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RECORDS OF SHALLOW-WATER MARINE ISOPODS FROM BERMUDA WITH DESCRIPTIONS OF FOUR NEW SPECIES

Brian Kensley

A B S T R A C T

An extensive collection of marine isopods from the Peabody Museum, Yale University, taken from 114 collecting stations on Bermuda, is reported. The collection adds 10 new records to the list of known Bermudan isopods, including two undescribed species, *Mesanthura bermudensis* and *Joeropsis nigricapitis*. These two species can be recognized initially by their distinctive pigment patterns. Fresh material shows *Anthomuda stenotelson* Schultz to be a junior synonym of *Anthelura affinis* Richardson. Also included in the report are the descriptions of two new species collected from a cave, *Munnogonium somersensis* and *Stenobermuda iliffei*. The latter, which exhibits protogynous hermaphroditism, is shown to be a member of the Gnathosteneiroidea.

While several reports on the isopod fauna of Bermuda have been published (Richardson, 1902; Schultz, 1986; Kensley and Schotte, 1989), the collection of about 1,500 marine and littoral specimens reported here from the Peabody Museum, Yale University, includes 23 species and is probably the most comprehensive collection yet made. The isopods were collected from the intertidal to about 10-m depth, from a variety of habitats including algal clumps and turfs, turtle grass beds, sponges, rocks, coral rubble and coarse sediments, and mangrove roots.

The current list of 60 isopod species known from Bermuda (Table 1, including for completeness the terrestrial oniscideans and the parasitic epicarideans) contains 10 new records, five of which have a Caribbean distribution. Of the remaining five, one wood-boring species, *Limnoria multipunctata* Menzies, has a widespread marine distribution; four species were previously undescribed. This list cannot be considered as complete, given that single specimens of an unidentifiable munnid, arcturid, and gnathiid are present in the Peabody collection. Further, no records of interstitial isopods are known, probably because no attempt has been made to collect them. Overall, however, the Bermudan marine isopod fauna continues to be primarily tropical/subtropical Caribbean in its affinities, while its 30% endemism (14 of 46 marine species), presumably developed since the last Pleistocene glaciation, emphasizes its relative isolation.

Of the marine forms, the genus *Carpis* appears to be ecologically the most widespread, occurring in 86 of the 114 collection stations (see Table 1). One species, *Carpis minutus* (Richardson), is represented at 40 of these stations.

Included in this report are descriptions of two new species collected from Bermudan caves by Dr. Thomas Iliffe of Texas A&M University, and deposited in the National Museum of Natural History (USNM), Smithsonian Institution. Holotypes from the Yale collection are deposited in the Peabody Museum, Yale University (YPM), along with the rest of the collection which is catalogued in a block commencing with catalogue number YPM 9551; where available, paratypes were deposited in the Smithsonian Institution and the Bermuda Biological Station (BBS).

SYSTEMATICS

Family Antheluridae Poore and
Lew Ton, 1988

Anthomuda affinis (Richardson, 1902)

Fig. 1

Anthelura affinis Richardson, 1902: 288, pl. 28, figs. 29–32.

Ananthura affinis: Schultz, 1969: 101, fig. 137.

Anthomuda affinis: Poore and Lew Ton, 1988: 500.

Anthomuda stenotelson Schultz, 1979: 909, figs. 12–21.—Poore and Lew Ton, 1988: 500.—Kensley and Schotte, 1989: 23, 270, fig. 7A.

Material Examined.—Holotype of *A. affinis*, YPM 3349, nonovigerous ♀ total length (tl) 5.0 mm, Bermuda, collector A. E. Verrill, 1901.—Holotype of *A. stenotelson*, USNM 171263, nonovigerous ♀ tl 8.0 mm, paratype USNM 171264, nonovigerous ♀ tl 7.9 mm,

Table 1. Isopod records from Bermuda. ! stygobiont. + endemic form. * new record.

Suborder Anthuridea	
	<i>Amakusanthura magnifica</i> (Menzies and Frankenberg, 1966)
+	<i>Anthelura affinis</i> (Richardson, 1902)
+	<i>Apanthura harringtoniensis</i> Wägele, 1981
+	<i>Colanthura tenuis</i> Richardson, 1902
! +	<i>Curassanthura bermudensis</i> Wägele, 1985
*	<i>Kupellonura imswe</i> (Kensley, 1982)
+ *	<i>Mesanthura bermudensis</i> , new species
	<i>Paranthura infundibulata</i> Richardson, 1902
	<i>Pendantthura tanaiformis</i> Menzies and Glynn, 1968
Suborder Asellota	
! +	<i>Atlantasellus cavernicolus</i> Sket, 1979
+ *	<i>Carpas algicola</i> (Miller, 1941)
	<i>Carpas bermudensis</i> Richardson, 1902
+	<i>Carpas minutus</i> (Richardson, 1902)
*	<i>Carpas serricaudus</i> Menzies and Glynn, 1968
	<i>Joeropsis rathbunae</i> Richardson, 1902
+ *	<i>Joeropsis nigricapitis</i> , new species
+ *	<i>Munnogonium somersensis</i> , new species
*	<i>Santia milleri</i> (Menzies and Glynn, 1968)
	<i>Stenotrium stebbingi</i> Richardson, 1902
+	<i>Stenobermuda acutirostrata</i> Schultz, 1979
! + *	<i>Stenobermuda iliffei</i> , new species
Suborder Epicaridea	
	<i>Bopyrissa wolffi</i> Markham, 1978
	<i>Cancricepon choprae</i> (Nierstrasz and Brandis, 1925)
	<i>Leidya bimini</i> Pearse, 1951
	<i>Parathelges piriformis</i> Markham, 1972
	<i>Parathelges tumidipes</i> Markham, 1972
	<i>Pseudione affinis</i> (Sars, 1882)
	<i>Probopyrinella lateuticola</i> (Gissler, 1882)
+	<i>Stegias clibanarii</i> Richardson, 1904
	<i>Synsynella choprae</i> (Pearse, 1932)
	<i>Synsynella deformans</i> Hay, 1917
Suborder Flabellifera	
! +	<i>Alcirona krebsi</i> Hansen, 1890
	<i>Arubolana aruboides</i> (Bowman and Iliffe, 1983)
	<i>Colopisthus parvus</i> Richardson, 1902
	<i>Cymothoa oestrup</i> (Linnaeus, 1793)
	<i>Dynamenella perforata</i> (Moore, 1901)
	<i>Eurydice personata</i> Kensley, 1987
*	<i>Exciorolana mayana</i> (Ives, 1891)
	<i>Excorallana quadricornis</i> (Hansen, 1890)
*	<i>Limnoria multipunctata</i> Menzies, 1957
	<i>Limnoria tuberculata</i> Sowinsky, 1884
	<i>Lironeca reniformis</i> Menzies and Frankenberg, 1966
	<i>Nerocila acuminata</i> Schioedte and Meinert, 1881
	<i>Paracerceis caudata</i> (Say, 1818)
Suborder Valvifera	
	<i>Idotea balthica</i> (Pallas, 1772)
	<i>Idotea metallica</i> Bosc, 1802

Table 1. Continued.

Suborder Oniscidea	
	<i>Agabiformius lentus</i> (Budde-Lund, 1885)
	<i>Armadillidium vulgare</i> (Latreille, 1840)
	<i>Armadilloniscus ellipticus</i> (Harger, 1878)
	<i>Halophiloscia couchi</i> (Kinahan, 1858)
	<i>Leptotrichus panzeri</i> (Audouin, 1826)
	<i>Ligia baudiniana</i> H. Milne Edwards, 1840
	<i>Porcellio laevis</i> Latreille, 1804
	<i>Porcellio lamellatus</i> Budde-Lund, 1885
	<i>Porcellio scaber</i> Latreille, 1804
	<i>Porcellionides pruinosus</i> (Brandt, 1833)
	<i>Porcellionides sexfasciatus</i> (Koch, 1847)
	<i>Stenoniscus pleonalis</i> Aubert and Dollfus, 1890
	<i>Tylos latreillei</i> Audouin, 1825
	<i>Tylos niveus</i> Budde-Lund, 1885

off Castle Roads, Bermuda, 9.0 m.—Peabody locality 123, North Rock, 9 m, 1 nonovigerous ♀ tl 5.0 mm.

Remarks.—Poore and Lew Ton (1988) noted that *Anthelura affinis* and *Anthomuda stenotelson* appeared to be very similar, and were perhaps synonymous. Examination of the type material of both species confirms this synonymy. The pereopods and uropodal rami, previously poorly illustrated, are figured here, as is the most recently collected nonovigerous female, to show the dorsal pigmentation.

