Isopod Crustacea (exclusive of Epicaridea)

ISSN-0085-0683

MEMOIRS OF THE HOURGLASS CRUISES

Published by
Florida Department of Natural Resources
Marine Research Laboratory
St. Petersburg, Florida 33701

VOLUME VI APRIL 1983 PART I

ISOPOD CRUSTACEA
(Exclusive of Epicaridea)

By

ROBERT J. MENZIES[1] and WILLIAM L. KRUCZYNSKI[2]

ABSTRACT

Thirty-two species in 26 genera of marine isopod crustaceans (excluding Epicaridea) were captured in a 28-month sampling program at ten stations (6 to 73 m) along two transects on the central west Florida shelf. Two new species in new genera [*Tropedotea lyonsi* (Idotheidae), *Edwinjoycea horologium* (Arcturidae)] are described, as are eight new species in previously known genera [*Arcturella spinata* and *Arcturella bispinata* (Arcturidae), *Gnathia floridensis* (Gnathiidae), *Mesanthura floridensis* and *Skuphonura lindae* (Anthuridae), *Paranthura floridensis* (Paranthuridae), *Lironeca tropicalis* (Cymothoidae), *Carpias floridensis* (Janiridae)]. High incidence of new taxa reflects little previous study of Gulf of Mexico and Caribbean shelf isopods. Previously known species were predominantly of West Indian Faunal Province affinity, but several temperate and a few boreal species were present. Coincidence of species from three west Florida estuaries with Hourglass shelf species ranged from 18 to 41 percent; only 25 percent of the shelf species have been reported from any west Florida estuary. Fourteen species comprised 92 percent of all specimens. Habitat partitioning by depth, apparent for many species, was probably related to substrate and associated organisms. Checklists and analytical keys are provided for all marine isopod species (except Epicaridea) known previously or expected to occur in the Gulf of Mexico and Caribbean Sea from depths less than 600 m.

[1]Department of Oceanography, Florida State University, Tallahassee, Florida 32306. Deceased.
[2]College of Science and Technology, Florida A & M University, Tallahassee, Florida 32307. Present address: U.S. Environmental Protection Agency, Region IV, 345 Courtland Street, Atlanta, GA 30365.

This public document was promulgated at an annual cost of $9707 or $ 9.71 per copy to provide the scientific data necessary to preserve, manage, and protect Florida's marine resources and to increase public awareness of the detailed information needed to wisely govern our marine environment.

INTRODUCTION

Isopod crustaceans are important members of marine food chains and can be indicators of specialized environmental regimes. To date, Richardson's (1905) monograph is the only major original work that discusses systematics of isopods of the United States. Also, a useful handbook of the group was prepared by Schultz (1969).

Our report is based on a series of 28 monthly samples from the cruises of the R/V *Hernan Cortez*, called the Hourglass Cruises because of the sampling pattern (Figure 1), having a northern transect off Tampa Bay and a southern transect off Fort Myers, Florida. These collections included 1026 isopod specimens, representing 26 genera and 32 species. Of these, two genera and ten species are described as new to science. Epicaridea, also present in the material, are not treated herein but will be the subject of a separate report. Briggs (1974) stated that the fauna of the Gulf of Mexico is rich but that the Gulf is the most poorly studied area in the United States. That so many new genera and species were found in this study is therefore not surprising. The Hourglass collections were from the inner and outer shelf off central Florida in a subtropical environment, and isopods of this area had not previously been studied by other investigators.

ACKNOWLEDGMENTS

We thank the Florida Department of Natural Resources Marine Research Laboratory for organizing and implementing the arduous sampling program of the Hourglass Cruises. Special thanks are due to Edwin A. Joyce, Jr., who made this collection available to us for study. William G. Lyons and David K. Camp made considerable editorial corrections and kindly provided valuable references and suggestions; we thank them for this assistance. Ms. Linda House first sorted this material and provided tentative identifications which saved us much time in the initial phases of our study. Dr. T. E. Bowman, National Museum of Natural History (USNM), Washington, D.C., provided valuable discussion of a difficult nomenclatorial problem and made many helpful suggestions during his review of the manuscript. Dr. Brian Kensley, also USNM, made suggestions regarding that portion of the manuscript treating Anthuridea.

METHODS AND MATERIALS

The Hourglass Cruises were conducted off the west coast of Florida between Tampa Bay and Sanibel Island from August 1965 through November 1967. Thirty min trawl and 15 min dredge samples were made at each station along two east-west transects (Figure 1). Locations, depths and temperatures of these stations are given in Table 1. Complete descriptions of stations, sampling gear, methods and hydrographic data were presented by Joyce and Williams (1969).

Isopods were examined under a stereomicroscope, dissected, and identified. Illustrations were made using a Leitz microprojection prism. These were verified and corrected under higher magnification.

Each species diagnosis is preceded by familial and generic diagnoses; taken together, these constitute a reasonably complete description of each species. Accordingly, species diagnoses are brief and refer to characteristics separating a given species from others belonging to the same genus. New species diagnoses are followed by supplementary descriptions.

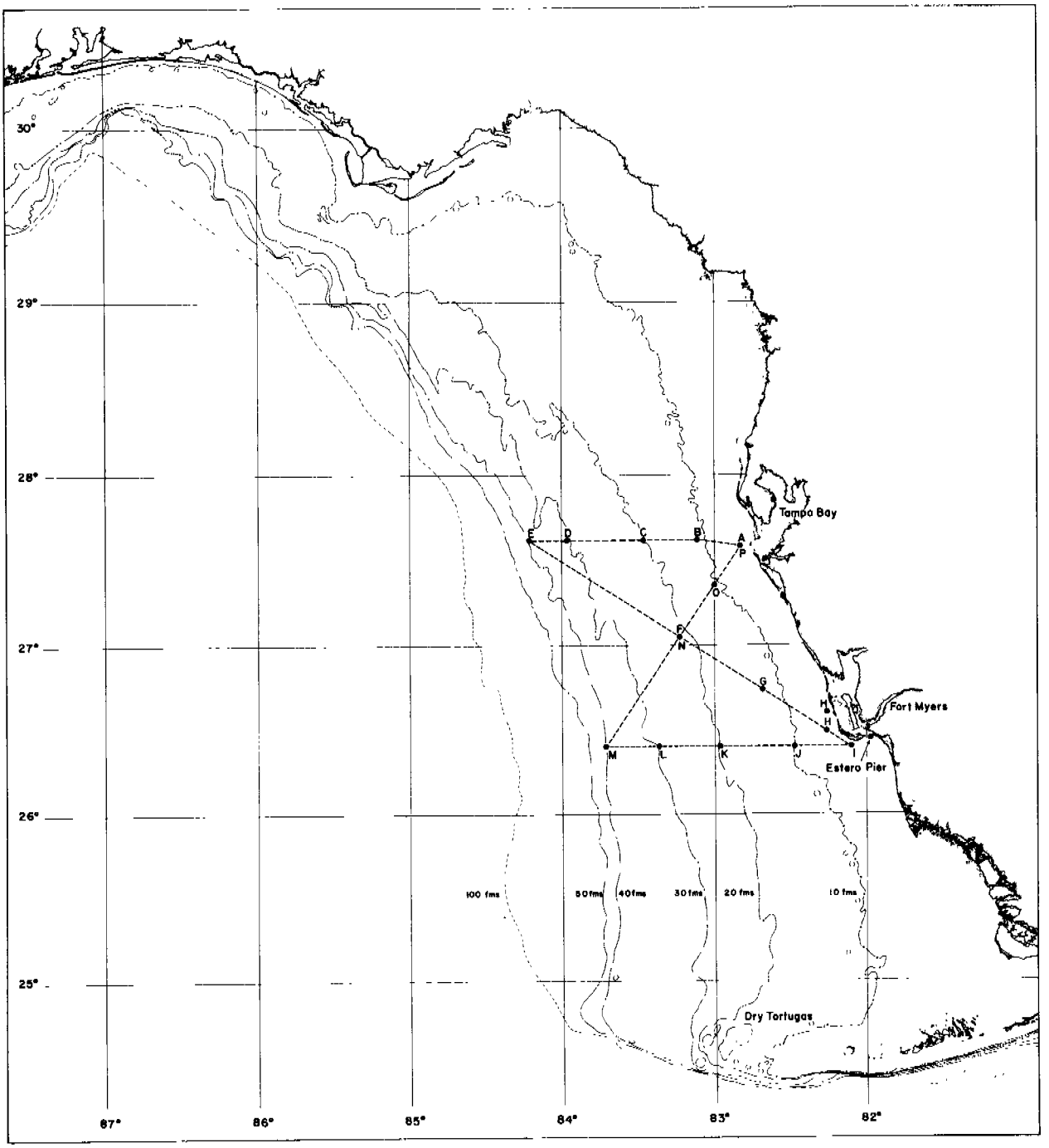

Figure 1. Hourglass cruise pattern and station locations.

TABLE 1. HOURGLASS STATION DATA.

Station	Latitude*	Longitude*	Depth (meters)	Approximate nautical miles offshore	Bottom temperature range (°C)
A	27°35'N	82°50'W	6.1	4, due W of Egmont Key	11.3 (Feb) - 31.5 (Jul)
B	27°37'N	83°07'W	18.3	19, due W of Egmont Key	13.9 (Feb) - 30.0 (summer)
C	27°37'N	83°28'W	36.6	38, due W of Egmont Key	15.85 (Feb) - 25.8 (Aug)
D	27°37'N	83°58'W	54.9	65, due W of Egmont Key	16.8 (Feb) - 24.5 (fall)
E	27°37'N	84°13'W	73.2	78, due W of Egmont Key	17.5 (Apr) - 26.0 (Oct)
I	26°24'N	82°06'W	6.1	4, due W of Sanibel Light	15.5 (Feb) - 31.0 (summer)
J	26°24'N	82°28'W	18.3	24, due W of Sanibel Light	16.4 (Feb) - 30.0 (Aug)
K	26°24'N	82°58'W	36.6	51, due W of Sanibel Light	18.0 (Mar) - 27.96 (Nov)
L	26°24'N	83°22'W	54.9	73, due W of Sanibel Light	18.5 (Jun) - 26.0 (Nov)
M	26°24'N	83°43'W	73.2	92, due W of Sanibel Light	17.2 (Aug) - 25.6 (Nov)

*U. S. Coast and Geodetic Chart No. 1003, dated June, 1966

A typical marine isopod, as exemplified by the genus *Cirolana*, is shown in Figure 2, which illustrates dorsal and lateral views of the whole animal and a ventral view of the head or cephalon with parts projected laterally and below. The isopod body is divided into three major parts: cephalon (head), pereon (*auct.* peraeon or pereion) or thorax, and pleon (abdomen). The parts and their appendages follow:

CEPHALON - From front to rear in ventral aspect one encounters the following appendages:
First antenna - Consisting of a peduncle and a flagellum.
Second antenna - Consisting of a penduncle and a flagellum. The penduncle may or may not bear an antennal scale (not shown).
Frontal lamina - Usually situated between the antennal peduncles.
Clypeus - An ovate structure between the frontal lamina and upper lip.
Mandible - With an incisor often bearing teeth, usually a triarticulate palp, a lacinia mobilis on the left or both mandibles, and a molar process of variable size, shape, and function.
First maxilla - With an inner and outer plate.
Second maxilla - With a bilobed outer plate and a single-lobed inner plate.
Maxilliped - With a palp and an endite as well as an outer lobe. Based on isopod embryology, it is known that the maxilliped is derived from the leg of the embryonal first pereonal somite. We are considering it a head appendage here.

PEREON - The pereon consists of seven somites (pereonites) numbered somite I to VII consecutively. Generally, each pereonite bears a pair of legs or pereopods. Some authorities identify the first free pereonal somite of the adult as somite II because the maxilliped is derived from the embryonal first somite. This we do not do. The Gnathiidea have only five free pereonal somites. This is an exception and characterizes the Gnathiidea as a distinctive tribe or suborder.
Pereopods - Pereopods are numbered from 1 to 7 in order. Each pereopod has seven articles; these are numbered as they exit from the body from 1 to 7 instead of designating each article with a name, such as coxa (1), basis (2), ischium (3), etc.

PLEON - The pleon of most isopods consists of six somites. The first five pleonites bear a pair of biramous pleopods ventrally. The sixth somite is fused with the telson, is called the pleotelson, and bears the uropods.
Pleopods - Pleopods are biramous and are numbered 1 to 5. In adult males, the inner ramus of

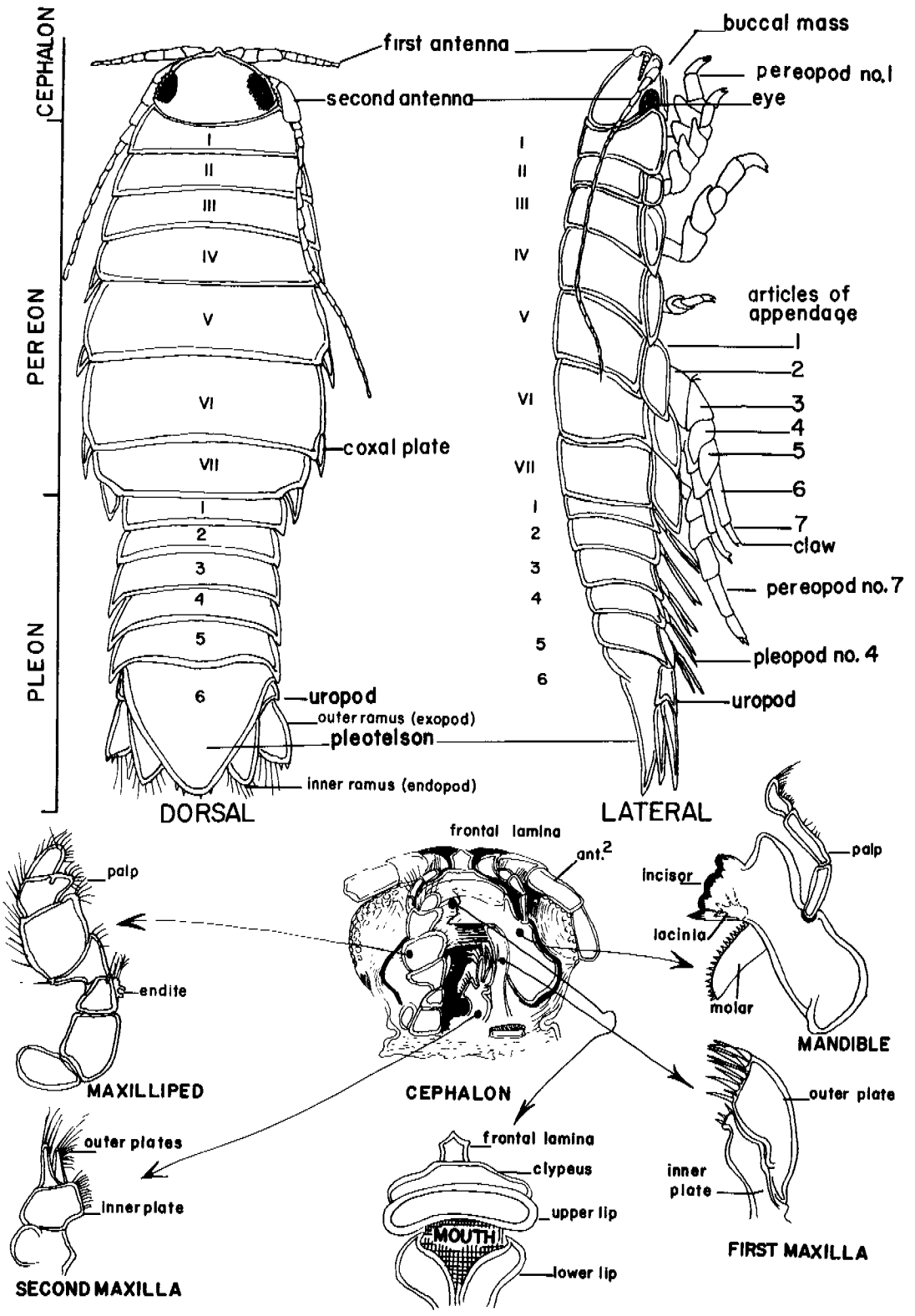

Figure 2. External anatomy of a typical marine isopod.

pleopod 2 bears an appendix masculinum that presumably assists in the transfer of sperm to the female.
Pleotelson - Most isopods have a distinct pleotelson composed of the anus-bearing telson and the sixth pleonite as a fused single piece. Uropods are uniramous or biramous and are lateral, dorsal, ventral, or terminal in position depending on the group of isopods.

Holotypes of all new species and representatives of other Hourglass isopods are deposited in the Division of Crustacea, National Museum of Natural History (USNM), Washington, D.C. Remaining materials are contained in the Invertebrate Reference Collection (FSBC I) of the Florida Department of Natural Resources Marine Research Laboratory, St. Petersburg, Florida.

SYSTEMATICS

No unified treatment of isopod species from the Gulf of Mexico has been published. Reference to individual papers describing new species from the Gulf and Caribbean are included in literature cited. Lists of shallow-water bay and estuarine species have appeared periodically. Examples of these are found in the works of Tabb and Manning (1961), Rouse (1969), Lyons et al. (1971), Menzel (1971) and Collard and D'Asaro (1973). Without verification and examination of their specimens, one can only presume that names found in these lists are correct, but this is certainly not always the case. Although inshore species are included in accompanying lists and keys, only species from Hourglass collections are described or diagnosed herein. The considerable difference between the nearshore isopod fauna and that of the shelf prompts us to caution the reader against using this report as a general guide to west Florida isopods.

Each species known by us to have been reported from the Gulf of Mexico and Caribbean is included in the lists and keys in this report. We have also included species from the Atlantic Carolinian Province but have excluded cases of obvious misidentification. Keys and lists also include "expected species", i.e., those that may be expected to be found in the Gulf of Mexico whenever the requisite collections are made. Deep-sea species, those from depths in excess of 600 m, and planktonic species have been excluded from our lists, and may be found in Menzies (1962a) and the compilation by Schultz (1969). Whether all of these species will ultimately be found in the Gulf of Mexico is subject to speculation. Surely the Caribbean species may well be found in southern Florida and Yucatan; Atlantic Carolinian species are most likely to occur between Texas and north Florida.

We have followed Kaestner (1970) in spellings of isopod suborders and have used the ending -idea, since -oidea is recommended for superfamilies in zoology by the International Code of Zoological Nomenclature. Each suborder of marine isopods represented in the collections is briefly characterized. Depending on the authority, suborders of the Isopoda are different and doubtless will undergo changes in the future as the composition of each becomes better known. Generally we have followed Menzies and Glynn (1968) in our presentation.

Three suborders of marine isopods not represented in Hourglass collections are known from Florida or the Caribbean. At least three species of intertidal, interstitial Microcerberidea have been noted from Bimini, Bahamas (Schultz, 1969); members of this suborder may be expected to be found in at least the more tropical intertidal sands of the Gulf of Mexico. Likewise, three species of supratidal *Ligia* (= *Ligyda*), suborder Oniscidea, have been reported from along the Florida west coast and other nearby localities (Richardson, 1905). Species of Epicaridea,

primarily Bopyridae, are numerous (Markham, 1974). The several species collected during the Hourglass Cruises will be treated in another report.

It is possible to use characteristics in the keys to reconstruct a general description of a species by working backwards, couplet by couplet, and readers are encouraged to do so when they wish a generalized idea of a species. It is believed that the illustrations are sufficient to make this an unnecessary exercise for Hourglass species, but it would be useful for other species in the keys.

All species from the Hourglass collections are illustrated. In the case of previously known species, brief diagnoses and references in synonymies to extant descriptions and additional illustrations are provided. Complete descriptions are provided for all new species. Diagnostic features of the two monotypic new genera defined herein also characterize their accompanying new species, and, together with the species descriptions, provide a more complete characterization of those species.

A KEY TO SUBORDERS OF MARINE ISOPOD CRUSTACEA

1. Body of female slightly to greatly asymmetrical; both pairs of antennae rudimentary; parasitic on Crustacea ..... EPICARIDEA
1. Body bilaterally symmetrical; both pairs of antennae not rudimentary; free living, commensal or parasitic; if parasitic, not on Crustacea 2
2. With five pairs of walking legs ..... GNATHIIDEA (p. 20)
2. With six or seven pairs of walking legs 3
3. Uropods inflexed under pleotelson, thus covering pleopods as operculum ..... VALVIFERA (p. 8)
3. Uropods terminal, lateral, or rarely similar to pleopods but not serving as operculum 4
4. Uropods lateral 5
4. Uropods terminal 6
5. Body tubular, six to eight times as long as wide ..... ANTHURIDEA (p. 25)
5. Body flattened, less than six times as long as wide ..... FLABELLIFERA (p. 38)
6. Pleopods specialized for air breathing with air cavities and tracheae; terrestrial or amphibious ..... ONISCIDEA
6. Pleopods not specialized for air breathing; aquatic 7
7. Minute, body length less than 2 mm; body elongate, about seven times longer than wide; interstitial ..... MICROCERBERIDEA
7. Body length usually greater than 2 mm; body usually less than seven times longer than wide ..... ASELLOTA (p. 91)

TABLE 2. VALVIFERANS PREVIOUSLY KNOWN OR EXPECTED TO OCCUR IN THE GULF OF MEXICO OR CARIBBEAN.

1. *Arcturus floridanus* Richardson, 1900
2. *"Astacilla" cymodocea* Menzies and Glynn, 1968
3. *Astacilla lauffi* Menzies and Frankenberg, 1966
4. *Astacilla lasallae* Paul and Menzies, 1971
5. *Cleantis planicauda* Benedict in Richardson, 1899
6. *Chiridotea coeca* (Say, 1818)
7. *Chiridotea stenops* Menzies and Frankenberg, 1966 (= *Chiridotea arenicola* ? Wigley, 1960)
8. *Chiridotea excavata* Harper, 1974
9. *Erichsonella attenuata* (Harger, 1873)
10. *Erichsonella filiformis filiformis* (Say, 1818)
11. *Erichsonella filiformis isabelensis* Menzies, 1951
12. *Erichsonella filiformis tropicalis* Menzies and Glynn, 1968
13. *Erichsonella floridana* Benedict in Richardson, 1901
14. *Edotea triloba* (Say, 1818)
15. *Idotea metallica* Bosc, 1802
16. *Thermoarcturus venezuelensis* Paul and Menzies, 1971

ORDER ISOPODA
Suborder Valvifera

Diagnosis: Isopoda having uropods inflexed under pleotelson to form operculum covering pleopods from view. All apparently lack mandibular palp.

Remarks: Formerly, valviferans were considered to live mainly in polar and boreal regions; however, recent studies have shown that the tropics also contain a sizable assemblage. Sixteen valviferan species and subspecies were previously known or expected to occur in the Gulf of Mexico and Caribbean (Table 2). None of the expected species were found in Hourglass collections, but two new genera and four new species were found. Two families of Valvifera were represented, the Idotheidae and the Arcturidae. The expected number has been increased over three times from the listing given by Menzies and Glynn (1968).

Examination of the description and illustrations of *Astacilla cymodocea* Menzies and Glynn, 1968 indicates that this species does not belong to *Astacilla* and is probably a member of an undescribed genus.

The species *Chiridotea stenops* Menzies and Frankenberg, 1966 is believed by Watling and Maurer (1975) to be a juvenile of *Chiridotea arenicola* Wigley, 1960. This may or may not be the case; the argument for this is based on a comparison of dead specimens of differing size. A more definitive conclusion can be reached when the animals are grown or cultured to maturity with moults used to prove the changes that are implied.

A KEY TO GULF AND CARIBBEAN VALVIFERA

1. All seven pereopods subsimilar, first pair usually subchelate, others adapted for clinging, grasping or walking (Idotheidae) 2

1. First four pereopods directed towards mouth, functioning as mouth parts; last three pairs clinging types (Arcturidae) 13

2. Maxillipedal palp with five articles ..... *Cleantis planicauda* Benedict in Richardson

2. Maxillipedal palp with three or four articles 3

3. Maxillipedal palp with three articles 4

3. Maxillipedal palp with four articles 8

4. Flagellum of antenna 2 multiarticulate 5

4. Flagellum of antenna 2 a single article 7

5. Lateral margins of cephalon with a deep incision, body densely pigmented ..... *Chiridotea coeca* (Say)

5. Lateral margins of cephalon scarcely incised, body with little pigment 6

6. Sixth article of pereopod 1 with six two-pointed setae along inferior margin ..... *Chiridotea excavata* Harper

6. Sixth article of pereopod 1 with two two-pointed setae along inferior margin ..... *Chiridotea stenops* Menzies and Frankenberg (possibly the young of *C. arenicola* Wigley)

7. No coxal plates visible in dorsal view ..... *Edotea triloba* (Say)

7. Three coxal plates visible in dorsal view on pereonites V, VI and VII ..... *Tropedotea lyonsi*, n. gen. and n. sp.

8. Flagellum of antenna 2 multiarticulate, with more than six articles ..... *Idotea metallica* Bosc

8. Flagellum of antenna 2 clavate, consisting of fused articles 9

9. Pereonites I-IV each with a spine near lateral margin as well as a dorsal spine on each somite ..... *Erichsonella floridana* Benedict in Richardson

9. Pereonites I-IV with or without a middorsal tubercle, lateral spines absent 10

10. Frontal lamina narrow, pointed ..... *Erichsonella attenuata* (Harger)

10. Frontal lamina widely bifurcate 11

11. Pereonites I-IV without middorsal tubercle .... *Erichsonella filiformis isabelensis* Menzies

11. Pereonites I-IV with middorsal tubercle 12

12. Middorsal tubercles large, spine-like .... *Erichsonella filiformis tropicalis* Menzies and Glynn

12. Middorsal tubercles minute ..... *Erichsonella filiformis filiformis* (Say)

13. First pereonal somite free, not coalesced with cephalon ..... *Thermoarcturus venezuelensis* Paul and Menzies

13. First pereonal somite fused dorsally with cephalon 14

14. Flagellum of antenna 2 with five articles ..... *Arcturus floridanus* Richardson

14. Flagellum of antenna 2 with three or fewer articles 15

15. Flagellum of antenna 2 with two articles, last cup-shaped, with a margin of spines ..... *Edwinjoycea horologium*, n. gen. and n. sp.

15. Flagellum of antenna 2 with two or three articles and a terminal claw 16

16. Pleon with two distinct somites in front of pleotelson, sutures of a third somite laterally 17

16. Pleon with one, two, or no distinct somites in front of pleotelson, without third somite indicated laterally 18

17. Eyes red; flagellum of antenna 2 uniarticulate inclusive of claw ..... *Arcturella spinata*, n. sp.

17. Eyes black; flagellum of antenna 2 biarticulate inclusive of claw ..... *Arcturella bispinata*, n. sp.

18. Pleon entire, with lateral incisions of one anterior somite .... *"Astacilla" cymodocea* Menzies and Glynn

18. Pleon with one or two somites anterior to pleotelson 19

19. One somite anterior to pleotelson ..... *Astacilla lauffi* Menzies and Frankenberg

19. Two somites anterior to pleotelson ..... *Astacilla lasallae* Paul and Menzies

Family Idotheidae Dana, 1853

Diagnosis: Valviferans having all seven pairs of legs subsimilar, specialized for clinging or grasping. First pereonal somite not coalesced with cephalon. Mandible lacking palp.

