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The genera of the Nannoniscidae (Isopoda, Asellota)

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Abstract. Four new genera of the deep-sea asellote isopod family Nannoniscidae Hansen are described. Two new species of *Exiliniscus*, new genus, are described, *E. clipeatus* and *E. aculeatus*. *Nannoniscus hanseni* Just is transferred to *Exiliniscus*. *Nannoniscus crassipes* Hansen is transferred to *Rapaniscus*, new genus; *Rapaniscus dewdneyi*, new species, is described. *Nannoniscus tenellus* Birstein is transferred to *Panetela*, new genus; *Panetela wolffi*, new species, is described. *Nannoniscus armatus* Hansen is referred to *Regabellator*, new genus; *Regabellator profugus*, new species, is described. The bathymetric ranges of the new genera are: *Exiliniscus*, 80–5223 m; *Rapaniscus*, 220–2934 m; *Panetela*, 770–5495 m; *Regabellator*, 1964–4680 m. The other 6 nannoniscid genera are reviewed and illustrated. Two new species of *Nannoniscus* Sars are described, *N. intermedius* and *N. teres*. A key to the family and a list of species are given. These new descriptions are based on benthic samples taken at 74 stations in the North and South Atlantic Ocean, encompassing a depth range of 508–5223 m.

Introduction

The family Nannoniscidae (Isopoda, Asellota) encompasses a broad range of diverse morphologies. Recently, Siebenaller and Hessler (1977) have redefined the family to accommodate this diversity. The most useful features in distinguishing a nannoniscid are the bulbous fifth article of antenna I and the medial fusion dorsally of pereonites 6 and 7. However, these characters are not universally present in all of the species, and other characters must be employed: the single major dactylar claw on pereopods II–VII, the flat triangular molar process of the mandible, uropodal shape, and the presence of major anterolateral setae on the tergites of pereonites 2–4.

Within the genus *Nannoniscus* there is presently a striking diversity of morphologies. Many of the species in this genus differ markedly from the type species *N. oblongus* Sars, 1870. Perhaps because these unique forms have often been described from finds of single individuals or samples from a single locality, workers have been reluctant to erect additional genera. Extensive collections have become available from a number of deep-sea sampling programs. The present study is based primarily on materials from the deep-sea sampling program of the Woods Hole Oceanographic Institution (Sanders et al., 1965; Hessler and Sanders, 1967; Sanders and Hessler, 1969). The program has sampled transects throughout the Atlantic Ocean, running out from shallow coastal waters into the abyss. Such transects are located off the northeastern United States (Gay Head–Bermuda transect), Surinam, northern Brazil, Argentina, southwest Africa, Angola, Senegal, and Ireland. Additional samples have come from the Bay of Biscay (J. Allen, University of Newcastle upon Tyne), the Canary Islands (J. Allen), and the Weddell Sea (J. Rankin, University of Connecticut). A list of stations is given in Table 1.

It has become apparent from these additional materials that the morphologies of many of the described *Nannoniscus* species which appeared to be unique, specific characters in fact recur repeatedly in other species, and hence the establishment of new genera is both desirable and necessary. This study undertakes to establish these new genera as is warranted, and to delimit their geographic and bathymetric distribu-

TABLE 1. Station data.

	Station	Depth (m)	Latitude	Longitude
WHOI	Bermuda 1	1000	32°16.5′N	64°42.5′W
	Bermuda 2	1700	32°16.6′N	64°36.3′W
	Bermuda 4	1700	32°17.0′N	64°35′W
	Bermuda 5	2000	32°11.4′N	64°41.6′W
	Bermuda 6	1500	32°14.3′N	64°42′W
	Bermuda 7	2500	32°15′N	64°32.6′W
	Bermuda 8	1000	32°21.3′N	64°33′W
	HH 3	2900	38°47′N	70°08′W
	G 1	2000	39°42′N	70°39′W
	LL 1	4977	35°35′N	67°25′W
	JJ 3	4540	37°13.1′N	68°39.6′W
	OO 2	4667	33°0.67′N	65°2.2′W
	G 9	2021	39°44.7′N	70°38.3′W
	Chain 35, dredge 12	770–805	07°09′S	34°25.5′W
	61	2000	39°43.2′N	70°37.8′W
	62	2496	39°26′N	70°33′W
	65	2891	38°46.8′N	70°6.8′W
	66	2802	38°46.7′N	70°8.8′W
	70	4680	36°23′N	67°58′W
	73	1330–1470	39°46.5′N	70°43.3′W
	84	4749	36°24.4′N	67°56′W
	85	3834	37°59.2′N	69°26.2′W
	92	4694	36°20′N	67°56′W
	95	3753	38°33′N	68°32′W
	100	4743–4892	33°56.8′N	65°47′W
	109	4750	36°25′N	68°6.0′W
	118	1135–1153	32°19.4′N	64°34.9′W
			32°19.0′N	64°34.8′W
	119	2095–2223	32°15.8′N	64°31.6′W
			32°16.1′N	64°32.6′W
	120	5018–5023	34°43.0′N	66°32.8′W
			34°40.5′N	66°35.0′W
	121	4800	35°50.0′N	65°11.0′W
	122	4833	35°50.0′N	64°57.5′W
			35°52.0′N	64°58.0′W
	125	4825	37°24.0′N	65°54.0′W
			37°26.0′N	65°50.0′W
	126	3806	39°37.0′N	66°47.0′W
			39°37.5′N	66°44.0′W
	128	1254	39°46.5′N	70°45.2′W
	131	2178	36°28.9′N	67°58.2′W
	142	1624–1796	10°30.0′N	17°51.5′W
	145	2185	10°36.0′N	17°49.0′W
	149	3861	10°30.0′N	18°18.0′W
	155	3730–3783	00°03.0′S	27°48.0′W
	156	3459	00°46.0′S	29°28.0′W
			00°46.5′S	29°24.0′W
	159	834–939	07°58.0′S	34°22.0′W
	167	943–1007	07°58.0′S	34°17.0′W
			07°50.0′S	34°17.0′W
	169	587	08°03.0′S	34°23.0′W
			08°02.0′S	34°25.0′W
	175	4667–4693	36°36′N	68°29′W
			36°36′N	68°31′W
	195	3797	14°49′S	9°56′E
			14°40′S	9°54′E
	197	4595–4597	10°29′S	9°04′E
	199	3764–3779	9°47′S	10°29′E
			9°49′S	10°33′E
	200	2644–2754	9°41′S	10°55′E
			9°43.5′S	10°57′E
	201	1964–2031	9°29′S	11°34′E
			9°25′S	11°35′E

TABLE 1. Continued.

	Station	Depth (m)	Latitude	Longitude
	202	1427–1643	9°04′S	12°17′E
			8°56′S	12°15′E
	209	1501–1693	39°47.6′N	70°49.9′W
			39°46′N	70°51.5′W
	242	4382–4402	38°16.9′S	51°56.1′W
	245	2707	36°55.7′S	53°01.4′W
	247	5208–5223	43°33.0′S	48°58.1′W
	256	3906–3917	37°40.9′S	52°19.3′W
	259	3305–3317	37°13.3′S	52°45.0′W
	287	4934–4980	13°16.0′N	54°52.2′W
			13°15.8′N	54°53.1′W
	293	1456–1518	8°58.0′N	54°04.3′W
	295	1000–1022	8°04.2′N	54°21.3′W
	297	508–523	7°45.3′N	54°24.0′W
	301	2487–2500	8°12.4′N	55°50.2′W
	303	2842–2853	8°28.8′N	56°04.5′W
	306	3392–3429	9°31.1′N	56°20.6′W
	313	1491–1500	51°32.2′N	12°35.9′W
	321	2868–2890	50°12.3′N	13°35.8′W
	323	3338–3356	50°08.3′N	13°53.7′W
			50°08.3′N	13°50.9′W
	326	3859	50°04.9′N	14°23.8′W
			50°05.3′N	14°24.8′W
	328	4426–4435	50°04.7′N	15°44.8′W
	330	4632	50°43.5′N	17°51.7′W
			50°43.4′N	17°52.9′W
Allen	33	1784	43°40.8′N	3°36′W
	40	860	43°35.6′N	3°24.8′W
	50	2379	43°46.7′N	3°38′W
	65	1922	46°15′N	4°50′W
1969 Rankin	0022ES	3111	73°28.4′S	30°26.9′W

tions. Because of the great number of new species in the presently available materials, we will not attempt to describe all of the new species, but only to outline the composition of the genera. Occasional reference will be made to some of the undescribed species. Our intention is to reduce the unnatural heterogeneity of some of the present genera and to introduce a framework to permit future phylogenetic, biogeographic, and ecological studies. A key to the genera is given in Table 2. The described species of the family are compiled in Table 3.

Institutional abbreviations used in this study follow: WHOI, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA; USNM, United States Museum of Natural History, Washington, D.C., USA. Specimens without USNM numbers are presently in the working collection of R. R. Hessler.

SYSTEMATICS

Nannoniscidae Hansen, 1916 (Nannoniscini *auctoris*)

Exiliniscus, new genus

Diagnosis.—Pereonites 6 and 7 free. Body hemicylindrical, elongate and narrow; length greater than 5 times tergal width of pereonite 2. Cephalon with massive rostral crest, forming concave face. Antenna I compact, with bulbous distal segment. Antenna II short, tends to be compact and robust; length approximately one-quarter of total body length; some flagellar segments fused. Mandible lacks palp.

Additional descriptive notes.—Propodus of pereopod II with robust, medium-length setae distally, 1 dorsal and 1 ventral, setting off dactylus; both setae about

TABLE 2. A key to the genera of the Nannoniscidae.

Nannoniscidae with pereonites 6 and 7 free		I
Nannoniscidae with pereonites 6 and 7 fused medially		II
I.	Pereonite 7 fused with pleon	*Nannonisconus*
	Pereonite 7 not fused with pleon	1
	1. Antenna I 5-segmented, with bulbous distal article	2
	Antenna I >5 segments	3
	2. Protruding rostral crest, antenna I compact	*Exiliniscus*
	No rostral crest, antenna I not compact	*Panetela*
	3. Body flattened and broad with expanded pleura and pleon	*Austroniscus*
	Body not exceptionally flattened or broadened	4
	4. Female pleon with posterolateral spines; posterior pereopods not flattened for swimming; no opercular ventral medial spines; operculum indented distally	*Nannoniscoides*
	Female pleon generally without posterolateral spines; sexual dimorphism of pleon shape; posterior pereopods flattened for swimming; opercular ventral medial spines; operculum blunt distally	*Thaumastosoma*
II.	Pereopod I robust and thickened, much more so than other pereopods, which are slender in contrast	*Rapaniscus*
	Pereopod I normal, similar to other pereopods in thickness	5
	5. Several major ventral medial spines	*Regabellator*
	One or no ventral medial spines	6
	6. Antenna I >5 segments	*Nannoniscoides*
	Antenna I 5-segmented	7
	7. Penultimate segment of antenna I without shelf-like process; pleon with posterolateral spines	*Hebefustis*
	Penultimate segment of antenna I with shelf-like process	*Nannoniscus*

equally well developed. Posterior pereopods often with natatory setae. Female operculum (pleopod II) length approximately equal to width; length approximately one-half length of pleon. Pleon spade-shaped in dorsal view, i.e., tapering anteriorly to posteriorly. Uropodal endopod long and narrow; exopod much reduced.

Type-species.—Exiliniscus clipeatus, new species.

Etymology.—Exiliniscus is taken from the Latin *exilis,* thin or slender. The gender of the name is masculine.

Remarks.—This genus is readily distinguished from most of the other Nannoniscidae by its narrow and elongate body and the lack of fusion of pereonites 6 and 7. *Exiliniscus* is distinct from the other nannoniscid genus *Panetela,* new genus (which has an elongate body and lacks fusion of pereonites 6 and 7), in its well-developed rostral crest (cf. Figs. 1B and 2B with Fig. 5B), the compactness of antennae I and II (cf. Figs. 1E and 2G with Fig. 5D), and the lack of a mandibular palp. *Exiliniscus* is the only nannoniscid known to lack a mandibular palp. *Nannoniscus hanseni* Just, 1970 is transferred to *Exiliniscus,* new genus. This species clearly possesses the diagnostic features of the genus. The presence or absence of a mandibular palp is not noted in Just's description. *Exiliniscus hanseni* is distinct from the other species of the genus in lacking notches in the cephalon for the insertion of antennae.

This genus contains the following species: *E. clipeatus,* new species; *E. hanseni* (Just, 1970); and *E. aculeatus,* new species.