Family Anthuridae Leach, 1814
***Mesanthura bermudensis*, new species**
Figs. 2, 3

Material Examined.—Holotype, YPM 9553, ♂ 6.8 mm, Peabody locality 20, Shelly Bay, in subtidal algae, collector M. F. Gable, 3 Jun 1985.—Paratype, YPM 9554, ♂ 5.6 mm, Peabody locality 45, Whalebone Bay, rocky intertidal, collector M. F. Gable, 24 May 1987.—Paratype, YPM 9555, nonovigerous ♀ 6.2 mm, Peabody locality 47, promontory off Shelly Bay, algal clumps, collector M. F. Gable, 28 May 1987.—Paratype, YPM 9556, manca 2.6 mm, Peabody locality 73, cove west of Bermuda Biological Station, Ferry Reach, turtle and manatee grass and sediment, collector A. J. Baldinger, 29 May 1987.—Paratype, YPM 9557, ♂ 4.6 mm, Peabody locality 74, Evans Bay, algal scrapings from pier, collector E. A. Lazo-Wasem, 30 May 1987.—Paratype, YPM 9558, manca 2.7 mm, Peabody locality 105, North Rock, red algae, collector A. J. Baldinger, 2 Jun 1987.—Paratypes, YPM 9559, nonovigerous ♀ 3.2 mm, manca 2.33 mm, Peabody locality 196, cove west of Devonshire Bay, washings from rocks, midtide level, collector E. A. Lazo-Wasem, 15 Jun 1988.—Paratype, BBS, ♂ 4.4 mm, Peabody locality 61, cove west of Bermuda Biological Station, Ferry Reach, bed of *Thalassia*, collector A. J. Baldinger, 29 May 1987.—Paratype, USNM 243585, ♂ 5.4 mm, Peabody locality 99, Shark Hole,

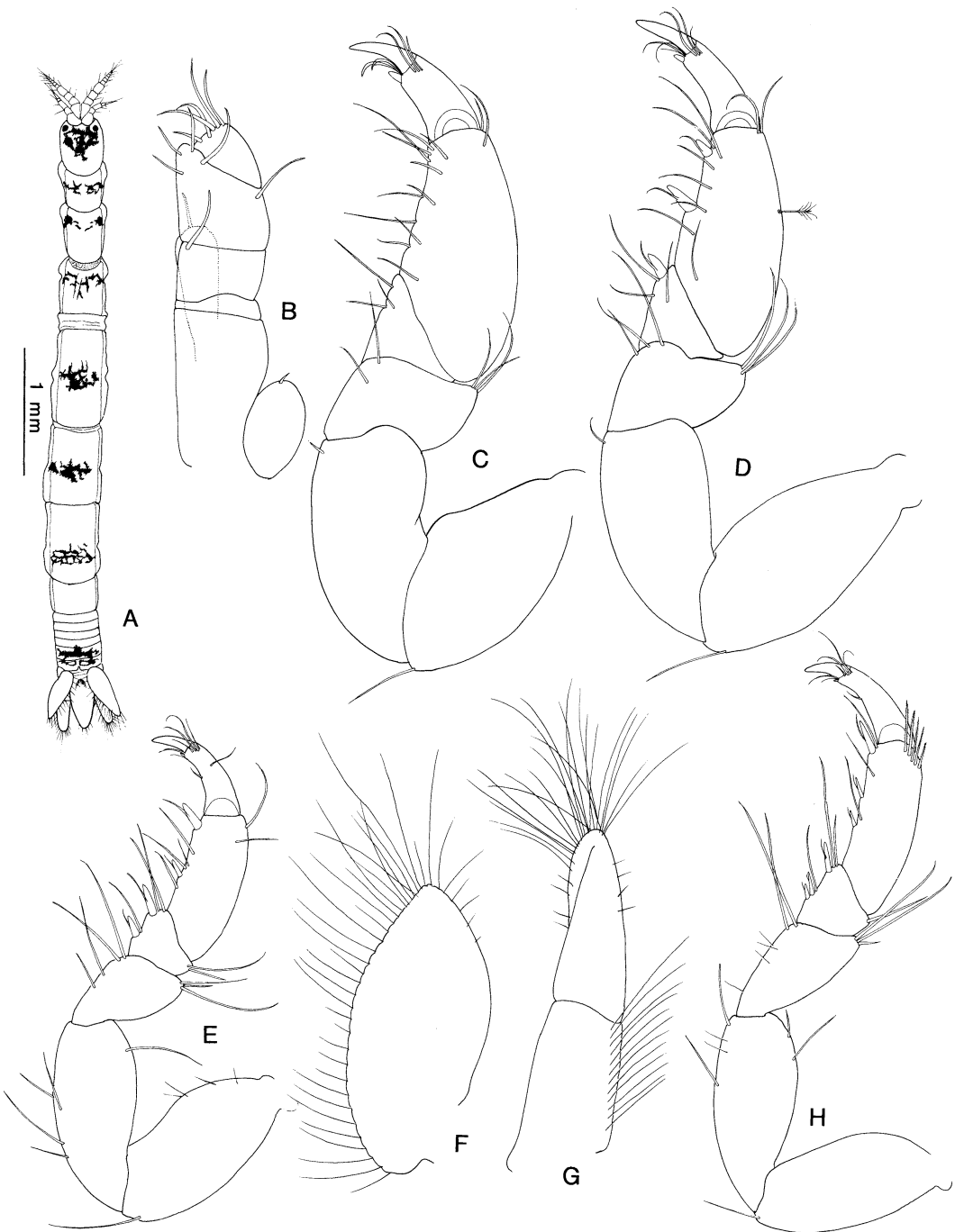


Fig. 1. *Anthomuda affinis*: A, habitus nonovigerous ♀ PMY locality 123. Paratype of *A. stenotelson*, USNM 171264; B, maxilliped; C, pereiopod 1; D, pereiopod 2; E, pereiopod 4; F, uropodal exopod; G, uropodal protopod and endopod; H, pereiopod 7.

Harrington Sound, subtidal encrusted rocks, collector E. A. Lazo-Wasem, 1 Jun 1987.—Paratype, USNM 243586, nonovigerous ♀ 4.9 mm, Peabody locality 46, Harrington Sound, attached wall community, collector M. F. Gable, 25 May 1987.

Description.—Nonovigerous female: Body proportions, $C < 1 < 2 = 3 = 4 = 5 = 6 > 7 = P$. Cephalon with moderate rostral point; anterolateral eyes strongly pigment-

ed. Telson posteriorly rounded, having transparent marginal flange, with 6 pairs of apical setae.

Antennular peduncle with basal article broader and slightly longer than 2 distal articles together; flagellum of 3 articles, terminal article bearing 4 aesthetascs. Antennal flagellum consisting of 4 setose articles. Mandibular palp, article 3 with 6 distal spines, subapical spine longest; incisor with 3 sclerotized cusps; lamina dentata having 5 teeth; molar truncate, barely sclerotized. Maxilla having 6 distal spines. Maxilliped with basal article of palp slightly shorter than article 2; terminal article with mesial margin truncate, bearing 3 fringed setae. Pereiopod 1, carpus posterodistally rounded; propodal palm with transparent rounded lobe at about midpoint; unguis about equal in length to rest of dactylus, with small spine at base. Pereiopod 2, carpus triangular, lacking free anterior margin; propodus with strong posterodistal spine, fringed scales along posterior margin; unguis half length of rest of dactylus. Pereiopod 7, carpus with short spine on posterior margin, latter longer than free anterior margin; propodus with posterodistal fringed scales and strong spine; unguis less than half length of rest of dactylus. Pleopod 1, endopod parallel-sided, about 6 times longer than wide, with 10 distal plumose setae; exopod about 3.5 times wider than endopod, widest at midlength. Uropodal exopod almost twice longer than wide, apically acute, with broad subapical notch, bearing numerous marginal setae; endopod broadly rounded, one-fifth longer than basal width, bearing numerous marginal setae. Color pattern: cephalon with broad pigment patch between eyes and reaching posteriorly three-fourths length of segment; pereionites 1–7 each with roughly rectangular dorsal patch of pigment falling well short of posterior margin, those of pereionites 2–5 with clear oval area on midline; pleon with pigment patch anteriorly lobed, and with short anterolateral pigment lines; telson with rectangular pigment patch falling well short of posterior margin; small patch of pigment on uropodal endopod and exopod.

Male: Body proportions, $C < 1 < 2 > 3 = 4 < 5 > 6 > 7 < P$. Eyes larger than in female. Antennular flagellum with 8 articles, all except terminal one bearing whorl

of aesthetascs. Pereiopod 1, carpus posterodistally rounded; propodus with rounded transparent lobe at about midlength of palm, submarginal band of stiff setae on mesial surface; unguis slightly less than length of rest of dactylus. Pleopod 2, endopod with 5 distal plumose setae, copulatory stylet articulating in proximal half of mesial margin, reaching well beyond distal margin of ramus; exopod with transverse suture at about midlength, bearing 8 distal plumose setae. Color pattern: peduncles of antennules and antennae pigmented; entire dorsal surface of cephalon pigmented; pereionites 1–7 with ovate patch of pigment; posterior half of pleon with 5 rough transverse bands, medially joined, and with anteromedial extension; uropods and telson strongly pigmented, that of latter falling well short of apex.