Genus *Tropedotea*, new genus

Diagnosis: Superficially resembling *Edotea*. Coxal plates visible in dorsal view on pereonites V, VI, VII. Pleon consisting of two partly fused anterior somites and a spear-shaped pleotelson. Uropods uniramous. Maxilliped with triarticulate palp. Antenna 1 longer than and only slightly stouter than antenna 2, consisting of four articles, last minute; antenna 2 consisting of five articles. Pereopods 1-7 subsimilar, article 5 of each bearing cutting teeth along inner margin; article 4 with two long, two-pointed setae on inferior margin.

Type-species: *Tropedotea lyonsi*, new species.

Composition: Presently monotypic.

Etymology: The generic name *Tropedotea* (feminine) is derived from the Greek *tropikos* meaning tropical, referring to its occurrence off the southwestern coast of Florida, and *Edotea*, a closely related valviferan genus.

Remarks: This genus is closely allied to *Edotea* from which it differs markedly in having coxal plates visible in dorsal view on pereonites V to VII. The coxal plates resemble those of *Ronalea* Menzies and Bowman, 1956, and *Eusymmerus* Richardson, 1899, but the antennae and pleon are distinctive.

Tropedotea lyonsi, new species

Figure 3

Material examined: HOURGLASS STATION J: 1 ♀, 3.8 (HOLOTYPE); 14 November 1967; dredge; USNM 170787. — 1 ♀, unmeasured (PARATYPE); same; FSBC I 18237.

Description: Holotype female, length 3.8 mm, width 1.5 mm. Cephalon twice as wide as long; eyes lateral; frontal lamina bifid, visible in dorsal view. Antenna 1 with four articles, stouter than antenna 2; first, second and third articles subequal in length, fourth minute; antenna 2 with five

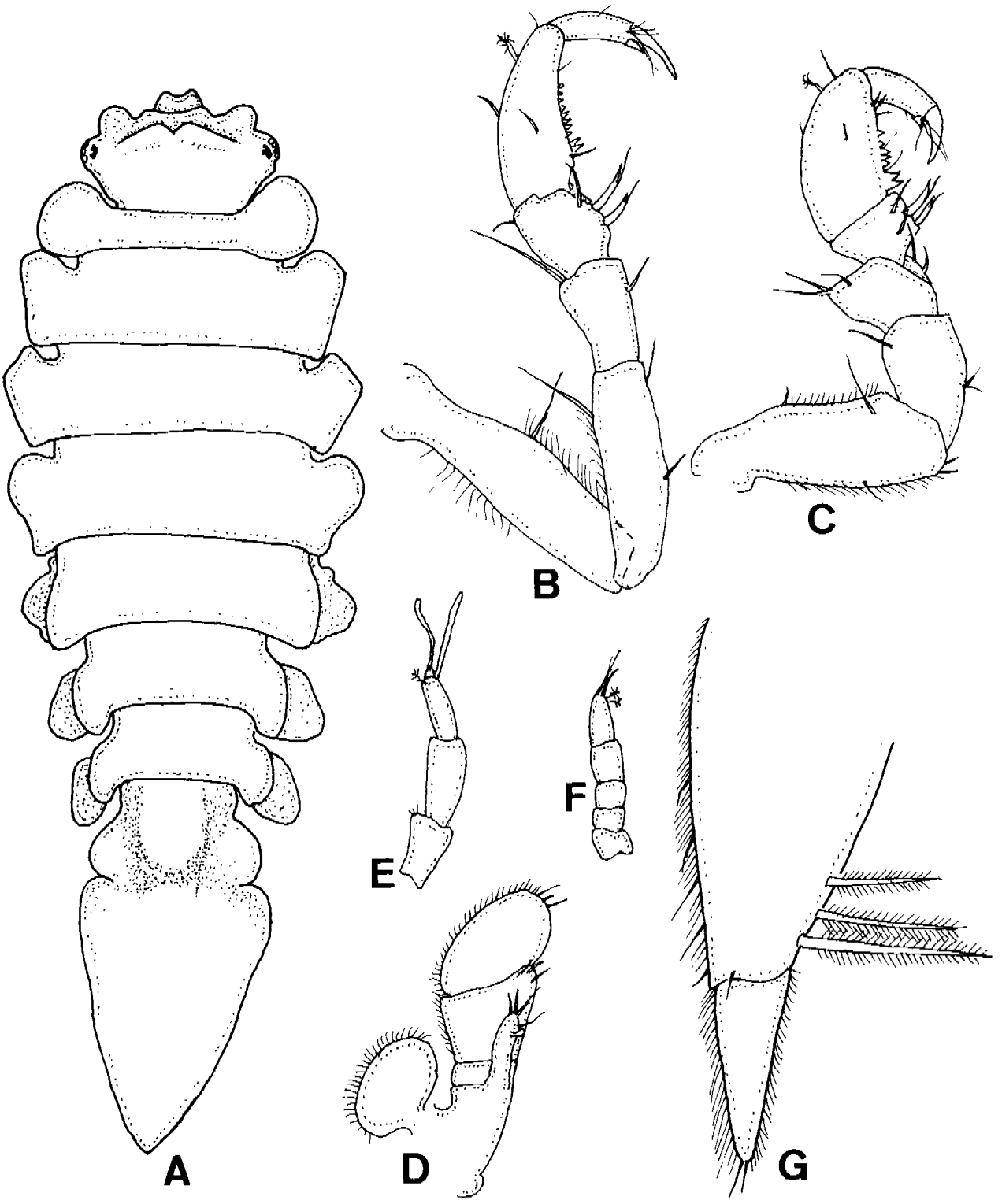

Figure 3. *Tropedotea lyonsi*, n. gen. et n. sp. Holotype female, USNM 170787: length 3.8 mm, width 1.5 mm. A. whole animal; B. pereopod 7; C. pereopod 1; D. maxilliped, inner surface; E. antenna 1; F. antenna 2; G. uropod near apex.

articles, first three subequal in length, fourth twice length of third, subequal to last. Mandible and maxillae 1 and 2 normal for Idotheidae, nondistinctive. Pereonite I half as long as II; II=III=IV in length, IV widest; V, VI and VII successively shorter and narrower. Pleon = length of pereonites IV to VII inclusive, apex pointed. Pereopod 1 with two stout, two-pointed setae on inferior margin of article 4; fifth with eight cutting teeth; sixth with biunguiculate dactyl; pereopods 2-6 similar to pereopod 1, but longer; pereopod 7 with two stout, two-pointed setae on inferior margin of fourth article, row of 10 cutting teeth on inferior margin of fifth article, sixth with biunguiculate dactyl. Pleopods normal for Idotheidae. Uropod uniramous, peduncle with three large plumose setae on outer margin near junction of exopod. Pleon with elevated swollen area medially above first lateral incision, extending to second lateral incision; terminal somite spear-shaped, pointed at apex.

Type-locality: Hourglass Station J, 26°24'N, 82°28'W; 18 m depth; about 24 nmi off Sanibel Island, Florida west coast.

Distribution: Known only from type-locality, Gulf of Mexico, central west Florida shelf, 18 m.

Etymology: The species is named in honor of William G. Lyons, Florida Department of Natural Resources.

Remarks: Neither of the two female specimens was gravid.

Family Arcturidae G. O. Sars, 1897

Diagnosis: Valviferan isopods with first four pereopods directed toward mouth, usually multisetose, distinctly different from last three pairs of pereopods that are of stout and clinging type. Body usually bent between fourth and fifth pereonites. Uropods usually biramous, with minute endopods concealed by inflexed exopods.

Remarks: The Arcturidae may be conveniently divided into two or more groups. One group includes *Arcturus* Latreille, *Antarcturus* zur Strassen, and *Dolichisus* Richardson and has the flagellum of antenna 2 composed of five or more articles. These all have the fourth pereonite not more than two times the length of the third or fifth. Another group consists of animals having the flagellum of antenna 2 with three or fewer articles. These may be further subdivided into two major subgroups: those with a short pereonite IV and those having pereonite IV very much longer than the third or fifth. Those with a short pereonite IV include *Neoarcturus* Barnard, *Pseudarcturella* Tattersall, *Arcturides* Studer, *Thermoarcturus* Paul and Menzies, and *Microarcturus* Nordenstam.

Recently, Kussakin (1972) revised the polar and boreal Arcturidae and attached great importance to the number of claws of pereopod 2 without attention to the length of pereonite IV. We opine that the growth changes required to produce an elongated pereonite IV seem very profound and tend to unite those isopods with a similar pereonite enlargement into one group, more so than one or two claws on the pereopods.

Genus *Arcturella* G. O. Sars, 1899

Diagnosis: First pereonite fused with cephalon. Fourth pereonite more than two times longer than others, in females much wider than others. Pleon with two short anterior somites and elongate,

shield-shaped pleotelson. Uropoda biramous. Flagellum of antenna 2 with one to three articles and terminal claw. Pereopods 2-4 lack terminal claw.

Type-species: *Astacilla dilatata* G. O. Sars, 1882.

Remarks: This genus has not been reported previously from the Gulf of Mexico or Caribbean. Two species were found in Hourglass collections, and both are new to science.

Arcturella spinata, new species

Figure 4

Material examined: HOURGLASS STATION D: 1 ♀; 2 August 1967; trawl; FSBC I 18239. — 1 ♀; 12 September 1967; dredge; FSBC I 18240. — HOURGLASS STATION L: 1 ♀; 7 December 1966; dredge; FSBC I 18238. — 1 ♀; 13 January 1967; trawl; USNM 170789. — 1 ♀, 8.5 mm (HOLOTYPE); 13 January 1967; dredge; USNM 170788. — 1 ♀; 8 August 1967; trawl; USNM 170790. — 1 ♀; 15 November 1967; dredge; FSBC I 18241. — HOURGLASS STATION M: 1 ♀; 8 August 1967; dredge; USNM 170791.

Diagnosis: *Arcturella* with flagellum of antenna 2 of two articles, last being apical claw. Middorsum of cephalon with four stout spines between eyes; eyes red in preserved specimens. Pereonites I-V each with single long spine posteromedially, several small spines laterally. Pereonite IV with middorsal swollen area bearing long stout spine and tuberculations. Pereonites V-VII with rows of small spines dorsolaterally. Pleonites 1 and 2 similarly spinulose. Pleotelson with single middorsal spine on swollen area at level of anterolateral teeth, two posterolateral teeth, and pointed triangular apex.

Supplementary description: Female holotype 8.5 mm long, 2 mm wide, with brood plates; length 4.5 times greatest width. Cephalon globular, as long as wide, with flattened frontal region; eyes separated by two eye lengths. Antenna 1 equalling length of cephalon and composed of four articles; peduncle with prominent dorsal tooth on article one; next two articles subequal in length, followed by flagellum twice as long as peduncle. Antenna 2 equalling length of pereon; last article consisting of single piece followed by claw; second peduncular article bearing stout spine anterolaterally; third twice length of second, half length of fourth. Mandibles and maxillae 1 and 2 normal for family. Maxilliped with pentarticulate palp; third article larger than fourth or fifth; one coupling hook on endite; epipod extending to articulation between second and third articles of palp. Pereon with somite I slightly longer than II; III=II; IV as long as wide, longer than first three plus cephalon posterior to eyes. Somite V half length of IV; VI one-third shorter than IV, twice as long as VII. Pereopod 1 stout, last three articles densely covered with setae, last article with terminal claw. Pereopod 2 slender, long; articles with long setae, dactyl and claw absent. Pereopods 3 and 4 similar to 2. Pereopods 5, 6 and 7 clinging, stout, dactyls biunguiculate. Pleon of two dorsally fused somites and pleotelson. Pleotelson twice combined lengths of pleonites 1 and 2, laterally bearing two projections or teeth; apex triangulate, pointed. Uropods biramous; endopod with three plumose setae.

Type-locality: Hourglass Station L, 26°24'N, 83°22'W; 55 m depth; about 73 nmi off Sanibel Island, Florida west coast.

Distribution: Found at Hourglass Stations D, L and M, 55 to 73 m, central west Florida shelf, Gulf of Mexico.

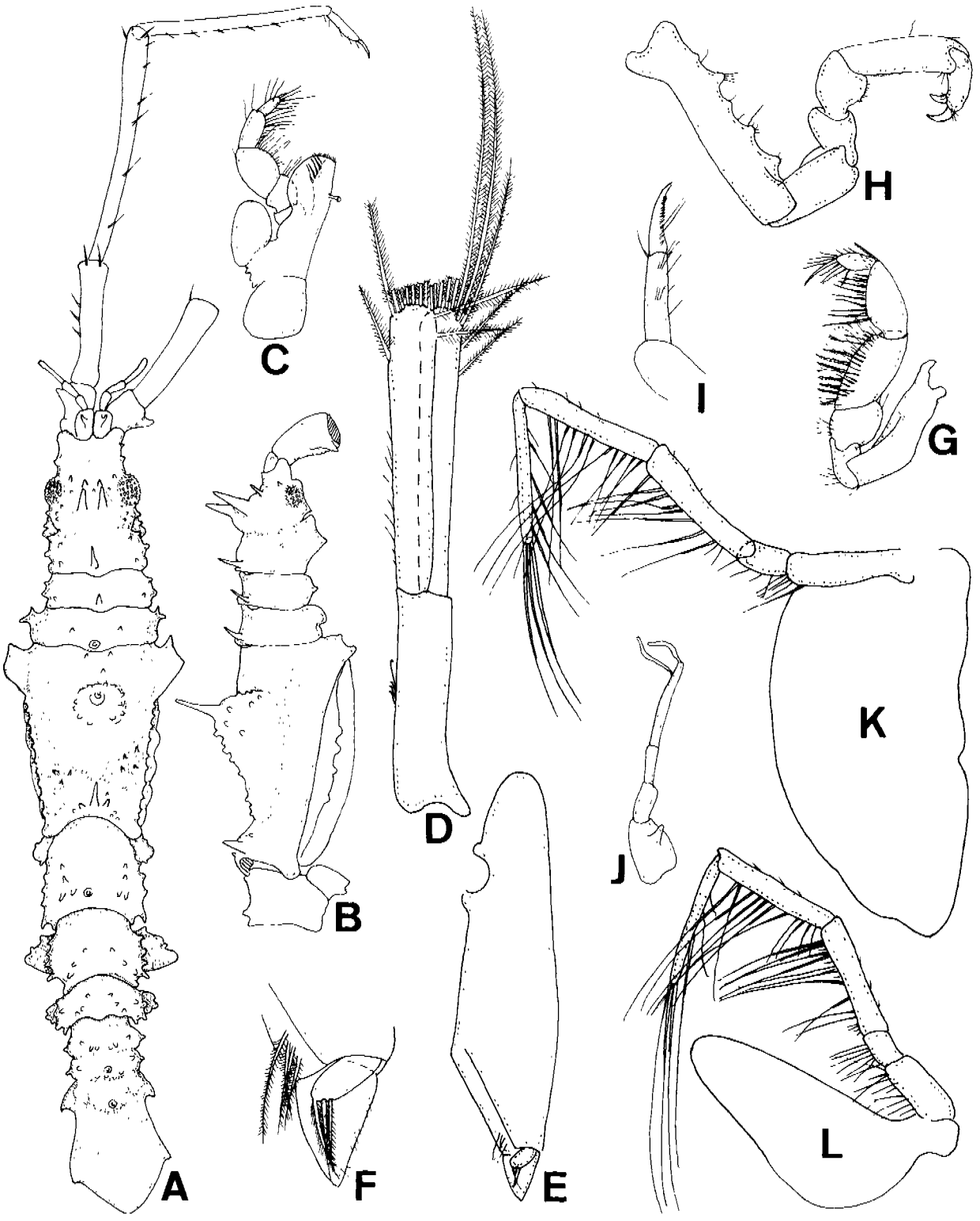

Figure 4. *Arcturella spinata*, n. sp. Holotype female, USNM 170788: length 8.5 mm, width 2.0 mm. A. whole animal; B. lateral view, head to fifth pereonite; C. maxilliped; D. pleopod 1; E. uropod; F. uropodal apex; G. pereopod 1; H. pereopod 5; I. flagellum of antenna 2; J. antenna 1; K. pereopod 2; L. pereopod 3.

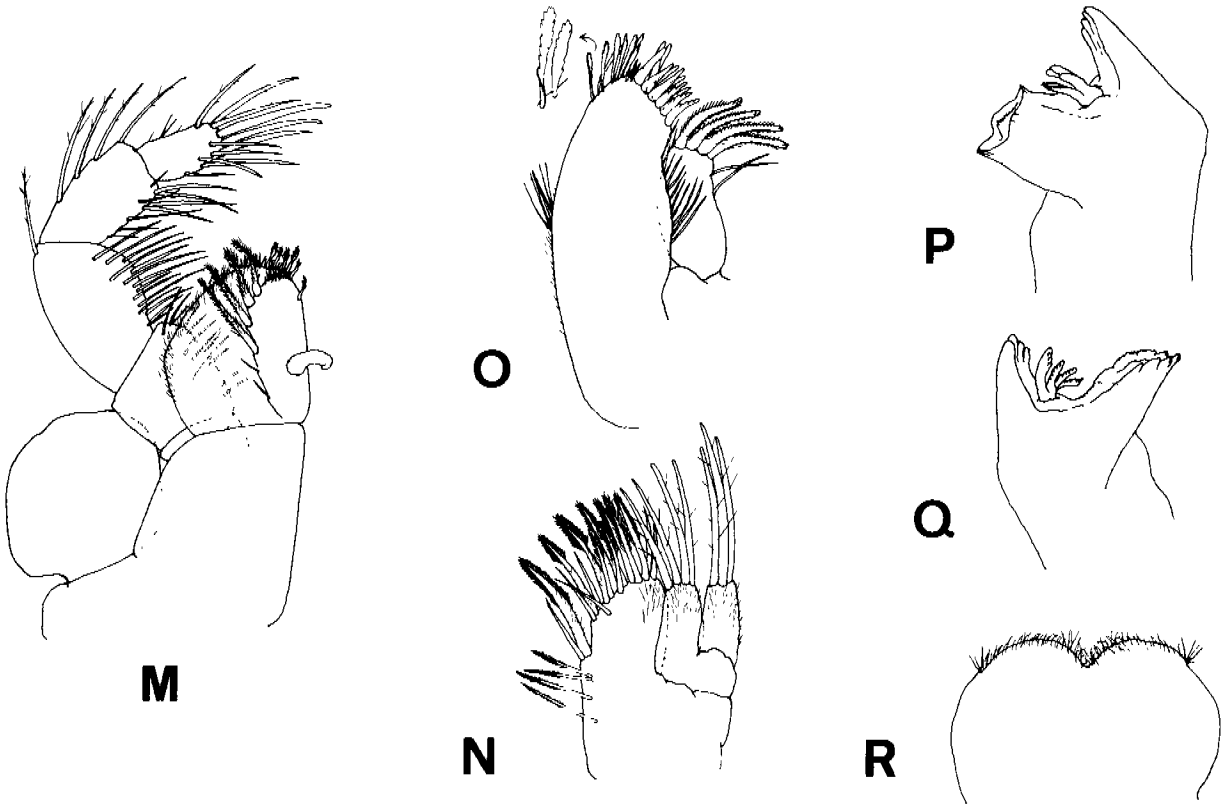

Figure 4 (continued). *Arcturella spinata*, n. sp. Paratype female, FSBC I 18238: M. maxilliped; N. maxilla 2; O. maxilla 1; P. right mandible; Q. left mandible; R. labrum.

Etymology: The specific name *spinata*, an adjective referring to the middorsal spine-like tubercle on pereonites I, II, III and IV, is derived from the Latin *spina*, meaning sharp projection.

Remarks: Three of the eight females were gravid, and one contained twenty developing embryos; they occurred in August and September, 1967. The species was found only at 55 and 73 m depths.

Arcturella bispinata, new species

Figures 5, 6

Material examined: HOURGLASS STATION D: 1 ♀; 21 May 1967; dredge; FSBC I 18243. — 1 ♀; 1 September 1967; dredge; FSBC I 18244. — HOURGLASS STATION E: 1 ♀, 3.5 mm (HOLOTYPE); 2 August 1966; dredge; USNM 170792. — 1 ♂ (ALLOTYPE); 2 December 1966; dredge; USNM 170793. — 6 ♀ (PARATYPES); same; FSBC I 18242. — 1 ♀; 2 August 1967; dredge; USNM 170794. — DATA UNKNOWN: 1 ♀ given erroneous sample number.

Diagnosis: Female holotype with flagellum of antenna 2 of three articles and apical claw; inferior margin of flagellum with many teeth. Middorsum of cephalon with median pair of long spines between eyes; eyes black in preserved specimens. Pereonites I-VII each with pair of spines on dorsum; pereonite IV with swollen central area, densely tuberculate, with pronounced pair of

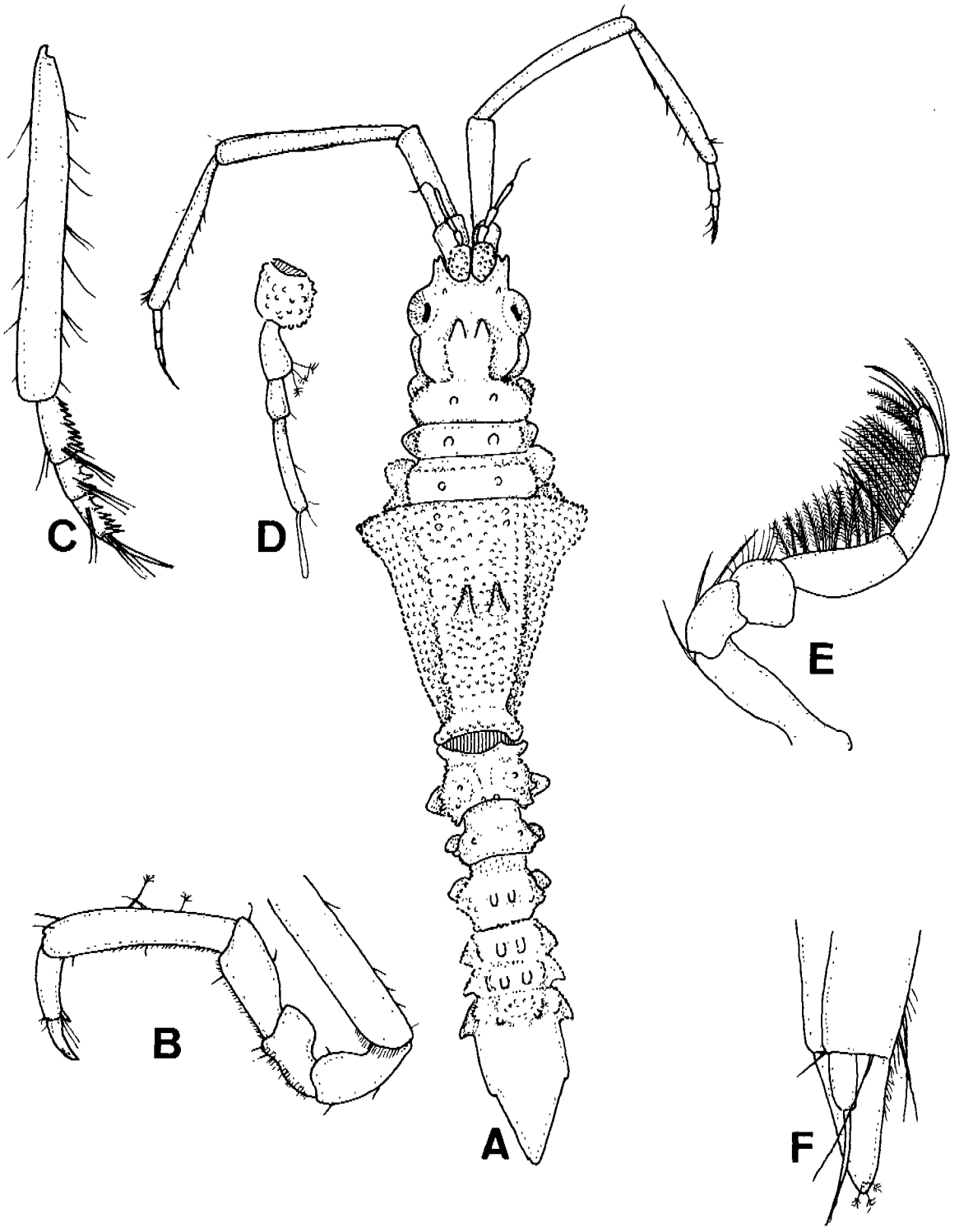

Figure 5. *Arcturella bispinata*, n. sp. Holotype female, USNM 170792: length 3.5 mm, width 0.8 mm. A. whole animal; B. pereopod 7; C. flagellum of antenna 2; D. antenna 1; E. pereopod 1; F. apex of uropod.

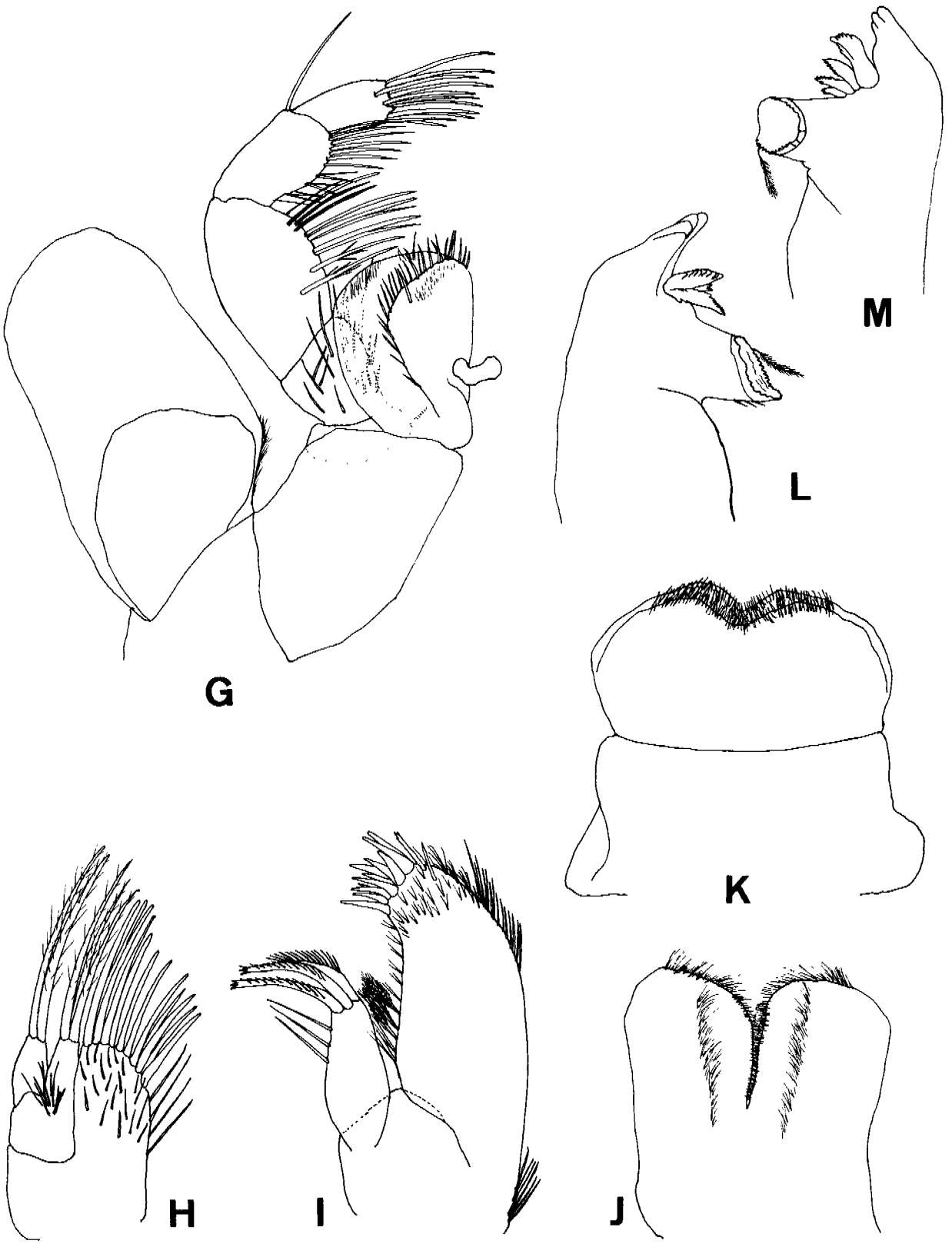

Figure 5 (continued). *Arcturella bispinata*, n. sp. Paratype female, FSBC I 18242: G. maxilliped; H. maxilla 2; I. maxilla 1; J. labium; K. epistome and labrum; L. right mandible; M. left mandible.

