus multiuncifer* sp. nov., holotype, juvenile male. A, Antennule; B, antenna; C, mandible; D, maxillule; E, maxilla; F, labium; G, maxilliped 1; H, maxilliped 2; I, maxilliped 3.

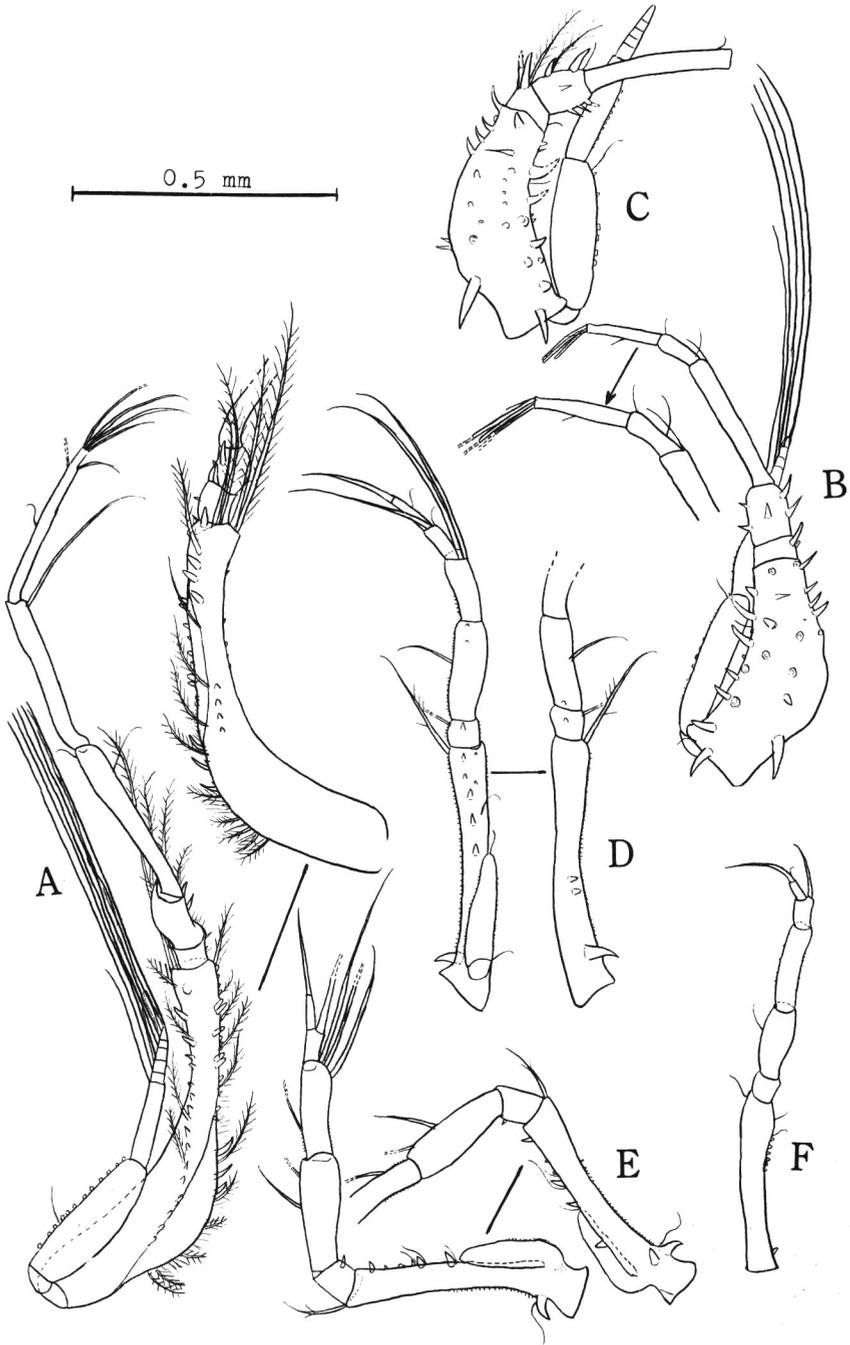


Fig. 3. *Vemakylindrus multiuncifer* sp. nov., holotype, juvenile male. A, Pereopod 1; B–C, pereopod 2 (C, left pereopod 2); D, pereopod 3; E, pereopod 4; F, pereopod 5.