Etymology.—The specific name derives from the type locality, the island of Bermuda.

Remarks.—*Mesanthura bermudensis* closely resembles the widespread *M. paucidens* Menzies and Glynn, 1968, in overall proportions and armature of the appendages, and in the general distribution of pigment (the latter being well-nigh species-specific within the genus). The following differences can be detected, however, in a comparison with material from Puerto Rico (Menzies and Glynn, 1968), Belize (Kensley, 1982), and Martinique (Müller, 1991a). (1) Distribution of pigment: the males of *M. paucidens* do not have pigmented antennular and antennal peduncles. The pleon of the earlier species lacks both the short anterior “threads” of pigment as well as an anteromedial extension seen in both males and females from Bermuda. (2) The Bermudan male has two more articles in the antennular flagellum than do the specimens from Martinique. (3) The endopod of pleopod 1 has 10 distal plumose setae in the Bermudan form, three or four in those from the rest of the Caribbean. (4) The telson of the Bermudan form has four pairs of long simple setae, two pairs of short simple setae, and one pair of feathered setae on the posterior margin. The Caribbean form has two pairs of long setae and one pair of feathered setae.

These seemingly small differences would indicate that the Bermudan *Mesanthura* is probably closely related to the Caribbean

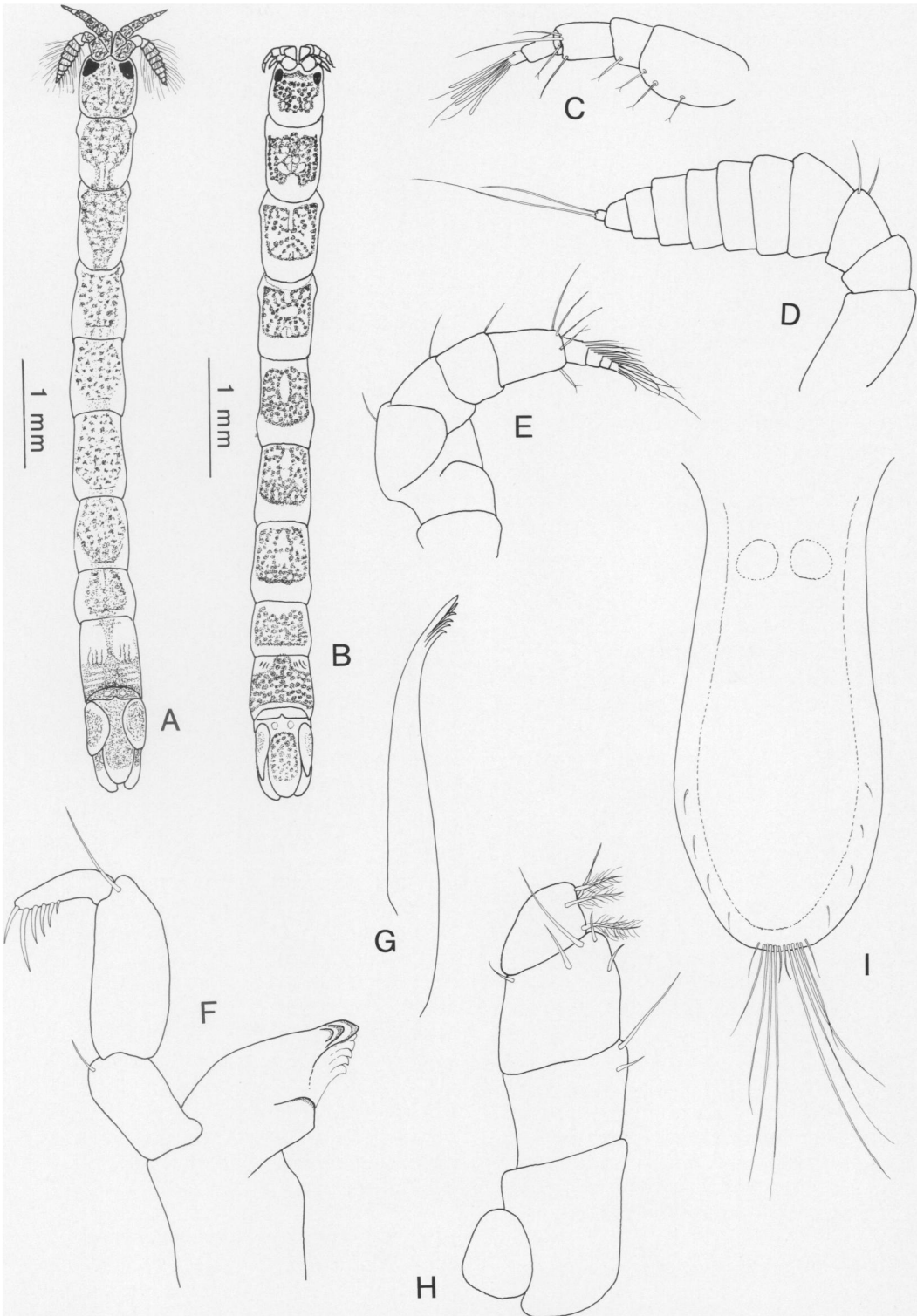


Fig. 2. *Mesanthura bermudensis*, new species: A, habitus ♂, dorsal view; B, habitus ♀, dorsal view; C, antennule ♀; D, antennule ♂, aesthetascs omitted; E, antenna; F, mandible; G, maxilla; H, maxilliped; I, pleotelson.

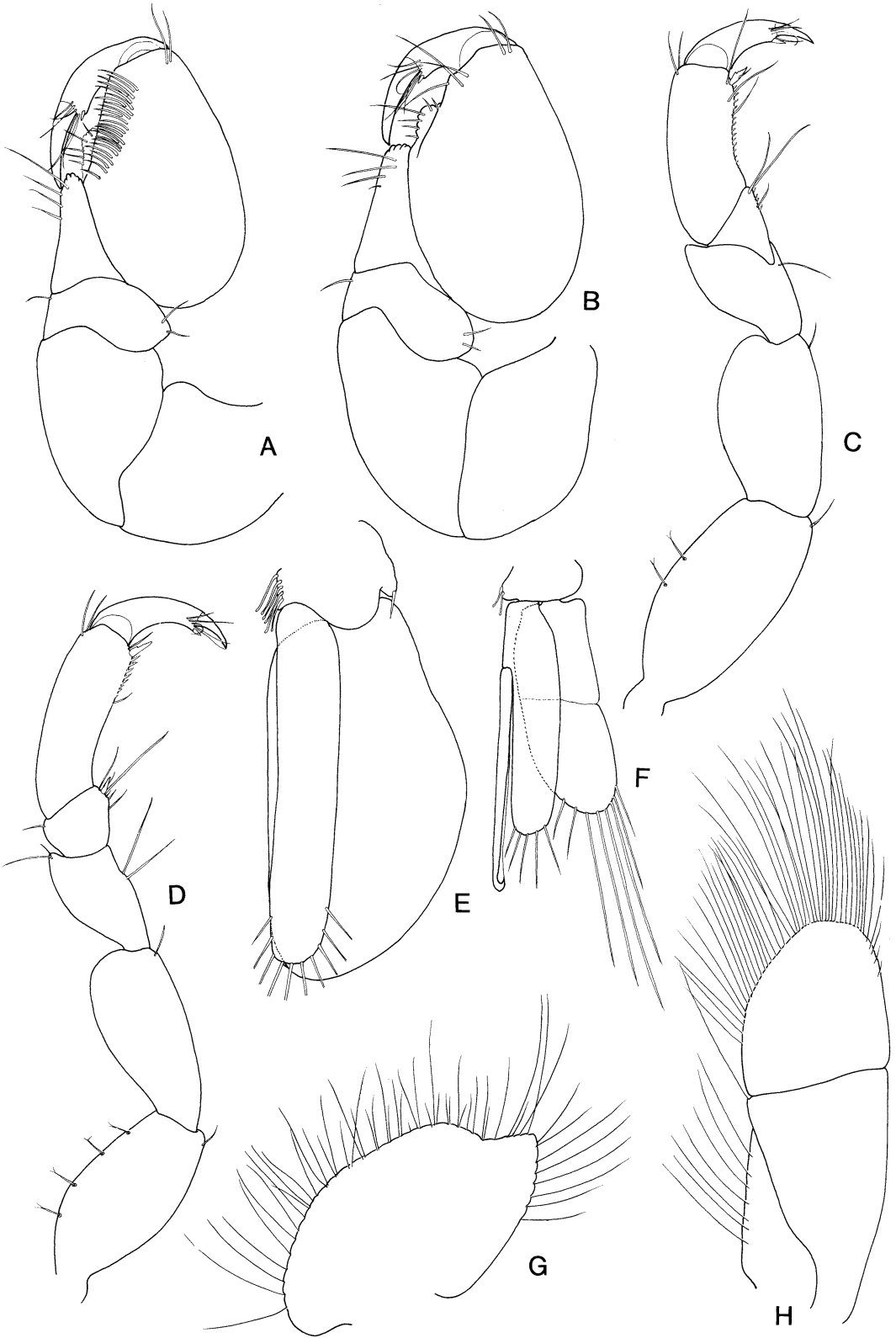


Fig. 3. *Mesanthura bermudensis*, new species: A, pereopod 1 ♂; B, pereopod 1 ♀; C, pereopod 2; D, pereopod 7; E, pleopod 1; F, pleopod 2 ♂; G, uropodal exopod; H, uropodal protopod and endopod.