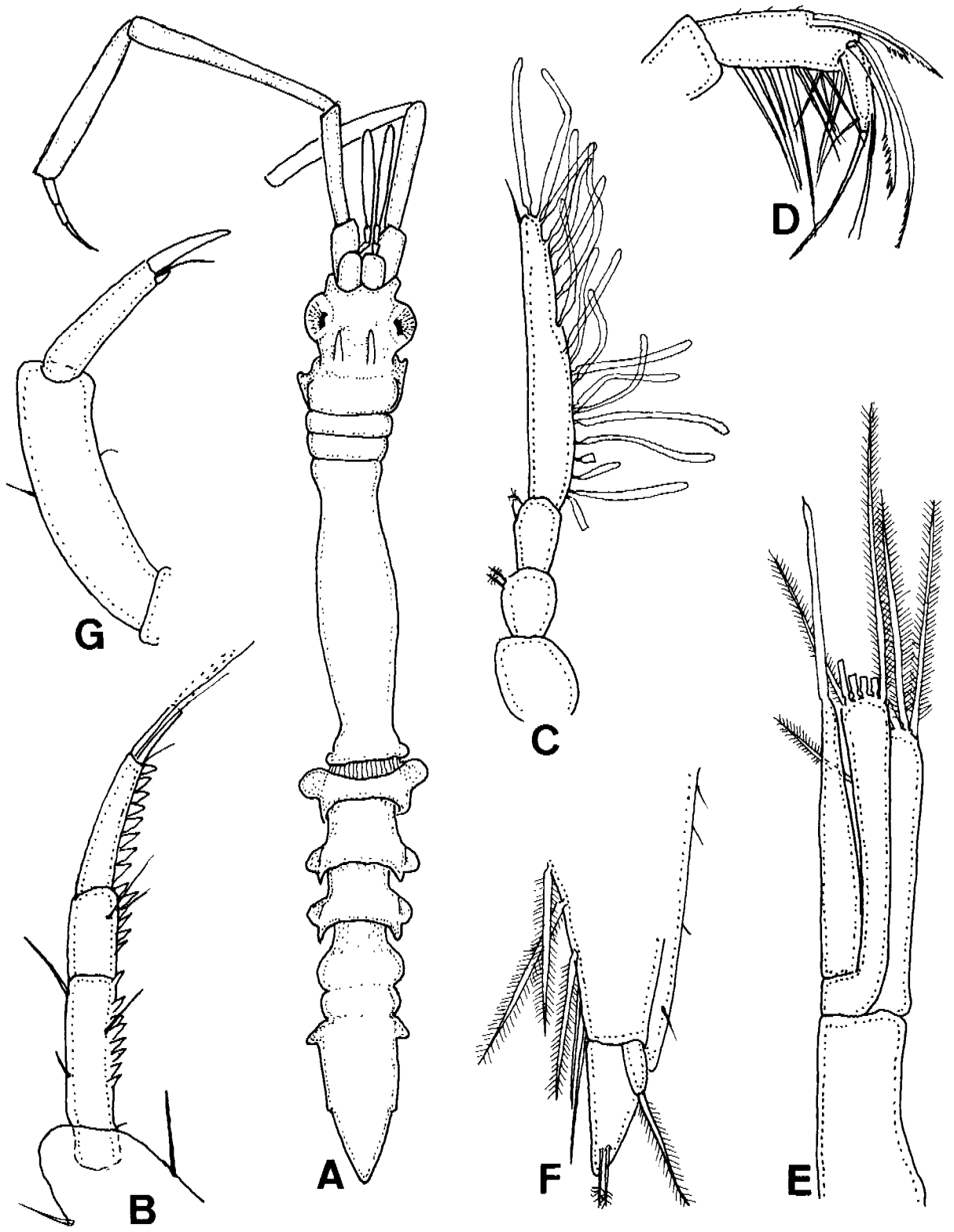

Figure 6. *Arcturella bispinata*, n. sp. Allotype male, USNM 170793: length 4.5 mm, width 0.4 mm. A. whole animal; B. flagellum of antenna 2; C. antenna 1; D. pereopod 1, distal articles; E. pleopod 2; F. uropodal apex; G. pereopod 6, distal articles.

middorsal spines. Pleonites 1 and 2 similarly with pairs of spines dorsally. Pleotelson with pair of spines on swollen area anteriorly; two pairs of lateral teeth, anterior pair larger; apex pointed.

Male (allotype) with two cephalic spines, otherwise devoid of spines on pereonites and pleonites. Pleotelson shape similar in both sexes, as are articles of flagellum of antenna 2 and eye color.

Supplementary description: Female holotype 3.5 mm long, 0.8 mm wide; length about four times greatest width. Pleon one-third body length. Cephalon as long as wide, three times larger than pereonite I. Antenna 1 quadriarticulate, reaching to middle of third peduncular article of antenna 2; first article of peduncle quadrate and tuberculate; second article longer than third, last twice length of third (female) and four times length of third (male). Antenna 2 exceeding length of pereon; flagellum with three articles followed by apical claw; second penduncular article lacking spines. Mandibles and maxillae normal for family. Maxilliped with pentarticulate palp similar to that of *A. spinata*. Pereonites I=II=III in length, each increasing in width posteriorly; pereonite IV widest anteriorly, tapering posteriorly, four times as long as pereonite III; pereonites V-VII subequal in length. Pereopod 1 with apical claw; pereopods 2-4 similar to *A. spinata*; pereopods 5-7 biunguiculate. Uropods biramous; endopod with single apical seta. Stylus of appendix masculinum extending beyond apical margin of endopod of pleopod 2. Sexual differences, unless already noted, as illustrated on Figures 5 and 6.

Type-locality: Hourglass Station E, 27°37'N, 84°13'W; 73 m depth; about 78 nmi off Egmont Key, Florida west coast.

Distribution: Hourglass Stations D and E, 55 to 73 m, central west Florida shelf, Gulf of Mexico.

Etymology: The specific name *bispinata* is an adjective derived from the Latin *spina*, meaning sharp projection, and Latin *bi*, meaning two, and describes the paired sharp, middorsal tubercles on pereonites I, II, III, and IV of females.

Remarks: Six of the 11 females were gravid, each with 5-8 embryos. All gravid specimens were found in August and September. Specimens were encountered only from the northern transect off Tampa Bay at 55 and 73 m depths.

Genus *Edwinjoycea*, new genus

Diagnosis: Cephalon and pereonite I fused. Fourth pereonite more than twice length of and wider than other pereonites. Pereonites I, III, V, VI, and VII subequal in length. Pleon consisting of single somite with no indications of segmentation. Uropods uniramous. Flagellum of antenna 2 biarticulate, last article modified into spoon-shaped structure margined with teeth. Maxillipedal palp quadriarticulate. Pereopod 1 without apical claw; pereopods 5-7 with single short claws and cutting teeth on inferior margins of last articles.

Type-species: *Edwinjoycea horologium*, new species.

Composition: Presently monotypic.

Etymology: The generic name *Edwinjoycea* (masculine) is in honor of Edwin A. Joyce, Jr.,

Director, Division of Marine Resources, Florida Department of Natural Resources, a founding participant and continuing proponent of the Hourglass investigations.

Remarks: The quadriarticulate palp of the maxilliped, uniramous uropoda, and single-jointed pleon make this genus distinctive. The flagellum of antenna 2 is also unique. The type-species of this genus superficially resembles *"Astacilla" cymodocea* Menzies and Glynn from Puerto Rico, but differs in too many aspects to be included in the same genus.

Edwinjoycea horologium, new species

Figure 7

Material examined: HOURGLASS STATION M: 1 ♀, 6 mm (HOLOTYPE); 9 March 1967; dredge; USNM 170795. — 1 ♀ (PARATYPE); 6 July 1967; trawl; FSBC I 18727.

Description: Body about four times longer than wide; widest across anterior of pereonite IV, tapering anteriorly and posteriorly. Cephalon slightly longer than wide, with no dorsal spines or tuberculations. Eyes separated by more than one eye length dorsally, black in preserved specimen. Antenna 1 quadriarticulate, extending slightly beyond second article of antenna 2; basal article longer than combined lengths of next two articles; terminal article longer than articles 2 or 3, with two aesthetascs. Antenna 2 extending to middle of fourth pereonite; flagellum with two articles. Maxillipedal palp quadriarticulate; article 2 longest. Mandibles and maxillae normal for family. Pereon smooth, glabrous, with no tubercles or spines dorsally; coxal plates not visible in dorsal view. First pereonite fused with cephalon, longer than wide; second and third pereonites rectangular, third 1.5 times as wide as second; fourth widened anteriorly, tapering posteriorly to one-third its greatest width, bearing two pairs of lateral projections. Pereonites V-VII quadrate, VII smallest. Pereopod 1 without apical claw but with four apical setae. Pereopod 5 biunguiculate, inferior claw minute; inferior margin of article 7 with cutting teeth. Pleon with all somites coalesced into pleotelson, a pair of projections (uropodal insertions) near middle; apex evenly rounded. Pleopods biramous; endopod and exopod of equal length, each with eight plumose marginal setae. Uropods uniramous.

Type-locality: Hourglass Station M, 26°24'N, 83°43'W; 73 m depth; about 92 nmi off Sanibel Island, Florida west coast.

Distribution: Known only from type-locality.

Etymology: The specific name *horologium*, a noun in apposition, is Latin for hourglass and commemorates the Hourglass Cruises.

Remarks: Setation of the maxillipedal palp differs between the holotype and paratype. The holotype has two setae on articles 2 and 4, and three on article 3 (Figure 7C), whereas the paratype has a single seta on article 2 and two setae on each of articles 3 and 4. However, quadriarticulate palps and single coupling hooks are present on maxillipeds of both specimens.

Suborder Gnathiidea

Diagnosis: Isopoda having first and second pereonal somites united with cephalon, appendages

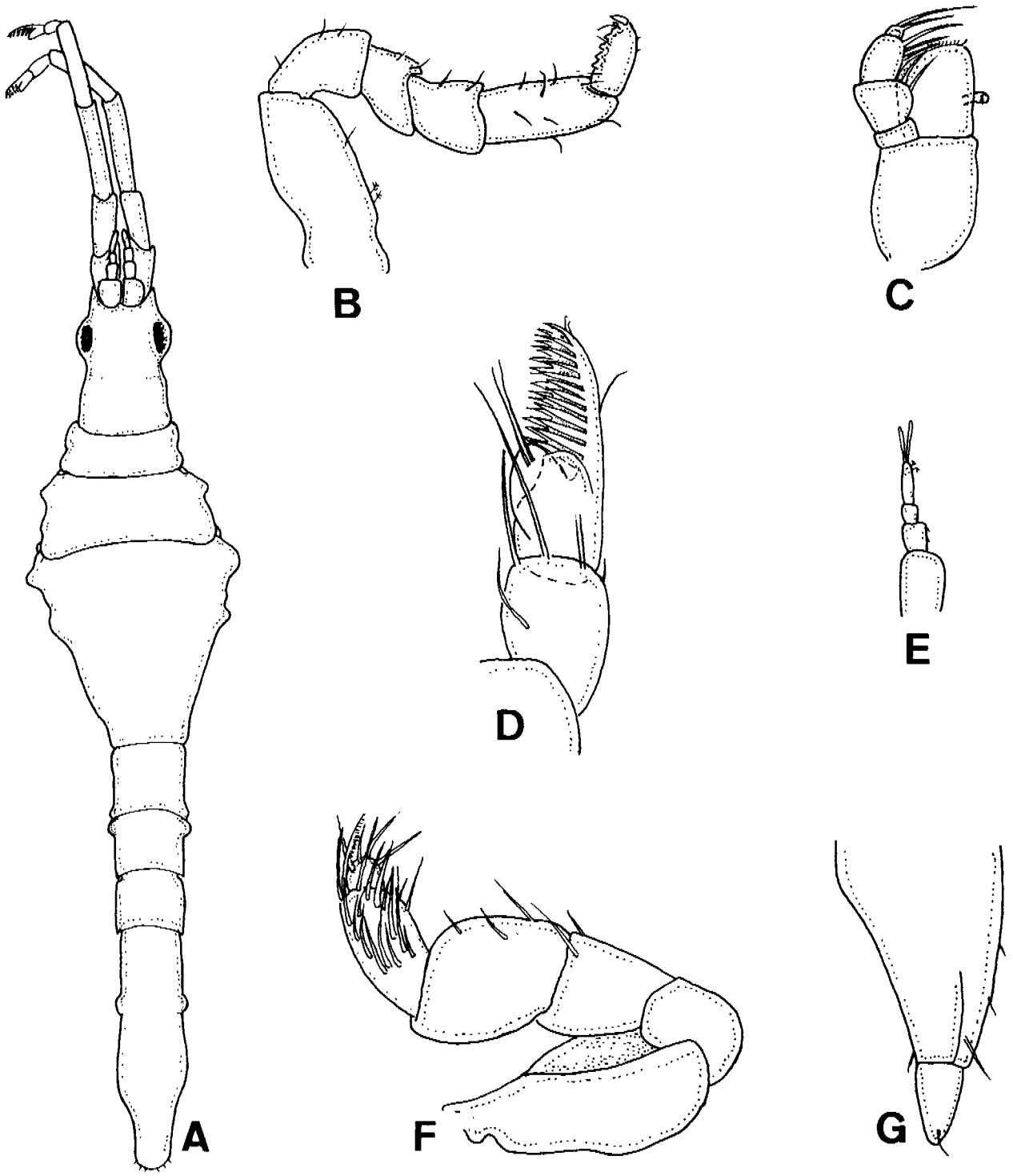

Figure 7. *Edwinjoycea horologium*, n. gen. et n. sp. Holotype female, USNM 170795: length 6.0 mm, width 1.7 mm. A. whole animal; B. pereopod 5; C. maxilliped; D. flagellum of antenna 2; E. antenna 1; F. pereopod 1; G. uropod.

thereto functioning as maxillipeds. Mandibles of male projecting in front of cephalon as pair of pincers. Pereon of five somites, each with pair of subsimilar pereopods. Pleon of five somites and pleotelson. Females with piercing and sucking mouthparts; pereonites III-V fused, functioning as egg sac.

A KEY TO GULF AND CARIBBEAN GNATHIIDEA BASED ON MATURE MALES

1. Frons medially emarginate 2
1. Frons produced or rounded 3
2. Frons with central spine ..... *Gnathia puertoricensis* Menzies and Glynn
2. Frons lacking central spine ..... *Gnathia beethoveni* Paul and Menzies
3. Frons produced, truncate; only pleon hirsute ..... *Gnathia triospathiona* Boone
3. Frons rounded; entire body hirsute ..... *Gnathia floridensis*, n. sp.

Family Gnathiidae Harger, 1880

Diagnosis: Same as for suborder.

Remarks: Richardson (1905) did not record gnathiids from the Gulf of Mexico or the Caribbean. Since then, three (*Gnathia triospathiona* Boone, 1918, *G. puertoricensis* Menzies and Glynn, 1968, and *G. beethoveni* Paul and Menzies, 1971) have been reported from the Caribbean, and we herein add a fourth.

Genus *Gnathia* Leach, 1814

Diagnosis: Gnathiidea with eyes and bi- or triarticulate second maxilliped (= pylopod). Frons without medial projection longer than mandibles (from Menzies and Glynn, 1968: pp. 22, 23).

Type-species: *Gnathia termitoides* Leach, 1814.

Gnathia floridensis, new species

Figure 8

Material examined: HOURGLASS STATION D: 1 ♂, 1.19 mm (HOLOTYPE); 15 March 1967; trawl; USNM 170796. — 1 ♀ (ALLOTYPE); same; USNM 170797. — 4 ♂ (PARATYPES); same; FSBC I 18247. — HOURGLASS STATION L: 1 ♂, 1 ♀; 8 August 1966; dredge; FSBC I 18246. — 1 ♂ (broken); 15 November 1967; dredge; USNM 170798.

Diagnosis: Male frons scarcely produced between mandibles, rounded, tricrenulate. Mandibles lacking aciles, with evenly rounded projections on inferior borders. Anterolateral projections of

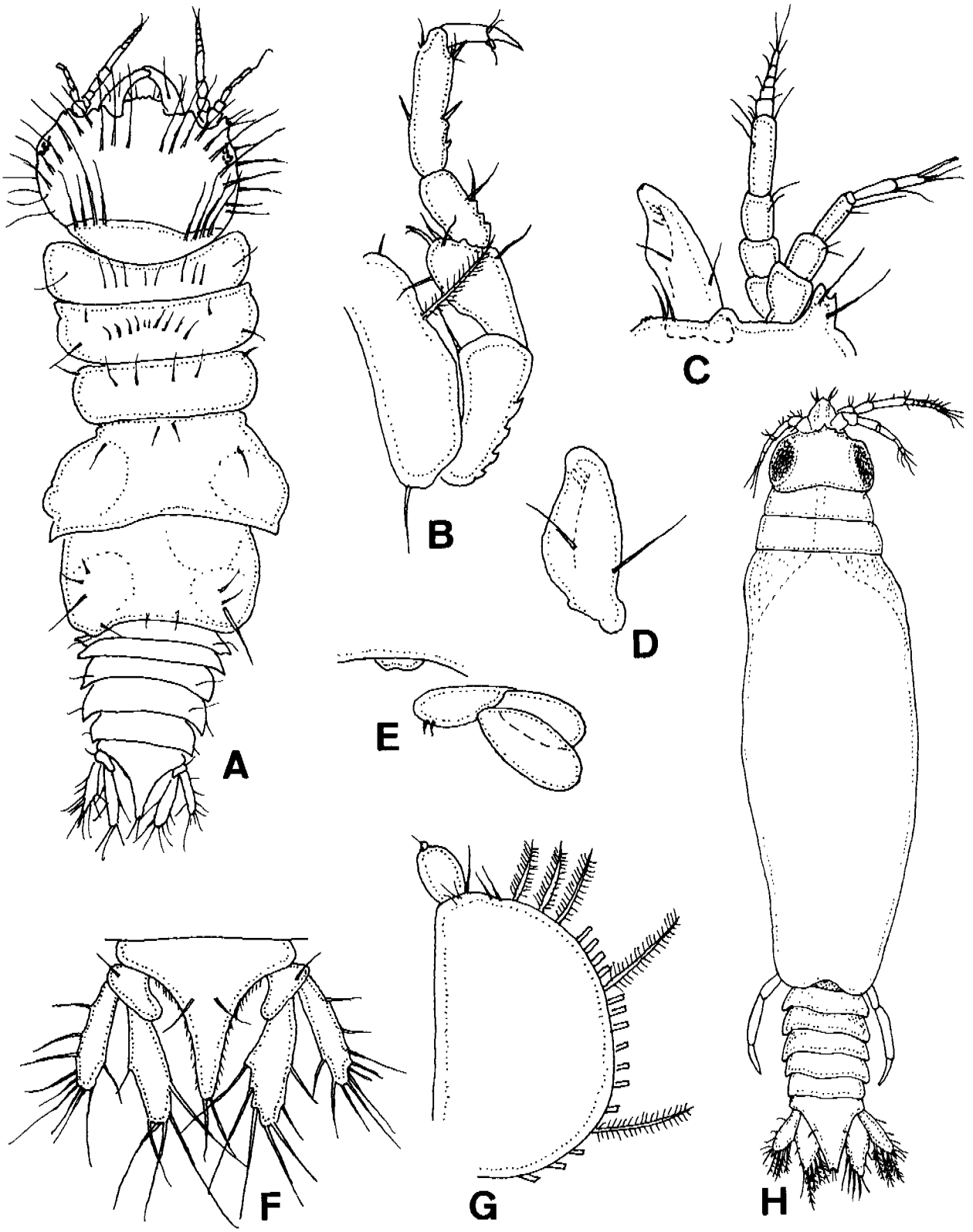

Figure 8. *Gnathia floridensis*, n. sp. Holotype male, USNM 170796: length 1.19 mm, width 0.39 mm. A. whole animal; B. pereopod 7; C. frons and antennae; D. mandible; E. penes and pleopod 1, ventral view; F. pleotelson; G. pylopod. Allotype female, USNM 170797: length 1.6 mm, width 0.6 mm. H. whole animal.

cephalon two-pointed. Maxillipedal somite visible. Cephalon hirsute; eyes small, lateral, black in color; pylopod triarticulate. Body hirsute at each somite. Uropodal endopod extending beyond pleotelsonal apex; exopod and endopod of similar length; endopod wider than exopod.

Supplementary description: Holotype male length 1.19 mm, width 0.39 mm. Cephalon as long as wide, with rounded lateral margins, dorsum with 25 setae inclusive of maxillipedal somite. Pereonite I slightly shorter than II; II=III; IV twice as long as III; IV=V in length. Pereonite I with transverse row of setae; II with similar transverse row of setae; III with transverse row of four setae; IV with four setae, two near anterior margin, two near lateral margin; V with three longitudinal setae near each posterolateral margin. Pleonites with a seta near each lateral margin. Antenna 1 with triarticulate peduncle extending to articulation of last peduncular article of antenna 2; flagellum triarticulate, first article minute, second and third subequal. Flagellum of antenna 2 with five articles.

Female allotype length 1.6 mm, width 0.6 mm. Cephalon (to frons) wider than long, lateral margins rounded, setae lacking dorsally; eyes occupying entire lateral margin; frons sharply trilobed, lateral lobes minute. Mouthparts piercing and sucking, projecting in front of frons as a buccal cone. Antenna 1 with seven articles, shorter than antenna 2; antenna 2 flagellum with seven articles, extending to posterior border of first free pereonite. Pereonites (free) I=II in length; III-V fused into single, swollen, egg-bearing somite over twice as long as wide, tapering posteriorly. Pleon with five segments and uropod-bearing pleotelson. Uropodal exopod shorter than pleotelson, slightly shorter than endopod, with four plumose setae on inner margin, apical tooth and six setae on outer margin. Endopod extending slightly beyond apex of pleotelson, with five plumose setae along inner margin, three setae on outer margin, short spine near apex. Apex of pleotelson sharply bifid, with two terminal setae.

Type-locality: Hourglass Station D, 27°37'N, 83°58'W; 55 m depth; about 65 nmi off Egmont Key, Florida west coast.

Distribution: Hourglass Stations D and L, 55 m, central west Florida shelf, Gulf of Mexico.

Etymology: The specific name *floridensis* is an adjective derived from Florida, the area from which the species is first described, and the Latin suffix *-ensis*, meaning native or resident in.

Remarks: This species is most closely related to *Gnathia coralliophila* Monod, 1926, from which it differs in setation of the pereon and pleon.

Females of *Gnathia* have seldom been used in the identification of species or in keys or diagnoses, and it appears quite likely that female specimens have been assigned at times to the wrong species. This is because females are generally nondescript and difficult to characterize precisely, and also because males and females are not always taken together. We were hesitant to assign a male from Station L (FSBC I 18246) to this species, as it had been dried and all features were not discernable. The telson and uropods are similar to other material of this species, but the frontal margin of the cephalon was twisted by desiccation. We include it here because it was accompanied by an identifiable female.

Specimens were found only at 55 m depths along both transects. Both females had developing ovaries; one was taken in March and the other in August.

Suborder Anthuridea

Diagnosis: Cylindrical Isopoda with body over six times as long as wide. Pleon composed of six somites plus telson (seventh pleonite), although not always apparent due to fusion of pleonites in some genera. Uropods lateral, often folding over telson. Mouthparts piercing and sucking, or cutting or biting types.

Remarks: The only anthurids we know to have been previously reported from the Gulf of Mexico are *Cyathura polita* (Stimpson) (Rouse, 1969; Menzel, 1971), *C. burbancki* Frankenberg (Huff, 1975), and *Apanthura magnifica* Menzies and Frankenberg (Kruczynski and Myers, 1976). Menzies and Frankenberg (1966) recorded eight species from Georgia, Menzies and Glynn (1968) recorded six others from Puerto Rico, Paul and Menzies (1971) reported another six from Venezuela, and Carvacho (1977) described one from Guadeloupe in addition to those Caribbean species treated by Barnard (1925). All could be expected to occur in the Gulf of Mexico (Table 3). *Anthelura affinis* and *Colanthura tenuis*, both described by Richardson (1902), are omitted from this list; neither has been found since its original collection at Bermuda, although most other isopod species originally described from Bermuda have since been found in Florida or the Caribbean. Four species were found in the Hourglass collections, of which three are described as new. The Anthuridae was represented by *Mesanthura* and *Skuphonura* and the Paranthuridae by *Paranthura* and *Accalathura*. Only *Accalathura crenulata* Richardson was encountered from the list of expected species.

Barnard (1925: 134) described specimens from the West Indies and assigned them to *Eisothistos atlanticus* Vanhöffen, 1914, from the Cape Verde Islands. He stated, however, that his identification may have been erroneous because he had not examined Vanhöffen's type. Schultz (1969: 97) also questioned the conspecificity of specimens from such widespread localities and suggested they should be examined more closely. We agree that Barnard's specimens may have been misidentified and refer to this western Atlantic record of the genus as *Eisothistos atlanticus* of Barnard, 1925, not Vanhöffen, 1914.