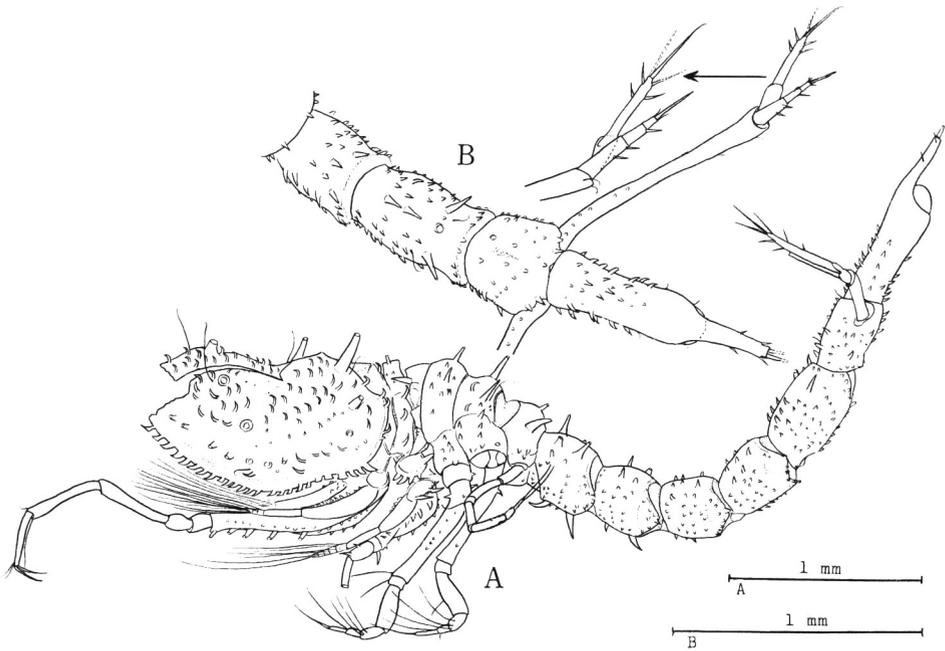


Fig. 4. *Vemakylindrus multiuncifer* sp. nov., allotype, juvenile female. A, Lateral view; B, last 3 pleonites with telson and right uropod.

longer than propodus and dactylus combined; propodus about  $\frac{1}{2}$  as long as dactylus. Pereopod 3 (Fig. 3 D) with basis a little shorter than remaining segments together and pereopod 4 (Fig. 3 E) with basis  $\frac{3}{4}$  as long as remaining segments together, each basis bears a row of spines on outer edge, a strong spine at inner base, and a rudimentary 1-segmented exopod. Pereopod 5 as shown in Fig. 3 F. Uropod (Fig. 1 F) with peduncle much longer than last 2 pleonites together, with 7 spinules on outer edge and 2 spines on distal inner edge. Endopod 3-segmented, about  $\frac{2}{5}$  as long as peduncle; basal segment slightly longer than distal subequal 2 segments combined, with 2 spines on distal inner edge; 2nd segment with a spine on each distal end; 3rd segment bears 3 terminal spines. Exopod 2-segmented, much longer than endopod; distal segment about 3 times as long as basal one, bears 1 or 2 lateral and 3 distal spines.

Allotype juvenile female (Fig. 4 A–B) without oostegites, carapace damaged and its anterior part including pseudorostrum missing. Differing from male holotype in usual manner. Telson about  $\frac{2}{3}$  as long as last pleonite and a little shorter than uropodal peduncle; pre-anal part  $\frac{2}{3}$  as long as post-anal, and 5 pairs of hook-shaped lateral spines and many spinules on its proximal two-thirds; post-anal part with 2 pairs lateral and a pair of end spines. Uropod with peduncle  $\frac{1}{3}$  as long as last 2 pleonites combined.

*Etymology.* The specific name *multiuncifer* is a combination of three Latin

words (*multi*=many, *unc(us)*=a hook, barb, and *fer*=bear, carry) and refers the carapace bearing many hook-shaped spinules.

*Remarks.* *Vemakylindrus multiuncifer* is allied to *V. grandidentatus* Gamô, 1988, from north off Miyako-jima I. (1650 m deep), *V. costaricanus* (Băcescu, 1961) from Costa Rica (3718 m deep), and *V. gladiger* (Băcescu, 1961) from off Colombia (912 m deep), but easily distinguished from them by having the carapace with many hook-like spinules (in the three known species, the carapace has only normal spinules).