M. paucidens, perhaps even derived from this species, but also reflect the isolation of the Bermudan population. The latter is therefore regarded as a separate species.

Family Joeropsidae Nordenstam, 1933

Joeropsis nigricapitis, new species

Fig. 4

Material Examined.—Holotype, YPM 9551, ♂ 2.9 mm, paratypes, YPM 9552, 37 ♂♂ 2.2–2.9 mm, 18 ovigerous ♀♀ 2.0–2.2 mm, 164 immature and juvenile.—Paratypes, USNM 243584, 10 ♂♂, 10 ovigerous ♀♀, Peabody locality 196, cove west of Devonshire Bay, washings from rocks, 0.3 m, collector E. A. Lazo-Wasem, 15 Jun 1988.—Paratypes, BBS, Peabody locality 211, 3 ♂♂, 1 ovigerous ♀, 6 juvenile, Bailey's Bay, 1 m, collector E. A. Lazo-Wasem, 17 Jun 1988.—Peabody locality 3, 1 ♂, 1 ♀, cove on small island in Tobacco Bay, collector M. F. Gable, 2 Jun 1985.—Peabody locality 19, 1 ♂, off Barry and Grenadire Roads, St. George's, in algal clumps, 2–3 m, collector M. F. Gable, 2 Jun 1985.—Peabody locality 47, 1 ♀, promontory off Shelly Bay, from algal clumps and shells, collector M. F. Gable, 28 May 1987.—Peabody locality 48, 1 ♂, north side of Shelly Bay, shallow subtidal algal scrapings, collector E. A. Lazo-Wasem, 28 June 1987.

Description.—Body glabrous. Cephalon lacking lateral serrations; rostrum wider than median length, with faint indentation in anterior margin, latter bearing border of transparent scales. Pleon with 5 lateral serrations. Color pattern: dorsal surface of cephalon dark red-brown; pereionite 1 unpigmented; pereionites 2–4 with dorsal reticulation, that of 4 strongest; pereionite 5 unpigmented; pereionites 6 and 7 with faint reticulation; anterior pleon with irregular reticulation.

Basal antennular article with fringe of transparent scales; terminal article shorter than subterminal, bearing 2 aesthetascs. Fourth antennal peduncle article with fringe of transparent scales; flagellum consisting of large basal and 6 tiny distal articles. Mouthparts typical of genus. Mandibular palp, article 2 with 3 fringed spines on laterodistal margin, terminal article with 7 distal setae. Maxillipedal palp with article 2 broadest, with rounded lobe at distomesial margin; articles 4 and 5 slender. Pereiopods typical of genus, pereiopod 1, dactylus with 2 ungui; pereiopods 2–7 with 3 dactylar ungui each. Male pleopods typical of genus, pleopod 5 consisting of single lamellar ramus. Operculum (pleopod 2) of female pentagonal, margins distally faintly concave, setose, apical angle just less than 90°. Uropod with

mesiodistal hook; mesial ramus slightly longer than lateral.

Etymology.—The specific epithet, which refers to the dorsally pigmented head of the animal, is derived from the Latin *niger*, black or dark, and *capitus*, head.

Remarks.—The only species of *Joeropsis* previously recorded from Bermuda is *J. rathbunae* Richardson, 1902. The two male syntypes of this species were examined (USNM 24870, YPM 3251) and several differences noted when compared with the present species. These differences include the color pattern (faintly reticulate over entire body, strongest on cephalon, in *J. rathbunae*, strong dark brown pigment on most of cephalon and pereionite 4, fainter reticulation on pereionites 2, 3, 6, 7, and anterior pleon, pereionites 1 and 5 unpigmented in *J. nigricapitis*), the rostral shape (apically broadly rounded in *J. rathbunae*, very faintly emarginate in *J. nigricapitis*), the pleonal serrations (4 in the earlier species, 5 in the present species), and the relative lengths of the terminal antennular article, and the uropodal rami.

Family Paramunnidae Vanhöffen, 1914

Munnogonium somersensis, new species

Figs. 5, 6

Material Examined.—Holotype, USNM 243587, ♂ 0.93 mm, paratypes, USNM 243588, ♂ 0.71 mm, 4 ovigerous ♀♀ 0.98 mm, 1 juvenile ♀ 0.57 mm, Red Bay Cave, collector T. Iliffe, 23 Oct 1986.

Description.—Male: Body pear-shaped, twice longer than wide, widest at pereionite 3. Frontal margin of cephalon broadly convex, flattened at midline; ovate black pigment of eyes on short lateral projections. In dorsal view, coxal plates clearly visible on pereionites 5–7. Pleotelson consisting of anterior pleonite plus subcircular pleon, latter with 8 lateral teeth, posterior margin rounded.

Antennular peduncle of 2 subequal elongate articles, several jointed setae distally on article 2; flagellum of 4 articles, distal-most bearing single elongate aesthetasc. Antennal peduncle with article 2 short, set on anterior margin of article 3; article 4 set at right angle to article 3, penultimate article slightly shorter than last article, latter with several jointed setae distally; flagellum of 7 articles. Mandible lacking palp; incisor hav-