TABLE 3. ANTHURIDEA PREVIOUSLY KNOWN OR EXPECTED TO OCCUR IN THE GULF OF MEXICO AND CARIBBEAN.

1. *Pendanthura tanaiformis* Menzies and Glynn, 1968
2. *Ptilanthura tricarina* Menzies and Frankenberg, 1966
3. *Apanthuroides millae* Menzies and Glynn, 1968
4. *Haliophasma irmae* Paul and Menzies, 1971
5. *Haliophasma valeriae* Paul and Menzies, 1971
6. *Haliophasma curri* Paul and Menzies, 1971
7. *"Malacanthura" caribbica* Paul and Menzies, 1971
8. *Malacanthura cumanensis* Paul and Menzies, 1971
9. *Mesanthura paucidens* Menzies and Glynn, 1968
10. *Mesanthura decorata* Menzies and Glynn, 1968
11. *Mesanthura pulchra* Barnard, 1925
12. *Paranthura barnardi* Paul and Menzies, 1971
13. *Paranthura infundibulata* Richardson, 1902 [= *P. verrillii* Richardson, 1902 (Barnard, 1925)]
14. *Paranthura antillensis* Barnard, 1925
15. *Apanthura signata* Menzies and Glynn, 1968
16. *Apanthura magnifica* Menzies and Frankenberg, 1966
17. *Apanthura significa* Paul and Menzies, 1971
18. *Xenanthura brevitelson* Barnard, 1925
19. *Horoloanthura irpex* Menzies and Frankenberg, 1966
20. *Eisothistos atlanticus* of Barnard, 1925, not Vanhöffen, 1914
21. *Panathura formosa* Menzies and Frankenberg, 1966
22. *Cyathura burbancki* Frankenberg, 1965
23. *Cyathura polita* (Stimpson, 1855)
24. *Cyathura crucis* Barnard, 1925
*25. *Accalathura crenulata* (Richardson, 1901)
26. *Accalathura crassa* Barnard, 1925
27. *Skuphonura laticeps* Barnard, 1925
28. *Colanthura ornata* Carvacho, 1977

*Species in Hourglass collections

Barnard (1925) described *Malacanthura* as having a maxilliped with five joints (four free); *M. cumanensis* Paul and Menzies fits the description of *Malacanthura* Barnard, 1925, but *M. caribbica* Paul and Menzies, with a maxilliped of six joints (five free), should be placed in a different genus. It is retained in our key as "*Malacanthura*."

A KEY TO GULF AND CARIBBEAN ANTHURIDEA

1. Piercing and sucking mouthparts (Paranthuridae) 2
1. Cutting or biting mouthparts (Anthuridae) 8
2. Maxilliped narrow and pointed, with two free articles 3
   [Note: basal article of maxilliped not counted since it is fused with cephalon and not free; thus, number of articles herein is one less than listed by Barnard (1925).]
2. Maxilliped broad, with three free articles 7
3. Exopod of uropod very short, not reaching to articulation of endopod ..... *Colanthura ornata* Carvacho
3. Exopod of uropod long 4
4. Exopod of uropod ovate, overlapping at midline of telson ..... *Paranthura barnardi* Paul and Menzies
4. Exopod of uropod elongate, not meeting at midline of telson 5
5. Apex of telson and uropodal endopods truncate ..... *Paranthura infundibulata* Richardson
5. Apex of telson and uropodal endopods rounded 6
6. Outer margin of uropodal exopod crenulate ..... *Paranthura antillensis* Barnard
6. Outer margin of uropodal exopod smooth; telson marginally serrate near apex ..... *Paranthura floridensis*, n. sp.
7. Eyes and flagella of both antennae well developed ..... *Accalathura crenulata* Richardson
7. Eyes absent; flagella of both antennae rudimentary ..... *Accalathura crassa* Barnard
8. Maxilliped with two free articles 9
8. Maxilliped with more than two free articles 11
9. First free articles of maxilliped fused mesially; second antennae with accessory flagellum (exopod) ..... *Xenanthura brevitelson* Barnard
9. First free articles of maxilliped not fused mesially; second antennae without exopod 10
10. Pleon wider than long, without lateral incisions visible in dorsal view ..... *Pendanthura tanaiformis* Menzies and Glynn
10. Pleon longer than wide, with four lateral incisions visible in dorsal view ..... *Ptilanthura tricarina* Menzies and Frankenberg
11. Pleon fused dorsally into single somite plus telson 12
11. Pleon with four to six somites distinct dorsally 26

12. Pereopod 1 not subchelate; lateral incisions of pleon nearly meeting dorsally ..... *Apanthuroides millae* Menzies and Glynn

12. Pereopod 1 subchelate, stout, with expanded propodus; pleon without lateral incisions nearly meeting dorsally 13

13. Maxilliped with three free articles 14

13. Maxilliped with four or five free articles 16

14. Second article of antenna 1 shaped like recurved semilunar spine ..... *Haliophasma irmae* Paul and Menzies

14. Second article of antenna 1 quadrate 15

15. Telson tapering distally to broad point ..... *Haliophasma valeriae* Paul and Menzies

15. Telson rounded distally ..... *Haliophasma curri* Paul and Menzies

16. Endopod of uropod not reaching apex of telson 17

16. Endopod of uropod reaching or extending beyond apex of telson 18

17. Pleon and telson pigmented; margin of uropodal exopod serrate ..... *"Malacanthura" caribbica* Paul and Menzies

17. Pleon and telson unpigmented; margin of uropodal exopod smooth ..... *Malacanthura cumanensis* Paul and Menzies

18. Pleon with dorsal longitudinal incisions 19

18. Pleon without dorsal longitudinal incisions 21

19. Pereopod 1 with fifth joint not projecting; appendix masculina apically simple ..... *Cyathura crucis* Barnard

19. Pereopod 1 with projecting carpal tooth; appendix masculina with lateral lobe bearing hook-crowned rod 20

20. Exopods of uropods meeting at middorsal line of telson ..... *Cyathura burbancki* Frankenberg

20. Exopods of uropods not meeting at middorsal line of telson ..... *Cyathura polita* (Stimpson)

21. Body pigmented 22

21. Body not pigmented 25

22. Pigment of pleon in parallel rows spanning width of pleon ..... *Mesanthura paucidens* Menzies and Glynn

22. Pigment of pleon not in parallel rows 23

23. Pleon solidly pigmented ..... *Mesanthura pulchra* Barnard

23. Pleon with central area devoid of pigment 24

24. Margin of uropodal exopod crenulate ..... *Mesanthura decorata* Menzies and Glynn

24. Margin of uropodal exopod without crenulations ..... *Mesanthura floridensis*, n. sp.

25. Cephalon triangulate ..... *Skuphonura laticeps* Barnard

25. Cephalon quadrate ..... *Skuphonura lindae*, n. sp.

26. Pleon with somites 1 to 3 and 6 entire; lateral incision between pleonal somites 4 and 5 27

26. Pleon with six free somites plus telson 29

27. Cephalon longer than pereonite 1 ..... *Apanthura significa* Paul and Menzies

27. Cephalon not longer than pereonite 1 28

28. Pereopod 1 with small palmar tooth; female with pigmentation ..... *Apanthura signata* Menzies and Glynn

28. Pereopod 1 with well-developed palmar tooth; female without pigmentation ..... *Apanthura magnifica* Menzies and Frankenberg

29. Maxilliped with four free articles ..... *Horoloanthura irpex* Menzies and Frankenberg

29. Maxilliped with more than four free articles 30

30. Telson splayed, apically truncated; maxilliped with five free articles (minute apical joint counted) ..... *Eisothistos atlanticus* of Barnard

30. Telson not splayed; maxilliped of five free articles plus inner plate ..... *Panathura formosa* Menzies and Frankenberg

Family Anthuridae Leach, 1814

Diagnosis: Anthuridea with biting and chewing mouthparts.

Genus *Mesanthura* Barnard, 1914

Diagnosis: Anthuridae with eyes; pereon without dorsal pits. Pleon short, sutures absent or extremely obscure. Telson not indurated, dorsally smooth or nearly flat. Antenna 1 with brush-like flagellum in male, two-jointed in female; antenna 2 with flagellum two- to four-jointed. Maxilliped with four free articles. Pereopods 4-7 with fifth joint underriding sixth. Pleopod 1 not indurated, operculiform. Uropods not indurated; exopod apically notched. Oostegites four pairs (after Barnard, 1925).

Type-species: *Anthura catenula* Stimpson, 1855.

Mesanthura floridensis, new species

Figure 9

Material examined: HOURGLASS STATION B: 1 ♀ (PARATYPE); 1 August 1967; dredge; FSBC I 18251. — 6 ♀; 2 November 1967; dredge; USNM 170800. — 1 ♀, 7.1 mm (HOLOTYPE); 20 November 1967; dredge; USNM 170799. — HOURGLASS STATION C: 1 ♀ (PARATYPE); 2 June 1967; dredge; FSBC I 18250. — HOURGLASS STATION J: 1 ♀; 7 April 1967; dredge; FSBC I 18248. — 1 juv.; 14 November 1967; dredge; FSBC I 18252. — HOURGLASS STATION K: 1 ♀; 14 November 1967; dredge; FSBC I 18253.

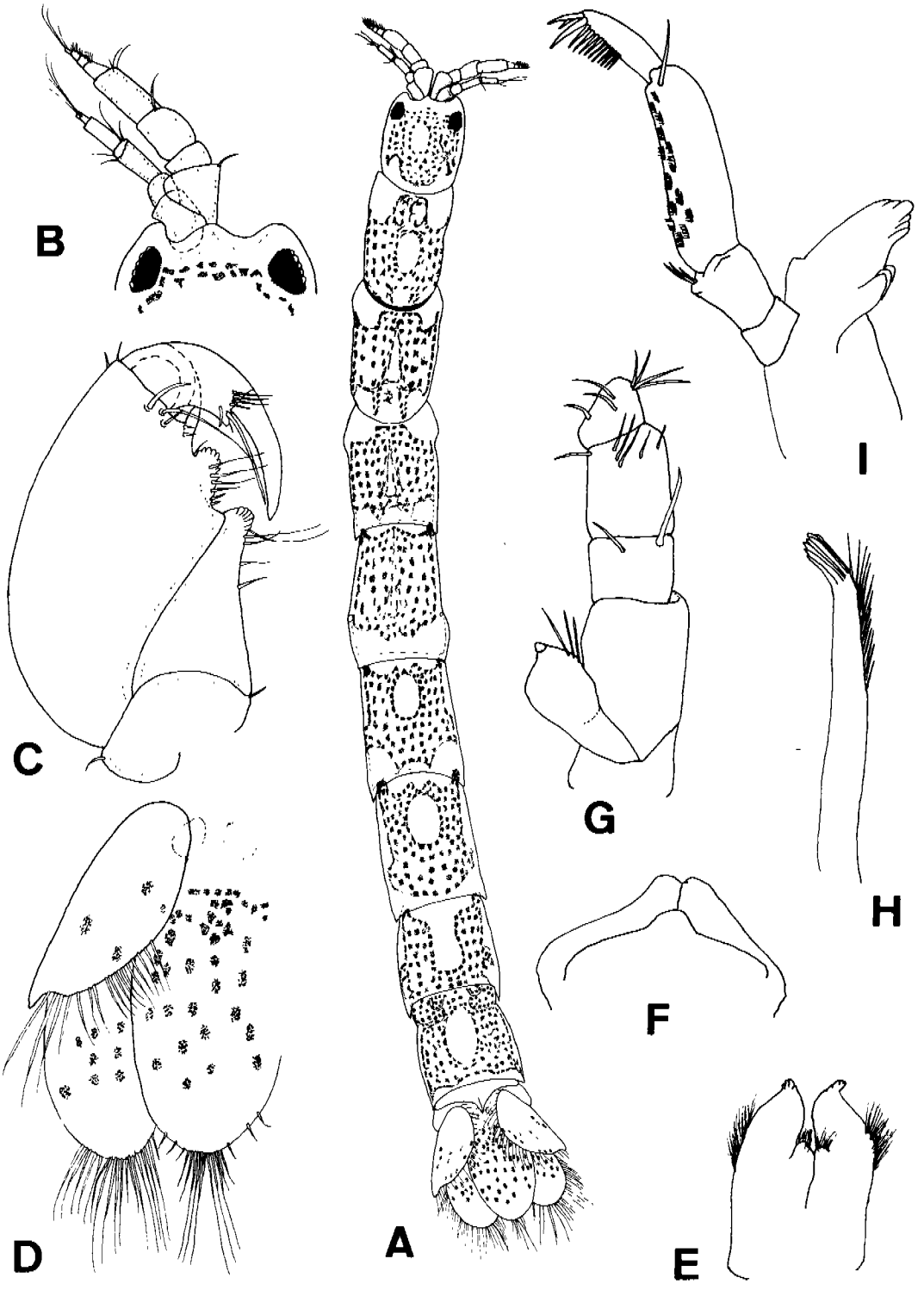

Figure 9. *Mesanthura floridensis*, n. sp. Holotype female, USNM 170799: length 7.1 mm, width 0.5 mm. A. whole animal; B. cephalon; C. pereopod 1; D. telson and uropod. Female, FSBC I 18248: E. labium; F. labrum; G. maxilliped; H. maxilla; I. mandible.

Diagnosis: Chromatophores defining single unpigmented circles on cephalon, pereonites I, V, VI, and pleon; single acute triangles on pereonites II, III, and IV. Statocysts paired. Palmar tooth of propodus of pereopod 1 crenulate. Apex of telson with ten setae, followed by three small ones on each side.

Supplementary description: Antenna 1 shorter than antenna 2; article 1 quadrate, longer than wide; article 2 half length of article 1 and narrower; article 3 three times as long as wide; article 4 intercalated, minute; article 5 as long as 3 but narrower; articles 6 and 7 minute. Antenna 2 articles 1 and 4 similar in length, second shortest; flagellum with four articles tapering to point. Mouthparts as illustrated. Cephalon with medial lobe; eyes separated by three eye lengths. Cephalon shorter than pereonite I; pereonites I, II, and V similar in length, IV and VI longest, subequal in length, VII shortest. Pleon=pereonite VII in length. Telson (pleotelson)=length of pereonites IV and VI, with anterior end constricted. Exopod of uropod not meeting other exopod at midline over telson, not extending to apex of telson; endopod barely reaching apex of telson. Palmar tooth of pereopod 1 with crenulate margin and fringe of setae; inferior claw of dactyl minute, superior claw robust. Margins of uropods and telson setose, lacking teeth or crenulations.

Type-locality: Hourglass Station B, 27°37'N, 83°07'W; 18 m depth; about 19 nmi off Egmont Key, Florida west coast.

Distribution: Known only from central west Florida shelf, Gulf of Mexico, at 18 and 37 m along both Hourglass transects.

Etymology: The specific name *floridensis* is an adjective derived from Florida, the area from which the species is first described, and the Latin suffix *-ensis*, meaning native or resident in.

Remarks: This species is close to *M. decorata* Menzies and Glynn, 1968, but differs in lacking crenulations on the uropodal exopod.

Genus *Skuphonura* Barnard, 1925

Diagnosis: Eyes present. Pereon not keeled dorsolaterally, without dorsal pits. Pleon segments 1-5 completely fused, without trace of sutures, wider than pereon, with posterolateral angles of segment 5 produced backwards; segment 6 much narrower than preceding segments of pleon or pereon. Telson not indurated, dorsally convex, smooth, ventrally concave. Antenna 1 with flagellum of a single joint. Antenna 2 with flagellum of a single joint. Mandible with third palpal joint shorter than first, tipped with few setae. Maxilliped five-jointed (four free). Pereopod 1 stout, palm sinuous, unguis short. Pereopods 2 and 3 more slender, sixth joint narrow, ovate. Pereopods 4-7 with fifth joint underriding sixth. Pleopod 1 not indurated. Uropods not indurated; exopod not folding down over, but nearly vertical at sides of telson. Oostegites (?) (after Barnard, 1925).

Type-species: *Skuphonura laticeps* Barnard, 1925.

Remarks: Points of disagreement between our specimens and the generic diagnosis of Barnard are underlined above. It is possible that our species belongs to a new genus, but we leave it in *Skuphonura* until we can evaluate generic significance of the points of difference and morphological variation within age classes.

Skuphonura lindae, new species

Figure 10

Material examined: HOURGLASS STATION B: 1 ♂; 11 September 1967; trawl; FSBC I 18259. — HOURGLASS STATION C: 1 ♀; 31 August 1966; trawl; USNM 170803. — 1 ♀; 1 December 1966; dredge; USNM 170804. — 1 juv.; 5 February 1967; dredge; FSBC I 18257. — 1 ♀; 20 May 1967; trawl; USNM 170805. — 1 ♀; 21 November 1967; dredge; FSBC I 18261. — HOURGLASS STATION D: 1 ?; 4 March 1966; dredge; FSBC I 18254. — 1 ♂ (lost); 6 February 1967; dredge. — HOURGLASS STATION E: 1 ♂, 7.05 mm (PARATYPE); 9 October 1966; dredge; USNM 170802. — 1 ♂ (dried); same; FSBC I 18256. — HOURGLASS STATION I: 1 juv. (dried); 4 September 1966; dredge; FSBC I 18255. — HOURGLASS STATION K: 1 ♀; 13 January 1966; trawl; FSBC I 18249. — 1 ♀, 10 mm (HOLOTYPE); 7 April 1967; trawl; USNM 170801. — 1 ♀; 7 April 1967; dredge; FSBC I 18258. — HOURGLASS STATION L: 1 juv.; 15 November 1967; dredge; FSBC I 18260.

Diagnosis: Same as for genus except that flagella of antennae 1 and 2 have four and two articles respectively and exopods of uropods bend over telson. Pereopod 1 with sinuous palm but with long unguis. Pleopod 1 not indurate. Five pairs of oostegites. Statocysts paired. Apex of telson with one or two long and three short setae on either side of midline. Cephalon with sides parallel.

Supplementary description: Cephalon equal to pereonite VII in length, longer than wide, with medial pointed lobe. Antenna 1 shorter and narrower than antenna 2; article 1 stoutest, equal to article 3 in length; flagellum triarticulate, last two articles minute. First article of antenna 2 nearly as wide as long, equaling article 4 in length; second article shortest; flagellum quadriarticulate. Eyes separated by one eye length. Maxilliped with four free articles, last article shortest, next to last article widest. Mandible with triarticulate palp and toothed incisor. Pereonites II, III, and IV equal in length; cephalon three-fourths length of pereonite I. Pleon equal to length of cephalon measured at midline, but longer at lateral borders; posterior margin of pleonite 6 produced mesially, overriding telson; telson not fused with posterior margin of pleon. Uropodal exopods not meeting at midline, extending to apex of telson; outer margin incised near apex, crenulate; endopods strap-like, apically blunt, extending to apex of telson. Telson with minute apical lobe, with long stout seta on either side, followed by three or four smaller, more delicate setae; lateral margins entire, without spines or crenulations.

Type-locality: Hourglass Station K, 26°24'N, 82°58'W; 37 m depth; about 51 nmi off Sanibel Island, Florida west coast.

Distribution: Central west Florida shelf, 6-73 m, Gulf of Mexico.

Etymology: The specific name is in honor of Linda House, who initially sorted and identified most Hourglass isopods.

Remarks: This species is easily distinguished from *S. laticeps* Barnard by having margins of the cephalon parallel and by having flagellum of each antenna composed of more than one article. It is possible that the single immature specimen identified by Miller (1968) as *Skuphonura* sp. is *S. lindae*; his specimen was also taken from the west coast of Florida off Cape Sable and differs from Barnard's diagnosis in many of the characters we listed above. However, both Barnard's and Miller's descriptions indicate that the exopods of the uropods do not fold over the telson, while in our specimens exopods of uropods fold slightly over the telson.

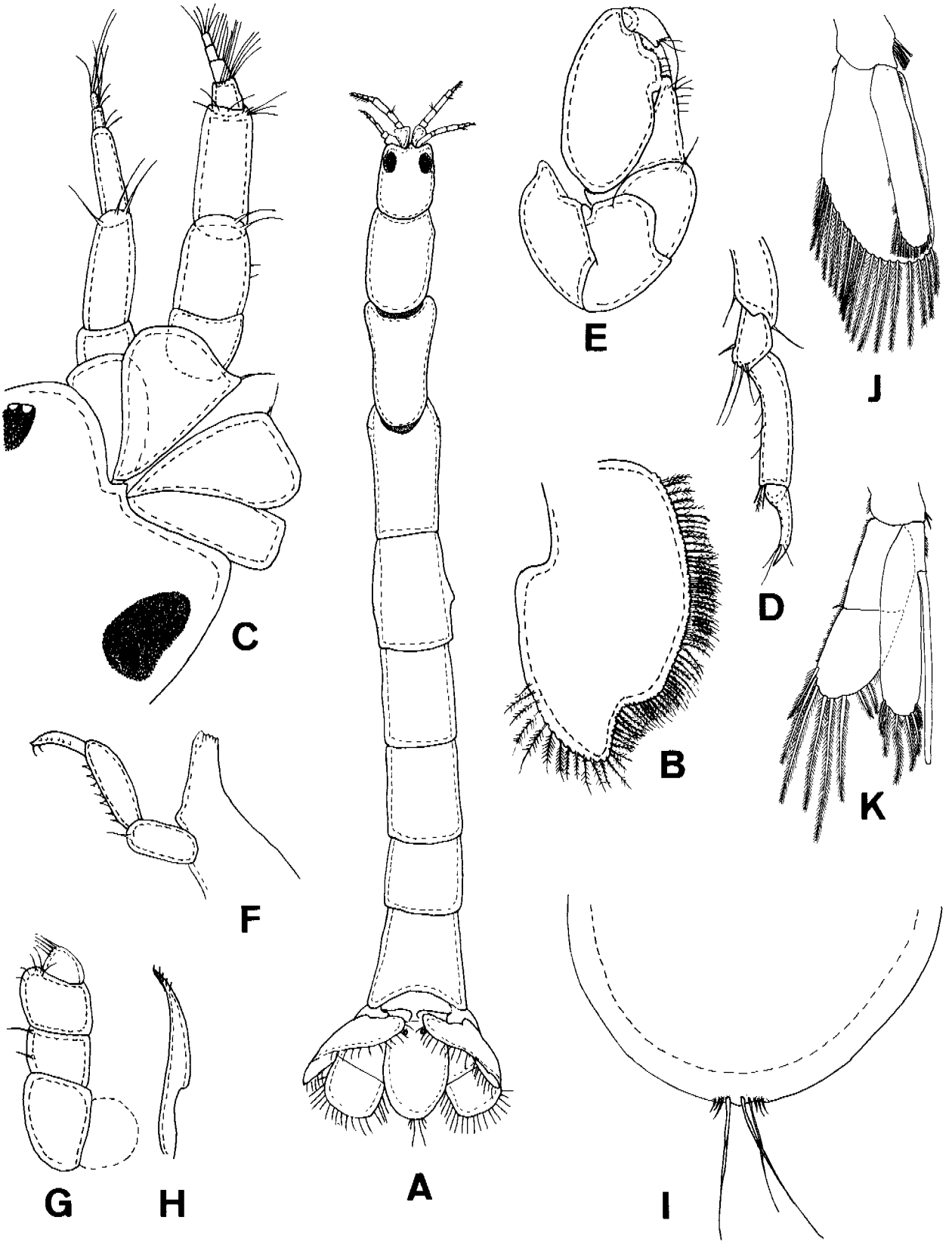

Figure 10. *Skuphonura lindae*, n. sp. Holotype female, USNM 170801: length 10.0 mm, width 0.9 mm. A. whole animal; B. uropodal exopod; C. cephalon; D. pereopod 6; E. pereopod 1; F. mandible; G. maxilliped; H. maxilla; I. apex of telson. Male, FSBC I 18259: J. pleopod 1; K. pleopod 2.

TABLE 4. MONTHLY ABUNDANCES OF *Skuphonura lindae*; DREDGE AND TRAWL SAMPLES COMBINED.

Skuphonura lindae

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																															
B_2																												1			1
C_1															1			1			1										3
C_2																							1							1	2
D_1								1													1										2
D_2																															
E																2															2
I															1																1
J																															
K						1																	2								3
L																														1	1
M																															
TOT						1		1							2	2		1			2		2	1				1		2	15

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

The species was found along both transects, most frequently at 37 m depth, but occurred rarely at all depths between 6 and 73 m. Specimens were taken more frequently in dredge than in trawl samples. Specimens were captured during all months of the year except June, July and August (Table 4). Three of the seven females had developed brood pouches containing up to 30 developing embryos. They occurred in May, September and November.

Family Paranthuridae Menzies and Glynn, 1968

Diagnosis: Anthuridea with piercing and sucking mouthparts.

Genus *Paranthura* Bate and Westwood, 1868

Diagnosis: Paranthuridae with only two free articles to maxilliped, last article more or less spear-shaped. Telson spatulate, not indurated.

Type-species: *Paranthura costana* Bate and Westwood, 1868.

Paranthura floridensis, new species

Figure 11

Material examined: HOURGLASS STATION M: 1 ♀, 6.3 mm (HOLOTYPE); 13 November 1966; dredge; USNM 170806.

Diagnosis: *Paranthura* having uropodal exopods not meeting at dorsal midline of telson. Endopods of uropods extending beyond apex of telson. Telson marginally serrate near apex. Inner margin of article 6 of pereopod 1 convex throughout length.