***Vemakylindrus gymnocephalus* sp. nov.**

(Figs. 5–7)

*Type specimen.* Holotype (NSMT-Cr 12404), immature female with rudimentary oostegites, length 7.8 mm (including telson). St. H (KT73-15), 34°55.06'N, 138°44.06'E–34°54.24'N, 138°44.11'E, off Toi, Suruga Bay, 304–313 m depth; 27 October, 1973.

*Description.* Carapace (Fig. 5 A–C) thin, calcified and brittle; a little less than  $\frac{1}{5}$  as long as total body length,  $1\frac{1}{3}$  as long as greatest width near hind edge, and a little wider than depth; carapace without spinules on its whole surface, except for front part of frontal lobe and basal part of pseudorostrum, with about 18 large fragile spines, all of which are broken off, arranging in 4 circles, and a row of about 10 moderate spines running along lower edge from hind part of pseudorostrum to about middle of carapace. Pseudorostrum much produced, nearly straight in front of eyeless ocular lobe, about  $\frac{4}{5}$  as long as rest of carapace (from ocular lobe to hind edge) with branchial siphons projecting forward about  $\frac{2}{3}$  as long as pseudorostrum. Pseudorostral lobes armed with several rows of spinules. Antennal notch slightly excavated; its anterolateral angle not prominent. Anterolateral or lower edge serrated.

Pereon (Fig. 5 A–B)  $\frac{5}{6}$  as long as carapace, almost rectangular in shape and narrower posteriorly, pereonite 1 widest, a little narrower than carapace; pereonite 5 about  $\frac{1}{2}$  as long as pereonite 1; each pereonite has a pair of large dorsal spines and a few similar spines on lateral side; pereonites 2–5 flanged laterally. Pleon (Fig. 5 A, D) much more than  $\frac{1}{2}$  as long as total body length, cylindrical and spinose. Pleonite 5 longer than pleonites 4 or 6. Telson (Fig. 5 A, D) much more than twice as long as last pleonite and about as long as uropodal peduncle; pre-anal part about twice as long as post-anal, and with about 10 lateral spines and many dorsal spines on its proximal two-thirds, and a number of ventral spines near its base; post-anal part bears 3 or 4 lateral spines and 2 long stout terminal spines.

Antennule (Fig. 6 A) with 3 peduncular segments; basal segment slightly more than as long as distal 2 segments combined, robust, and bears a diagonal row of stout spines and most of them broken off; 2nd segment  $\frac{1}{3}$  as long as 1st, and about  $\frac{1}{2}$  as long as 3rd. Main flagellum slender, cylindrical, 2-segmented, together nearly as long