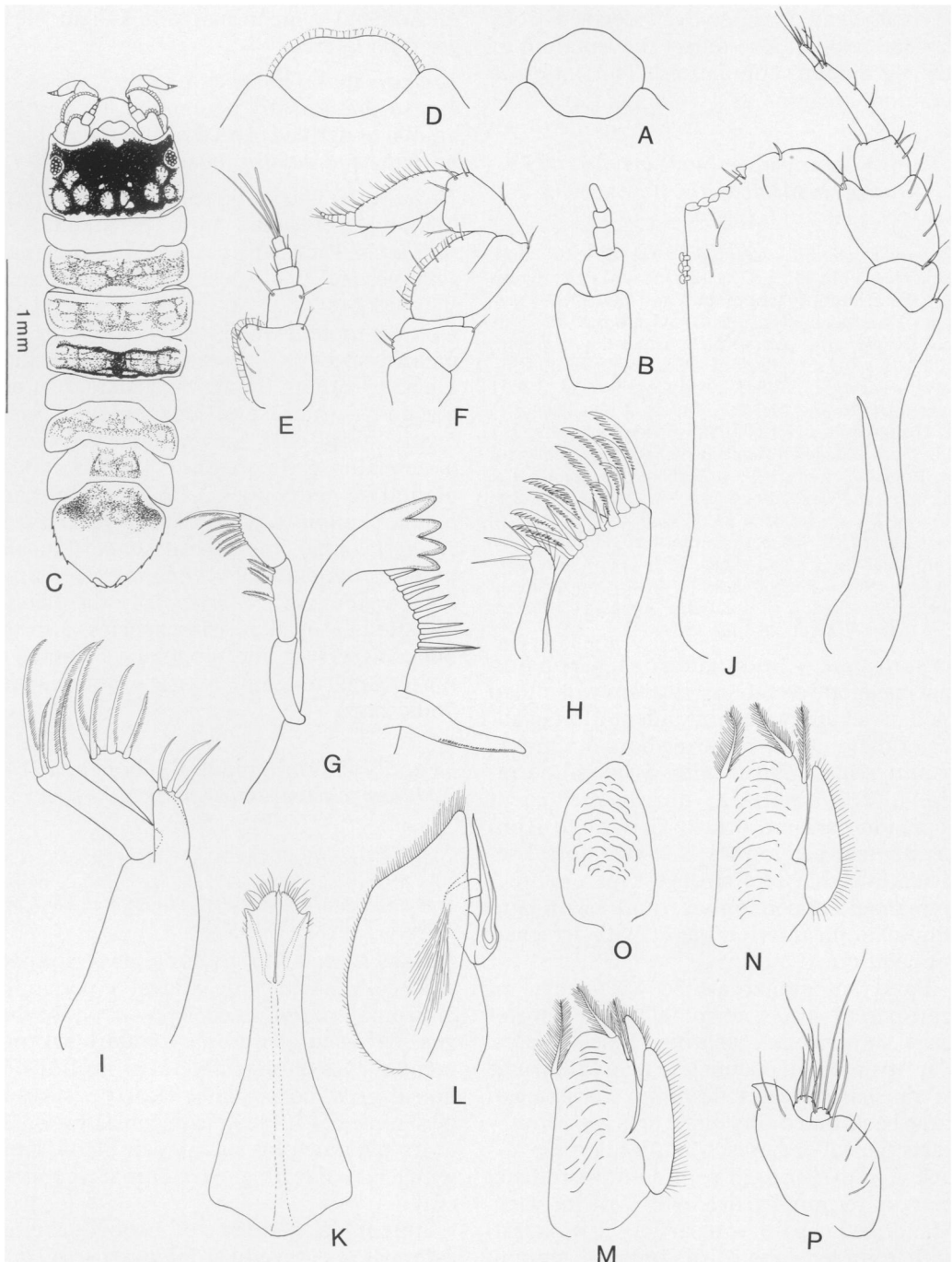
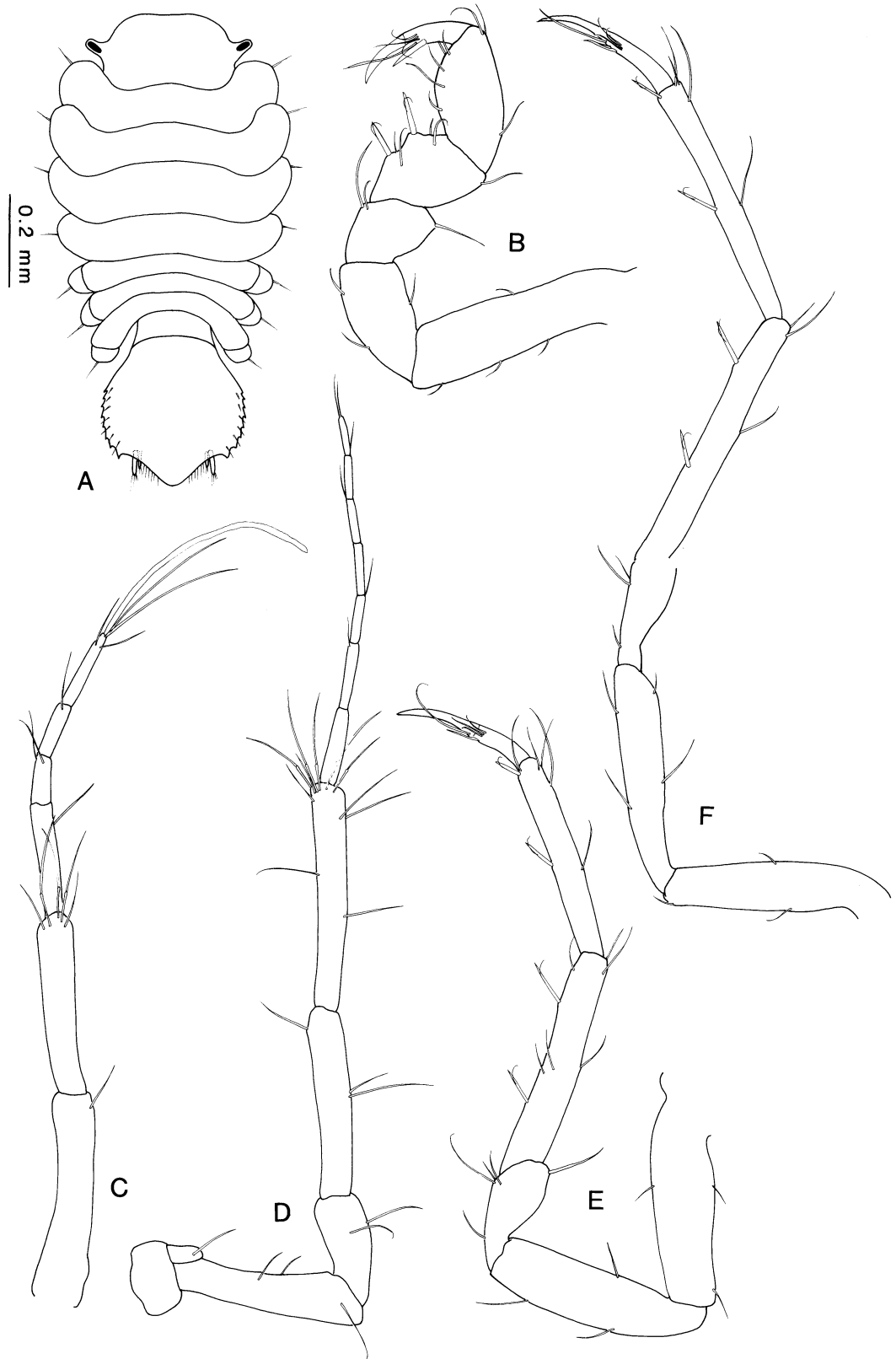


Fig. 4. *Joeropsis rathbunae*, PMY 3251: A, rostrum; B, antennule. *Joeropsis nigricapitis*, new species: C, habitus, dorsal view; D, rostrum; E, antennule; F, antenna; G, mandible; H, maxilla 1; I, maxilla 2; J, maxilliped; K, pleopod 1 ♂; L, pleopod 2 ♂; M, pleopod 3; N, pleopod 4; O, pleopod 5; P, uropod.

Fig. 5. *Munnogonium somersensis*, new species: A, habitus, dorsal view; B, pereopod 1; C, antennule; D, antenna; E, pereopod 2; F, pereopod 7.



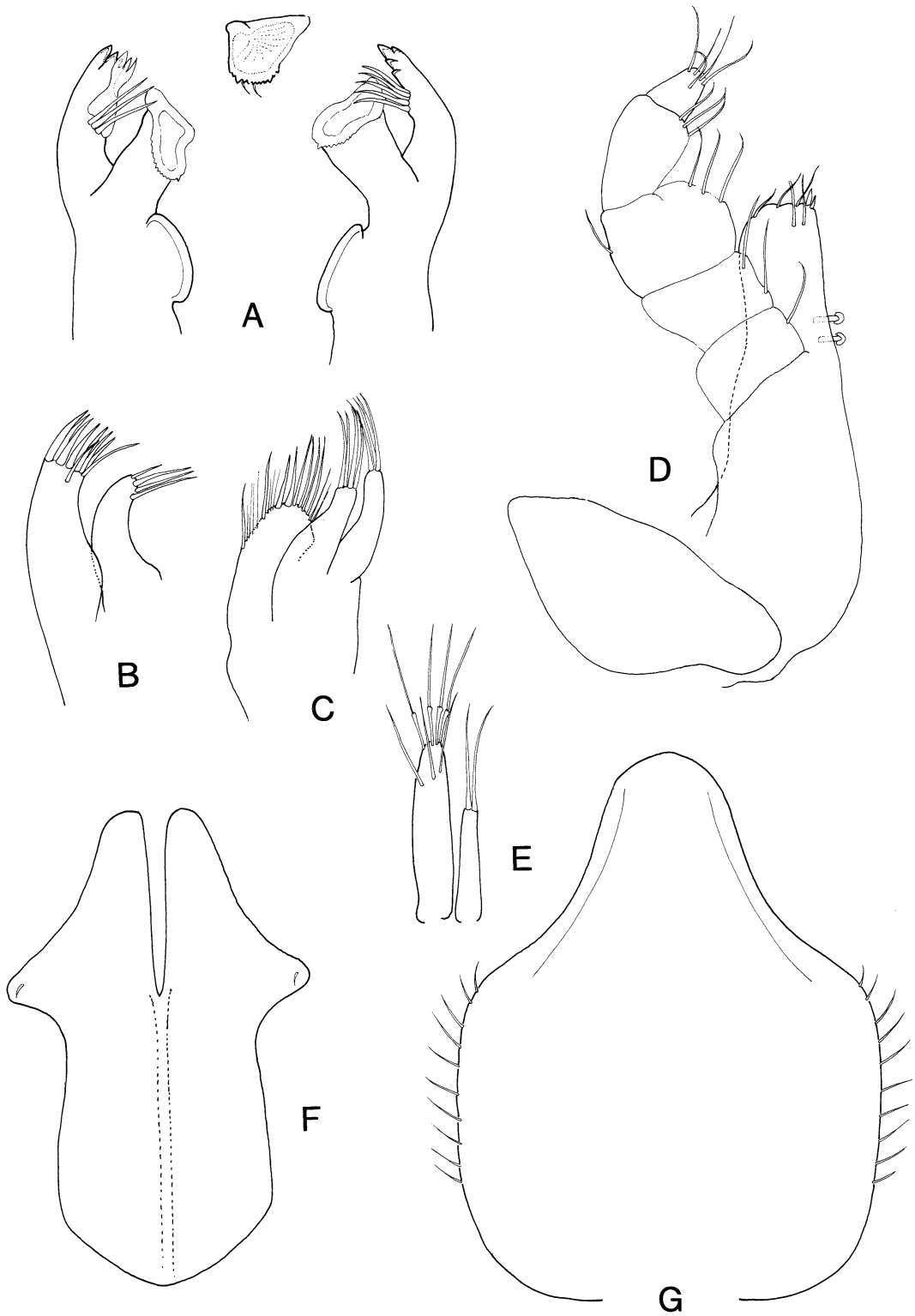


Fig. 6. *Munnogonium somersensis*, new species: A, left and right mandible, with surface of molar; B, maxilla 1; C, maxilla 2; D, maxilliped; E, uropod; F, pleopod 1 ♂; G, operculum ♀.

ing several acute cusps; spine row consisting of lacinia mobilis having 3 cusps plus 3 spines, or of 4 spines; molar distally truncate, with few small marginal teeth. Maxilla 1 with 4 setae on inner ramus, 9 setae on outer. Maxilla 2, 2 outer rami each with 4 distal setae, inner ramus with setae and setules of varying thickness. Maxillipedal endite having 2 coupling hooks, distal margin with few slender setae; palp of 5 articles, article 3 widest, distal article about half length of article 4. Pereiopod 1 basis subequal in length to merus plus ischium; carpus with 2 strong sensory spines on posterior margin; propodus ovate, with 5 slender setae on convex posterior margin; unguis subequal in length to rest of dactylus, strong accessory spine present. Pereiopods 2–7 similar, elongate-slender, carpi and propodi each having 2 slender sensory spines on posterior margin; unguis subequal in length of rest of slender dactyli. Pleopod 1 broadly sagittate, median fused rami longer than free distal part. Uropodal endopod about five-eighths length of, and slightly wider than, exopod, with 2 distal setae; exopod with cluster of several jointed setae distally.