Distribution.—Exiliniscus clipeatus: northwest Atlantic Ocean, 3834–5023 m; *E. hanseni:* Jørgen Brønlund Fjord, Greenland, 80–90 m (Just, 1970); *E. aculeatus:* southeast equatorial Atlantic Ocean, 1964–3797 m. This genus has a wide bathymetric distribution in the Atlantic Ocean, ranging from 80 to 5223 m. The stations at which the genus (including undescribed materials) has been taken are as follows: WHOI 65, 2891 m; WHOI 66, 2802 m; WHOI 84, 4749 m; WHOI 85, 3834 m; WHOI 95, 3753 m; WHOI 100, 4743–4892 m; WHOI 118, 1135–1153 m; WHOI 119, 2095–2223 m; WHOI 120, 5018–5023 m; WHOI 121, 4800 m; WHOI 122, 4833 m; WHOI 125, 4825 m; WHOI 142, 1624–1796 m; WHOI 145, 2185 m; WHOI 149, 3861 m; WHOI 159, 834–939 m; WHOI 167, 943–1007 m; WHOI 169, 587 m; WHOI 175, 4667–4693 m; WHOI 195,

TABLE 3. A compilation of the nannoniscid species (* indicates generic type-species).

Genus	Species
Nannoniscus	*acanthurus* Birstein, 1963; *aequiremis* Hansen, 1916; *affinis* Hansen, 1916; *analis* Hansen, 1916; *arcticus* Hansen, 1916; *australis* Vanhöffen, 1914; *bidens* Vanhöffen, 1914; *camayae* Menzies, 1962; *caspius* Sars, 1897; *coalescus* (Menzies and George, 1972); *detrimentus* Menzies and George, 1972; *inermis* Hansen, 1916; *intermedius*, new species; *laevis* Menzies, 1962; *laticeps* Hansen, 1916; *minutus* Hansen, 1916; *muscarius* Menzies and George, 1972; *oblongus** Sars, 1870 (figured 1899); *ovatus* Menzies and George, 1972; *perunis* Menzies and George, 1972; *plebejus* Hansen, 1916; *reticulatus* Hansen, 1916; *simplex* Hansen, 1916; *spinicornis* Hansen, 1916; *teres*, new species
Nannonisconus	*latipleonus** Schultz, 1966
Austroniscus	*acutus* Birstein, 1970; *groenlandicus* (Hansen, 1916); *karamani* Birstein, 1962; *ovalis** Vanhöffen, 1914; *rotundatus* Vanhöffen, 1914; *vinogradovi* (Gurjanova, 1950)
Nannoniscoides	*angulatus** Hansen, 1916; *biscutatus* Siebenaller and Hessler, 1977; *coronarius* Siebenaller and Hessler, 1977; *excavatifrons* (Birstein, 1970); *gigas* Siebenaller and Hessler, 1977; *latediffusus* Siebenaller and Hessler, 1977
Hebefustis	*alleni* Siebenaller and Hessler, 1977; *cornutus* Siebenaller and Hessler, 1977; *dispar* Siebenaller and Hessler, 1977; *hexadentium* Siebenaller and Hessler, 1977; *hirsutus* (Menzies, 1962); *mollicellus* Siebenaller and Hessler, 1977; *par* Siebenaller and Hessler, 1977; *primitivus* (Menzies, 1962); *robustus* (Birstein, 1963); *vafer** Siebenaller and Hessler, 1977
Thaumastosoma	*distinctum* (Birstein, 1963); *platycarpus** Hessler, 1970; *tenue* Hessler, 1970
Exiliniscus	*aculeatus*, new species; *clipeatus**, new species; *hanseni* (Just, 1970)
Rapaniscus	*crassipes* (Hansen, 1916); *dewdneyi**, new species
Panetela	*tenella* (Birstein 1963); *wolffi**, new species
Regabellator	*armatus* (Hansen, 1916); *profugus**, new species

3797 m; WHOI 197, 4595 m; WHOI 200, 2644–2754 m; WHOI 201, 1964–2031 m; WHOI 242, 4382–4402 m; WHOI 247, 5208–5223 m; WHOI 259, 3305–3317 m; WHOI 287, 4934–4980 m; WHOI 293, 1456–1518 m; WHOI 295, 1000–1022 m; WHOI 301, 2487–2500 m; WHOI 303, 2842–2853 m; WHOI 306, 3392–3429 m; WHOI 313, 1491–1500 m; WHOI 321, 2868–2890 m; WHOI 323, 3338–3356 m; WHOI 326, 3859 m; WHOI 328, 4426–4435 m; WHOI 330, 4632 m; WHOI HH 3, 2900 m; WHOI JJ 3, 4540 m; WHOI LL 1, 4977 m; WHOI OO 2, 4667 m; WHOI Bermuda 1, 1000 m; WHOI Bermuda 2, 1700 m; WHOI Bermuda 4, 1700 m; WHOI Bermuda 5, 2000 m; WHOI Bermuda 6, 1500 m; WHOI Bermuda 7, 2500 m; WHOI Bermuda 8, 1000 m; ALLEN 40, 860 m; ALLEN 50, 2379 m; ALLEN 65, 1922 m; 1969 RANKIN 0022ES, 3111 m.

Exiliniscus clipeatus, new species
Figure 1

Holotype.—WHOI 85, brooding ♀, 2.7 mm long, USNM 184182.

Other material.—WHOI 84, 1 individual; WHOI 120, 1 individual; WHOI 121, 2 individuals; WHOI 122, 5 individuals; WHOI 175, 1 individual.

Distribution.—Northwest Atlantic Ocean, 3834–5023 m.

Etymology.—Latin, armed with a shield.

Diagnosis.—Body length 6.6 times tergal width of pereonite 2. Pereonite 4 length to width ratio (l/w) 0.9. Pereonite 5 (l/w) 1.1. Pleon (l/w) 1.08; width 0.8 times width of pereonite 2. Rostral crest not protruding far forward, bluntly rounded. Antenna I with projection forming full shield over distal bulbous article. Antenna II robust; segment 5 (l/w) 1.38. Uropodal endopod (l/w) 3.13; exopod reduced, (l/w) 1.5; endopod length 8.33 times exopod length. Operculum (♀ pleopod II) rounded; distal margin straight.

Additional descriptive notes.—Pereopods I and II robust. Pereopod I carpus and

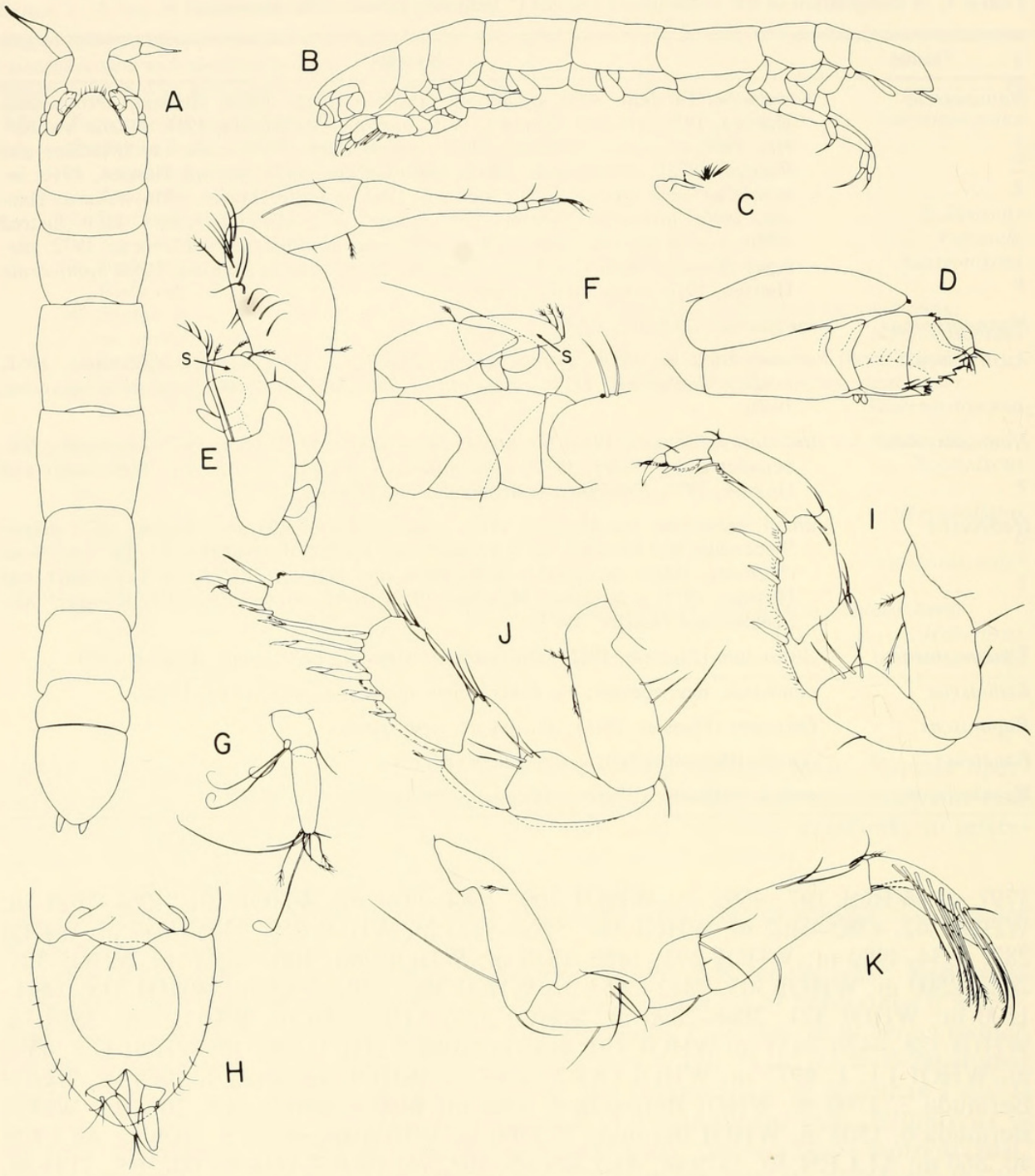

FIG. 1. *Exiliniscus clipeatus*, new species, WHOI 85. A. brooding ♀ (holotype), dorsal view; B. preparatory ♀, lateral view; C. juvenile ♀ left mandible; D. juvenile ♀, maxilliped; E. brooding ♀ (holotype) right antennae I and II (dorsal view), s: shield; F. brooding ♀ (holotype) antenna I and base of antenna II, lateral view, s: shield; G. brooding ♀ (holotype) right uropod; H. brooding ♀ (holotype) operculum (pleopod II); I. juvenile ♀ left pereopod I; J. juvenile ♀ left pereopod II; K. juvenile ♀ left pereopod VI.

propodus of approximately equal length; carpus with 3–4 robust setae on ventral surface; propodus with 1. Pereopod II carpus somewhat longer than propodus; carpus with 5 robust setae on ventral surface, propodus distal seta on dorsal surface somewhat longer than ventral seta. Pereopod VI propodus with natatory setae; limb slender, carpus much longer than propodus.

Remarks.—Exiliniscus clipeatus, new species, is readily distinguished from the other species of the genus by the well-developed shield, stemming from segment 2, which fully envelops the bulbous distal article of antenna I dorsally. Other distinctive features include the dimensions of pereonites 4 and 5, the length and shape of the uropodal rami, and the robustness of antennae II.