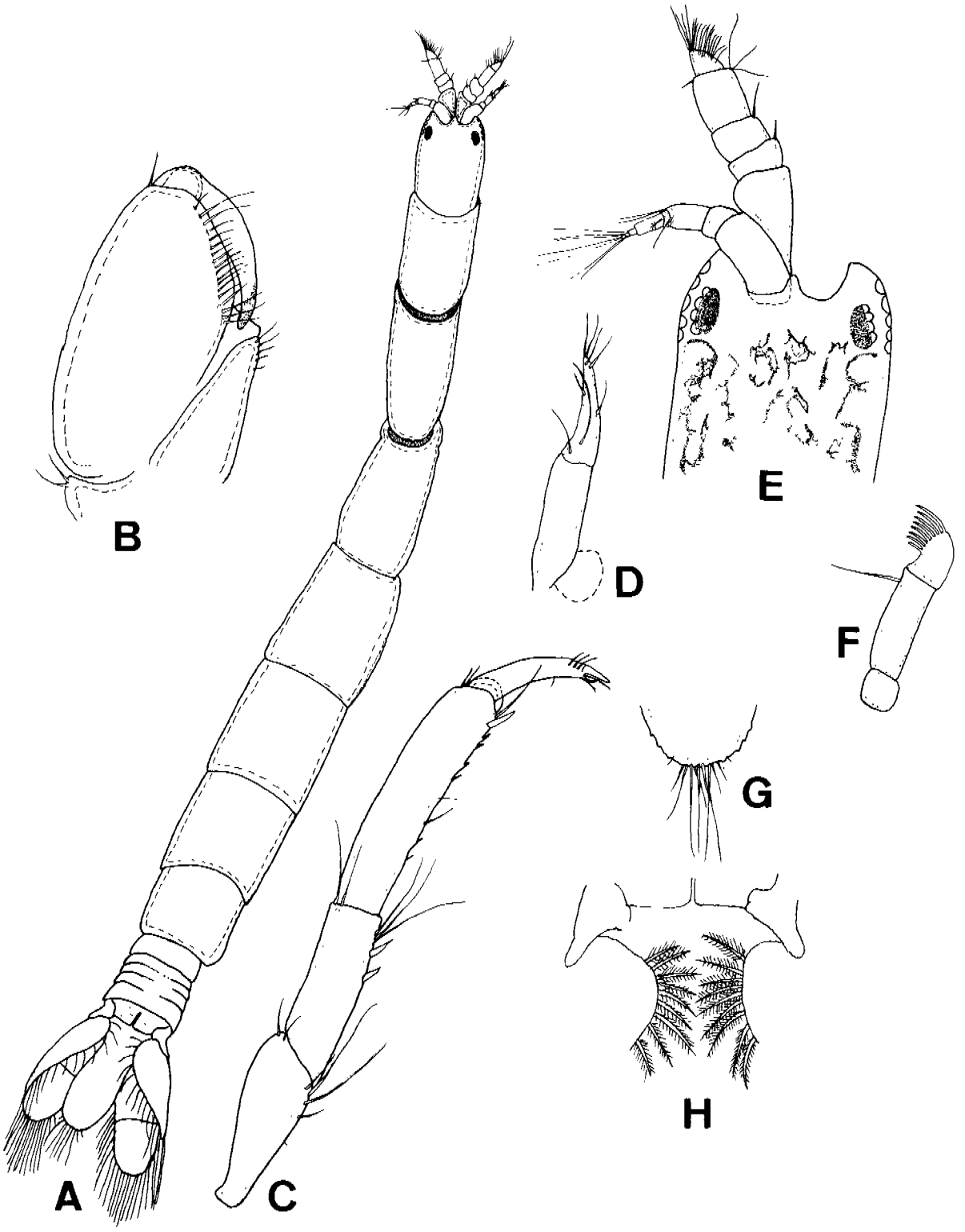

Figure 11. *Paranthura floridensis*, n. sp. Holotype female, USNM 170806: length 6.3 mm, width 0.6 mm. A. whole animal; B. pereopod 1; C. pereopod 6; D. maxilliped; E. cephalon and antennae; F. palp of mandible; G. apex of telson; H. setae of exopods of uropods.

Supplementary description: Antenna 1 shorter and narrower than antenna 2; article 1 largest, longest; article 2 short, half length of third; fourth article minute, intercalated; flagellum multiarticulate, with last three articles minute. First article of antenna 2 longest; second, third, and fourth articles progressively increasing in length; flagellum clavate, uniarticulate, much shorter than fourth article. Antennae deeply immersed in front of cephalon. Frontal margin with pronounced, pointed medial lobe. Maxilliped lanceolate, apparently biarticulate (two free articles). Mandibular palp triarticulate, last article with characteristic comb of setae. Cephalon two-thirds as long as wide, equal to pereonites I or VI in length. Pereonites II=III=IV=V in length, each one-fourth longer than I; VII shortest. Pleonites 1 and 5 longest; 2, 3, and 4 short, subequal in length, with segmentation obscure dorsally but evident laterally. Uropodal exopods not meeting at dorsal midline of telson but extending nearly to apex of telson; endopods strap-like, extending beyond apex of telson. Lateral margins of telson minutely serrate, apex with tuft of fine setae.

Type-locality: Hourglass Station M, 26°24'N, 83°43'W; 73 m depth; about 92 nmi off Sanibel Island, Florida west coast.

Distribution: Known only from type-locality.

Etymology: The specific name *floridensis* is an adjective derived from Florida, the area from which the species is first described, and the Latin suffix *-ensis*, meaning native or resident in.

Remarks: The closest geographic relative is *Paranthura barnardi* Paul and Menzies from Venezuela, but all pleonal somites are distinct on that species. Other differences between these two are in those characters cited in the diagnosis. The two species are otherwise very similar.

Genus *Accalathura* Barnard, 1925

Diagnosis: Paranthuridae with maxilliped of three free articles. Statocyst single, not paired. Flagellum of antenna 2 multiarticulate. Pleopod 1 operculiform, not indurated. Uropodal endopod distinctly narrower than peduncle.

Type-species: *Calathura crenulata* Richardson, 1901.

Accalathura crenulata (Richardson, 1901)

Figure 12

Calathura crenulata Richardson, 1901, pp. 509, 510; 1905, pp. 74, 75, figs. 58-61.

Accalathura crenulata: Barnard, 1925, pp. 147, 148, fig. 3, pl. 4, fig. 18; Menzies and Glynn, 1968, pp. 33, 34, fig. 13; Schultz, 1969, p. 96, fig. 128.

Material examined: HOURGLASS STATION B: 1; 2 November 1967; dredge; FSBC I 18300. — 1; 20 November 1967; trawl; FSBC I 18305. — 1; 20 November 1967; dredge; FSBC I 18306. — HOURGLASS STATION C: 1; 3 January 1966; dredge; FSBC I 18262. — 1; 2 June 1967; dredge; FSBC I 18286. — 1; 11 September 1967; dredge; FSBC I 18295. — 1; 5 October 1967; dredge; FSBC I 18296. — 1; 21 November 1967; dredge; FSBC I 18307. — HOURGLASS STATION D: 2; 8 February 1967; dredge; FSBC I 18274. — 1; 28 February 1967; dredge; FSBC I 18276. — 1 ♂; 3 March 1967; dredge; FSBC I 18277. — 1; 15 March 1967; dredge; FSBC I 18280.

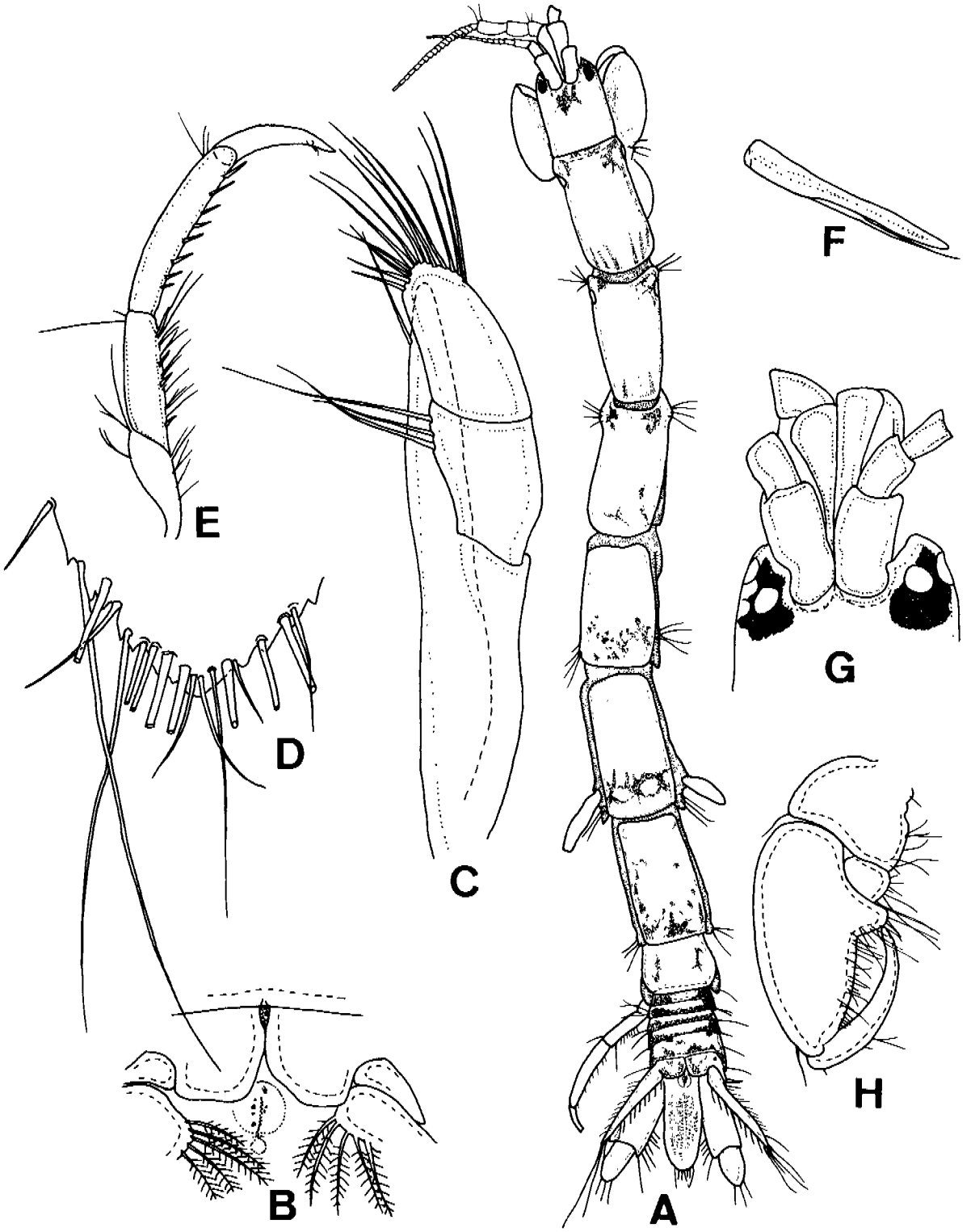

Figure 12. *Accalathura crenulata* (Richardson). Female: length 14.0 mm. A. whole animal; B. dorsal view of pleon showing statocyst; C. maxilliped; D. posterior border of telson; E. pereopod 7; F. two-pointed seta from pereopod 7; G. cephalon and basal articles of antennae 1 and 2; H. apical articles of pereopod 1 (from Menzies and Glynn, 1968).

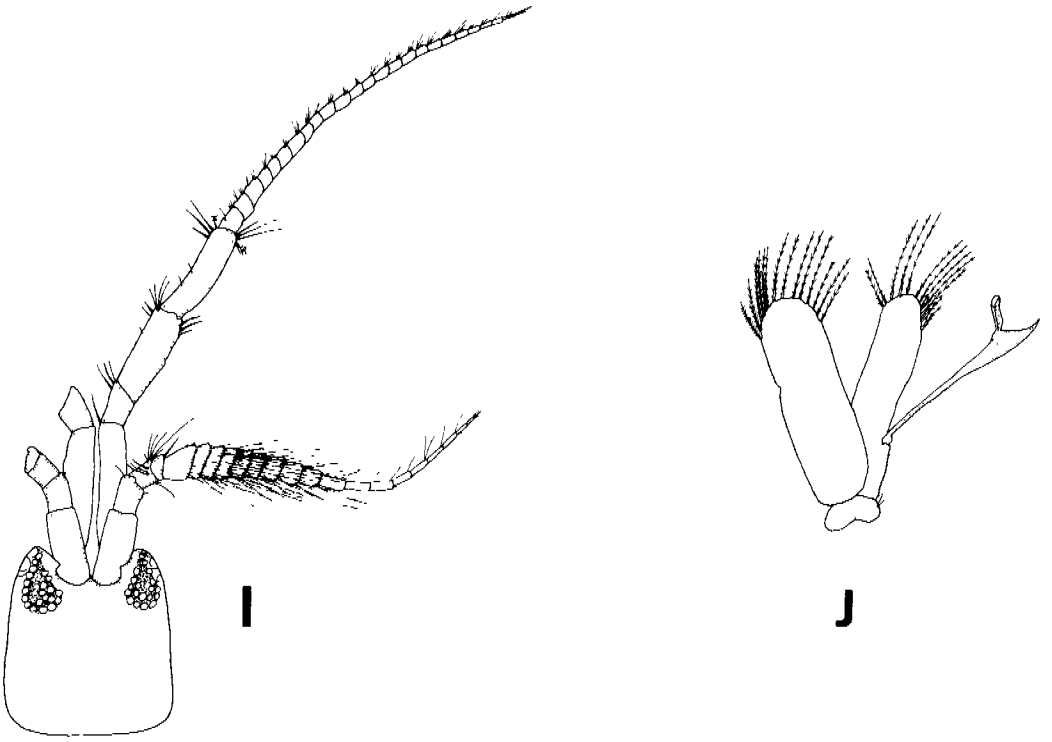

Figure 12 (continued). *Accalathura crenulata* (Richardson). Male, FSBC I 18277: I. cephalon, antennae 1 and 2; J. pleopod 2 with appendix masculinum.

— 1; 12 May 1967; dredge; FSBC I 18283. — 1 ♂; 21 May 1967; dredge; FSBC I 18285. — 1; 21 June 1967; dredge; FSBC I 18288. — 1 ♂; 2 August 1967; dredge; FSBC I 18290. — 2; 1 September 1967; dredge; FSBC I 18294. — 2; 6 October 1967; trawl; FSBC I 18297. — 1 ♂; 6 October 1967; dredge; USNM 170815. — 1; 27 October 1967; dredge; FSBC I 18299. — HOURGLASS STATION E: 5; 9 October 1966; dredge; FSBC I 18265. — 2; 2 December 1966; trawl; FSBC I 18268. — 6; 2 December 1966; dredge; FSBC I 18269. — 3; 2 August 1967; dredge; FSBC I 18291. — 1; 6 October 1967; dredge; FSBC I 18728. — 1; 3 November 1967; trawl; FSBC I 18301. — HOURGLASS STATION J: 1; 14 November 1967; dredge; FSBC I 18302. — HOURGLASS STATION K: 1; 6 December 1966; dredge; FSBC I 18270. — HOURGLASS STATION L: 1; 6 August 1966; dredge; FSBC I 18263. — 6; 5 September 1966; dredge; FSBC I 18264. — 5; 13 October 1966; dredge; FSBC I 18266. — 2; 7 December 1966; dredge; FSBC I 18271. — 1; 13 January 1967; trawl; FSBC I 18273. — 1; 13 January 1967; dredge; USNM 170813. — 6; 16 February 1967; dredge; FSBC I 18275. — 3; 9 March 1967; trawl; FSBC I 18278. — 1; 8 April 1967; trawl; FSBC I 18281. — 4; 16 May 1967; dredge; FSBC I 18284. — 1; 7 June 1967; dredge; FSBC I 18287. — 1; 6 July 1967; trawl; FSBC I 18289. — 1; 8 August 1967; trawl; FSBC I 18292. — 3; 12 October 1967; trawl; USNM 170814. — 3; 12 October 1967; dredge; FSBC I 18298. — 1; 15 November 1967; trawl; FSBC I 18303. — 4; 15 November 1967; dredge; FSBC I 18304. — HOURGLASS STATION M: 4; 5 September 1966; dredge; FSBC I 6948. — 1; 13 November 1966; trawl; FSBC I 18267. — 1; 7 December 1966; dredge; FSBC I 18272. — 3 (1 ovigerous ♀); 9 March 1967; dredge; FSBC I 18279. — 1 ♀ (ovigerous); 8 April 1967; trawl; FSBC I 18282. — 1; 8 August 1967; dredge; FSBC I 18293.

TABLE 5. MONTHLY ABUNDANCES OF *Accalathura crenulata*; DREDGE AND TRAWL SAMPLES COMBINED.

Accalathura crenulata

STA	1965					1966													1967										TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																														
B_1																													1	1
B_2																													2	2
C_1						1																		1				1		3
C_2																											1		1	2
D_1																					2	1		1			1	2	3	10
D_2																					1	1		1	1				1	5
E																5		8									3		1	1	18
I																														
J																													1	1
K																		1												1
L														1	6	5		2	2		6	3	1	4	1	1	1		6	5	44
M															4		1	1				3	1				1				11
TOT						1								1	10	10	1	12	2		9	8	2	6	3	1	6	3	12	11	98

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Diagnosis: *Accalathura* with apex of telson serrated; telson indurated, carinate. Endopod of uropod strap-like, not lanceolate nor pointed. Posterolateral angles of pereonite VII produced backwards to embrace pleonite 1. Eyes present, situated at anterolateral angles of cephalon (from Menzies and Glynn, 1968).

Distribution: Tropical Atlantic: Bahamas, West Indies, Brazil; Gulf of Mexico: central west Florida shelf; Yucatan.

Remarks: Richardson (1905) did not have a male specimen and hence did not observe the brush-like flagellum of antenna 1. Barnard (1925) illustrated the unique appendix masculinum of the male, and his drawing is nearly identical with the one we present for this species. Single ovigerous females were found in March and April. Adult males were rare; single specimens were found in March, May, August, and October. Specimens were found throughout all months and usually were taken in dredge samples. Of 51 captures, 29 occurred at depths of 55 m and 12 were from 73 m. Specimens were rare at 37 and 18 m stations, and none were taken from 6 m depths (Table 5).

Suborder Flabellifera

Diagnosis: Isopoda with lateral uropods and seven pairs of pereopods. Males and females similar in general body form. Body ovoid in cross section, less than six times as long as wide. Composed of two dissimilar groups: I. Sphaeromid type: pleon consisting of minute (concealed) first somite and large second segment formed by fusion of remaining pleonites plus swollen pleotelson; pleopods contained within vaulted pleotelson instead of being freely exposed. II. Cirolanid type: pleonites clearly visible, seldom fused, with pleopods extending below each pleonite.

Remarks: Menzies and Glynn (1968) listed 64 flabelliferans for the Gulf and Caribbean. Our list now totals 97 species (Table 6). Seventeen of the expected species are in the Hourglass collections, and one other is described as new.

We included *Aegathoa* Dana in the list and key but omitted its species since this genus is comprised of young of other cymothoids. Schultz (1969) diagnosed three western Atlantic forms. *Meinertia transversa* (Richardson), never adequately illustrated, probably also represents an immature specimen since uropodal rami and pleotelson are shown as "ciliated" distally in Richardson (1900; 1901; 1905).

Conspecificity of *Sphaeroma terebrans* Bate, 1866 (described from Brazil and subsequently reported from Florida and many Indo-Pacific localities) with *Sphaeroma destructor* Richardson, 1897 (originally described from Florida) has received some attention during the past seventy years. Estevez and Simon (1975) summarized these discussions, agreeing with previous conclusions that the two are identical and *terebrans* is the correct name for the Florida species. Herein we treat *S. terebrans* and *S. destructor* as conspecific but feel that more study is needed to resolve this problem. In our opinion, suture lines of the pleon of sphaeromids are more reliable indicators of species differences than are tuberculations, ridges or color patterns. We have compared syntypes of *S. destructor* with specimens of *S. terebrans* from Brazil, Africa and India and have found no major differences in pleonal sutures, but have also found that no one to date has correctly illustrated the pleonal sutures.

We included *Exosphaeroma crenulata* (Richardson) in the key with the group having a rounded margin of the pleotelson. Menzies and Glynn (1968) examined the type specimen and found it to have the pleotelson apex medially emarginate. This notch was not visible in the dorsal view presented by Richardson (1905).

We omitted *Cymothoa lanceolata* Say, 1818 from our list and key. Richardson (1905) stated that she saw the type specimen and referred it to the genus *Nerocila*. According to Schultz (1969), the species has not been encountered since Say's collection; thus, it is improbable that it will be found in the Gulf of Mexico or Caribbean. The holotype of *N. lanceolata* should be re-examined to determine the validity of the species.

TABLE 6. FLABELLIFERA KNOWN OR EXPECTED TO OCCUR IN THE GULF OF MEXICO AND CARIBBEAN.

Serolidae
- *1. *Serolis mgrayi* Menzies and Frankenberg, 1966

Sphaeromidae
- *2. *Sphaeroma quadridentata* Say, 1818
- 3. *Sphaeroma terebrans* Bate, 1866 [= *Sphaeroma destructor* Richardson, 1897]
- 4. *Sphaeroma walkeri* Stebbing, 1904
- 5. *Exosphaeroma alba* Menzies and Glynn, 1968
- 6. *Exosphaeroma producatelson* Menzies and Glynn, 1968
- 7. *Exosphaeroma diminuta* Menzies and Frankenberg, 1966
- 8. *Exosphaeroma crenulata* (Richardson, 1902)
- *9. *Cymodoce faxoni* (Richardson, 1905) [= *Exosphaeroma antillense* Richardson, 1912; = *Exosphaeroma barrerae* Boone, 1918]
- 10. *Paradynamene benjamensis* Richardson, 1905
- 11. *Geocerceis barbarae* Menzies and Glynn, 1968
- 12. *Cerceis carinata* Glynn, 1970
- 13. *Discerceis linguicauda* (Richardson, 1901)
- *14. *Paracerceis caudata* (Say, 1818) [= *Exosphaeroma yucatanum* (Richardson, 1901); = *Paracerceis tomentosa* Schultz and McCloskey, 1967]
- 15. *Paracerceis edithae* Boone, 1930
- 16. *Paracerceis nuttingi* (Boone, 1921)

*Species in Hourglass collections

TABLE 6 (cont.). FLABELLIFERA KNOWN OR EXPECTED TO OCCUR IN THE GULF OF MEXICO AND CARIBBEAN.

Sphaeromidae
17. *Dynamenella barnardi* Menzies and Glynn, 1968
18. *Dynamenella acutitelson* Menzies and Glynn, 1968
19. *Dynamenella perforata* (Moore, 1902) [= *Dynamene moorei* Richardson, 1905]
20. *Dynamenella dianae* (Menzies, 1962)
21. *Dynamenella quadripunctata* Menzies and Glynn, 1968
22. *Dynamenella angulata* (Richardson, 1901)
23. *Dynamenella tumidicauda* Glynn, 1970
24. *Dynamenella plicatura* Glynn, 1970
25. *Ancinus depressus* (Say, 1818)
26. *Cassidinidea lunifrons* (Richardson, 1900)
27. *Cassidinidea ovalis* (Say, 1818)
28. *Dies barnardi* Carvacho, 1977

Limnoriidae
29. *Paralimnoria andrewsi* (Calman, 1910)
30. *Limnoria platycauda* Menzies, 1957
31. *Limnoria pfefferi* Stebbing, 1904
32. *Limnoria simulata* Menzies, 1957
33. *Limnoria saseboensis* Menzies, 1957
34. *Limnoria tripunctata* Menzies, 1951

Cymothoidae
Aegathoa spp. [= juveniles of other Cymothoidae]
*35. *Nerocila acuminata* Schiödte and Meinert, 1883
36. *Anilocra laticauda* Milne Edwards, 1840
37. *Anilocra acuta* Richardson, 1910
38. *Anilocra plebia* Schiödte and Meinert, 1883
39. *Olencira praegustator* (Latrobe, 1802)
40. *Agarna cumulus* (Haller, 1880) [= *Agarna carinata* Schiödte and Meinert, 1883]
41. *Ceratothoa impressa* (Say, 1818)
42. *Meinertia deplanata* (Bovallius, 1885)
43. *Meinertia transversa* Richardson, 1900 [possibly juvenile of another cymothoid]
44. *Cymothoa oestrum* (Linné, 1758)
45. *Cymothoa excisa* Perty, 1833
*46. *Cymothoa caraibica* Bovallius, 1885
47. *Telotha henselii* (von Martens, 1869)
48. *Mothocya nana* (Schiödte and Meinert, 1884) [= *Irona nana* Schiödte and Meinert, *fide* Schultz, 1969]
49. *Lironeca tenuistylis* Richardson, 1912
50. *Lironeca redmanni* Leach, 1818
51. *Lironeca texana* Pearse, 1952
52. *Lironeca orinoco* Bowman and Ungría, 1957
53. *Lironeca symmetrica* Van Name, 1925
54. *Lironeca reniformis* Menzies and Frankenberg, 1966
55. *Lironeca ovalis* (Say, 1818)

Aegidae
*56. *Aega antillensis* Schiödte and Meinert, 1880
57. *Aega dentata* Schiödte and Meinert, 1880
58. *Aega incisa* Schiödte and Meinert, 1880
59. *Aega webbii* (Guérin, 1836)
60. *Aega ecarinata* Richardson, 1898
61. *Aega ornata* Richardson, 1911
62. *Aega psora* (Linné, 1761)
63. *Aega tenuipes* Schiödte and Meinert, 1880
64. *Aega gracilipes* Hansen, 1895
*65. *Rocinela signata* Schiödte and Meinert, 1880
66. *Rocinela dumerilii* (Lucas, 1849)
67. *Rocinela insularis* Schiödte and Meinert, 1880
68. *Rocinela cubensis* Richardson, 1898
69. *Rocinela oculata* Harger, 1883

Excorallanidae
70. *Excorallana fissicauda* (Hansen, 1890)
71. *Excorallana oculata* (Hansen, 1890)
72. *Excorallana warmingii* (Hansen, 1890)
*73. *Excorallana tricornis* (Hansen, 1890)
*74. *Excorallana mexicana* Richardson, 1905
75. *Excorallana sexticornis* (Richardson, 1901)
76. *Excorallana quadricornis* (Hansen, 1890)
77. *Excorallana subtilis* (Hansen, 1890)
*78. *Excorallana antillensis* (Hansen, 1890)
*79. *Nalicora rapax* Moore, 1902

Corallanidae
*80. *Alcirona krebsii* Hansen, 1890 [= *Alcirona insularis* Hansen, 1890; = *Alcirona hirsuta* Moore, 1902; = *Alcirona maldivensis* Stebbing, 1904]

Cirolanidae
81. *Colopisthus parvus* Richardson, 1902
82. *Bathynomus giganteus* Milne Edwards, 1879
83. *Conilera cylindracea* (Montagu, 1804)
84. *Oncilorpheus stebbingi* Paul and Menzies, 1971
85. *Eurydice spinigera* Hansen, 1890
86. *Eurydice convexa* Richardson, 1900
*87. *Eurydice littoralis* (Moore, 1902)
*88. *Eurydice piperata* Menzies and Frankenberg, 1966
89. *Hansenolana sphaeromiformis* (Hansen, 1890)
90. *Excirolana mayana* (Ives, 1892)
91. *Excirolana brasiliensis* Richardson, 1912
92. *Cirolana minuta* Hansen, 1890
93. *Cirolana obtruncata* Richardson, 1901
*94. *Cirolana parva* Hansen, 1890
*95. *Cirolana borealis* Lilljeborg, 1851
96. *Cirolana gracilis* Hansen, 1890
*97. *Cirolana polita* (Stimpson, 1854)

*Species in Hourglass collections

A KEY TO GULF AND CARIBBEAN MARINE FLABELLIFERA

1. Body greatly depressed dorsoventrally (Serolidae) ..... *Serolis mgrayi* Menzies and Frankenberg

1. Body not greatly depressed dorsoventrally 2

2. Pleon and pleotelson form a vault enclosing pleopods not visible in lateral view; animal capable of rolling into compact ball (Sphaeromidae) 3

2. Pleon and pleotelson not vaulted and not enclosing pleopods which are visible in lateral view; does not roll into compact ball 29