Female: slightly broader than male; mouthparts and pereiopods as in male. Pleonal operculum distinctly longer than greatest width, lateral margins bearing about 10 setae, posterior margin produced, narrowly rounded.

Etymology.—The specific epithet derives from Somers Island, a former name for Bermuda.

Remarks.—The genus *Munnogonium* currently contains six species, namely, *M. waldronense* George and Strömberg, 1968, from the San Juan Archipelago, Washington State; *M. maltinii* (Schiecke and Fresi, 1972), from the Bay of Naples, Mediterranean Sea; *M. subtilis* Kensley, 1976, from Amsterdam Island, Indian Ocean; *M. wilsoni* Hooker, 1985, from the Florida Middle Grounds; *M. polynesiensis* Müller, 1989, from the Society Islands; *M. adenensis* Müller, 1991b, from the Gulf of Aden. The only known western Atlantic representative, *M. wilsoni* Hooker, 1985, from the Gulf of Mexico, falls within the same size range as, and is very similar to, the present Bermudan species, but differs in a few subtle features. The pigmented ovate part of the

eye is larger in *M. somersensis*. The uropodal exopod is relatively more slender in the new species, while the first pleonite and anterior pleon are longer than in the somewhat squat *M. wilsoni*.

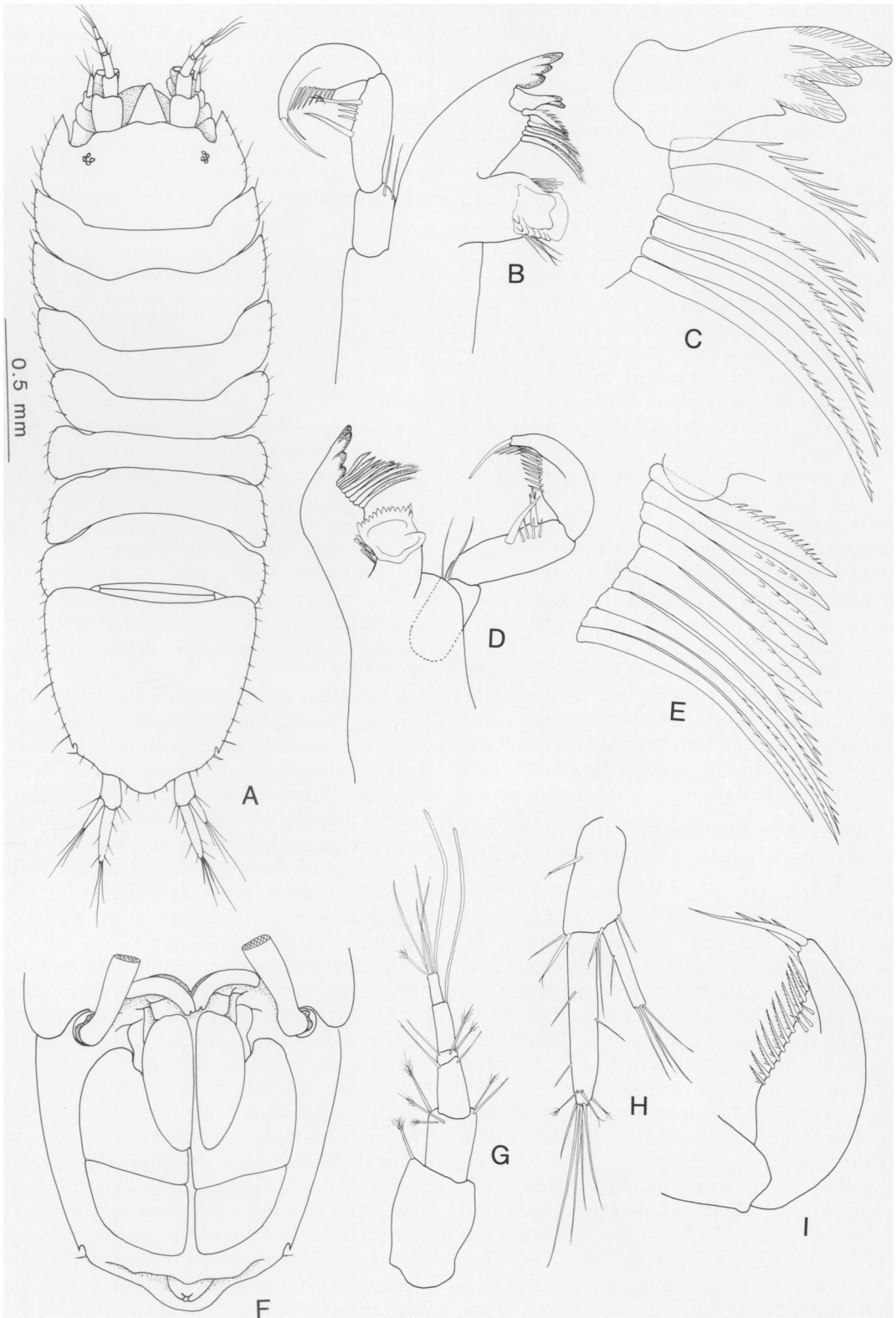
Family Gnathostenetroididae
Kussakin, 1967

Stenobermuda iliffei, new species
Figs. 7, 8, 9, 10

Material Examined.—Holotype, USNM 243589, ovigerous ♀ 2.9 mm, paratypes, USNM 243590, 6 ♂♂ 2.1 mm, 2.3 mm, 2.3 mm, 2.3 mm, 2.6 mm, 3.0 mm, 7 juvenile, Walsingham Cave, Bermuda, collector T. Iliffe, 11 Sep 1986.—Paratypes, USNM 243591, ovigerous ♀ 2.9 mm, 6 ♂♂ 2.1 mm, 2.3 mm, 2.4 mm, 2.5 mm, 3.0 mm, 3.2 mm, 4 juvenile, Walsingham Cave, Bermuda, collector T. Iliffe, 10 Oct 1986.

Description.—Body length/width ratio 3.5–3.6. Cephalon having triangular, apically subacute rostrum; anterolateral process reaching anteriorly just beyond distal margin of first antennal article; eye consisting of 4 close-set ommatidia. Pleon consisting of 2 short anterior pleonites plus shield-shaped pleotelson; latter with single posterolateral tooth with short stout seta just posterior to notch; posterior margin broadly rounded.

Antennular flagellum with 3 articles, subterminal bearing single aesthetasc, terminal with 2 aesthetascs. Antenna about 1.25 times body length; peduncle article 3 with short scale; flagellum with about 50 articles. Mandibular palp with 3 articles, article 2 bearing 2 stout setae and 4 shorter intervening setae on distolateral margin, article 3 falcate, with row of 14 fringed spines increasing in length distally to stout terminal spine; incisor having 4 sclerotized cusps; spine row with 9 stout dentate spines, or with lacinia mobilis plus 5 (?6) dentate spines; molar apically broadly truncate and sclerotized, having marginal denticles. Maxilla 1, inner ramus with 4 distal setae, outer ramus with 9 dentate spines. Maxilla 2, inner ramus with 4 distal fringed setae plus 7 setae on mesial margin; both lobes of outer ramus bearing 4 distal fringed setae. Maxillipedal epipod acutely tapering, subequal in length to endite; latter bearing 3 coupling hooks, distal margin bearing 3 broadly expanded fringed spines, single dentate spine, and short simple mesiodistal spine; palp with 5 articles bearing several simple setae mesiodistally, 3 basal articles broad, 2 distal articles slen-