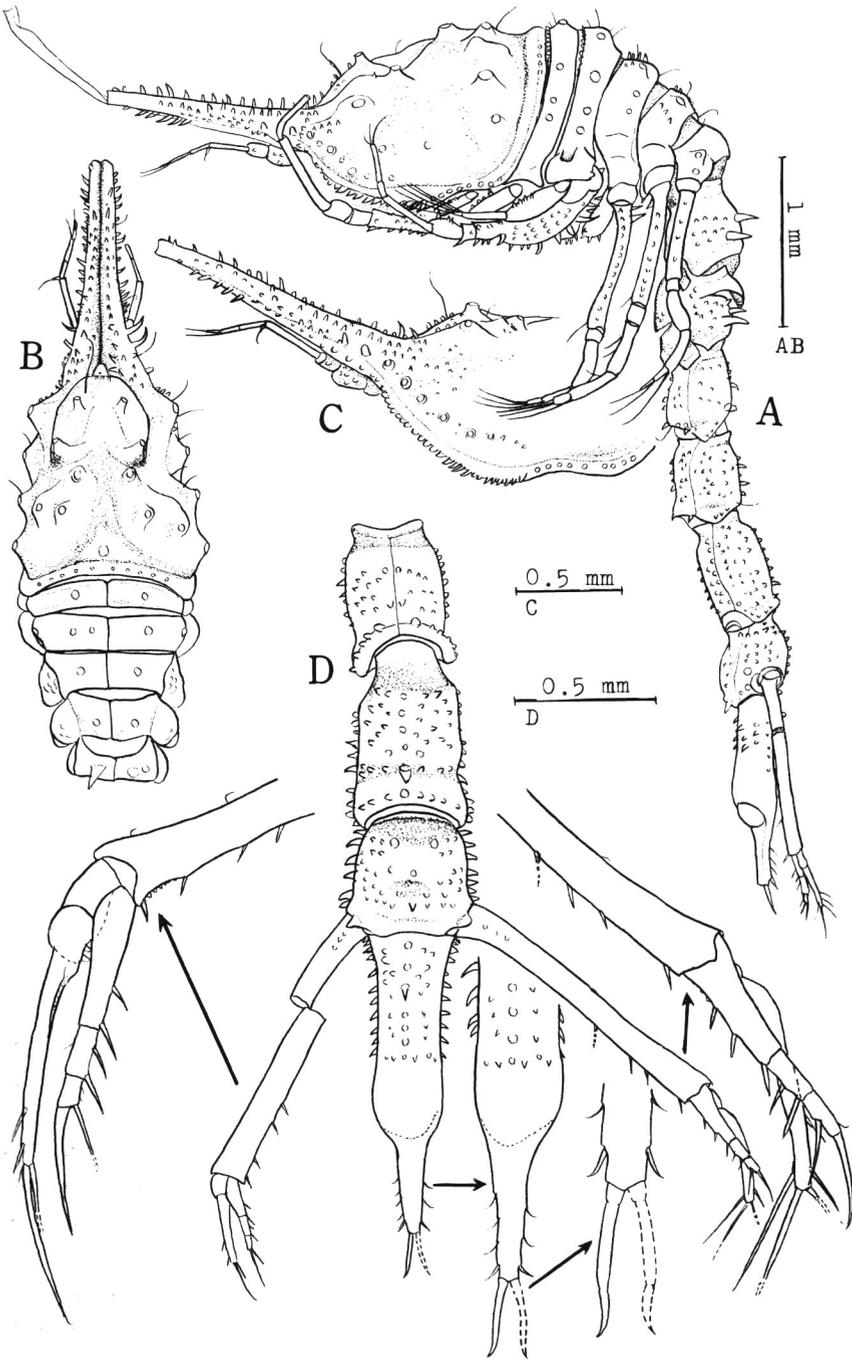


Fig. 5. *Vemakylindrus gymnocephalus* sp. nov., holotype, immature female with rudimentary oostegites. A, Lateral view; B, anterior portion of body, dorsal; C, antennal notch and lower edge of carapace; D, last 3 pleonites with telson and uropods.