3. Exopod of uropod absent ..... *Ancinus depressus* (Say)

3. Exopod of uropod present 4

4. Exopod of uropod reduced in length and contained within margin of endopod 5

4. Exopod of uropod not rudimentary, not contained within margin of endopod 7

5. Penis with single process ..... *Dies barnardi* Carvacho

5. Penis with double process 6

6. Apex of pleotelson truncate ..... *Cassidinidea lunifrons* (Richardson)

6. Apex of pleotelson obtusely triangulate ..... *Cassidinidea ovalis* (Say)

7. Articles 2, 3, or 4 of maxillipedal palp not produced into lobes 8

7. Articles 2, 3, or 4 of maxillipedal palp produced into lobes; usually all are lobed 11

8. Apex of pleotelson medially emarginate ..... *Paradynamene benjamensis* Richardson

8. Apex of pleotelson not emarginate 9

9. Dorsum of pleotelson smooth ..... *Sphaeroma quadridentata* Say

9. Dorsum of pleotelson with stout tubercles 10

10. Dorsum of pleotelson with four stout tubercles in transverse row near anterior margin ..... *Sphaeroma terebrans* Bate

10. Dorsum of pleotelson with two longitudinal rows of stout tubercles near midline ..... *Sphaeroma walkeri* Stebbing

11. Exopod of pleopod 4 partially two-jointed, suture incomplete 12

11. Exopod of pleopod 4 fully two-jointed, suture complete, or exopod entire, lacking suture 13

12. Stylus of male pleopod 2 with apex enlarged; apex of pleotelson with slight median indentation ..... *Exosphaeroma alba* Menzies and Glynn

12. Stylus of male pleopod 2 without apex enlarged; apex of pleotelson rounded, lacking indentation ..... *Exosphaeroma productatelson* Menzies and Glynn

13. Exopod of pleopod 4 two-jointed, suture complete 14

13. Exopod of pleopod 4 entire, lacking suture 16

14. Apex of pleotelson trilobed ..... *Cymodoce faxoni* (Richardson)

14. Apex of pleotelson evenly rounded 15

15. Lateral margin of exopod of uropod crenulate; first pereonal segment subequal in length to second ..... *Exosphaeroma crenulata* (Richardson)

15. Lateral margin of exopod of uropod smooth, not crenulate; first pereonal segment 1.5 times length of second..... *Exosphaeroma diminutum* Menzies and Frankenberg

16. Posterior margin of pleotelson with deep submedian cleft on each side of broad, median projection; projection extending posteriorly beyond submedian teeth formed by clefts ... . *Discerceis linguicauda* (Richardson)

16. Posterior margin of pleotelson medially emarginate or evenly rounded 17

17. Dorsum of pleotelson with three tubercles, lateral ones rounded, median one long, acute..... ..... *Dynamenella angulata* (Richardson)

17. Dorsum of pleotelson with or without tubercles but lacking long, acute median one ... 18

18. Exopod of pleopod 3 unjointed 19

18. Exopod of pleopod 3 two-jointed..... 20

19. Inner third of endopod of pleopod 1 indurate, unlike outer ramus..... ..... *Dynamenella barnardi* Menzies and Glynn

19. Inner third of endopod of pleopod 1 membranous, like exopod .... *Geocerceis barbarae* Menzies and Glynn

20. Cephalon with prominent dorsolateral ridges; dorsum of pleotelson with long, medial carina, extending nearly to posterior margin..... *Cerceis carinata* Glynn

20. Cephalon lacking dorsolateral ridges; dorsum of pleotelson lacking long, medial carina.... 21

21. Exopod of uropod of adult male elongate, tubular, longer than endopod; apex of uropod of female and young male truncate..... 22

21. Exopod of uropod of adult male flattened, similar to length of endopod; apex of uropod of female and young male not truncate 24

22. Pleotelson of adult male with two spines at anterior end of medial cleft .... *Paracerceis caudata* (Say)

22. Pleotelson of adult male with one spine at anterior end of medial cleft..... 23

23. Single median spine on margin of pleotelson nearly as long as cleft depth .... *Paracerceis edithae* Boone

23. Single median spine on margin of pleotelson about half as long as cleft depth..... ..... *Paracerceis nuttingi* (Boone)

24. Adult male penes short, blunt at apex..... *Dynamenella acutitelson* Menzies and Glynn

24. Adult male penes long, slender, pointed..... 25

25. Dorsum of pleotelson covered with numerous minute, evenly dispersed tubercles .... *Dynamenella perforata* (Moore)

25. Dorsum of pleotelson with few stout tubercles or carinae 26

26. Pleonal sutures separate, not united anterior to pleonal margin; antennal flagellum with eleven articles ..... *Dynamenella quadripunctata* Menzies and Glynn

26. Pleonal sutures united anterior to pleonal margin, Y-shaped; antennal flagellum with more than twelve articles 27

27. Posterior area of pleotelson bulbous; pleonal sutures united near to posterior margin of pleon ..... *Dynamenella tumidicauda* Glynn

27. Posterior area of pleotelson not noticeably bulbous; pleonal sutures united far anterior to posterior margin of pleon 28

28. Mesial tubercle or carina on dorsum of pleotelson immediately anterior to foramen or marginal indentation; anterior margin of cephalon with low, shelf-like extension..... ..... *Dynamenella dianae* (Menzies)

28. Pleotelson lacking tubercle or carina anterior to foramen; anterior margin of cephalon not produced ..... *Dynamenella plicatura* Glynn

29. Wood boring; uropodal rami tubular or claw-like (Limnoriidae)..... 30

29. Free living or parasitic; uropodal rami fan-like 35

30. Uropodal rami similar, elongate, with a spine..... *Paralimnoria andrewsi* (Calman)

30. Uropodal exopod a simple claw, much shorter than endopod..... 31

31. Dorsum of pleotelson smooth, devoid of tubercles..... *Limnoria platycauda* Menzies

31. Dorsum of pleotelson tuberculate or carinate 32

32. Flagellum of antenna 2 with four articles 33

32. Flagellum of antenna 2 with five articles 34

33. Dorsum of pleotelson with pair of longitudinal carinae ..... *Limnoria pfefferi* Stebbing

33. Dorsum of pleotelson with pair of tubercles near anterior margin .... *Limnoria simulata* Menzies

34. Dorsum of pleotelson foveolate, with pair of tubercles each followed by carina in anterior half..... *Limnoria saseboensis* Menzies

34. Dorsum of pleotelson not foveolate, with three tubercles, one ventral and two lateral in anterior half ..... *Limnoria tripunctata* Menzies

35. All pereopods prehensile, with strongly curved claws (Cymothoidae)..... 36

35. Not all pereopods prehensile..... 58

36. Posterior margin of uropodal rami with fringing setae 37

36. Posterior margin of uropodal rami without fringing setae 38

37. Eyes large, occupying much of dorsum of cephalon ..... *Aegathoa* Dana

37. Eyes small, almost obscure, located at posterolateral margin of cephalon..... ..... *Meinertia transversa* Richardson

38. Anterolateral margins of pereonite I not extended forward embracing cephalon 39

38. Anterolateral margins of pereonite I extended forward, embracing cephalon; posterior border of cephalon immersed in pereonite I 43

39. Posterior angles of pereonites prominent, those of somites V-VII greatly produced and pointed ..... *Nerocila acuminata* Schiödte and Meinert

39. Posterior angles of pereonites II-VII scarcely produced 40

40. Body relaxed, somites separated; cephalon constricted at base ..... *Olencira praegustator* (Latrobe)

40. Body compact, somites contiguous; cephalon not constricted at base 41

41. Endopod of uropod shorter than exopod ..... *Anilocra plebia* Schiödte and Meinert

41. Endopod of uropod as long as or longer than exopod 42

42. Endopod of uropod about as wide as exopod; both rami rounded distally ..... *Anilocra laticauda* Milne Edwards

42. Endopod of uropod wider than exopod, pointed distally ..... *Anilocra acuta* Richardson

43. Antennae 1 contiguous at base or nearly so 44

43. Antennae 1 widely separated at base 46

44. Basal segments of antennae 1 compressed ..... *Agarna cumulus* (Haller)

44. Basal segments of antennae 1 dilated 45

45. Claws of pereopods long, those of pereopod 3 longest ..... *Ceratothoa impressa* (Say)

45. Claws of pereopods short, all equal in length ..... *Meinertia deplanata* (Bovallius)

46. Pleon abruptly narrower than pereonite VII 47

46. Pleon and pereon forming continuous convex body margin 50

47. Pereon broadly ovate, about twice as wide as pleon ..... *Telotha henselii* (von Martens)

47. Pereon not ovate, about 1.3 to 1.5 times as wide as pleon 48

48. Anterolateral angles of pereonite I of female extend to anterior margin of cephalon ..... *Cymothoa oestrum* (Linné)

48. Anterolateral angles of pereonite I of female not extending to anterior margin of cephalon 49

49. Anterolateral angles of pereonite I broad throughout; anterior margin of cephalon flatly rounded ..... *Cymothoa caraibica* Bovallius

49. Anterolateral angles of pereonite I narrow, acutely produced; anterior margin of cephalon broadly indented medially ..... *Cymothoa excisa* Perty

50. Pleon deeply immersed in pereon, greatly enveloped by pereonite VII ..... *Mothocya nana* (Schiödte and Meinert)

50. Pleon scarcely immersed in pereon 51

51. Uropods extending far beyond apex of pleotelson 52

51. Uropods not extending beyond apex of pleotelson 53

52. Posterior margin of pereonite VII trisinuate; anterolateral angles of pereonite I extend about one-third length of cephalon ..... *Lironeca redmanni* Leach

52. Posterior margin of pereonite VII convex, not trisinuate; anterolateral angles of pereonite I scarcely extended ..... *Lironeca tenuistylis* Richardson

53. Pleonites not immersed in pereon ..... *Lironeca ovalis* (Say)

53. Pereon enveloping at least first pleonite 54

54. Posterior margin of pleotelson acuminate ..... *Lironeca symmetrica* Van Name

54. Posterior margin of pleotelson indented, rounded or pointed, not acuminate 55

55. Pleonites extend laterally on at least one side well beyond lateral margin of pereonites and pleotelson ..... *Lironeca texana* Pearse

55. Pleonites do not extend laterally beyond lateral margins of pereonites or telson 56

56. Body axis of males curved ..... *Lironeca reniformis* Menzies and Frankenberg

56. Body axis of males straight 57

57. Pereon slightly convex dorsally; pereonites without transverse grooves ..... *Lironeca tropicalis*, n. sp.

57. Pereon markedly convex dorsally; pereonites with transverse grooves ..... *Lironeca orinoco* Bowman and Ungría

58. All pereopods ambulatory; mandibles mostly tridentate, with lacinia mobilis and toothed molar process (Cirolanidae) 83

58. Some pereopods more or less specialized for clinging; mandibles not as above 59

59. Apical articles of maxillipedal palp with recurved hooks (Aegidae) 60

59. Apical articles of maxillipedal palp with setae but without recurved hooks 73

60. Maxillipedal palp biarticulate 69

60. Maxillipedal palp with five articles 61

61. Eyes touching middorsally 62

61. Eyes separated middorsally 65

62. Pleotelson with medial notch on posterior margin ..... *Aega incisa* Schiödte and Meinert

62. Pleotelson without medial notch 63

63. Pleotelson dentate ..... *Aega dentata* Schiödte and Meinert

63. Pleotelson without dentition 64

64. Pleotelson triangular, pointed distally; uropodal endopod with lateral notch ..... *Aega antillensis* Schiödte and Meinert

64. Pleotelson broadly rounded; uropodal endopod entire ..... *Aega tenuipes* Schiödte and Meinert

65. Pleotelson with five lateral incisions, each ending at a tubercle ..... *Aega ornata* Richardson

65. Pleotelson without lateral incisions 66

66. Pleotelson triangular, no lateral dentition; rostrum pointed, extending well beyond antennal peduncles ..... *Aega psora* (Linné)

66. Pleotelson otherwise; rostrum lacking or short 67

67. Uropodal endopod sulcate; apex of pleotelson pointed, dentate distally ..... *Aega gracilipes* Hansen

67. Uropodal margins entire; posterior margin of pleotelson concave or sinuate 68

68. Posterior margin of pleotelson sinuate ..... *Aega ecarinata* Richardson

68. Posterior margin of pleotelson concave ..... *Aega webbii* (Guérin)

69. Eyes touching middorsally ..... *Rocinela oculata* Harger

69. Eyes separated middorsally 70

70. Flagellum of antenna 2 composed of 10-12 articles ..... *Rocinela signata* Schiödte and Meinert

70. Flagellum of antenna 2 (longer pair) composed of 14-16 articles 71

71. Eyes almost touching middorsally ..... *Rocinela insularis* Schiödte and Meinert

71. Eyes distinctly separated middorsally 72

72. Cephalon bicarinate, carinae separated by median groove; front of cephalon produced over basal articles of antennae ..... *Rocinela dumerilii* (Lucas)

72. Cephalon without carinae; anterior margin of cephalon produced into rounded, spatulate process ..... *Rocinela cubensis* Richardson

73. Distal half of mandibles narrow, most or all concealed by labrum and clypeus; maxillipedal palp not narrow, segments not elongate (Corallanidae) ..... *Alcirona krebsii* Hansen

73. Distal half of mandibles with stout, prominent process, very conspicuous, or only anterior margin concealed; maxillipedal palp narrow, articles 2 or 3 elongate, at least twice as long as articles 1 or 4 (Excorallanidae) 74

74. Second article of maxillipedal palp elongate, more than twice length of first; maxilla 1 with recurved claw and mesial lobe ..... *Nalicora rapax* Moore

74. Article 3 of maxillipedal palp elongate, more than twice length of articles 2 or 4; maxilla 1 robust but without mesial lobe 75

75. Eyes touching middorsally 76

75. Eyes separated middorsally 78

76. Pleotelson widely excavated medially on distal margin ... *Excorallana fissicauda* (Hansen)

76. Pleotelson with apex pointed or broadly rounded, not excavated 77

77. Pleotelson pointed, with fissure near middle of lateral margin ..... *Excorallana oculata* (Hansen)

77. Pleotelson broadly rounded, without fissure at lateral margin ..... *Excorallana warmingii* (Hansen)

78. Apical part of left mandible distinctly trifid; clypeus and labrum conspicuous, not obscured by mandibles 79

78. Apical part of left mandible obscurely trifid or single-toothed; clypeus and labrum usually entirely covered by mandibles 81

79. Cephalon of male with three tubercles or horns; pereon not tuberculate ..... *Excorallana tricornis* (Hansen)

79. Cephalon of male with one or two pairs of tubercles 80

80. Cephalon of male with single pair of dorsal tubercles; pereon tuberculate ..... *Excorallana mexicana* Richardson

80. Cephalon of male with four blunt spines or tubercles, first two small, second two very large; pereon tuberculate, with submedial pair of tubercles on pereonite I near anterior edge ..... *Excorallana sexticornis* (Richardson)

81. Cephalon of male with two pairs of horn-like tubercles ..... *Excorallana quadricornis* (Hansen)

81. Cephalon of male lacking tubercles 82

82. Pleonites 4 and 5 with deep longitudinal excavation in middorsal line, ornamented with many carinae and tubercles; apex of pleotelson with four two-pointed setae ..... *Excorallana antillensis* (Hansen)

82. Pleonites 4 and 5 without deep excavation, not ornamented with carinae or tubercles; apex of pleotelson with two two-pointed setae ..... *Excorallana subtilis* (Hansen)

83. Pleon with one pleonal segment indicated dorsally plus pleotelson; lateral margin of pereonite I crenulate ..... *Colopisthus parvus* Richardson

83. More than one pleonite distinct dorsally 84

84. Pleopod 1 with one or both rami indurated, operculiform 85

84. Pleopod 1 not indurated nor operculiform 86

85. Exopod of pleopod 1 indurated ..... *Oncilorpheus stebbingi* Paul and Menzies

85. Both rami of pleopod 1 indurated ..... *Conilera cylindracea* (Montagu)

86. Endopods of pleopods with branchial tufts ..... *Bathynomus giganteus* Milne Edwards

86. Endopods of pleopods without branchial tufts 87

87. Uropods insert ventrolaterally, scarcely visible in dorsal view; peduncle of antennae 2 composed of four articles 88

87. Uropods insert laterally, forming caudal fan; peduncle of antennae 2 composed of five articles 91

88. Distal margin of pleotelson incised medially ..... *Eurydice spinigera* Hansen

88. Apex of pleotelson broadly rounded or trunctated 89

89. Apex of pleotelson truncated, with four stout, two-pointed setae much shorter than plumose setae between them ..... *Eurydice piperata* Menzies and Frankenberg

Material examined: HOURGLASS STATION C: 1 ♀; 8 September 1966; trawl; FSBC I 18308.

Diagnosis: *Sphaeroma* having evenly rounded pleotelsonal apex; dorsum of pleotelson smooth, without carinae or tuberculations. Exopods of uropods serrated.

Distribution: Atlantic coast of North America to Key West and western Florida.

Remarks: In all probability this record is an artifact of collecting. We suspect the animal was transported with the fouling of the ship. It was not found at other stations and is normally intertidal, usually occurring in empty barnacle shells and similar habitats. Miller (1968) reported the species from a nearshore buoy in the vicinity of Tampa Bay, Menzel (1971) listed it as an uncommon member of the estuarine fauna at Alligator Harbor, northwest Florida, and Subrahmanyam et al. (1976) reported it as uncommon in tidal creeks near the latter locality.

Genus *Cymodoce* Leach, 1814

Diagnosis: Sphaeromid-type Flabellifera. Pleopods 4 and 5 with endopods thick, fleshy, having deep transverse folds; exopods thin, pellucid, two-jointed. Apex of pleotelson trilobed. Maxilliped with pronounced lobes on second to fourth articles of palp.

Type-species: *Cymodocea truncata* Leach, 1814.

Cymodoce faxoni (Richardson, 1905)

Figure 14

Exosphaeroma faxoni Richardson, 1905, pp. 292, 293, figs. 307, 308; Pearse and Wharton, 1938, p. 640.

Exosphaeroma antillense Richardson, 1912b, p. 191, fig. 1.

Exosphaeroma barrerae Boone, 1918, pp. 599, 600, pl. 90, figs. 2, 4.

Cymodoce faxoni: Menzies and Miller, 1955, pp. 292-296, figs. 1, 2; Rouse, 1969, p. 134; Schultz, 1969, p. 127, fig. 182; Lyons et al., 1971, p. 28.

Material examined: HOURGLASS STATION J: 1 ♀; 6 August 1965; dredge; FSBC I 18309.

Diagnosis: *Cymodoce* with pair of swollen tubercles on dorsum of pleotelson. Uropodal exopod styliform, twice as long as endopod (male).

Distribution: Texas and Florida, Gulf of Mexico.

Remarks: Rouse (1969) reported *Cymodoce faxoni* as abundant in eastern Florida Bay. The species was also common at more shoreward stations near Crystal River, Florida west coast (Lyons et al., 1971). It is apparently a constituent of more estuarine communities than those sampled during the Hourglass program.

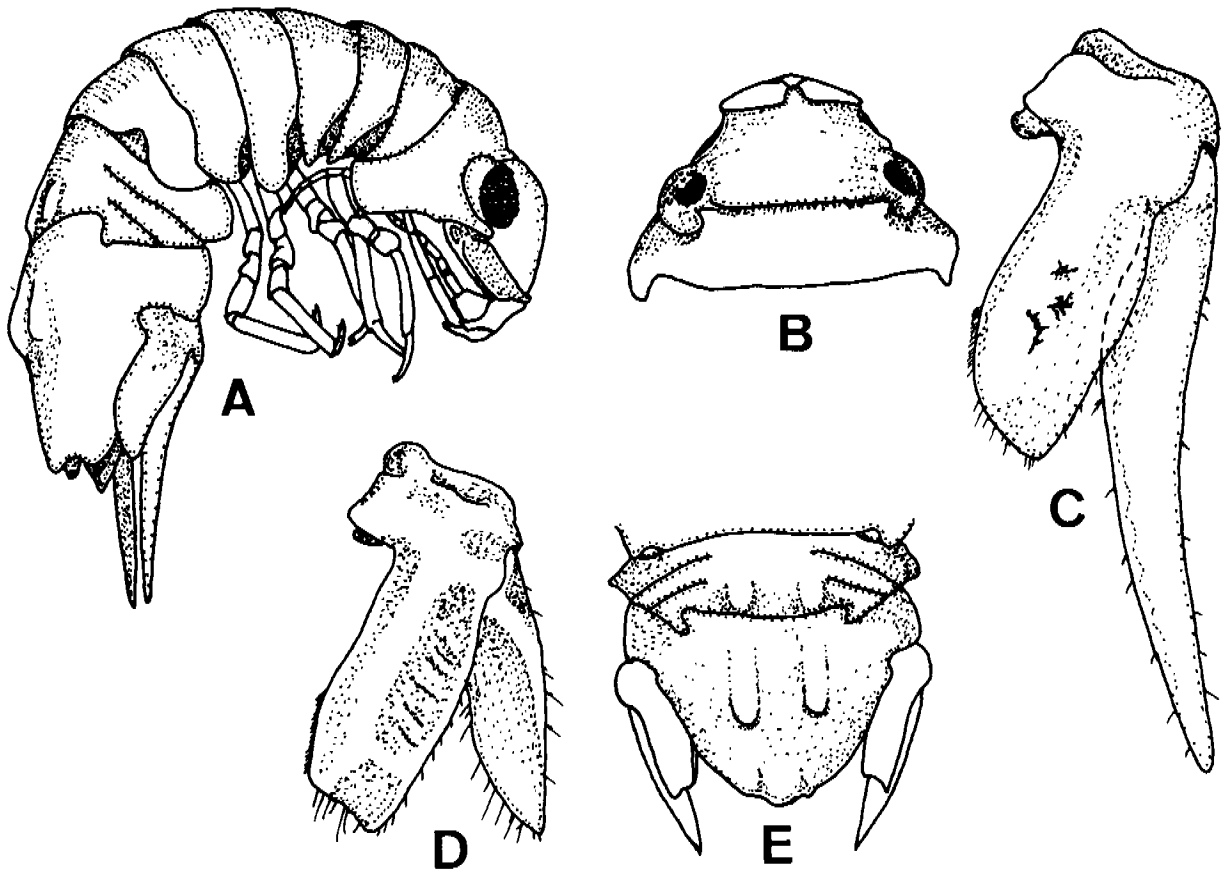

Figure 14. *Cymodoce faxoni* (Richardson). A. male, lateral view; B. cephalon and first pereonal segment, female; C. male uropod; D. female uropod; E. pleon, young male (from Menzies and Miller, 1955).

Genus *Paracerceis* Hansen, 1905

Diagnosis: Sphaeromid-type Flabellifera. Pleopods 4 and 5 with both rami fleshy and with deep transverse folds. Apex of male pleotelson deeply notched, with a pair or single denticle in notch terminus. Male without mesial process on sixth pereonite. Exopod of uropod about as large as or larger than endopod, greatly elongate in male.

Type-species: *Naesa caudata* Say, 1818.

Paracerceis caudata (Say, 1818)

Figure 15

Naesa caudata Say, 1818b, p. 482; Milne Edwards, 1840, p. 219.

Cymodocea caudata: Ives, 1892, p. 188, pl. 6, figs. 11-14.

Cymodocea bermudensis Ives, 1892, p. 194.

Ciliceae caudata: Richardson, 1899, p. 186; 1901, p. 536; 1905, pp. 314-318, figs. 343-348; Tabb and Manning, 1961, p. 593; 1962, p. 62; Menzel, 1971, p. 75.

Dynamene bermudensis: Richardson, 1901, p. 534.

Paracerceis caudata: Hansen, 1905b, pp. 108, 126; Pearse, 1934a, pp. 121, 122; 1952b, p. 233; Menzies and Frankenberg, 1966, pp. 46, 47, fig. 22; Menzies and Glynn, 1968, pp. 54, 55, fig. 22; Miller, 1968, pp. 13, 14, fig. 3; Rouse, 1969, p. 134; Schultz, 1969, p. 119, fig. 165; Lyons et al., 1971, p. 28; Menzel, 1971, p. 76.

Exosphaeroma yucatanum Richardson, 1905, p. 291, figs. 304-306; Menzies and Glynn, 1968, p. 54.

Paracerceis tomentosa Schultz and McCloskey, 1967, pp. 111, 112, figs. 69-75; Schultz, 1969, p. 119, fig. 166.

Material examined: HOURGLASS STATION B: 1 ♂, 1 ♀; 3 August 1965; trawl; FSBC I 18310. — 1 ♀; 30 August 1965; dredge; FSBC I 18311. — 2 ♂; 19 November 1965; trawl; USNM 170816. — 1 ♂; 20 February 1966; trawl; FSBC I 18312. — 2 ♂, 2 ♀; 3 March 1966; trawl; FSBC I 18313. — 1 ♀; 18 May 1966; dredge; FSBC I 18314. — 1 ♂; 10 July 1966; dredge; FSBC I 18317. — 1 ♂; 10 August 1966; dredge; FSBC 18319. — 1 ♂; 8 September 1966; trawl; FSBC I 18320. — 1 ♂; 19 November 1966; trawl; FSBC I 18321. — 1 ♂; 1 December 1966; trawl; FSBC I 18322. — 1 ♂; 20 January 1967; dredge; FSBC I 18323. — 1 ♂, 1 ♀; 5 February 1967; trawl; FSBC I 18324. — 1 ♀; 5 February 1967; dredge; FSBC I 18325. — 1 ♀; 27 February 1967; trawl; FSBC I 18326. — 3 ♂; 3 April 1967; trawl; FSBC I 18327. — 1 ♂, 1 ♀; 3 April 1967; dredge; FSBC I 18328. — 1 ♂, 1 ♀; 11 April 1967; trawl; FSBC I 18329. — 1 ♂, 1 ♀; 11 April 1967; dredge; FSBC I 18330. — 3 ♂, 1 ♀; 11 May 1967; trawl; FSBC I 18331. — 1 ♂; 11 May 1967; dredge; FSBC I 18332. — 2 ♂, 2 ♀; 20 May 1967; dredge; FSBC I 18333. — 1 ♂; 2 June 1967; dredge; FSBC I 18334. — 2 ♂; 1 July 1967; trawl; FSBC I 18335. — 4 ♂, 3 ♀; 11 July 1967; dredge; FSBC I 18337. — 1 ♂, 1 ♀; 11 August 1967; dredge; USNM 170817. — 2 ♂, 3 ♀; 31 August 1967; dredge; FSBC I 18338. — 4 ♂, 5 ♀; 11 September 1967; trawl; FSBC I 18340. — 3 ♂, 3 ♀; 11 September 1967; dredge; FSBC I 18341. — 1 ♀; 5 October 1967; trawl; FSBC I 18342. — 1 ♀; 25 October 1967; trawl; FSBC I 18343. — 1 ♂, 2 ♀; 25 October 1967; dredge; FSBC I 18344. — 1 ♂; 2 November 1967; trawl; FSBC I 18345. — 1 ♂; 2 November 1967; dredge; USNM 170818. — 1 ♂; 20 November 1967; trawl; FSBC I 18346. — 1 ♂; 20 November 1967; dredge; FSBC I 18347. — HOURGLASS STATION I: 1 ♂, 2 ♀; 5 August 1966; dredge; FSBC I 18318. — HOURGLASS STATION J: 1 ♂, 1 ♀; 12 June 1966; dredge; FSBC I 18315. — 1 ♂; 5 July 1966; dredge; FSBC I 18316. — 1 ♂; 5 July 1967; dredge; FSBC I 18336. — HOURGLASS STATION K: 2; 4 September 1966; trawl; USNM 170819. — 1 ♀; 4 September 1967; dredge; FSBC I 18339.