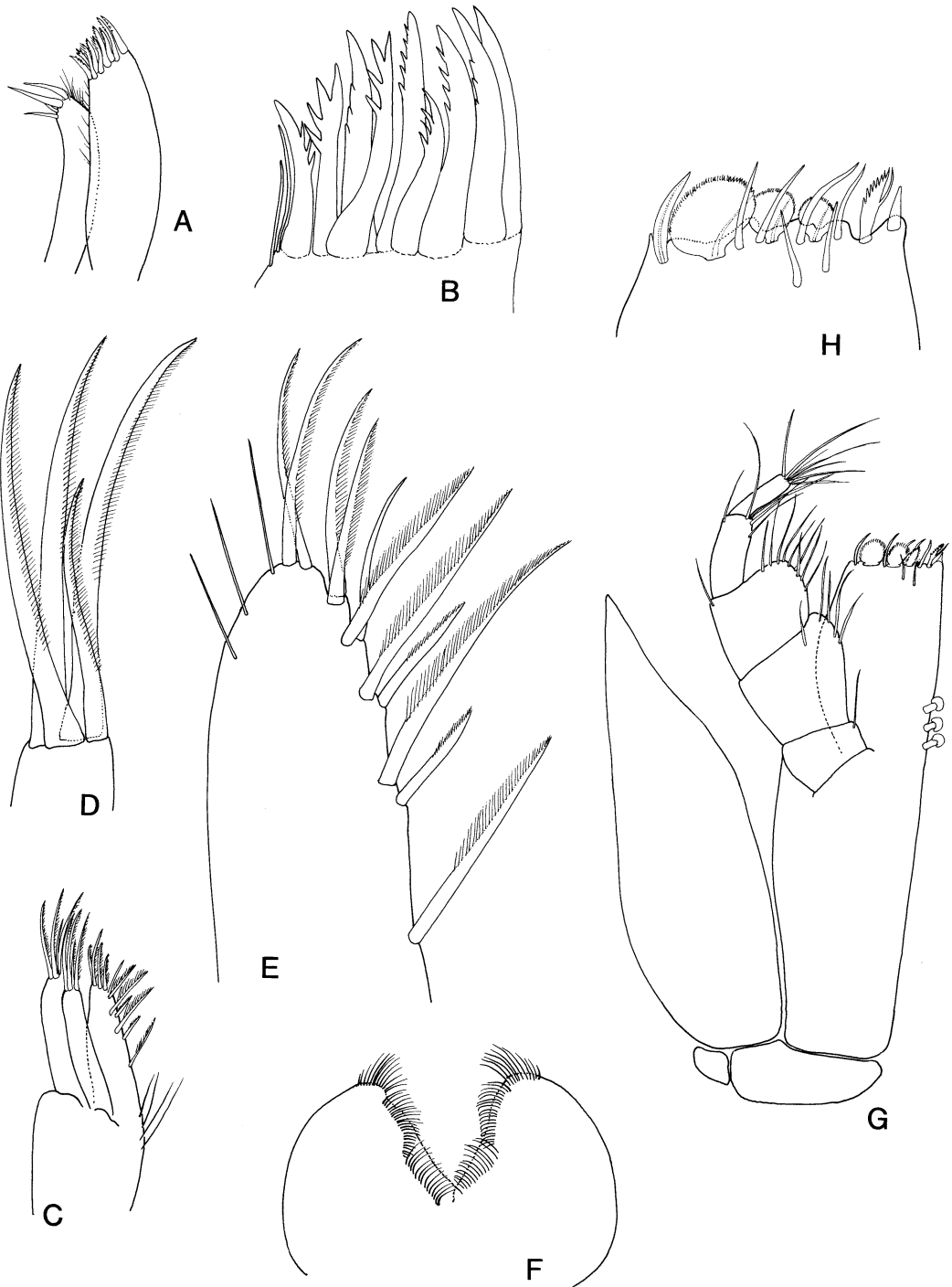
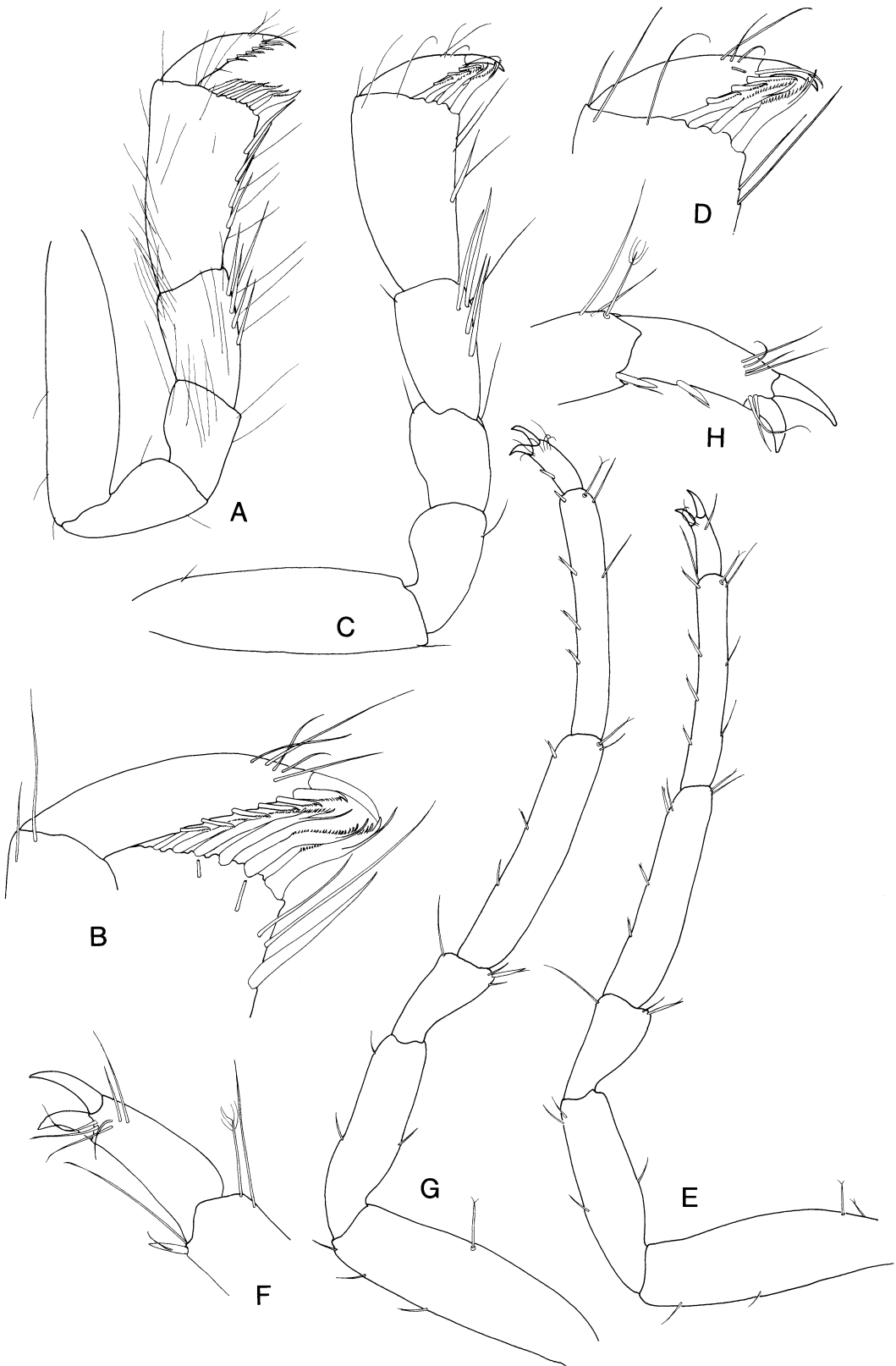


Fig. 8. *Stenobermuda iliffei*, new species: A, maxilla 1; B, apex of outer ramus enlarged; C, maxilla 2; D, apex of outer ramus enlarged; E, inner ramus enlarged; F, lower lip; G, maxilliped; H, apex of maxillipedal endite enlarged.

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Fig. 7. *Stenobermuda iliffei*, new species; A, ♂ 2.5 mm; B, left mandible; C, left mandible, spine row enlarged; D, right mandible; E, right mandible, spine row enlarged; F, pleotelson of male in ventral view; G, antennule; H, uropod; I, terminal article of mandibular palp.