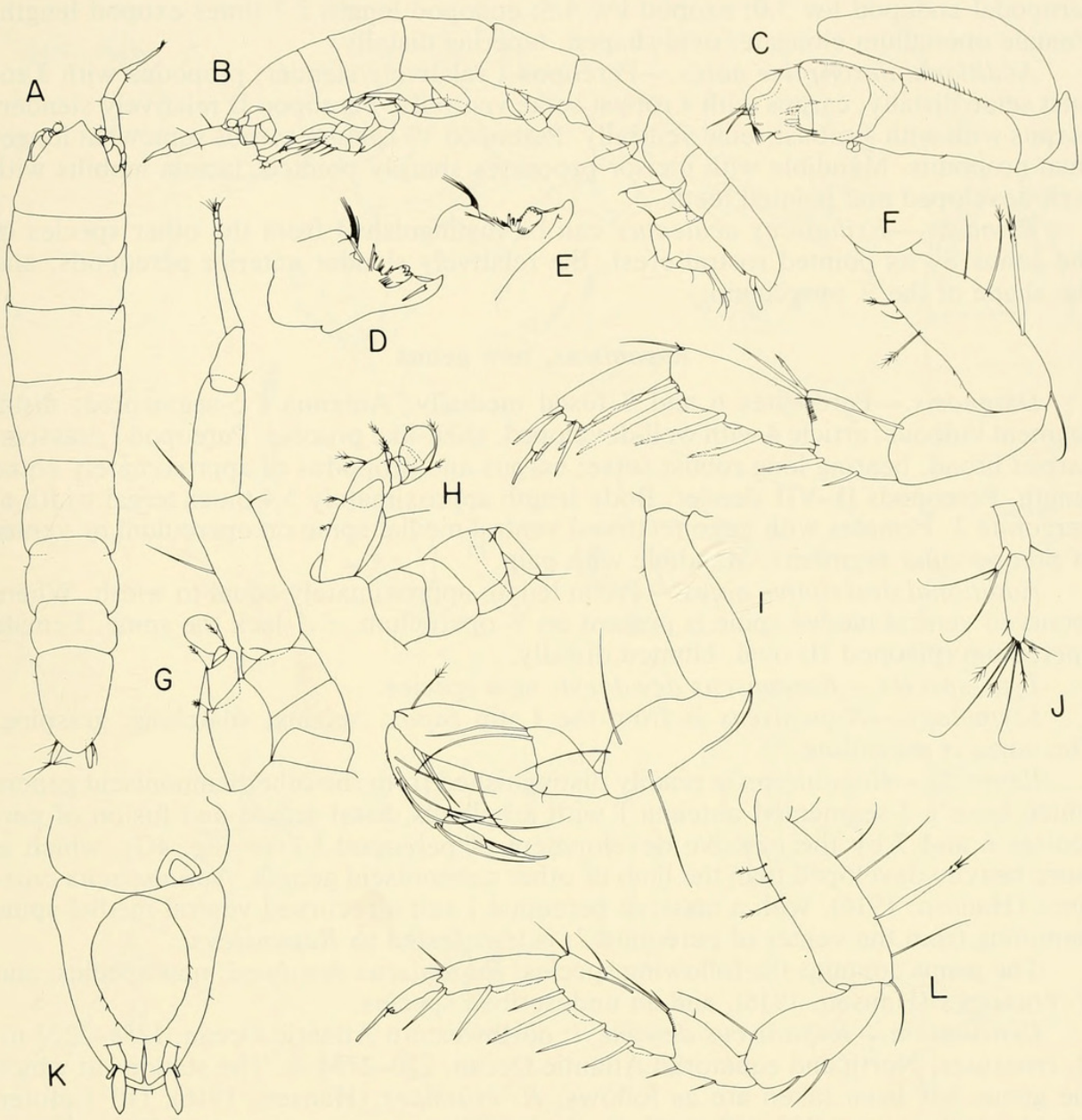

FIG. 2. *Exiliniscus aculeatus*, new species, WHOI 201. A. preparatory ♀ (holotype), dorsal view; B. preparatory ♀ (holotype), lateral view; C. brooding ♀ maxilliped; D. and E. brooding ♀ left mandible; F. brooding ♀ pereopod I; G. preparatory ♀ (holotype) antennae I and II; H. preparatory ♀ (holotype) antenna I and base of antenna II; I. brooding ♀ pereopod VI; J. preparatory ♀ (holotype) right uropod, *in situ*; K. preparatory ♀ (holotype) operculum (pleopod II), ventral view; L. brooding ♀ pereopod II.

Exiliniscus aculeatus, new species
Figure 2

Holotype.—WHOI 201, preparatory ♀, 2.3 mm long, USNM 184183.

Other material.—WHOI 201, 11 specimens; WHOI 200, 3 specimens; WHOI 195, 4 individuals and 2 fragments.

Distribution.—Southeast equatorial Atlantic Ocean, 1964–3797 m.

Etymology.—Latin, sharp, pointed, stinging.

Diagnosis.—Body length 5.6 times tergal width of pereonite 2. Pereonites 3, 4, and 5 broader than long. Pereonite 3 length to width ratio (l/w) 0.6; peronite 4 (l/w) 0.75; peronite 5 (l/w) 0.8. Pleon somewhat elongate; (l/w) 1.38; width 0.67 times width of pereonite 2. Rostral crest drawn to a point. Antenna I bulbous distal segment exposed, not fully shielded by projection. Antenna II relatively thin; segment 5 (l/w) 2.65.

Uropodal endopod l/w 3.0; exopod l/w 4.5; endopod length 2.7 times exopod length. Female operculum elongate, oval-shaped, tapering distally.

Additional descriptive notes.—Pereopod I relatively slender; propodus with 2 robust setae distally; carpus with 4 robust setae ventrally. Pereopod II relatively slender; carpus with with 4 robust setae ventrally. Pereopod VI robust, carpus somewhat longer than propodus. Mandible with incisor processes sharply pointed; lacinia mobilis with well-developed and pointed teeth.

Remarks.—Exiliniscus aculeatus can be distinguished from the other species of the genus by its pointed rostral crest, the relatively slender anterior pereopods, and the shape of the ♀ operculum.

Rapaniscus, new genus

Diagnosis.—Pereonites 6 and 7 fused medially. Antenna I 5-segmented; distal segment bulbous; article 4 with well-developed, shelf-like process. Pereopod I massive, carpus broad, bearing long robust setae; carpus and propodus of approximately equal length. Pereopods II–VII slender. Body length approximately 3.4 times tergal width of pereonite 2. Females with large recurved ventral medial spine on operculum or venter of preopercular segments. Mandible with palp.

Additional descriptive notes.—Pleon length approximately equal to width. Where recurved ventral medial spine is present on ♀ operculum, ♂♂ lack the spine. Female operculum (pleopod II) oval, blunted distally.

Type-species.—Rapaniscus dewdneyi, new species.

Etymology.—Rapaniscus is from the Latin *rapax,* seizing, snatching, grasping. The name is masculine.

Remarks.—Rapaniscus is readily distinguished from the other nannoniscid genera which have a 5-segmented antenna I with a bulbous distal article and fusion of pereonites 6 and 7 by the massive development of pereopod I (*see* Fig. 4G), which is more heavily developed than the limb of other nannoniscid genera. *Nannoniscus crassipes* (Hansen, 1916), with a massive pereopod I and a recurved ventral medial spine stemming from the venter of pereonite 7, is transferred to *Rapaniscus.*

The genus contains the following species: *Rapaniscus dewdneyi,* new species, and *R. crassipes* (Hansen, 1916), and an undescribed species.

Distribution.—Rapaniscus dewdneyi: northwestern Atlantic Ocean, 1254–2223 m. *R. crassipes:* North and equatorial Atlantic Ocean, 220–2754 m. The stations at which the genus has been taken are as follows: *R. crassipes* (Hansen, 1916): Off Lofoten Islands, at Skraaven, 220–457 m (G. O. Sars, 1899, as new specimens of *Nannoniscus oblongus*); WHOI G1, 2000 m; WHOI 73, 1330–1470 m; WHOI 145, 2185 m; WHOI 200, 2644–2754 m; WHOI 209, 1501–1693 m; *R. dewdneyi,* new species: WHOI G9, 2021 m; WHOI 61, 2000 m; WHOI 119, 2095–2223 m; WHOI 128, 1254 m; *Rapaniscus* species: WHOI 95, 3753 m; WHOI 118, 1135–1153 m; WHOI 119, 2095–2223 m; WHOI 256, 3906–3917 m; WHOI 287, 4934–4980 m; WHOI 306, 3392–3429 m; WHOI 321, 2868–2890 m; WHOI 330, 4632 m.

Rapaniscus dewdneyi, new species
Figure 3

Holotype.—WHOI 209, preparatory ♀, 1.4 mm long, USNM 184184.

Paratype.—WHOI 209, male, 1.2 mm long, USNM 184185.

Other material.—WHOI G9, 1 specimen; WHOI 61, 4 specimens; WHOI 119, 1 specimen; WHOI 128, 4 specimens; WHOI 131, 2 specimens.

Distribution.—Northwestern Atlantic Ocean, 1253–2223 m.

Etymology.—For our colleague, Dewdney Somero, with whom we have closely worked, whose counsel we respect, and whose efforts in support of research continue through the Dewdney Endowment.

Diagnosis.—Body length 3.5 (♀), 3.6 (♂) times tergal width of pereonite 2. Pereonite 4 width 0.8 times tergal width of pereonite 2. Pereonite 5 0.6 (♀), 0.8 (♂) times

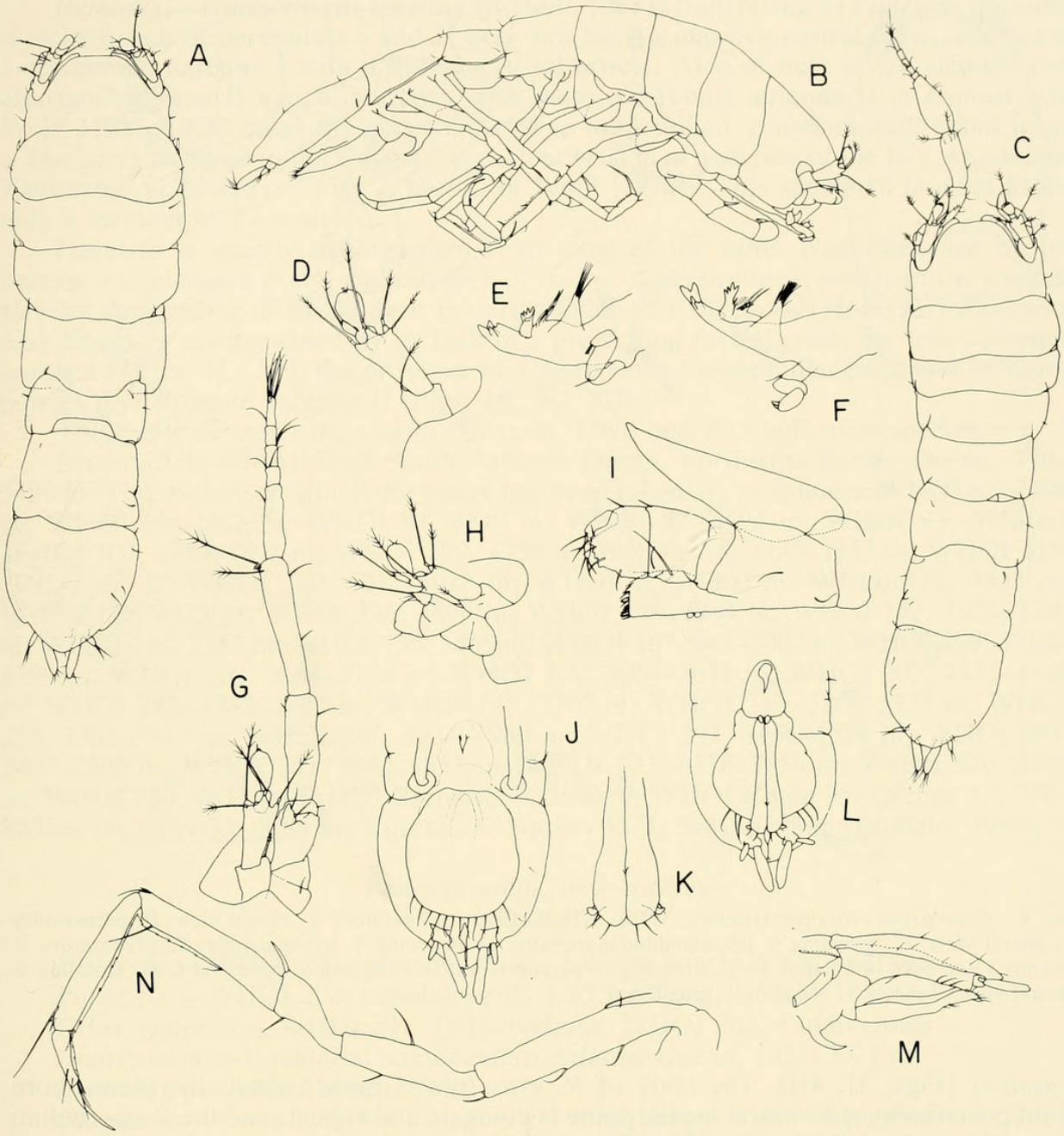

FIG. 3. *Rapaniscus dewdneyi,* new species, WHOI 209. A. preparatory ♀ (holotype), dorsal view; B. preparatory ♀ (holotype), lateral view; C. copulatory ♂ (paratype), dorsal view; D. preparatory ♀ (holotype) antenna I; E. and F. brooding ♀ left mandible; G. brooding ♀ antennae I and II; H. copulatory ♂ (paratype) antenna I; I. brooding ♀ maxilliped; J. brooding ♀ operculum (pleopod II); K. copulatory ♂ (paratype) pleopods I; L. copulatory ♂ (paratype), ventral view of pleon; M. copulatory ♂ (paratype) pleon, lateral view; N. brooding ♀ pereopod VI.

width of pereonite 2. Pleon length approximately equal to width; pleon tapers posteriorly. No sexual dimorphism of pleon shape. Pleon width 0.72 (♀), 0.76 (♂) times width of pereonite 2. Cephalic width 0.84 (♀), 0.91 (♂) times tergal width of pereonite 2. Uropod length 0.42 times length of pleon (measured in dorsal view). Endopod elongate and slender; length 5.6 (♀), 4.4 (♂) times width (l/w). Exopod short; (l/w) 3.4. Endopod length 2.6 times length of exopod. Male and ♀ with thin ventral medial spine on pereonite 7. Female operculum (pleopod II) relatively flat, not vaulted.