Diagnosis: Male with cordiform foramen at apex of pleotelson, two sharp teeth below foramen on midline, followed by second pair of sharp teeth; posterolateral projections bifid; dorsum of pleotelson with five stout tubercles, one on midline, two on either side; coalesced pleonites with transverse row of three stout tubercles. Uropodal endopod short, pointed; exopod elongated, tubular. Females with subequal uropodal rami; transverse row of three weak tubercles on dorsum of pleotelson.

Distribution: North Atlantic coast of America, from New Jersey to Florida Keys; Gulf of Mexico, from Florida Keys toYucatan; Caribbean, at Puerto Rico; Bahamas and Bermuda.

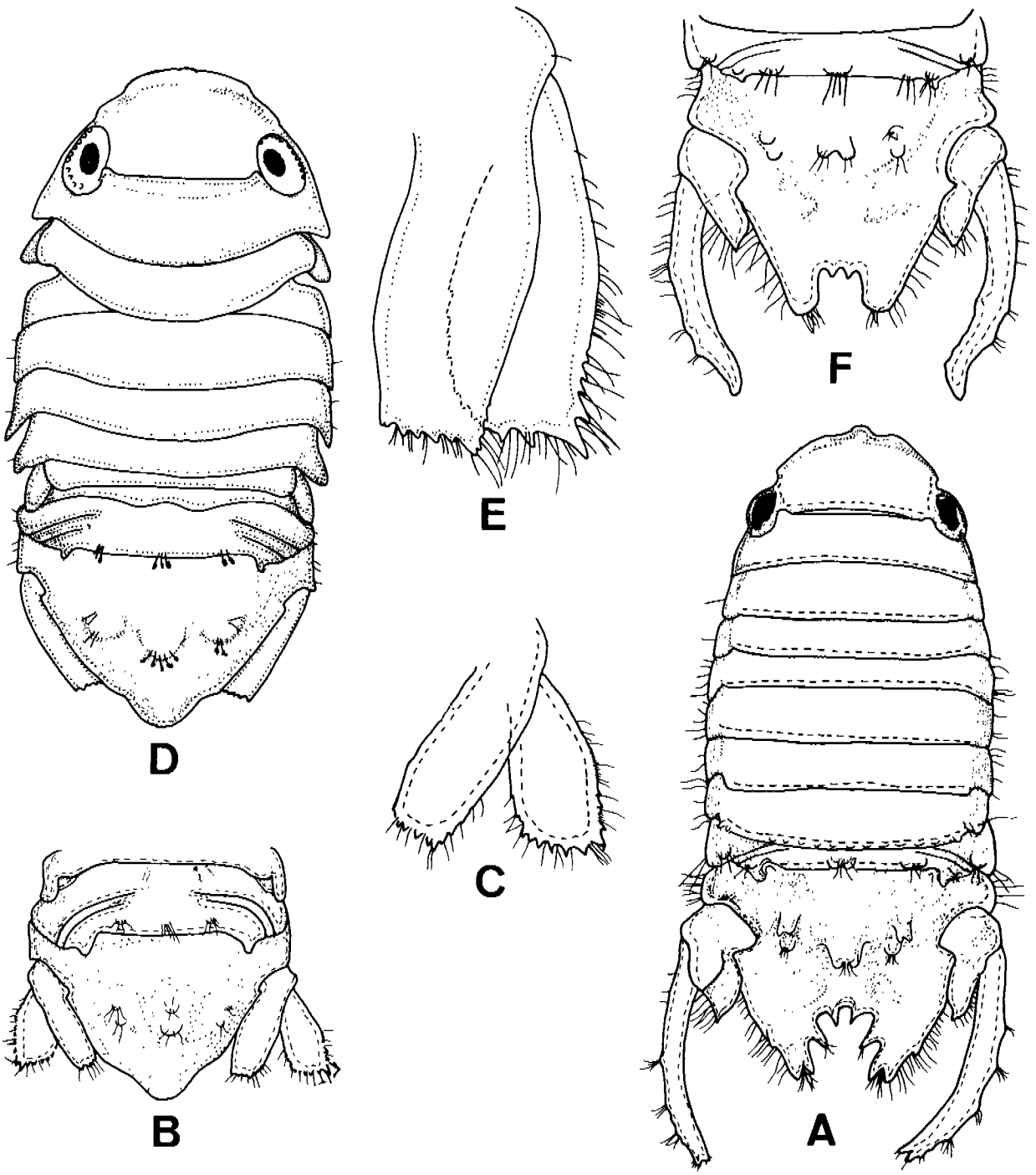

Figure 15. *Paracerceis caudata* (Say). A. adult male; B. female pleotelson; C. female uropod; D. adult female, dorsal view; E. adult female uropod; F. young male pleotelson (from Menzies and Glynn, 1968).

TABLE 7. MONTHLY ABUNDANCES OF *Paracerceis caudata*; DREDGE AND TRAWL SAMPLES COMBINED.

Paracerceis caudata

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1	2	1						4										1			3		5	5	1	2	2	5	1	2	34
B_2				2			1			1		1		1	1		1		1		1		4	4		7		15	4	2	46
C_1																															
C_2																															
D_1																															
D_2																															
E																															
I														3																	3
J											2	1													1						4
K															2													1			3
L																															
M																															
TOT	2	1		2			1	4		1	2	2		4	3		1	1	1		4		9	9	1	10	2	21	5	4	90

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Remarks: It is our opinion that the description of *Paracerceis tomentosa* by Schultz and McCloskey (1967) represents the female of *P. caudata* (Say). Schultz and McCloskey reported that the main difference between *P. caudata* and their species was presence of an apical notch at the posterior margin of the pleotelson in females of *P. caudata* which was absent from their specimens. We found this character to be variable with size and maturity in the large series available to us in the Hourglass collections. Since *P. tomentosa* was described from three immature females, it is herein considered a junior synonym of *P. caudata*. We suggest that species descriptions include male diagnoses in this very difficult and variable group.

The species was found during all months of the year. Gravid females occurred in March, April, June, July, September, and October; fourteen percent of all females were gravid. Most captures of this species were from 18 m depth. Specimens were not collected at depths greater than 37 m. Ninety percent were taken from Station B in the northern transect. They were captured about equally in dredge and trawl samples (Table 7).

Pearse (1934a) found *Paracerceis caudata* associated with the sponges *Stematumenia foetida* (Schmidt), *S. strobilina* (Lamarck), and *S. variabilis* (Schulze) at Dry Tortugas. He later (1952b) noted it in association with the ascidian *Styela plicata* (LeSueur) at Alligator Harbor, Florida.

Family Cymothoidae Leach, 1818

Diagnosis: Cirolanid-type Flabellifera with no clear distinction between flagellum and peduncle of antennae. Pleopoda without plumose marginal setae. All seven pereopods similar, with dactyls modified as large recurved hooks. Maxillipedal palp with two articles, last with stout, hook-like setae at apex (from Menzies and Glynn, 1968).

Remarks: Barnard (1914) assigned authorship of this family to Bate and Westwood (1868; Vol. 2, p. 274). Bate and Westwood, however, latinized the three groups of Cymothoadiens of Milne Edwards (1840), Cymothoadiens ravisseurs, C. errans, and C. parasites to Serolidae, Aegidae,

and Cymothoidae, respectively. Bate and Westwood (1868; Vol. 2, p. 110) credited Latreille for having divided the Isopoda into sections, one of which was the Cymothoada. Latreille's sections were suprageneric taxa which correspond to the suborders of Isopoda in our current classification, and his Cymothoada contained the genera *Cymothoa*, *Serolis*, and others. Bate and Westwood did not cite which of Latreille's papers they referred to on page 110, and we have not been able to give a date to his Cymothoada. Leach (1815) classified the four classes of Linné's Insecta and included *Cymothoa*, *Eurydice*, *Sphaeroma*, and others in Legion II, Section III, Division IV, Subdivision 2, and later (1818) included the genera of Subdivision 2 in the Cymothoadées. Bate and Westwood (1868; Vol. 2, p. 273) acknowledged Leach's (1818) use of Cymothoadées (Cymothoidae). Because of uncertainty of the date of Latreille's use of Cymothoada, we have assigned authorship of the family to Leach (1818) with the understanding that if the Latreille paper precedes that date, authorship will be changed accordingly. T. E. Bowman agrees with this decision (personal communication). Bate and Westwood (1868) cannot be considered for authorship since the International Code of Zoological Nomenclature (adopted by the XV International Congress of Zoology) states "A family-group name of which the suffix is incorrect is available with its original date and authorship, but in properly emended form" (Article 11e, ii).

Cymothoids were represented in Hourglass collections by three genera, each with one species. Species are parasitic and commensal on fishes.

Genus *Nerocila* Leach, 1818

Diagnosis: Cymothoidae with cephalon posteriorly produced into three lobes, not immersed in pereonite I. Anterior margin of pereonite I trisinuate at base. Posterolateral margins of pereonites strongly produced, spine-like, increasing in length from II to VII. Pleonal margins free from pereon, not covered at base or sides. Apex of pleotelson pointed (modified from Richardson, 1905).

Type-species: *Nerocila blainvillii* Leach, 1818.

Nerocila acuminata Schiödte and Meinert, 1883

Figure 16

Nerocila acuminata Schiödte and Meinert, 1881-1883, pp. 48-50, pl. 3, figs. 5, 6; Richardson, 1900, p. 220; 1901, p. 527; 1902, p. 291; 1905, pp. 220, 221, figs. 222, 223; Pearse, 1947, p. 326; 1952a, p. 39; Rouse, 1969, p. 133; Schultz, 1969, p. 152, fig. 225.

Pterisopodus bartschi Boone, 1918, pp. 596-598, pl. 89, figs. 2-5.

Material examined: HOURGLASS STATION C: 1 ♀; 18 July 1966; trawl; FSBC I 18348. — HOURGLASS STATION D: 1 ♀; 21 October 1965; trawl; USNM 170820. — 1 ♂; 6 February 1967; trawl; FSBC I 18351. — HOURGLASS STATION E: 1 ♂; 2 August 1966; trawl; FSBC I 18350. — HOURGLASS STATION L: 1 ♀; 22 July 1966; trawl; FSBC I 18349.

Diagnosis: *Nerocila* having rami of uropods lanceolate. Coxal plates of pereonites II-VII produced, pointed, extending beyond posterior margin of corresponding pereonites. Cephalon as long as wide.

Distribution: Atlantic Ocean, from Bermuda and Virginia to Florida and Cuba; Gulf of Mexico,

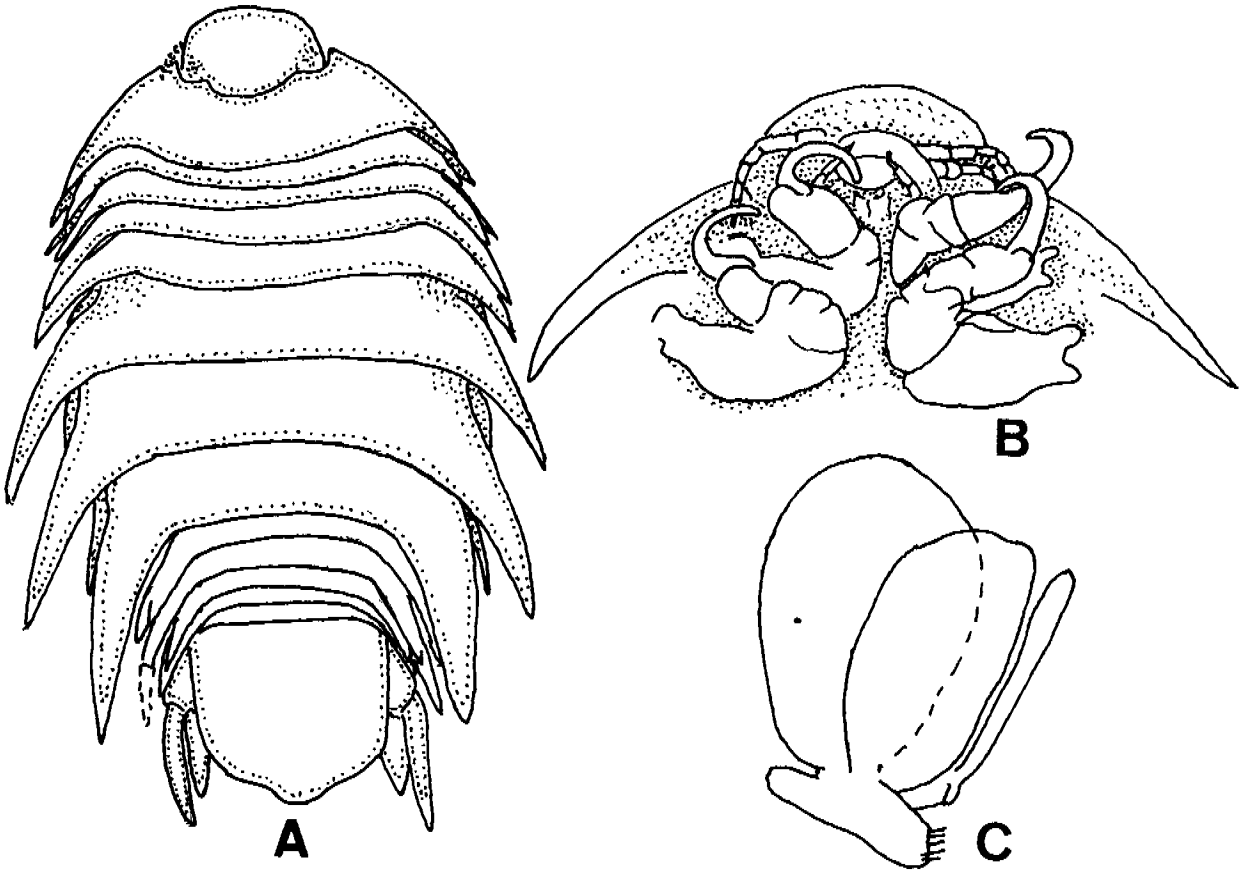

Figure 16. *Nerocila acuminata* Schiödte and Meinert. Female, FSBC I 18348: length 21.0 mm, width 11.0 mm. A. whole animal; B. cephalon and pereonite I, ventral view. Male, FSBC I 18350: C. pleopod 2.

from Florida Keys to Santa Ana, Mexico (Richardson, 1905).

Remarks: This species is a fish parasite. All three females collected were gravid; two were collected in July and one in October. Two females had more than 50 embryos in the brood pouch, and the third had 35 embryos. This species was collected at depths of 37, 55, and 73 m in the northern transect and at 55 m in the southern transect. All specimens were taken in trawl samples.

One female (USNM 170820) was attached to the fin of *Monacanthus ciliatus* (Mitchill). Richardson (1905) reported *Nerocila acuminata* as a parasite of the sawfish (*Pristis* sp.), as well as *Chaetodipterus faber* (Broussonet), *Sphaeroides maculatus* (Bloch and Schneider), *Aluterus shoepfi* (Walbaum), and *Lachnolaimus maximus* (Walbaum). Pearse (1947) found *N. acuminata* on *Larimus fasciatus* Holbrook, *Cynoscion regalis* (Bloch and Schneider), *Peprilus alepidotus* (Linné), *Prionotus carolinus* (Linné), *Chaetodipterus faber*, and *Lagadon rhomboides* (Linné) at Beaufort, North Carolina. In Texas, Pearse (1952a) reported the species on *Bagre marinus* (Mitchill), *Galeichthys* (= *Arius*) *felis* (Linné), *Diplectrum arcuatum* [= *D. bivittatum* (Valenciennes)], *Mugil cephalus* Linné, and *Promicrops* (= *Epinephelus*) *itajara* (Lichtenstein). Schultz (1969) added the dogfish to the list of known hosts. The species is generally found on the skin or fin(s) of the host.

Genus *Cymothoa* Fabricius, 1798

Diagnosis: Cymothoidae with cephalon more or less deeply immersed in pereonite I. First antennae widely separated at base. Pereonite I longer than pereonite II. Pleon immersed in pereonite VII. Uropoda of mature adult much shorter than pleotelson.

Type-species: *Oniscus oestrum* Linné, 1758.

Cymothoa caraibica (?) Bovallius, 1885

Figure 17

Cymothoa caraibica Bovallius, 1885, pp. 27-29, pl. 5, figs. 58-61; Richardson, 1905, pp. 252-254, fig. 262; Rouse, 1969, p. 134; Schultz, 1969, p. 160, fig. 242.

Cymothoa carabaica: Tabb and Manning, 1961, p. 593.

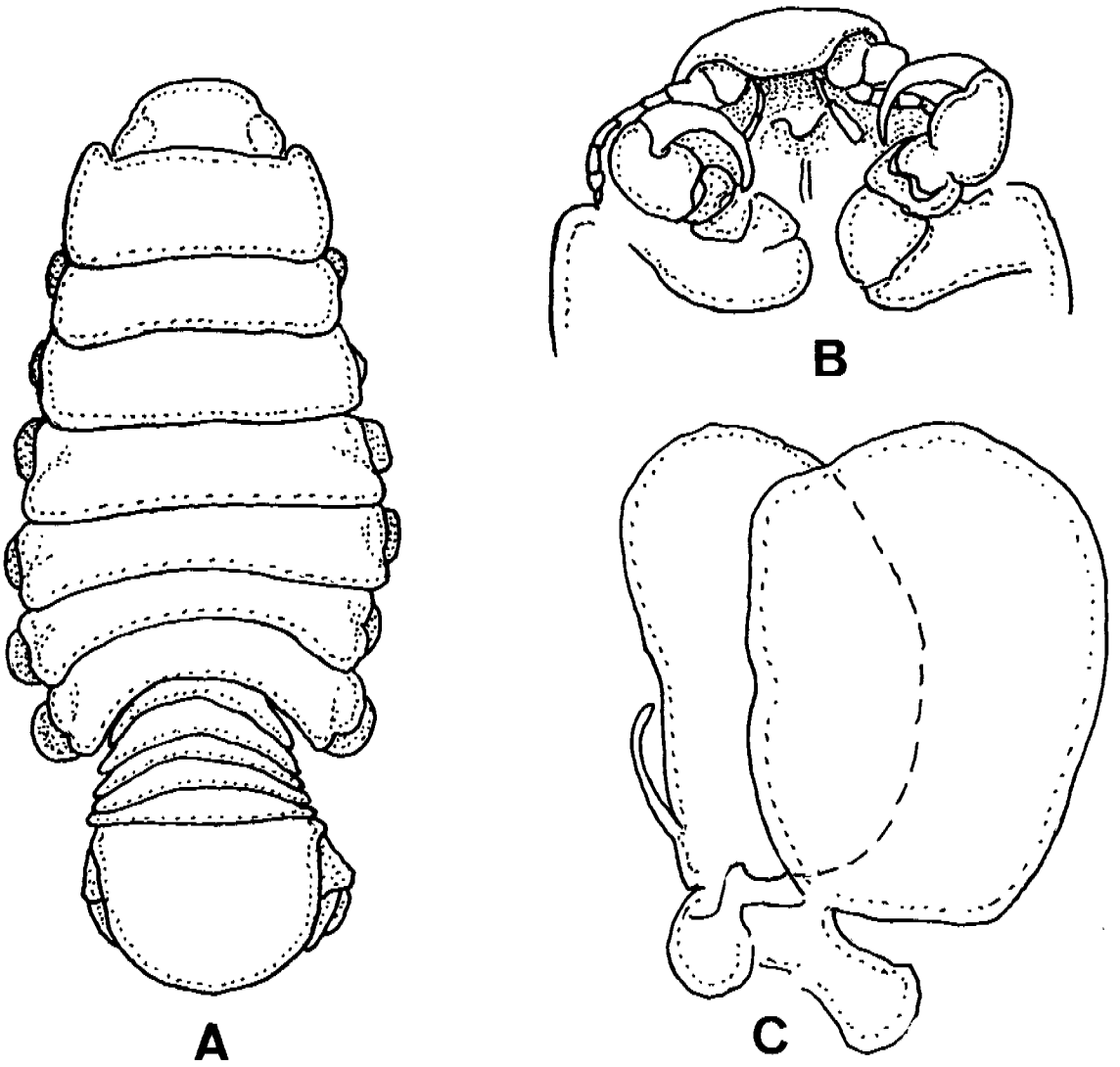

Figure 17. *Cymothoa caraibica* ? Bovallius. Female, FSBC I 18352: length 9.8 mm, width 4.2 mm. A. whole animal; B. cephalon, ventral view. Male, FSBC I 18352: length 8.3 mm, width 3.8 mm. C. pleopod 2.

Material examined: HOURGLASS STATION I: 1 ♂, 2 ♀; 6 June 1967; trawl; FSBC I 18352.

Diagnosis: *Cymothoa* with apex of pleon evenly rounded, not indented nor with dissimilar sides. Anterolateral angles of pereonite I projecting along sides of cephalon. First pereonite longer than cephalon and longer than pereonite II. First pleonite only slightly shorter than fifth. Eyes scarcely indicated in dorsal view, black in ventral view (from Richardson, 1905).

Distribution: Haiti and southwest Florida.

Remarks: Our specimens differ from the original description in having the cephalon slightly less quadrate and in having a narrower pleon. The appendix masculinum of our immature male does not reach the outer border of pleopod 2 as it does in Bovallius' specimen. Nevertheless, we do not feel the differences warrant specific separation until more specimens are available. Cymothoids are variable in gross morphology.

Three specimens were collected from one trawl sample at 6 m in the southern transect. Our specimens were not attached to fishes when collected, nor were the two specimens reported by Tabb and Manning (1961) from a trawl sample near Cape Sable, southwest Florida. We examined one specimen taken near Mullet Key, Florida, attached to a sciaenid, *Bairdiella chrysura* (Lacépède) (FSBC I 16585). This latter specimen possessed a slightly indented posterior margin of the pleotelson, while the pleotelson was broadly rounded in Hourglass specimens.

Genus *Lironeca* Leach, 1818

Diagnosis: Cymothoidae with cephalon deeply immersed in pereonite I. Antennae widely separated at base. Anterior margin of pereonite I trisinuate. Pleon not immersed in pereonite VII, more or less continuous with lateral borders of pereon (modified from Richardson, 1905).

Type-species: *Lironeca redmanni* Leach, 1818.

Lironeca tropicalis, new species

Figure 18

Material examined: HOURGLASS STATION B: 1 ♂; 20 November 1967; trawl; FSBC I 18380. — HOURGLASS STATION C: 1 ♂; 18 July 1966; trawl; FSBC I 18360. — 1 ♀; 2 November 1967; trawl; FSBC I 18376. — HOURGLASS STATION D: 1 ♀; 4 December 1965; trawl; USNM 170821. — 1 ♂; 21 February 1966; trawl; FSBC I 18355. — 1; 3 July 1966; trawl; FSBC I 18358. — 1 ♂, 11 mm (HOLOTYPE); 20 November 1966; trawl; USNM 170807. — 5 ♂ (PARATYPES); same; USNM 170809. — 1 ♂; 14 December 1966; trawl; FSBC I 18362. — 1 ♂, 1 ♀; 7 January 1967; trawl; FSBC I 18363. — 1 ♂; 2 August 1967; trawl; FSBC I 18370. — 3 ♂; 6 October 1967; trawl; FSBC I 18374. — HOURGLASS STATION E: 1 ♂; 9 October 1966; trawl; FSBC I 18361. — 2 ♂; 12 May 1967; trawl; FSBC I 18367. — 1 ♂; 2 August 1967; dredge; FSBC I 18371. — 1 ♂; 1 September 1967; trawl; FSBC I 18372. — 1 ♀, 1 juv.; 3 November 1967; trawl; FSBC I 18377. — HOURGLASS STATION K: 1 ♂; 11 October 1967; trawl; FSBC I 18375. — HOURGLASS STATION L: 1 ♀; 13 November 1965; dredge; FSBC I 18353. — 1; 13 June 1966; trawl; FSBC I 18357. — 1 ♀, 16 mm (ALLOTYPE); 13 November 1966; trawl; USNM 170808. — 1 ♀; 13

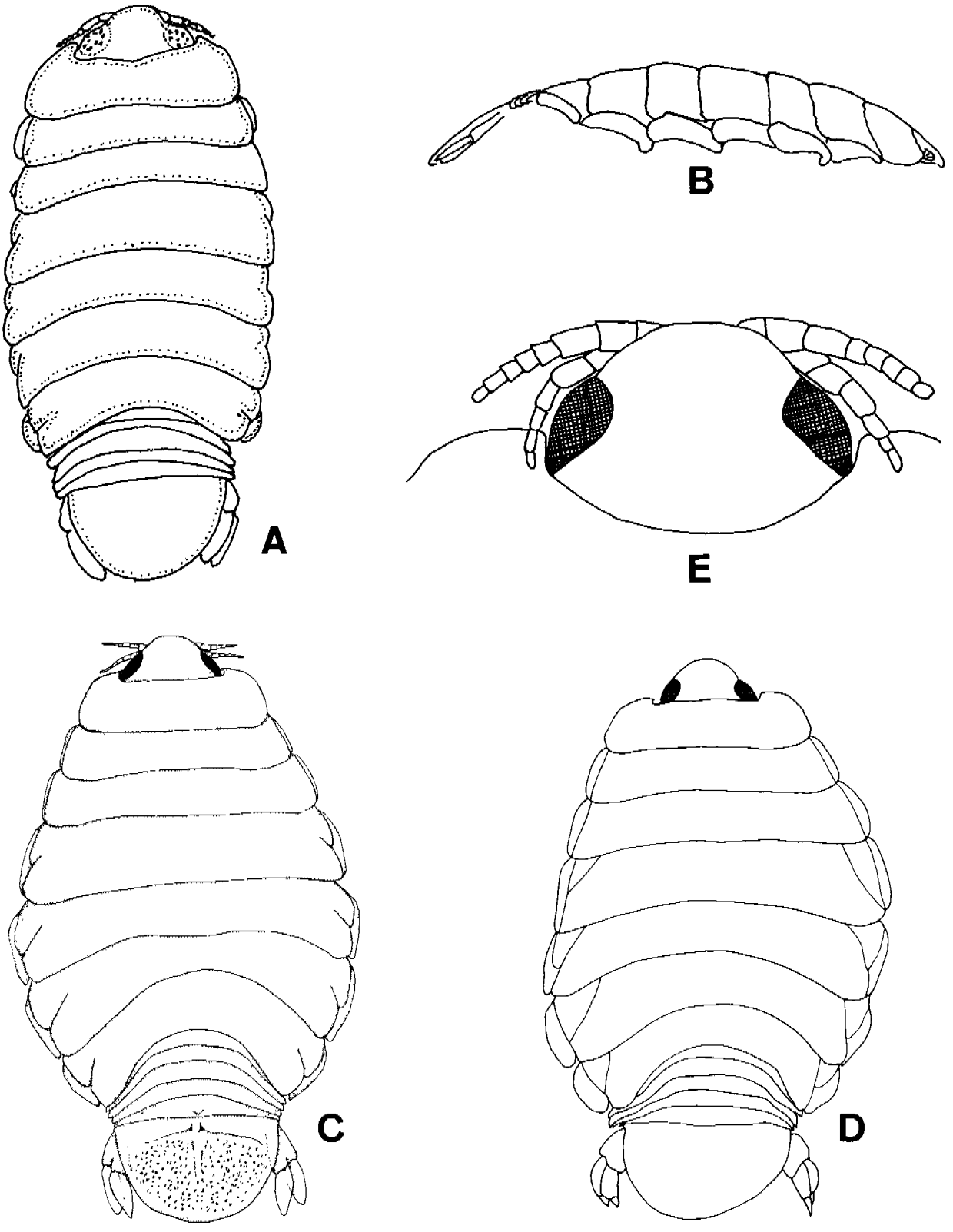

Figure 18. *Lironeca tropicalis*, n. sp. Holotype male, USNM 170807: length 11.0 mm, width 4.0 mm. A. whole animal; B. same, lateral view. Female, FSBC I 18353: length 15.1 mm. C. whole animal, showing slight distortion. Female, FSBC I 18376: length 15.5 mm. D. whole animal, showing greater distortion; E. cephalon.