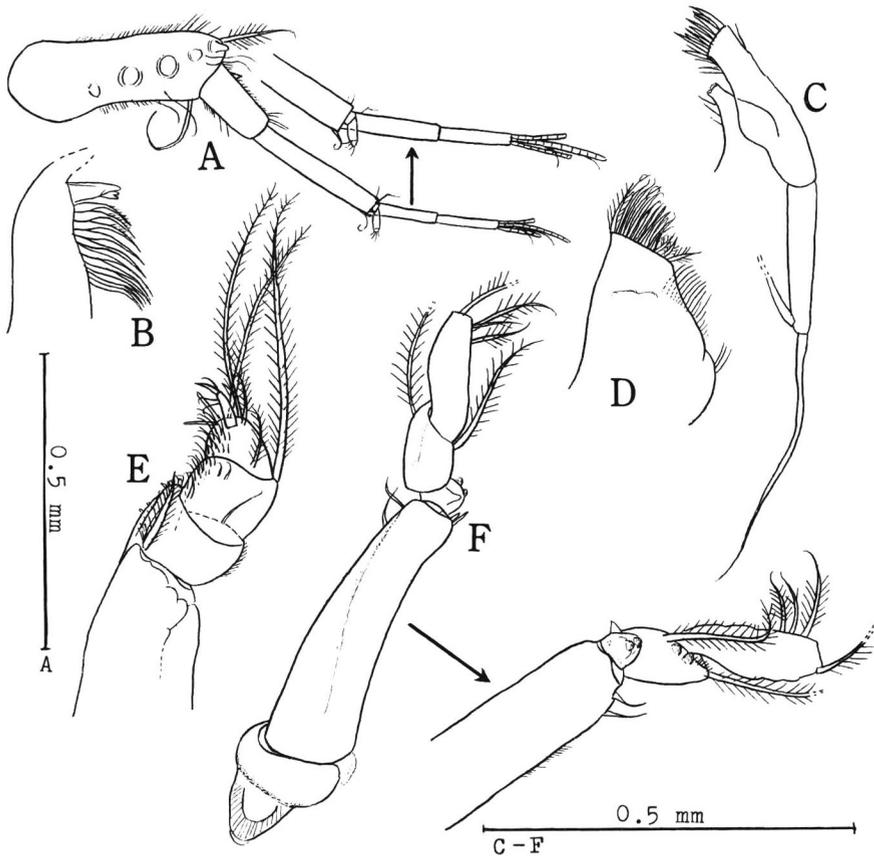


Fig. 6. *Vemakylindrus gymnocephalus* sp. nov., holotype, immature female. A, Antennule; B, mandible; C, maxillule; D, maxilla; distal portion of maxilliped 1; F, proximal portion of maxilliped 2.

as 2nd peduncular segment; 2nd segment a little longer than 1st, and has 2 aesthetascs. Mandible (Fig. 6C) with 11 setae and a lacinia mobilis on left incisor process. Maxillule (Fig. 6D) with palp bearing 2 filaments. Maxilla (Fig. 6E) damaged, and endites missing. Distal parts of Maxilliped 1 as shown in Fig. 6F. Maxilliped 2 (Fig. 6G) with ischium and merus bearing some minute protuberances and distal 2 segments missing. Maxilliped 3 (Fig. 7A) with basis a little less than remaining segments together, curved, slightly broader distally and bears a strong spine and spinules near its inner corner; its outer angle produced to about middle of ischium; ischium about  $\frac{2}{3}$  as long as merus or carpus, bearing a stout spine near inner angle; propodus about  $1\frac{1}{2}$  as long as carpus, a little longer than dactylus, and has a long slender spine on its outer end. Pereopod 1 (Fig. 7B) with basis, curved, slender, and a little longer than distal 4 segments together, and dactylus missing; basis has 2 rows of