Remarks.—Rapaniscus dewdneyi was taken at the same station as *Rapaniscus crassipes* (WHOI 209). *Rapaniscus dewdneyi* can be differentiated from *R. crassipes* by the shape of the uropodal endopod, elongate in *R. dewdneyi,* much shorter in *R.*

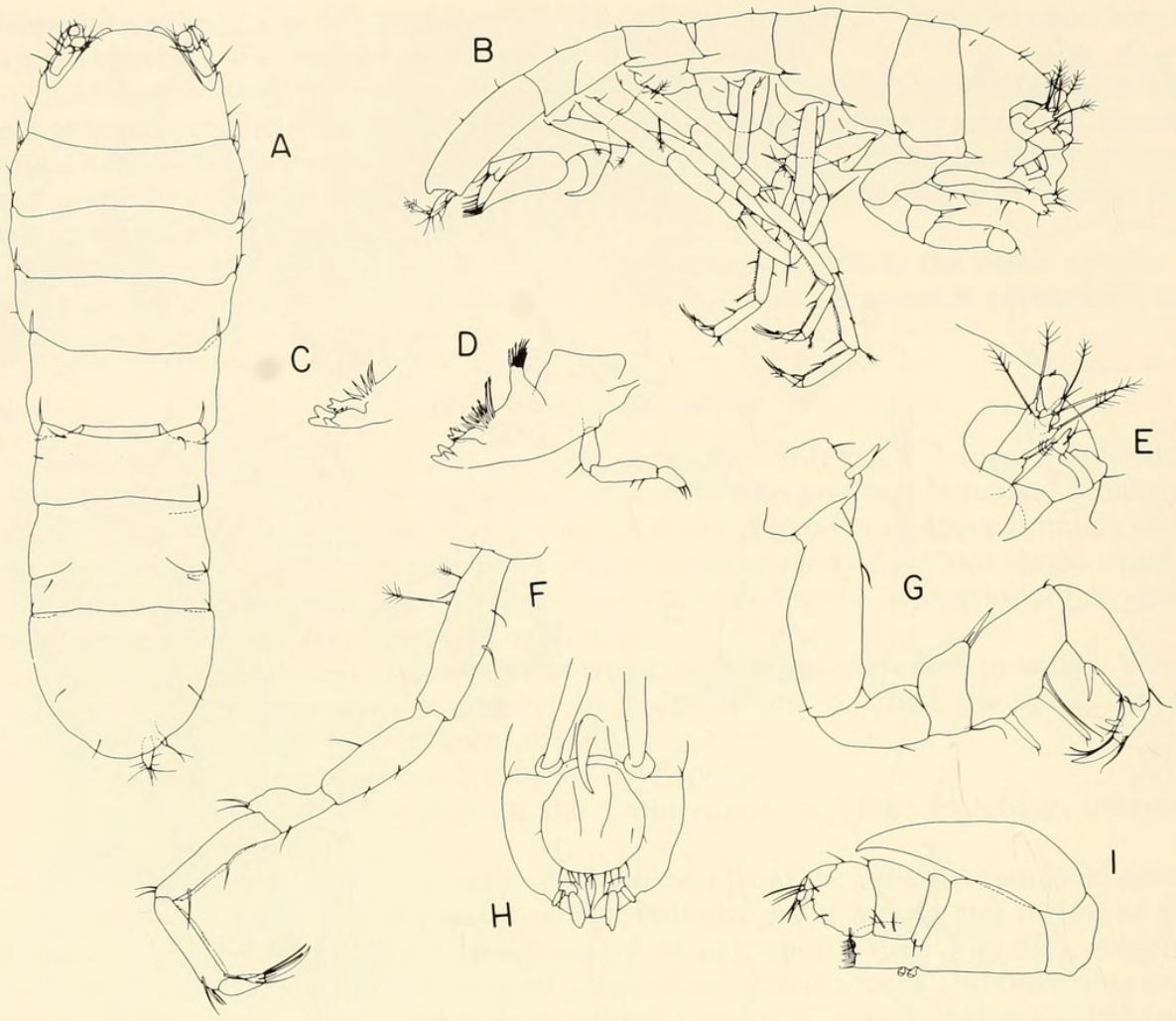

FIG. 4. *Rapaniscus crassipes* (Hansen, 1916), WHOI 209. A. preparatory ♀, dorsal view; B. preparatory ♀, lateral view; C. brooding ♀ left mandibular incisors; D. brooding ♀ left mandible; E. preparatory ♀ antenna I and base of antenna II; F. brooding ♀ pereopod VI; G. brooding ♀ pereopod I; H. brooding ♀ ventral view of pleon; I. brooding ♀ maxilliped.

crassipes (Figs. 3J, 4H). The body of *R. crassipes* is more robust, the pleon more blunt posteriorly, the ventral medial spine is elongate and robust, and the ♀ operculum is deeply vaulted (Figs. 3B, 4B). These two species may be distinguished from an undescribed species of *Rapaniscus* on the shape of the uropodal endopod, and the sexual dimorphism of the pleon, which is squared in the ♂ of the undescribed species, a condition unique among the species of the genus.

Panetela, new genus

Type-species.—Panetela wolffi, new species.

Diagnosis.—Pereonites 6 and 7 free. Body cylindrical or hemicylindrical, narrow and elongate; length greater than approximately 5 times tergal width of pereonite 2. Cephalon lacks massive rostral crest. Antenna I 5-segmented, with bulbous distal article; segment 2 slender. Mandible with 3-segmented palp.

Additional descriptive notes.—Antenna II generally narrow and long relative to body length. Pereopods moderately robust; posterior pereopods may have natatory setae. Shape of uropods and ♀ operculum (pleopod II) may vary interspecifically. Some species possess a ventral medial spine, stemming from either the venter of pereonite 7 or from the operculum.

Etymology.—Panetela is taken from Spanish, referring to the slender, cigar-like body form. The gender is feminine.

Remarks.—*Nannoniscus tenellus* Birstein, 1963 is transferred to *Panetela* because it lacks fusion of pereonites 6 and 7, does not have a massive rostral crest, and has a 5-segmented antenna I with a bulbous distal article. Also of note is the slender and elongate antenna II which contrasts with the more robust antenna II in *Exiliniscus*. Wolff (1975, 1976) notes the occurrence of an unidentified ♀ nannoniscid taken from a *Thalassia* rhizome in the Cayman Trench at 6800 m at a station of the R/V Akademik Kurchatov (1242A) (*see* Fig. 2, part O of Wolff [1976]). This specimen is most probably a member of *Panetela*.

Panetela is readily distinguished from most of the other Nannoniscidae by its narrow and elongate body, and the lack of fusion of pereonites 6 and 7. In the overall slender appearance of the body it is very similar to *Exiliniscus*. However, *Panetela* may be easily distinguished by its lack of a protruding rostral crest, the less compact antenna I (Figs. 1E, 5E), the presence of a 3-segmented mandibular palp, and its more narrow and elongate antenna II (Figs. 1E, 2G, 5D).

The genus contains: *P. tenella* (Birstein, 1963) and *P. wolffi*, new species.

Distribution.—North and South Atlantic Ocean, northwest Pacific Ocean, 770–5495 m. The stations at which the genus has been taken are as follows: WHOI 62, 2496 m; WHOI 66, 2802 m; WHOI 84, 4749 m; WHOI 92, 4694 m; WHOI 95, 3753 m; WHOI 100, 4743–4892 m; WHOI 109, 4750 m; WHOI 118, 1135–1153 m; WHOI 119, 2095–2223 m; WHOI 120, 5018–5023 m; WHOI 121, 4800 m; WHOI 122, 4833 m; WHOI 125, 4825 m; WHOI 126, 3806 m; WHOI 128, 1254 m; WHOI 142, 1624–1796 m; WHOI 145, 2145 m; WHOI 156, 3459 m; WHOI 167, 943–1007 m; WHOI 199, 3764–3799 m; WHOI 200, 2644–2754 m; WHOI 201, 1964–2031 m; WHOI 202, 1427–1643 m; WHOI 242, 4382–4402 m; WHOI 245, 2707 m; WHOI 247, 5208–5223 m; WHOI 259, 3305–3317 m; WHOI 287, 4934–4980 m; WHOI 293, 1456–1518 m; WHOI 301, 2487–2500 m; WHOI 303, 2842–2853 m; WHOI 323, 3338–3356 m; WHOI 326, 3859 m; WHOI 330, 4632 m; WHOI Bermuda 7, 2500 m; WHOI Chain 35, Dredge 12, 770–805 m; ALLEN 33, 1784 m; Kurchatov Station 3575, 5461–5495 m (Birstein, 1963).

Panetela wolffi, new species
Figure 5

Holotype.—WHOI 201, preparatory ♀, 2.0 mm long, USNM 184186.

Paratype.—WHOI 202, copulatory ♂, 1.35 mm long, USNM 184187.

Other material.—WHOI 201, 19 individuals; WHOI 202, 4 individuals.

Distribution.—Equatorial southeastern Atlantic Ocean, 1427–2031 m.

Etymology.—After Torben Wolff.

Diagnosis.—Body length 8 (♀), 6.4 (♂) times tergal width of pereonite 2. Body appears very elongate, pereonites 4–7 0.46 times body length. Female pleon rounded distally; ♂ pleon somewhat squared distally. Uropodal endopod elongate; exopod very slender and short. Pereopods VI and VII with natatory setae. No ventral medial spines.

Remarks.—*Panetela wolffi* has a very elongate appearance due to the length of pereonites 3–7. This contrasts with the condition in *P. tenella* (Birstein, 1963) in which the body is more compact. Also, the operculum (♀ pleopod II) of *P. wolffi* is more pear-shaped and elongate than that of *P. tenella*. The sexual dimorphism of pleonar shape in *P. wolffi* should also be noted.

Regabellator, new genus

Diagnosis.—Pereonites 6 and 7 fused. Body length approximately 3.4 times tergal width of pereonite 2. Antenna I 5-segmented, with bulbous terminal article; segment 4 with long lateral projection. Two large medial spines on venters of pereonites 6 and 7. Posterior spine with broad basal region; anterior spine narrower, generally directed ventrally or slightly anteriorly. Short spine-like processes may be present on ventral medial surfaces of other pereonal segments. Pereopod I with anteriorly directed coxal plate bearing small robust seta. Propodus and carpus devoid of long robust setae dorsally and ventrally. (However, small robust terminal seta is present.) Pereopods II–IV