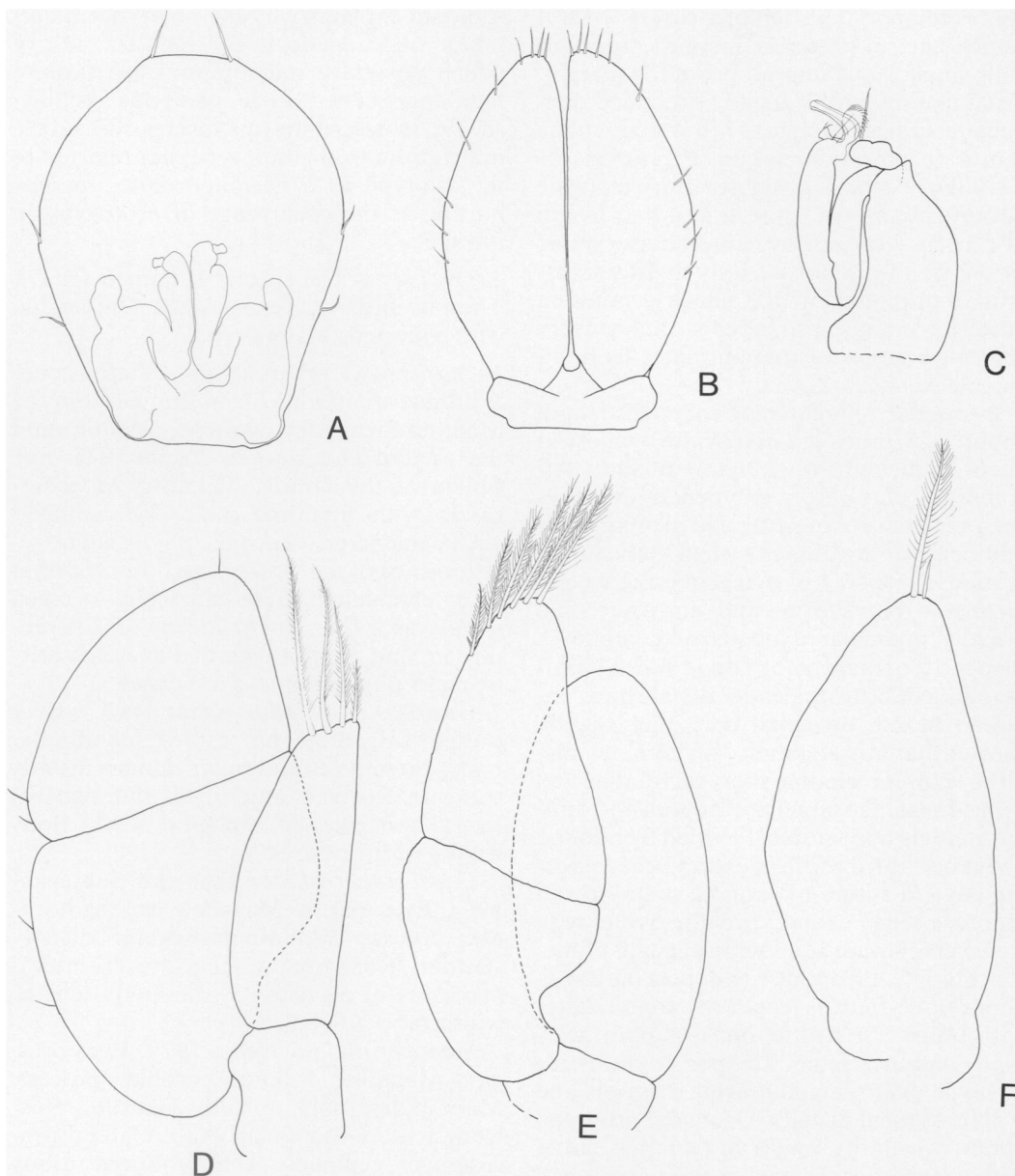


Fig. 10. *Stenobermuda iliffei*, new species: A, ♀ operculum, with precursors of ♂ pleopod 1; B, ♂ pleopod 1; C, ♂ pleopod 2; D, pleopod 3; E, pleopod 4; F, pleopod 5.

der. Pereiopod 1 in male: subchelate; basis subequal in length to carpus, merus, and ischium together; carpus with 5 fairly stout setae on posterior margin; propodus widening distally, about twice longer than distal

width, posterior margin with 4 stout setae, distal margin armed with 6 distally expanded and denticulate spines, largest at posterodistal corner; dactylus curved, with row of 6 slender denticulate spines on inner mar-

←

Fig. 9. *Stenobermuda iliffei*, new species: A, ♂ pereiopod 1; B, ♂ pereiopod 1, apex of propodus and dactylus enlarged; C, ♀ pereiopod 1; D, ♀ pereiopod 1, apex of propodus and dactylus enlarged; E, pereiopod 2; F, pereiopod 2, dactylus enlarged; G, pereiopod 7; H, pereiopod 7, dactylus enlarged.

gin. Pereiopod 1 in female: carpus with 4 stout setae on posterior margin; propodus with single stout seta on posterior margin, distal margin with 3 distally expanded denticulate spines; dactylus with 4 denticulate spines on posterior margin. Pereiopods 2–7 similar, becoming slightly more elongate posteriorly; merus short, about half length of carpus, with sensory anterodistal spine; carpus slender, elongate, only slightly shorter than propodus, with 3 sensory spines on posterior margin, propodus with 4 sensory spines on posterior margin; dactylus biunguiculate.

Pleopodal operculum of female, length about 1.25 times greatest width, widest at about midlength, with 2 pairs of short lateral setae, plus pair of submedian distal setae; precursors of male second pleopods visible beneath integument when stained and cleared. Pleopod 1 of male covering second pleopods, but shorter and narrower than broadly opercular exopods of pleopod 3. Pleopod 2 of male with exopod short, bluntly rounded, bearing slender distal spine; endopod flexed, proximal part only slightly shorter than distal, latter with complex distal structures including short sperm tube and fringed platelike lamella. Pleopods 3–5 similar in male and female. Pleopod 3 endopod about one-third width of exopod, just reaching beyond suture of exopod, with 4 distal plumose setae; exopod broadly ovate, with transverse suture at about midlength of mesial margin. Pleopod 4 endopod elliptical, about three-fourths length of exopod; latter with transverse suture, distal margin bearing 6 plumose setae. Pleopod 5 consisting of single ovate ramus bearing 1 simple and 1 plumose seta distally. Uropodal protopod about two-thirds length of endopod, latter with several distal setae; exopod about half length and half width of endopod, with several distal setae.

Biology. — The 22 available specimens of this species can be grouped according to size and reproductive structures: 8 individuals, 1.2–1.6 mm, females with pleopodal operculum containing male pleopod 1 precursors; 12 individuals, 2.1–3.2 mm, primary males with male pleopods; 2 individuals, 2.9 mm, secondary males with empty marsupium and male pleopods.

This sequence of protogynous hermaph-

roditism explains why the holotype and allotype of *S. acutirostrata* Schultz, both of which possess a marsupium, also possess first and second male pleopods. Schultz (1979), in describing this species, missed the marsupium in the holotype, but referred to the allotype as a hermaphrodite, thereby hinting at the occurrence of protogyny in the species.

Etymology. — The species is named for Dr. Thomas Iliffe of Texas A&M University, who collected this material.

Remarks. — Members of the Gnathostenetroididae are marine forms known from the Mediterranean, the western Atlantic, and the eastern and western Pacific. The five genera of the family, including *Stenobermuda* for the first time, can be differentiated on six characters. Since the phylogenetic relationships of the “lower” asellotes have yet to be elucidated, these characters are seen simply as a convenient means of differentiation, and are not regarded as necessarily being of phylogenetic significance.

Gnathostenetroides Amar, 1957. Eyes present. Hornlike process of mandibular body present. Mandibular molar distally truncate. Rostrum anteriorly bifid. Anterolateral processes of cephalon weak. Body length/width ratio 3.7.

Caecostenetroides Fresi and Schiecke, 1968. Eyes absent. Mandible lacking hornlike process. Mandibular molar distally slender. Rostrum lacking. Anterolateral processes of cephalon weak. Body length/width ratio 7.0–8.8.

Stenobermuda Schultz, 1979. Eyes present. Mandible lacking hornlike process. Mandibular molar distally truncate. Rostrum acutely triangular. Anterolateral processes of cephalon well produced. Body length/width ratio 3.5–3.9.

Marsiella Fresi and Scipione, 1980. Eyes present. Mandible lacking hornlike process. Mandibular molar distally truncate. Rostrum anteriorly bifid or rounded. Anterolateral processes of cephalon weak. Body length/width ratio 4.1–5.4.

Neostenetroides Carpenter and Magniez, 1982. Eyes absent. Mandible lacking hornlike process. Mandibular molar distally slender. Rostrum rounded. Anterolateral processes of cephalon weak. Body length/width ratio 2.5.

The Walsingham Cave material differs from the type of the genus, *Stenobermuda acutirostrata* Schultz, 1979, known from Castle Roads, Bermuda, and the Turks and Caicos Islands, in a number of features: the earlier species appears to be larger (ovigerous ♀ 4.0–4.8 mm versus 2.9 mm), the rostrum is more narrowly acute, and the anterolateral processes of the cephalon are more produced, while the antennule consists of 7 (versus 6) articles; further, the pleotelson posterior to the lateral tooth is relatively narrower in the earlier species.

It is probable that several species described under *Stenetrium* are actually representatives of *Stenobermuda*. Examples of these include *Stenetrium acutirostrum* Müller, 1991b, from the Gulf of Aden; *S. bourboni* Müller, 1991c, from Réunion Island; and *S. tetae* Müller, 1991d, from the Society Islands.

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ANNOUNCEMENT

At its annual meeting in Los Angeles, California, in December 1993, The Crustacean Society bestowed the first TCS Service Awards on Denton Belk, Treasurer, and Arthur G. Humes, Editor, for their contributions over many years to the society.