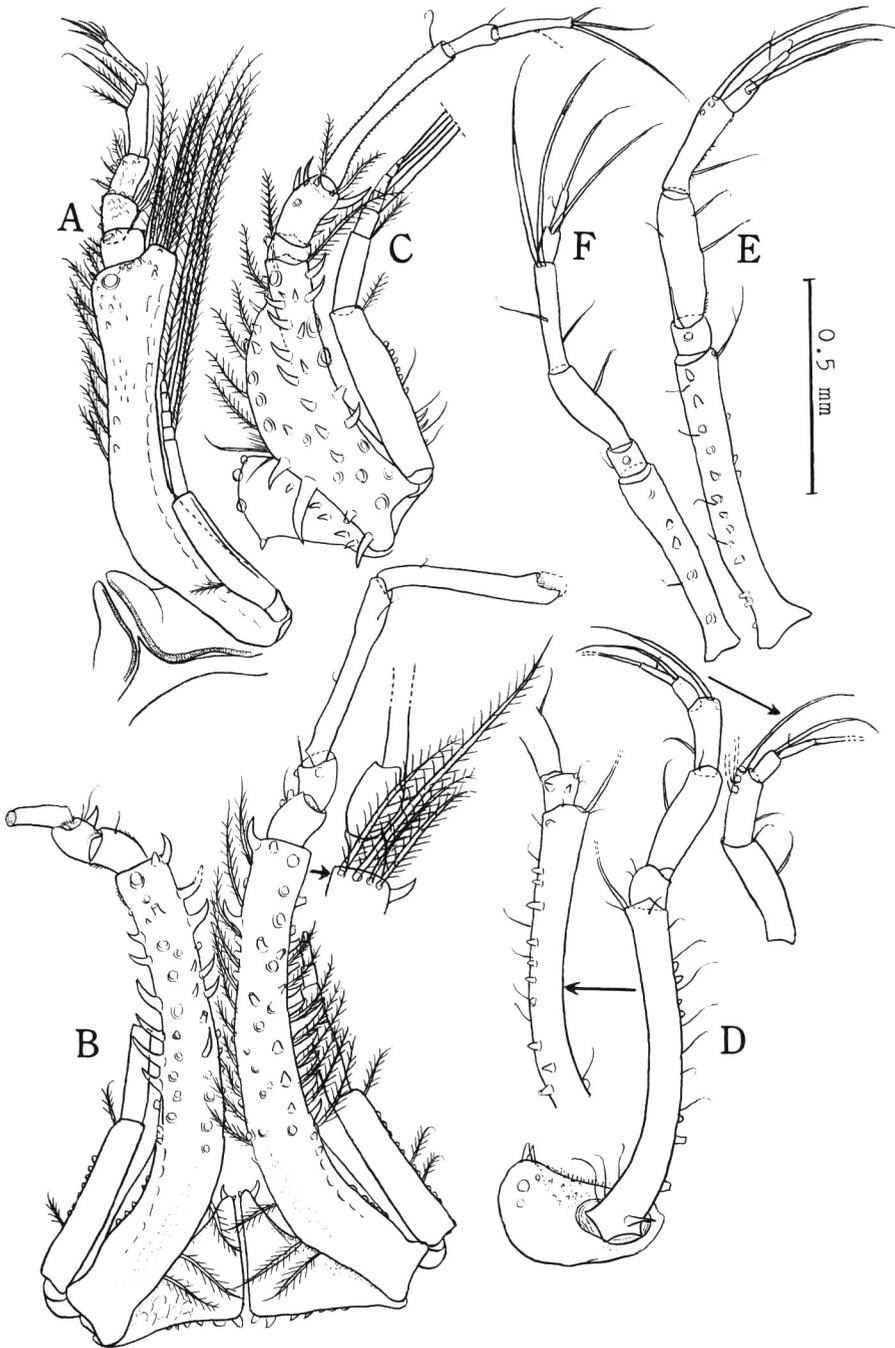


Fig. 7. *Vemakylindrus gymnocephalus* sp. nov., holotype, immature female. A, Maxilliped 3; B, pereopod 1; C, pereopod 2; D, pereopod 3; E, pereopod 4; F, pereopod 5.

robust spines on lower surface and a row of hook-shaped large spines and plumose setae on each lateral edge; ischium subequal to merus in length; carpus about twice as long as ischium and merus combined and slightly longer than dactylus. Pereopod 2 (Fig. 7C) with basis a little less than as long as remaining segments together, very broad, and abruptly narrowed distally, bearing 4 rows of strong hook-shaped spines on lower edges; ischium nearly  $\frac{1}{3}$  as long as merus, with a stout spine on inner edge; merus has 2 or 3 similar spines on each lateral edge and a pair of spinules distally; carpus about twice as long as ischium and merus together; propodus about  $\frac{1}{4}$  as long as carpus and about  $\frac{3}{4}$  as long as dactylus. Pereopod 3 (Fig. 7D) with basis about  $1\frac{1}{6}$  as long as remaining segments together. Pereopod 4 (Fig. 7E) with basis slightly more than  $\frac{4}{5}$  as long as remaining segments together. Pereopod 5 as in Fig. 7F. Basis of pereopods 3–5 with a row of spines on outer edge. Each coxa of pereopods 1–3 bears a rudimentary oostegite with spinules. Uropod (Fig. 5D) with peduncle as long as last 2 pleonites combined, with 3 small granules at base, and 4 spines on distal inner edge. Endopod 3-segmented,  $\frac{1}{3}$  as long as peduncle; basal segment about  $1\frac{1}{2}$  as long as distal 2 segments combined, three segments with 3, 2, 1 internal spines, respectively, and 3rd segment with a long apical spine. Exopod 2-segmented, much longer than endopod; basal segment very small; distal segment long, with 2 spines externally, 1 spine internally and 2 long end spines. Left uropod a little different from right one and it may be regenerated.

*Etymology.* Specific name *gymnocephalus* is derived from two Greek words (*gymno*=naked, bare and *cephalus*=head).

*Remarks.* *Vemakylindrus gymnocephalus* is allied to *V. grandidentatus* Gamô, 1988 and *V. multiuncifer* described in this paper at a glance, but it is easily distinguished from them by having the whole carapace not studded with spinules. The new species is most closely allied to *V. prolatus* (Jones, 1969) from Kermadec Trench, 2470 m deep, but differs from it in having different spination on the carapace and especially on the perenites, pleonites and the telson.

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