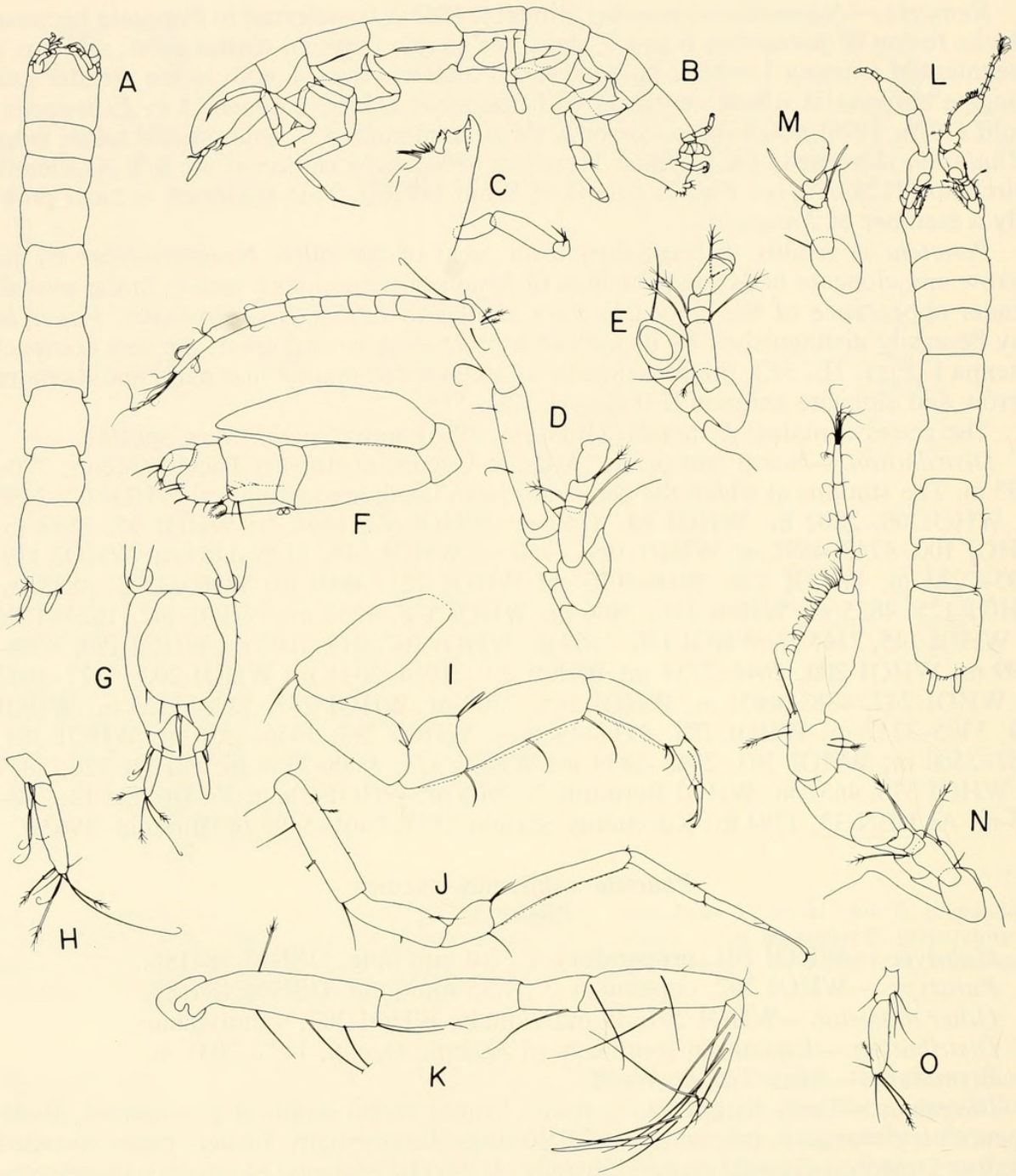

FIG. 5. *Panetela wolffi,* new species, WHOI 201. A. preparatory ♀ (holotype), dorsal view; B. preparatory ♀ (holotype), lateral view; C. brooding ♀ left mandible; D. preparatory ♀ (holotype) antennae I and II; E. preparatory ♀ (holotype) antenna I and base of antenna II; F. brooding ♀ maxilliped; G. brooding ♀ pleon, ventral view; H. brooding ♀ right uropod; I. juvenile ♀ right pereopod I; J. brooding ♀ right pereopod II; K. brooding ♀ left pereopod VI, WHOI 202, copulatory ♂ (paratype); L. dorsal view; M. antenna I; N. antennae I and II; O. left uropod.

with very long robust setae from ventral and dorsal surfaces of propodus and carpus. Pereopods V–VII not broadened, without well-developed natatory setae. Mandible with palp.

Additional descriptive notes.—Pereonites 4–7 distinctly narrower than anterior pereonites. Pleon tapers posteriorly, with ventral surface somewhat vaulted, deepening from lateral margins to branchial chamber. Posteriorly, lateral pleonar margins tuck under, setting off anal plates and uropods from rest of pleon. Uropods set close together and almost terminal. Uropods with small exopod; endopod variable in length.

Type-species.—Regabellator profugus, new species.

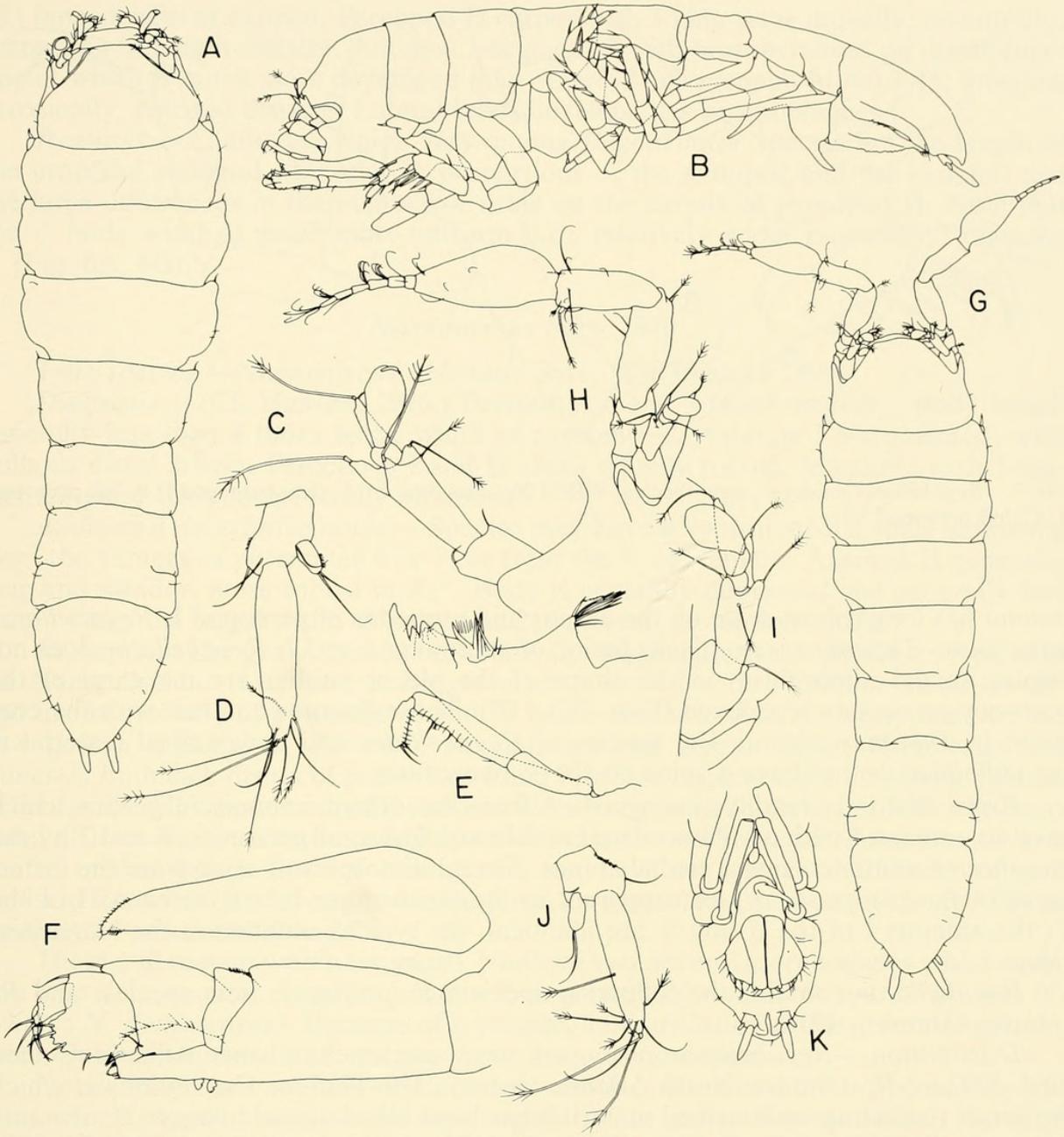

FIG. 6. *Regabellator profugus*, new species, WHOI 201. A. preparatory ♀ (holotype), dorsal view; B. preparatory ♀ (holotype), lateral view; C. preparatory ♀ (holotype) left antenna I; D. preparatory ♀ (holotype) left uropod; E. brooding ♀ left mandible; F. brooding ♀ maxilliped; G. ♂ (paratype), dorsal view; H. ♂ (paratype) antenna II; I. ♂ (paratype) antenna I; J. ♂ (paratype) right uropod; K. ♂ (paratype) pleopods I.

Etymology.—Regabellator is masculine, taken from the Latin *regalis* and *bellator*, regal warrior, referring to the presence of multiple ventral medial spines.

Remarks.—Nannoniscus armatus Hansen, 1916 is transferred to *Regabellator*. *Regabellator* is similar to described species of *Thaumastasoma* (*T. platycarpus* Hessler, 1970 and *T. tenue* Hessler, 1970) which also possess 2 major ventral medial spines (Fig. 11B). These 2 species also show similarities to *Regabellator* in the shape of the ♀ pleon and the close positioning of the uropods to the midline. *Thaumastasoma* has been removed from the Desmosomatidae to the Nannoniscidae by Siebenaller and Hessler (1977).

These two genera differ in the first antenna, which is 6-segmented and unmodified in *Thaumastasoma* (Fig. 11C), and 5-segmented with a bulbous distal article and a shelf-like process from the penultimate article in *Regabellator* (Fig. 6C). *Thaumas-*

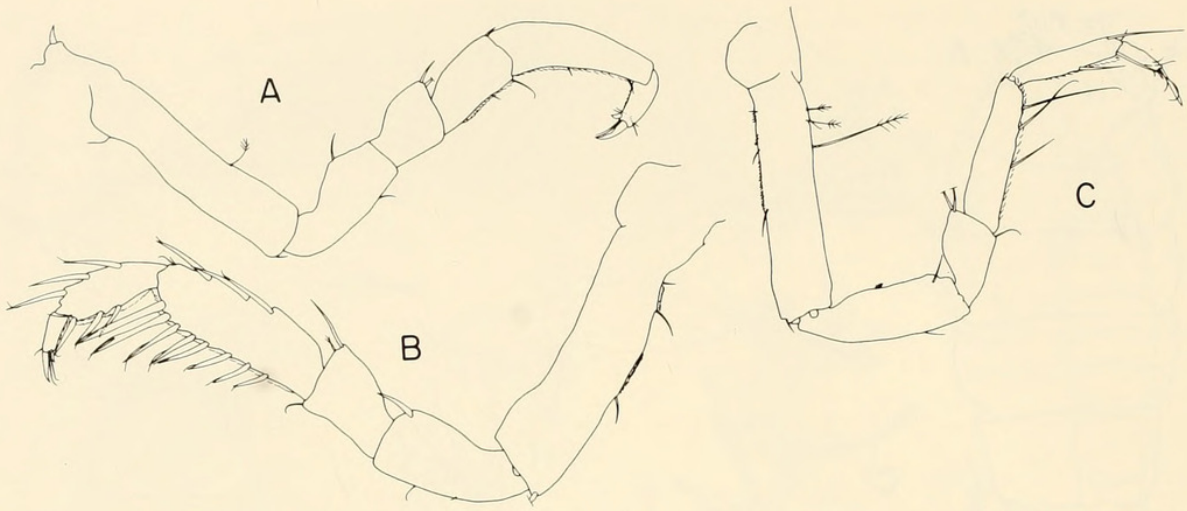

FIG. 7. *Regabellator profugus*, new species, WHOI 201, brooding ♀. A. right pereopod I; B. left pereopod II; C. left pereopod VI.

tasoma has long robust setae on the carpus and propodus of pereopod I; *Regabellator* lacks these. *Thaumastasoma* lacks fusion of pereonites 6 and 7. *Regabellator* does not display sexual dimorphism in the shape of the pleon; neither are the carpi of the posterior pereopods broadened (Figs. 7C, 11E). These features contrast with the condition in *Thaumastasoma*. The species of *Regabellator* and undescribed material in our collection do not have a spine on the ♀ operculum.

Regabellator is readily distinguished from the other nannoniscid genera which have an antenna I with a bulbous distal article and fusion of pereonites 6 and 7 by the presence of multiple ventral medial spines. Sexual dimorphism, aside from the differences in the pleopods, is most apparent in the much more robust antenna II of the ♂; the antenna I of the ♂ and ♀ are identical, the typical situation in the Nannoniscidae.

Regabellator contains the following species: *R. profugus*, new species, and *R. armatus* (Hansen, 1916).

Distribution.—Regabellator profugus, new species: southeast Atlantic Ocean, 1964–3797 m; *R. armatus:* North Atlantic Ocean, 2379–4435 m. The stations at which the genus (including undescribed material) has been taken are as follows: *R. armatus* (Hansen, 1916): Ingolf Station 38, 1870 fm [=3403 m] (Hansen, 1916); WHOI 85, 3834 m; WHOI 149, 3861 m; WHOI 328, 4426–4435 m; ALLEN 50, 2379 m; *R. profugus*, new species: WHOI 195, 3797 m; WHOI 200, 2644–2754 m; WHOI 201, 1964–2031 m; *Regabellator* species: WHOI 70, 4680 m; WHOI 256, 4563 m.

***Regabellator profugus*, new species**
Figures 6, 7

Holotype.—WHOI 201, preparatory ♀, 3.1 mm long, USNM 184188.
Paratype.—WHOI 201, ♂, 2.5 mm long, USNM 184189.
Other material.—WHOI 195, 1 specimen; WHOI 200, 1 specimen.
Distribution.—Southeastern Atlantic Ocean, 1964–2754 m.
Etymology.—Latin, wandering, fleeing.
Diagnosis.—Body elongate; length 3.4 (♀), 3.8 (♂) times width of pereonite 2. Pereonite 4 length 0.5 (♀), 0.6 (♂) times width; width 0.77 (♀), 0.73 (♂) times width of pereonite 2. Pereonite 5 rectangular; length to width ratio (l/w) 0.4; width 0.63 (♀), 0.7 (♂) times width of pereonite 2. Pereonites 6 and 7 and pleon broaden slightly. Pleon width 0.64 (♀), 0.72 (♂) times width of pereonite 2; length 1.1 times width. Uropods 0.35 times length of pleon (latter measured in dorsal view). Endopod long; (l/w) 4.4 (♀), 4.6 (♂). Exopod short; (l/w) 4.4 (♀), 2.5 (♂). Endopod length 5.0 (♀), 3.9

(♂) times length of exopod. Pereopod II carpus with 3 long setae dorsally; 8 ventrally, increasing in length distally. Antenna I segment 2 with protuberances on distal edge, one of which is much more developed than others. Male pleopod I (l/w) 3.15; broadest proximally, squared distally. Lateral lobes developed as protuberances.

Remarks.—Characters which vary among *Regabellator* species are the length of the uropodal endopod, the relative proportions of the endopod and the exopod, and the large differences in the number of setae on the carpus of pereopod II. Note that the ♂ body width is much more uniform (i.e., relatively wider posteriorly) than the ♀ (Fig. 6A, 6G).

Nannoniscus Sars, 1870

Type-species.—*Nannoniscus oblongus* Sars, 1870 (figured 1899).

Diagnosis.—(Cf. Hansen, 1916.) Pereonites 6 and 7 fused medially. Body length generally less than 4 times tergal width of pereonite 2. Antenna I 5-segmented, with bulbous distal article. Pereopods I and II about equally robust. Mandible with 3-segmented palp. Uropods generally biramous.

Additional descriptive notes.—Species may have a ventral medial spine stemming from the venters of pereonites 6 or 7, or from the ♀ operculum. Antenna II generally long and slender, more robust in ♂♂. Body is generally depressed and generally less than 4 times the tergal width of pereonite 2; however, exceptions occur.

Remarks.—The genus consists of relatively unspecialized morphologies typical of the Nannoniscidae (i.e., have a 5-segmented antenna I with a bulbous distal article, and fusion medially of pereonites 6 and 7). More specialized forms are typified by the new genera *Exiliniscus, Panetela, Rapaniscus,* and *Regabellator. Exiliniscus* and *Panetela* both lack fusion of pereonites 6 and 7, which is generally a diagnostic feature of the family. However, both of the genera have 5-segmented antennae I with a bulbous distal article. *Rapaniscus* has a highly modified pereopod I; *Regabellator* has several ventral medial spines. Both of these genera also have the typical combination of nannoniscid features (i.e., a 5-segmented antenna I with a bulbous distal article and fusion medially of pereonites 6 and 7).

There still remain within the genus *Nannoniscus* several morphologies which may, at a later date, require elevation to generic rank (e.g., *Nannoniscus muscarius* and *N. ovatus*; *N. detrimentus*). Because of a possible intergradation of these forms with the more typical *Nannoniscus* form, we leave this question open.

Nannoniscus intermedius, new species, which is discussed below, possesses features which suggest that it should be assigned to the genus *Nannonisconus* Schultz. *Nannoniscus intermedius* is strikingly similar to general features of *Nannonisconus latipleonus* Schultz, but differs from Schultz's diagnosis of the genus *Nannonisconus* in that it lacks fusion of pereonite 7 with the pleon. Other than *Nannonisconus latipleonus,* no species with fusion of pereonite 7 with the pleon has been reported. Future investigations may reveal that the diagnostic characteristic of *Nannonisconus* is not the fusion of pereonite 7 with the pleon, but rather the characteristic proportions and shape of the pleon. However, we have refrained from redefining the genus *Nannonisconus.*

Table 3 lists the species of *Nannoniscus.* The following species have been transferred from *Nannoniscus* to other genera in this study: *N. armatus* Hansen, 1916 to *Regabellator,* new genus; *N. crassipes* Hansen, 1916 to *Rapaniscus,* new genus; *N. hanseni* Just, 1970 to *Exiliniscus,* new genus; and *N. tenellus* Birstein, 1963 to *Panetela,* new genus. For reassignments of other species of *Nannoniscus* see Siebenaller and Hessler (1977).

Nannoniscus intermedius, new species
Figure 8

Holotype.—WHOI 297, preparatory ♀, 2.7 mm long, USNM 184190.

Other material.—WHOI 297, 6 individuals.

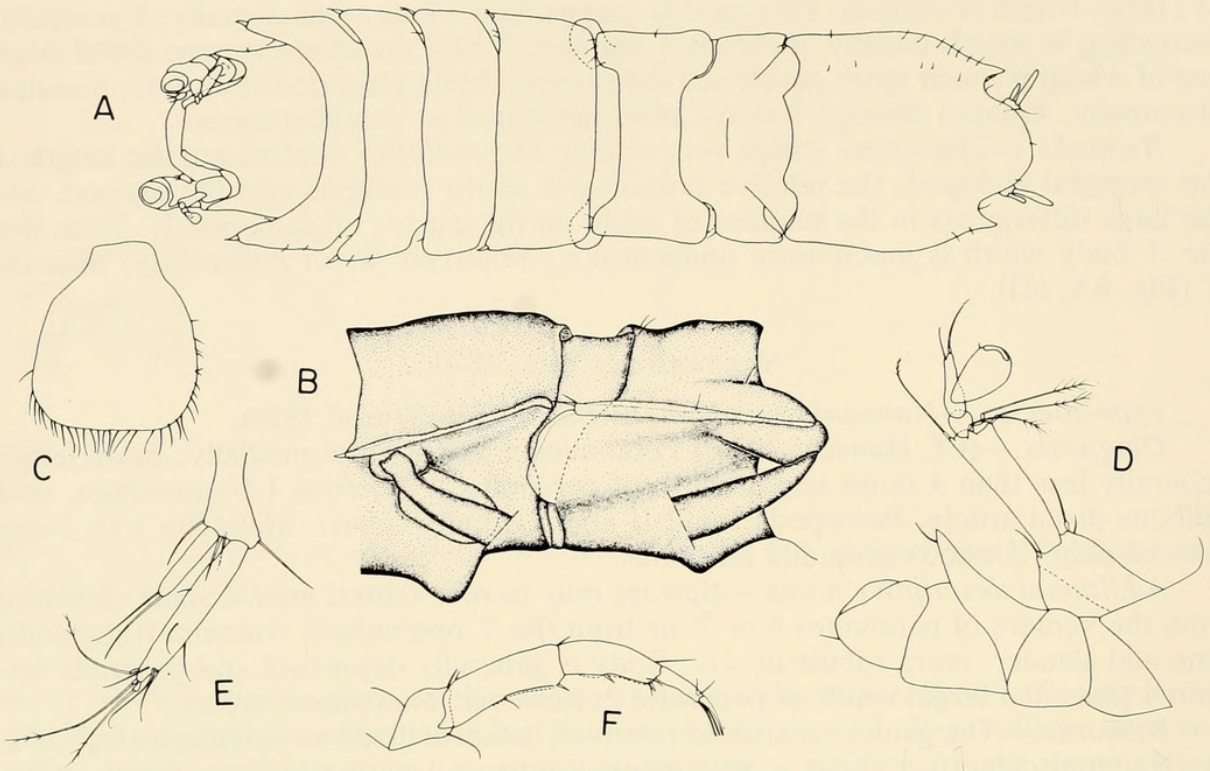

FIG. 8. *Nannoniscus intermedius*, new species, WHOI 297, preparatory ♀ (holotype). A. dorsal view; B. enlargement of the flap-like fold of pereonite 5; C. operculum (pleopod II); D. lateral view of left antenna I; E. right uropod, *in situ*; F. right pereopod I.

Distribution.—Equatorial west Atlantic Ocean, 508–523 m.

Etymology.—Latin, intermediate.

Diagnosis.—Body length 3.5 times tergal width of pereonite 2. Pleon broad, 0.9 times width of pereonite 2. Pleon with posterolateral spines. Cephalon narrow, 0.7 times tergal width of pereonite 2. Pereonite 1 lateral margins projecting strongly forward. Pereonite 5 anterolateral margins with ventrally projecting flaps. Uropodal endopod slender, length to width ratio (l/w) 6.4. Exopod slender and elongate; (l/w) 5.0. Endopod 2.2 times length of exopod. Female operculum (pleopod II) pear-shaped.

Remarks.—This species is very similar to *Nannonisconus latipleonus* Schultz, 1966 in the shape and width of the pleon (cf. Fig. 15). However, *Nannonisconus latipleonus* has pereonite 7 fused to the pleon. *Nannoniscus intermedius* can be readily distinguished from the other species of the genus *Nannoniscus* on the basis of the anterior margins of pereonite 5 and the protrusions anteriorly of the lateral margins of pereonite 1.

Nannoniscus teres, new species
Figure 9

Holotype.—WHOI 328, preparatory ♀, 4.2 mm long, USNM 184191.

Paratype.—WHOI 328, copulatory ♂, 4 mm long, USNM 184192.

Other material.—WHOI 328, 2 individuals.

Distribution.—Northeast Atlantic Ocean, 4426–4435 m.

Etymology.—Latin, refined, elegant.

Diagnosis.—Body length 3.1 (♀), 3.0 (♂) times tergal width of pereonite 2. Cephalon broad, 0.86 (♀), 0.77 (♂) times width of pereonite 2. Pereonite 1 with lateral margins projecting anteriorly. Pleon tapering to a point, triangular in shape; ♂ with stout spine projecting from apex. Female operculum (pleopod II) pear-shaped with medial spine stemming from proximal surface. Male pleopods I with well-developed

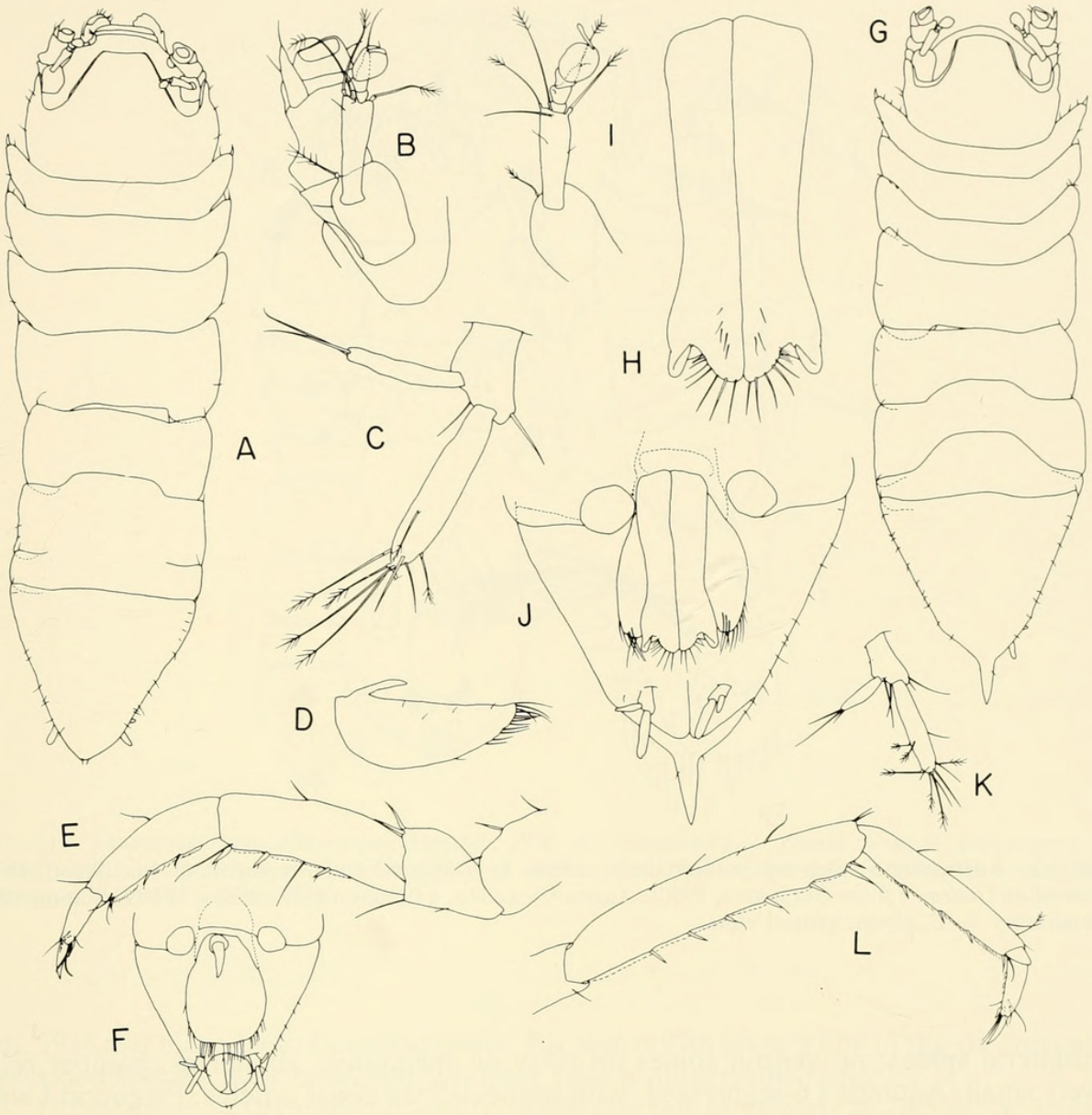

FIG. 9. *Nannoniscus teres*, new species, WHOI 328. A. preparatory ♀ (holotype), dorsal view; B, preparatory ♀ (holotype) left antenna I and base of antenna II; C. preparatory ♀ (holotype) right uropod; D. preparatory ♀ (holotype), lateral view of operculum (pleopod II); E. preparatory ♀ (holotype) left pereopod I; F. preparatory ♀ (holotype) operculum (pleopod II), ventral view; G. copulatory ♂ (paratype), dorsal view; H. copulatory ♂ (paratype) pleopods I; I. copulatory ♂ (paratype) left antenna I; J. copulatory ♂ (paratype) pleon, ventral view; K. copulatory ♂ (paratype) right uropod; L. copulatory ♂ (paratype) right pereopod II.

distolateral and distomedial lobes. Uropods small. Endopod 1.5 (♀), 2 (♂) times length of exopod. Endopod length to width ratio (l/w) 4.6 (♀), 4.8 (♂). Exopod (l/w) 5.5 (♀), 3.8 (♂).

Remarks.—Although this species is not unique in possessing a triangular-shaped pleon (cf. *N. acanthurus* Birstein, 1963), it is singular in that the ♂ has a spine stemming from the apex. The two species are very similar overall, but differ inter alia in the shape of the uropods and the distal margins of the ♂ pleopods I.

Austroniscus Vanhöffen, 1914
Figure 10

Synonymy.—*Nannoniscella* Hansen, 1916 (Birstein, 1962).

Diagnosis.—Body flattened; pereon and pleon expanded laterally into flat marginal flanges; on anterior pereonites, expansions extending anteriorly. Pleon without pos-

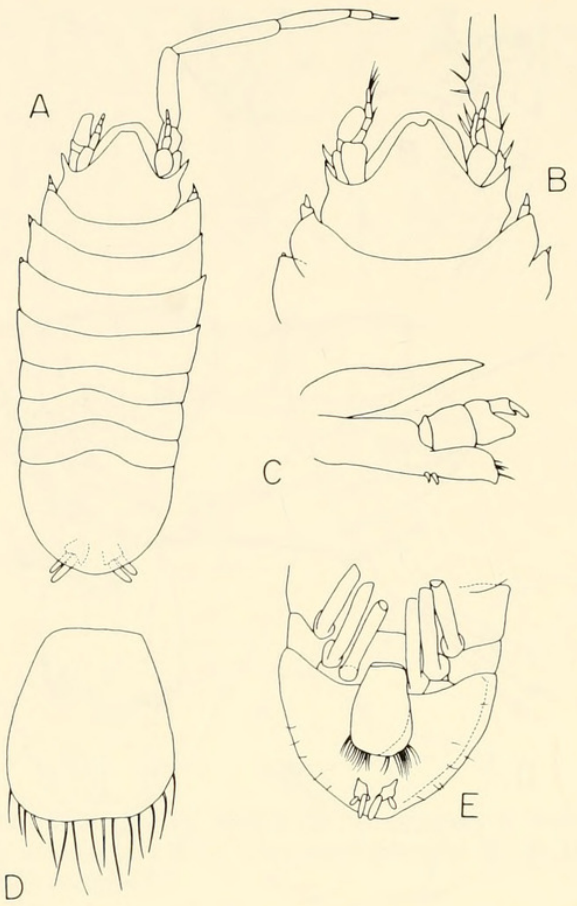

FIG. 10. *Austroniscus vinogradovi* (Gurjanova, 1950). A. dorsal view; B. cephalon; C. maxilliped; D. ♀ operculum (*redrawn from* Gurjanova, 1950). *Austroniscus* No. 6 (undescribed species, WHOI Station 195), preparatory ♀. E. pleon, ventral view.

terolateral spines; no ventral spines on body or operculum. Branchial chamber relatively small. Antenna I 6-segmented, with unspecialized distal articles. Pereopod I with conspicuous, anteriorly projecting epimere; where known, pereopod I of similar size to pereopod II and III. Pereopods V–VII not especially expanded for swimming, with only a few scattered swimming setae.

Additional descriptive notes.—A rostrum may or may not be well developed; where present, it may be slender or broad. On one undescribed species from WHOI 247, antenna I on mature ♂ has 9 articles with numerous aesthetascs, as opposed to the single aesthetasc of the other species. On another undescribed species from WHOI 155, WHOI 195, and WHOI 245, pereonite 7 is not developed laterally. This is the only known case where pereonites 6 and 7 are fused in the midline region. On many species, lateral expansion of pereonites 5–7 is so great that the base of the pereopods is only halfway from the midline; this trend is emphasized going from 5 to 7. On mature ♂♂, pleopod I exhibits a range of morphologies. For *A. rotundatus* and *A. ovalis* Vanhöffen, 1914, its medial lobe is rounded and extends only a short distance beyond the small, hook-like lateral lobes. On *A. karamani* Birstein, 1962, the medial lobe is long and pointed, and the lateral lobes are large but not hooked. An undescribed species from WHOI 195 is intermediate, having long but rounded medial lobes.

Type-species.—*Austroniscus ovalis* Vanhöffen, 1914 designated by Birstein (1962:34).

Remarks.—Vanhöffen's diagnosis contained a single character, the unspecialized flagellum of antenna I. The addition of other species has demonstrated the presence of other features, the most notable of which is the flat marginal expansions of the pereon and pleon. Menzies and Pettit (1956) correctly removed *A. ectiformis* Vanhöf-

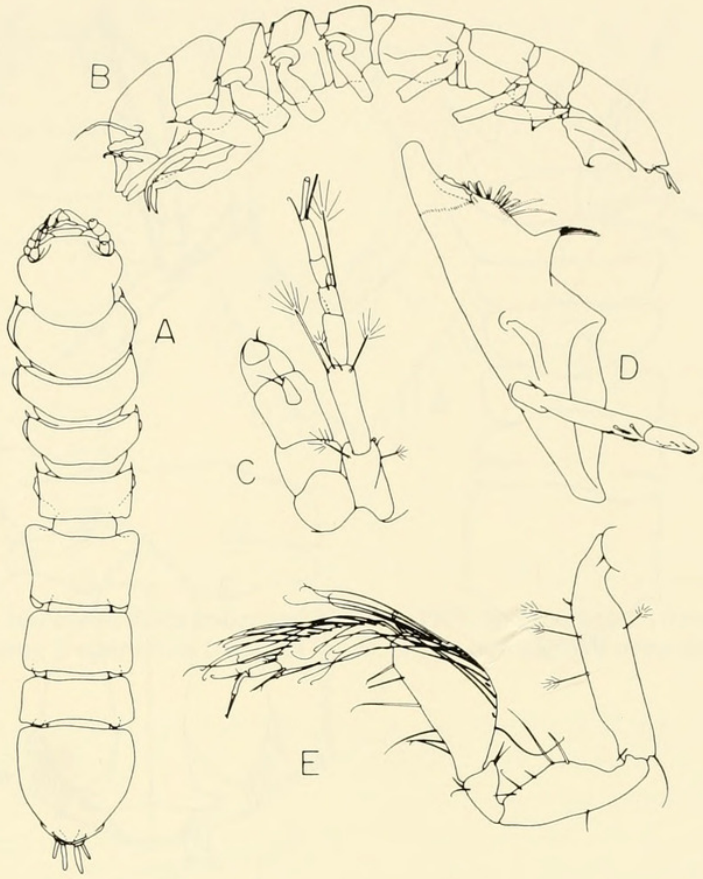

FIG. 11. *Thaumastosoma platycarpus* Hessler, 1970. A. preparatory ♀, dorsal view; B. preparatory ♀, lateral view; C. brooding ♀ antenna I and base of antenna II; D. brooding ♀ left mandible; E. brooding ♀ pereopod V (*from* Hessler, 1970).

fen, 1914 and placed it in *Caecianiropsis*. Birstein (1970) gives a key to the six currently described species. Our collection contains several undescribed species.

Distribution.—Austroniscus ovalis: Antarctic Indian Ocean, 70–385 m. *A. rotundatus:* Antarctic Indian Ocean, 70–385 m. *A. groenlandicus:* W. Greenland, 10–132 m. *A. karamani:* E. of Japan, 5000–5450 m. *A. acutus:* E. of Japan, 5005–6135 m. *A. vinogradovi:* Kamchatka Sea (Avachin Bay), 125 m. Undescribed material: northern, equatorial, and southwestern Atlantic Ocean, 1000–5600 m; east equatorial Pacific Ocean, 4800–5100 m.

Thaumastosoma Hessler, 1970
Figure 11

Synonymy.—Desmosoma (part) Birstein, 1963.

Diagnosis.—Body slender, not depressed. Cephalon without rostrum. Pereonites 5–7 and pleon with small lateral flanges; pereonites 6 and 7 not fused; pereonite 7 venter and ♀ pleopod II with medial, posteriorly directed spine; pleon with posterolateral spines on mature ♂; presence of small spines variable on ♀. Antenna I 6-segmented, with unspecialized distal articles. Mouthparts produced conspicuously, accompanied by many modifications of specific appendages (*see* Additional descriptive notes, below). Mandible with well-developed palp. Pereopod I stouter than pereopod II.

Additional descriptive notes.—Mandible elongate; incisor process bent forward; lacinia mobilis membranous. Maxilliped with unusually elongate coupling hooks; palp segments 2–4 produced forward medially such that on article 3 the medial setae are distributed in an arc on the ventral surface of the article, rather than from the disto-

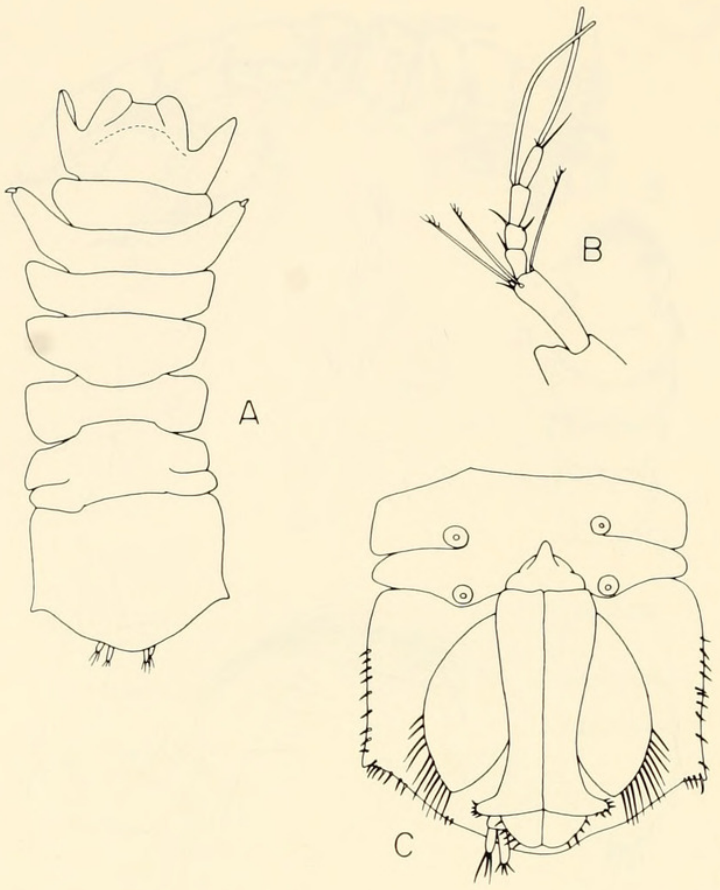

FIG. 12. *Nannoniscoides angulatus* Hansen, 1916. A. ♂, dorsal view; B. ♂ antenna I; C. ♂, ventral view of pleon and pereonites 6 and 7 (*from* Just, 1970).

medial margin; joint between articles 2 and 3 angles distomedially. Basal endite of maxilliped II less than half the length of the other lobes.

Type-species.—Thaumastosoma platycarpus Hessler, 1970.

Remarks.—This genus was first regarded as being part of the Desmosomatidae (Hessler, 1970; Birstein, 1963). At that time, the distinction between that family and the closely related Nannoniscidae was still unresolved. When their differences were finally clarified, it became obvious that *Thaumastosoma* must be a nannoniscid (Siebenaller and Hessler, 1977).

Distribution.—Thaumastosoma platycarpus: northwestern Atlantic Ocean, 2886 m. *T. tenue:* northwestern Atlantic Ocean, 2886–3753 m. *T. distinctum:* northwestern Pacific Ocean, 5680–5690 m. Undescribed material: northern, equatorial, and southwestern Atlantic Ocean, 1000–5600 m; eastern equatorial Pacific Ocean, 4800–5100 m.

Nannoniscoides Hansen, 1916
Figures 12, 13

Diagnosis.—Antenna I unspecialized, 6 (or rarely 7) segmented. Pleon with posterolateral spines. Operculum (♀ pleopod II) elongate, with concavity and calcareous fringe at midline of distal edge. Pereopod I of medium robustness; ventral surface of carpus and propodus with thin setae except for distal robust seta on carpus. Cephalon with pointed lateral lappets. Pereonites 6 and 7 free or fused. Pereonite 2 with robust seta on anterolateral corners. Medial lobes of ♂ pleopods I taper distally. Body depressed; length roughly 3 times tergal width of pereonite 2.

Type-species.—Nannoniscoides angulatus Hansen, 1916.

Remarks.—Mature or nearly mature ♂♂ may have a more massively developed cephalon than ♀♀ (cf. ♂ and ♀ of *N. latediffusus* [Siebenaller and Hessler, 1977]), and more strongly produced lateral lobes of pereonite 2. There is also some indication

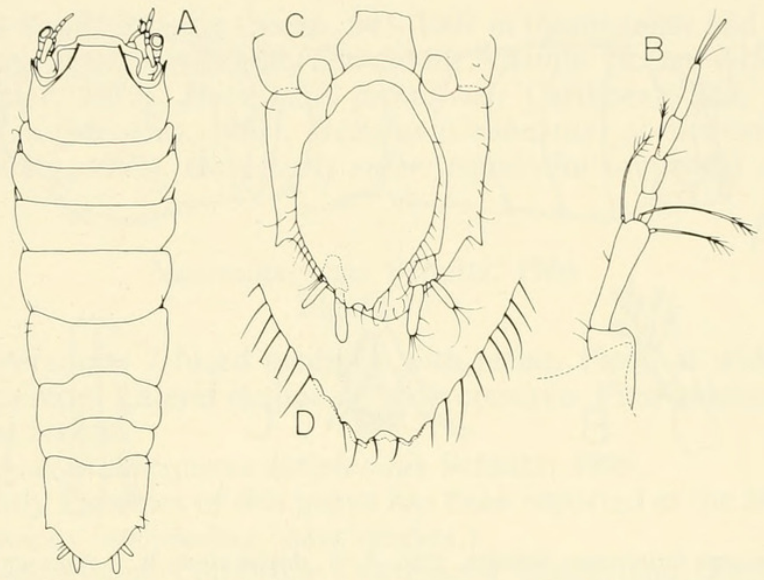

FIG. 13. *Nannoniscoides biscutatus* Siebenaller and Hessler, 1977. A. brooding ♀, dorsal view; B. brooding ♀ right antenna I; C. brooding ♀ operculum (pleopod II); D. posterior margin of operculum (*from* Siebenaller and Hessler, 1977).

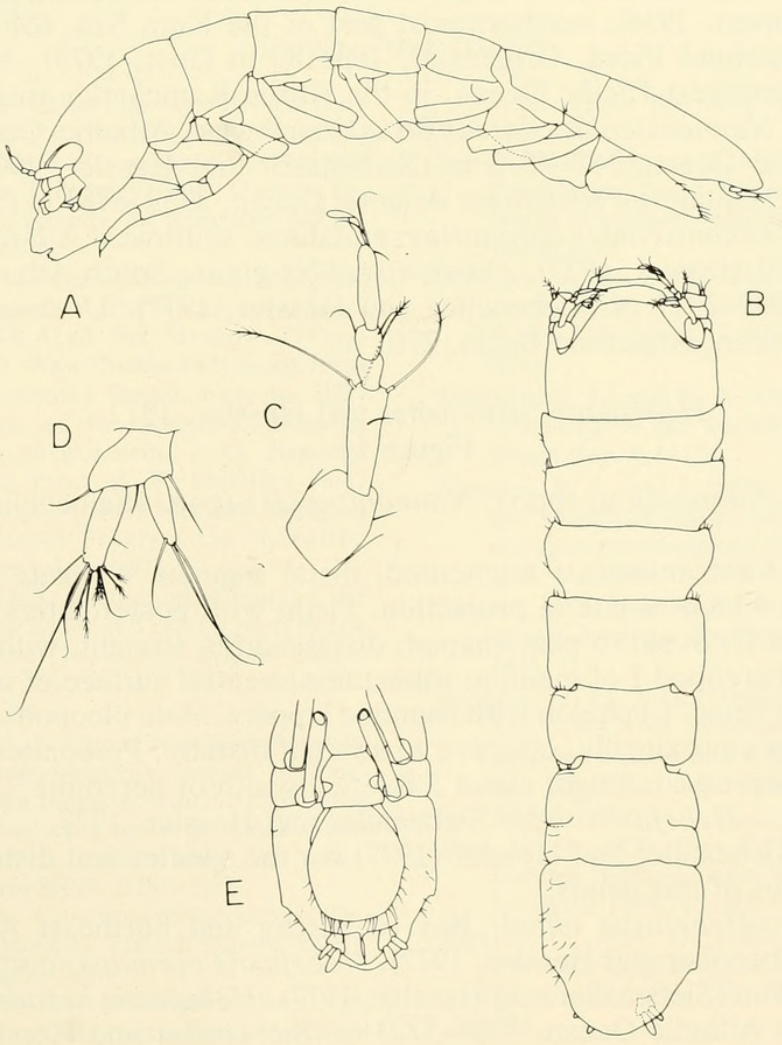

FIG. 14. *Hebefustis vafer* Siebenaller and Hessler, 1977, preparatory ♀. A. lateral view; B. dorsal view; C. right antenna I, dorsal view; D. uropods; E. pleon, ventral view (*from* Siebenaller and Hessler, 1977).

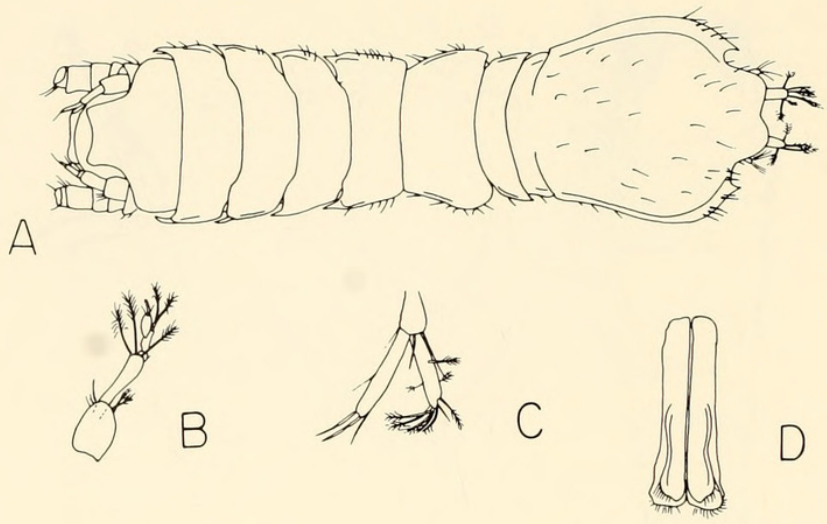

FIG. 15. *Nannonisconus latipleonus* Schultz, 1966. A. ♂, dorsal view; B. ♂ right antenna I; C. ♂ uropods; D. ♂ pleopods I (*from* Schultz, 1966).

of sexual dimorphism of the first antenna, unique in the Nannoniscidae. There may be differences in the number of aesthetascs and relative lengths of segments 5 and 6 (cf. *N. biscutatus* [Siebenaller and Hessler, 1977]).

Distribution.—Nannoniscoides angulatus: North Atlantic Ocean, north of the Faroes, 1284 m (Hansen, 1916); northernmost part of the Kara Sea, 698 m (Gurbunov, 1946); Jørgen Brønlund Fjord, Greenland, 160–180 m (Just, 1970). *Nannoniscoides excavatifrons:* northwest Pacific Ocean, in the Kurile-Kamchatka area, 1440–1540 m (Birstein, 1970). *Nannoniscoides latediffusus:* northwest Atlantic Ocean, equatorial southwest Atlantic Ocean, 587–4833 m (Siebenaller and Hessler, 1977). *Nannoniscoides biscutatus:* equatorial southwest Atlantic Ocean, 3459–3783 m (Siebenaller and Hessler, 1977). *Nannoniscoides coronarius:* equatorial southwest Atlantic Ocean, 1493 m (Siebenaller and Hessler, 1977). *Nannoniscoides gigas:* South Atlantic Ocean, Argentine Basin, 3909–3917 m (Siebenaller and Hessler, 1977). Undescribed material: South Atlantic Ocean, Argentine Basin, 2707 m.

Hebefustis Siebenaller and Hessler, 1977
Figure 14

Synonymy.—Nannoniscus (part), *Nannoniscoides* (part) (Siebenaller and Hessler, 1977).

Diagnosis.—First antenna 5-segmented, distal segment elongate and somewhat inflated; segment 4 lacks a lateral projection. Pleon with posterolateral spines. Operculum (♀ pleopod II) ovoid to pear-shaped; distal margin straight, without calcareous fringing margin. Pereopod I of medium robustness; ventral surface of carpus and propodus with robust setae. Cephalon with rounded lappets. Male pleopods I widest proximally; sides convex proximally, concave to straight distally. Pereonites 6 and 7 fused medially. Body depressed; length about 3.8 tergal width of pereonite 2.

Type-species.—Hebefustis vafer Siebenaller and Hessler, 1977.

Remarks.—Siebenaller and Hessler (1977) list the species and distinguishing specific characteristics of this genus.

Distribution.—Hebefustis alleni: Bay of Biscay and northeast Atlantic Ocean, 1623–1796 m (Siebenaller and Hessler, 1977). *Hebefustis cornutus:* northwest Atlantic Ocean, 3753–3806 m (Siebenaller and Hessler, 1977). *Hebefustis hexadentium:* Argentine Basin, South Atlantic Ocean, 5208–5223 m (Siebenaller and Hessler, 1977). *Hebefustis dispar:* southeast Atlantic Ocean, 1427–1643 m (Siebenaller and Hessler, 1977). *Hebefustis hirsutus:* South Atlantic Ocean, 5024 m (Menzies, 1962). *Hebefustis mol-*

licellus: equatorial South Atlantic Ocean, 943–1007 m (Siebenaller and Hessler, 1977). *Hebefustis par:* northeast, equatorial, and South Atlantic Ocean, 3459–4435 m (Siebenaller and Hessler, 1977). *Hebefustis primitivus:* Caribbean Sea, North Atlantic Ocean, 2868–2875 m (Menzies, 1962). *Hebefustis robustus:* northwest Pacific Ocean, 5461–5690 m (Birstein, 1963). *Hebefustis vafer:* equatorial southwest Atlantic Ocean, 587 m.

Nannonisconus Schultz, 1966
Figure 15

Diagnosis.—Pereonite 7 fused medially with pleon. Pleon at widest point wider than cephalon or pereon. Lateral outline of body concave. First antenna 5-segmented, with bulbous distal article.

Type-species.—*Nannonisconus latipleonus* Schultz, 1966.

Remarks.—Only 1 species of this genus has been reported in the literature. (However, *see Nannoniscus intermedius,* new species.)

Distribution.—Southern California Continental Borderland (Redondo Canyon), 465 m.

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