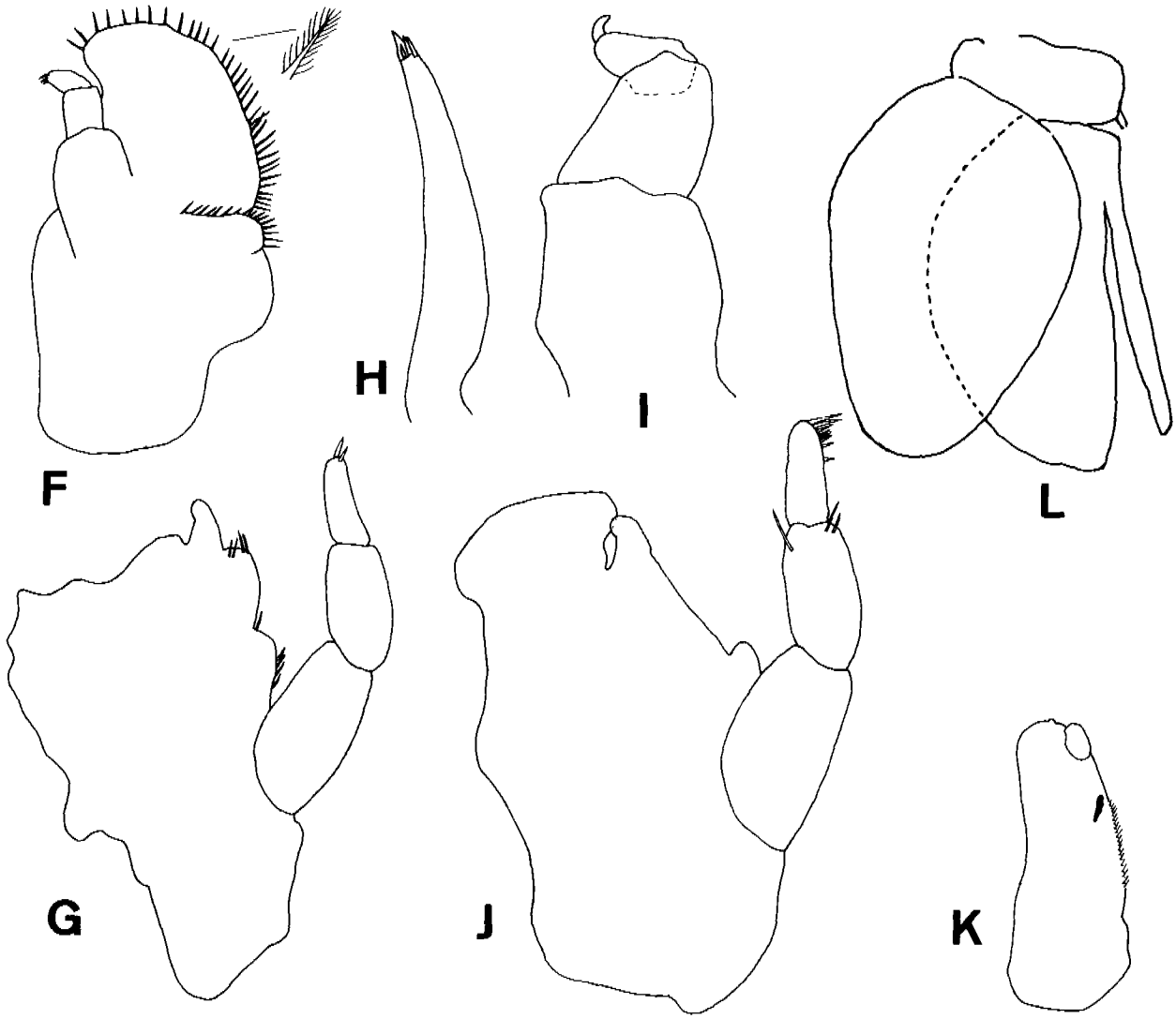

Figure 18 (continued). *Lironeca tropicalis*, n. sp. Female, FSBC I 18376: F. maxilliped; G. mandible; H. maxilla 1. Male, FSBC I 18358: length 10.1 mm. I. maxillipedal palp; J. mandible; K. maxilla 2. Holotype male, USNM 170807: L. pleopod 2.

January 1967; trawl; USNM 170824. — 1 ♀; 13 January 1967; dredge; FSBC I 18364. — 1 ♀; 15 November 1967; trawl; FSBC I 18378. — HOURGLASS STATION M: 1 ♂; 14 December 1965; trawl; FSBC I 18354. — 1 ♀; 14 January 1966; trawl; USNM 170822. — 1 ♀; 22 March 1966; trawl; FSBC I 18356. — 1 ♂; 6 July 1966; dredge; FSBC I 18359. — 2 ♂, 1 ♀; 7 December 1966; trawl; USNM 170823. — 2 ♂; 9 March 1967; trawl; FSBC I 18365. — 1 ♀; 9 March 1967; dredge; FSBC I 18366. — 1 ♂; 7 June 1967; trawl; FSBC I 18368. — 1 ♂; 6 July 1967; trawl; FSBC I 18369. — 1; 5 September 1967; dredge; FSBC I 18373. — 2 ♂; 15 November 1967; dredge; FSBC I 18379.

Diagnosis: *Lironeca* with uropods scarcely as long as pleotelson; endopod slightly wider than exopod. First somite of pleon not reaching posterolateral margin of pereonite VII in dorsal view. Body of males and small females not curved to one side; sides parallel. Body of large females curved less than 12° to one side. Cephalon evenly immersed in pereonite I on both sides.

Supplementary description: Body twice as long as wide; males and most small (< about 13 mm) females not twisted more toward one side than the other; large (> about 13 mm) females twisted about 5-11°. Cephalon slightly immersed in pereonite I, front trilobed; eyes lateral, separated by about two eye lengths. Mouthparts as illustrated. Pereonite I=cephalon=II=III=V=VII in length along midline; pereonite IV twice length of III. Pleon narrower than pereon, sides subparallel, not tapering; lateral margins of pleonites 2-5 free, exposed. Pleotelson longer than remaining pleon on males, subequal on females. Uropods not extending to apex of pleotelson; rami not lanceolate nor curved, subequal in length. Male appendix masculinum simple, extending nearly to end of endopod. Coxal plates developed on pereonites II-VII inclusive, but all not clearly visible in dorsal view.

Type-locality: Hourglass Station D, 27°37'N, 83°58'W; 55 m depth; about 65 nmi off Egmont Key, Florida west coast.

Distribution: Known only from central west Florida shelf, Gulf of Mexico; 18-73 m.

Etymology: The specific name *tropicalis* is an adjective derived from the Latin *tropicus* and Latin suffix *-alis*, indicating the probable tropical affinity of the species.

Remarks: *Lironeca reniformis* Menzies and Frankenberg was described from a single 7 mm male specimen. Our species differs slightly from *L. reniformis* in that males do not have the body curved more in one direction than the other. In this respect, it more closely resembles *L. texana* Pearse and *L. ovalis* (Say). Records of the latter species in Richardson (1905) in all probability involve a mixture of two or more species; we suspect that existing subtropical records of *L. ovalis* are actually of *L. tropicalis*, *L. texana*, or *L. reniformis*. We first thought our specimens belonged to *L. ovalis* (Say), because they agree with key characters of that species in Richardson (1905), but absence of transverse bands of yellow along posterior margins of all brown somites is too distinctive to be missed even in preserved specimens. Also, the pleon in *L. ovalis* tapers towards the pleotelson instead of having parallel margins. The narrow pleonite 1 distinguishes this species from *L. reniformis*, but not from *L. orinoco* Bowman and Ungria. From this latter species it is distinguished in having the anterolateral margin of pereonite I reaching the eyes and by lacking transverse grooves on the pereonites. Additional study comparing large series of material seems necessary to resolve apparent small differences between species in this group.

Most specimens were found at depths of 55 and 73 m along both transects (Table 8). They were collected in every month of the year except April. Gravid females were collected in March, November, and December. This species is a fish parasite and most specimens were collected in trawl samples. One female (FSBC I 18378) was taken from the right gill opening of *Ogcocephalus parvus* Longley and Hildebrand, but all others were collected without hosts. It is probable that these parasites fell off hosts at capture.

Family Aegidae Schiödte and Meinert, 1880

Diagnosis: Cirolanid-type Flabellifera having peduncles and flagella of antennae well defined. First three pairs of pereopods prehensile, last four pairs ambulatory. Pleopods with plumose marginal setae. Maxillipedal palp bi- or pentarticulate, last two articles with series of stout, recurved setae at apex. Maxilla 1 with single lobe; maxilla 2 with two dissimilar lobes armed with recurved teeth. Pleon of five subequal somites, followed by pleotelson bearing plumose marginal setae at apex.

TABLE 8. MONTHLY ABUNDANCES OF *Lironeca tropicalis*; DREDGE AND TRAWL SAMPLES COMBINED.

Lironeca tropicalis

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																															
B_2																														1	1
C_1													1																	1	2
C_2																															
D_1					1							1							2								1		3		8
D_2							1										6	1													8
E																1							2			1	1		2	7
I																															
J																															
K																													1		1
L				1							1						1		2											1	6
M					1	1		1				1						3				3			1	1		1		2	15
TOT				1	2	1	1	1			1	2	1			1	7	4	4			3		2	1	1	2	2	4	7	48

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Remarks: Two genera, each with one species, were found in Hourglass collections. Both were previously known from the Gulf of Mexico.

Genus *Aega* Leach, 1815

Diagnosis: Aegidae with maxillipedal palp of five articles. Mandibles lack molar processes. Article 6 of pereopod 1 simple, cylindrical, without mesial expansion bearing stout setae.

Type-species: *Oniscus psora* Linné, 1761 (= *Aega emarginata* Leach, 1815).

Aega antillensis Schiödte and Meinert, 1880

Figure 19

Aega antillensis Schiödte and Meinert, 1879-1880, pp. 361, 362, pl. 8, figs. 10-13; Richardson, 1901, p. 521; 1905, pp. 170, 171, figs. 149, 150; Hale, 1925, pp. 176-178, fig. 23; Schultz, 1969, p. 190, fig. 296.

Aega excisa Richardson, 1910b, p. 11, fig. 11; Hale, 1925, p. 178 [discussion].

Material examined: HOURGLASS STATION A: 1 ♂, 1 ♀; 5 February 1967; dredge; FSBC I 18382. — HOURGLASS STATION E: 1 ♂; 3 July 1966; trawl; FSBC I 18381. — HOURGLASS STATION M: 2 ♀; 8 August 1967; trawl; FSBC I 18383.

Diagnosis: Eyes contiguous at midline. Antenna 1 with first two articles of peduncle enlarged. Apex of pleotelson pointed; outer margin of uropodal endopod deeply incised, with ten stout, two-pointed setae and many plumose marginal setae.

Distribution: Previously known from Cuba, Mexico, the Philippines, Australia and Japan. This is the first record of the species from Florida.

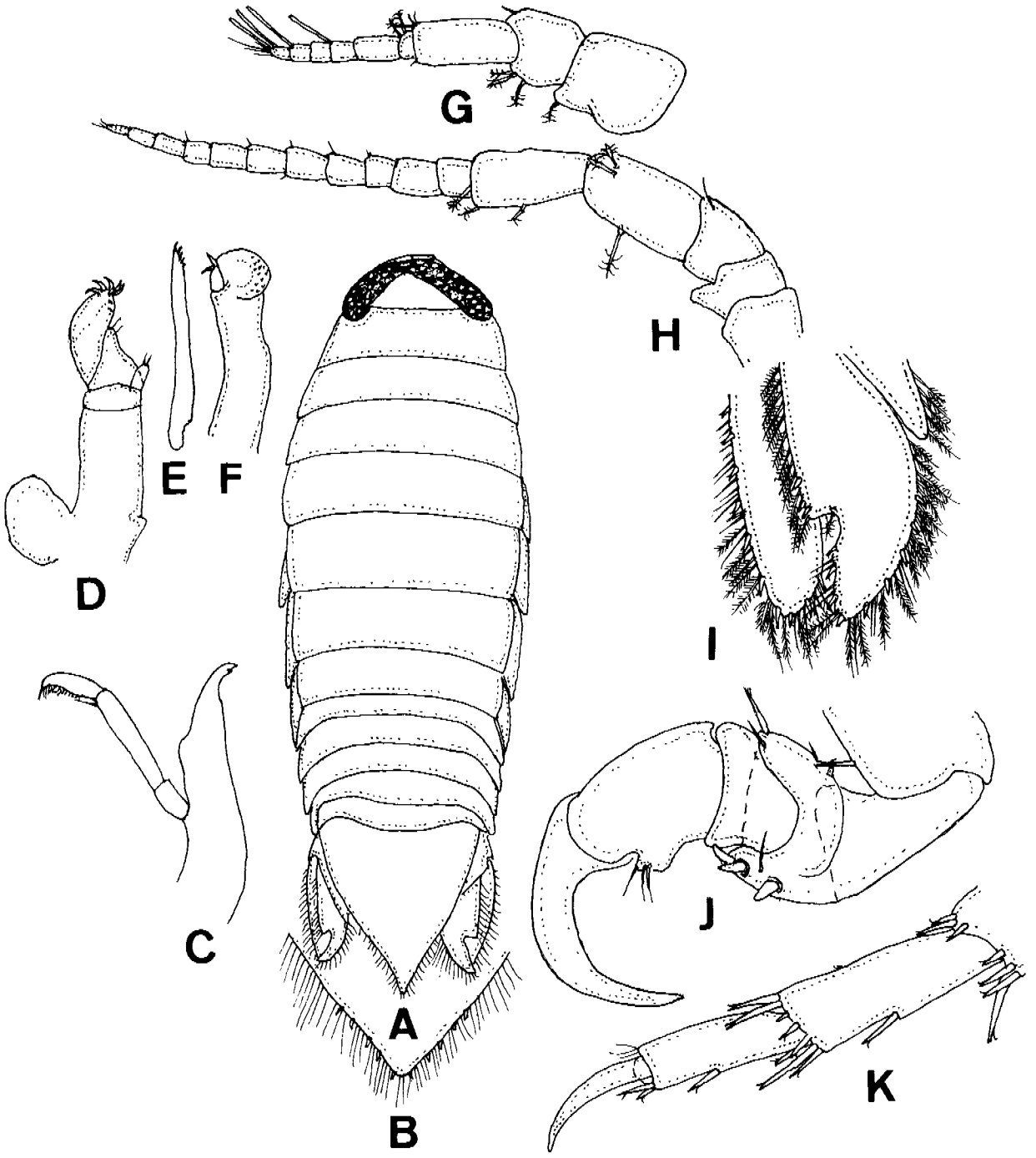

Figure 19. *Aega antillensis* Schiödte and Meinert. Female, FSBC I 18382: length 16.0 mm, width 5.0 mm. A. whole animal; B. apex of pleotelson; C. mandible; D. maxilliped; E. maxilla 1; F. maxilla 2; G. antenna 1; H. antenna 2; I. uropodal rami; J. pereopod 1; K. pereopod 7.

Remarks: This species is a fish parasite, usually taken from the skin. Other species of *Aega* have been taken from demersal fishes; the only host recorded for *A. antillensis* is the basking shark, *Cetorhinus maximus*. Hourglass specimens occurred in single collections from one 6 m and both 73 m stations. Previously, this species was reported in the western Atlantic from off Havana, Cuba at 298-422 m. Considering its previously known bathymetric range and other Hourglass records, presence of this species in a collection from 6 m is enigmatic, and may reflect erroneous transcription of a sample number. That the sample number was for a dredge haul, where few fish parasites were collected, further supports our suspicion. This is unfortunate in that the sample contained the only gravid female captured, making the month of capture (February) also questionable.

Genus *Rocinela* Leach, 1818

Diagnosis: Aegidae with biarticulate maxillipedal palp. Mandibles with molar processes. Article 6 of pereopod 1 with produced mesial lobe or expansion bearing setae.

Type-species: *Rocinela danmonensis* Leach, 1818.

Remarks: Not all species that have been referred to *Rocinela* have a lobe or expansion on mesial margin of prehensile legs. This only suggests that those without the lobe may be put into another genus at a subsequent date. The single Hourglass species is one of these. Lacking specimens of *R. danmonensis* Leach, we prefer to maintain the *status quo* and follow the arrangement of Richardson (1905).

Rocinela signata Schiödte and Meinert, 1880

Figure 20

Rocinela signata Schiödte and Meinert, 1879-1880, pp. 399-401, pl. 13, figs. 3-6; Richardson, 1901, p. 524; Moore, 1902, p. 171, pl. 10, fig. 2; Richardson, 1905, pp. 209, 210, figs. 211, 212; Pearse, 1934b, p. 113; 1951, p. 367; 1952b, p. 233; Menzies and Glynn, 1968, p. 45, figs. 20E-G; Rouse, 1969, p. 133; Schultz, 1969, p. 201, fig. 316; Lyons et al., 1971, p. 27; Menzel, 1971, p. 76; Bowman, 1977, pp. 659, 660, fig. 27.

Rocinela aries Schiödte and Meinert, 1879-1880, pp. 401-403, pl. 13, figs. 7, 8; Richardson, 1899, p. 828; 1905, pp. 210, 211, figs. 213-215; Menzies, 1962b, p. 345, fig. 5; Schultz, 1969, p. 201, fig. 317.

Material examined: HOURGLASS STATION B: 1 ♀; 20 November 1967; dredge; FSBC I 18405. — HOURGLASS STATION C: 1 ♀; 3 January 1966; trawl; FSBC I 18387. — 1 ♀; 6 November 1966; dredge; FSBC I 18394. — HOURGLASS STATION D: 1 ♀; 5 October 1965; trawl; FSBC I 18384. — 1 ♀; 4 January 1966; trawl; FSBC I 18388. — 1 ♀; 2 August 1966; trawl; USNM 170826. — 1 ♀; 1 September 1966; dredge; FSBC I 18392. — 1 ♀; 20 November 1966; dredge; FSBC I 18395. — 1 ♂; 21 May 1967; dredge; FSBC I 18400. — HOURGLASS STATION I: 1 ♀; 12 October 1965; trawl; FSBC I 18385. — 1; 12 November 1965; trawl; FSBC I 18386. — HOURGLASS STATION J: 1 ♂; 14 November 1967; trawl; FSBC I 18403. — 1 ♀; 14 November 1967; dredge; FSBC I 18404. — HOURGLASS STATION K: 1 ♀; 12 June 1966; trawl; FSBC I 18389. — 1 ♀; 5 July 1967; trawl; FSBC I 18401. — HOURGLASS STATION L: 1 ♀; 6 July 1966; trawl; FSBC I 18390. — 2 ♀; 22 July 1966; trawl; FSBC I 18391. — 1 ♀, 1 juv.; 5 September 1966; dredge; FSBC I 18393. — 1 ♀; 7 December 1966; trawl; FSBC I 18396. — 1 ♀; 7 December 1966; dredge; FSBC I 18397. — 2 ♂, 1 juv.; 16 February 1967; dredge; USNM 170825. — 1 ♂; 8 April

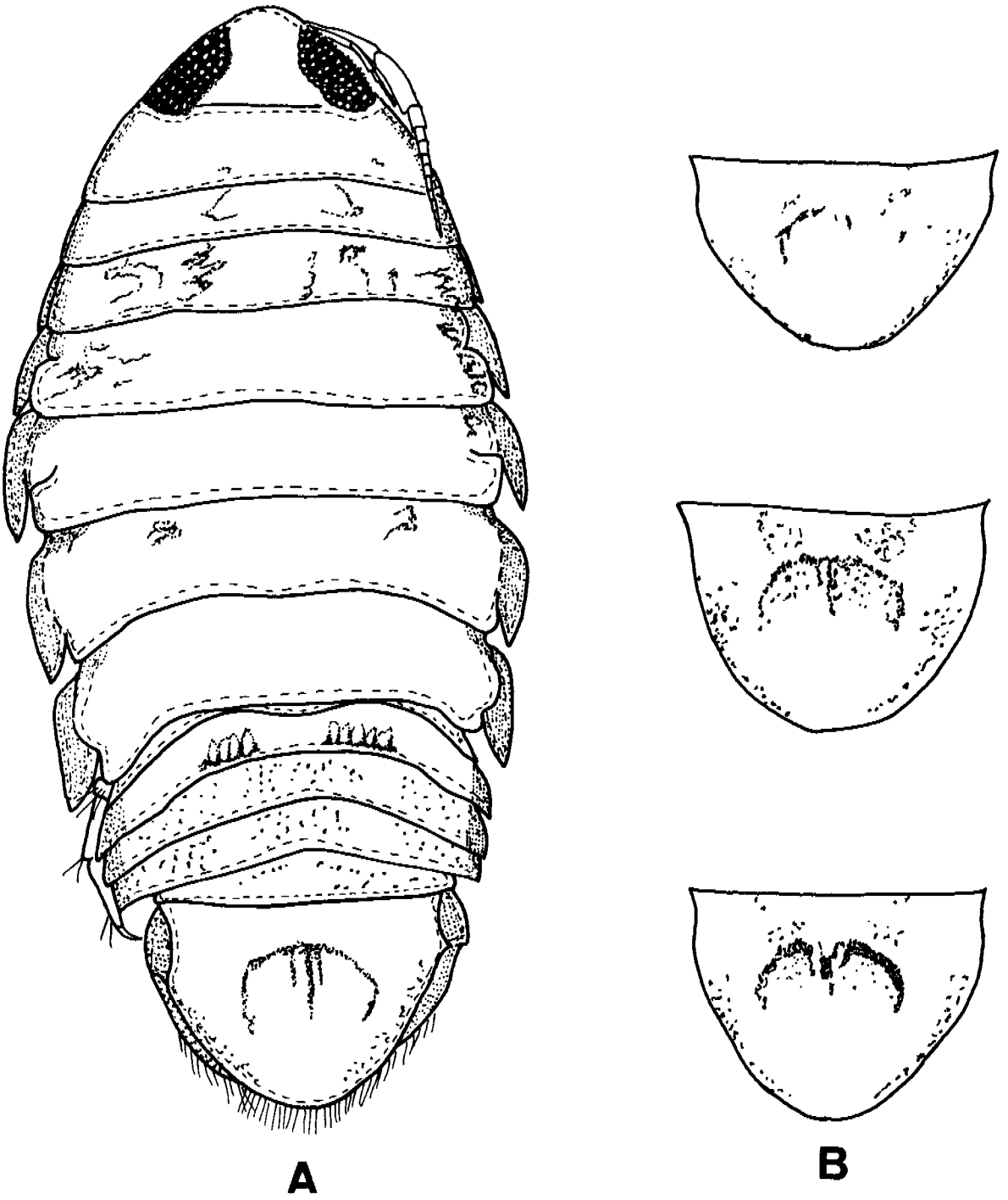

Figure 20. *Rocinela signata* Schiödte and Meinert. Female, length 12.0 mm. A. dorsal view; B. variation in pigmentation of pleotelson (from Menzies and Glynn, 1968).

1967; trawl; FSBC I 18398. — 1 ♀; 16 May 1967; dredge; FSBC I 18399. — 3 ♀; 5 September 1967; trawl; USNM 170827. — 1 ♀; 13 October 1967; trawl; FSBC I 18402.

Diagnosis: Eyes separated at midline. Flagellum of antenna 2 with ten or eleven articles. Body

TABLE 9. MONTHLY ABUNDANCES OF *Rocinela signata*; DREDGE AND TRAWL SAMPLES COMBINED.

Rocinela signata

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																															
B_2																														1	1
C_1						1											1														2
C_2																															
D_1			1			1								1	1																4
D_2																	1						1								2
E																															
I			1	1																											2
J																														2	2
K											1														1						2
L												1	2		2			2			3		1	1				3	1		16
M																															
TOT			2	1		2					1	1	2	1	3		2	2			3		1	2		1		3	1	3	31

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

smooth, without tubercles on dorsum. Pleotelson with paired semilunar bands of pigment. Article 6 of prehensile legs with one two-pointed spine, not three, but without expansion on mesial margin (modified from Menzies and Glynn, 1968).

Distribution: Atlantic: Gulf of Mexico, West Indies and Central America (Richardson, 1905), to Recife, Brazil (Schiödte and Meinert, 1879-1880); Pacific: San Quintin Bay, Lower California, Gulf of California to Panama; Socorro Island (Bowman, 1977).

Remarks: This species is a fish parasite. Most captures were at 55 m depth from both transects; none was collected from greater depths (Table 9). Specimens were collected during all months of the year except March and were captured about equally in dredges and trawls. Gravid females were found in September and November.

Richardson (1905) reported *Rocinela signata* from the back of a grouper, from *Diplectrum formosum* (Linné), and in the gills of both *Thunnus alalunga* (Bonnaterre) and a scarid. The original report was from *Haemulon* or *Sciaena*, from 1-4 m depth. Pearse found *R. signata* on gills of *Promicrops* (=*Epinephelus*) *itajara* (Lichtenstein) and *Lutjanus analis* (Cuvier) at Tortugas (1934b), on *L. analis*, *Archosargus probatocephalus* (Walbaum), *Calamus calamus* (Cuvier and Valenciennes), and *Balistes vetula* Linné at Bimini, Bahamas (1951), and on *Haemulon sciurus* (Shaw) at Alligator Harbor, Florida (1952b). Other specimens have been found on coarse sand and coral formation without recorded hosts. Hourglass specimens were not associated with hosts when recovered from preserved samples.

Family Corallanidae Hansen, 1890

Diagnosis: Cirolanid-type Flabellifera with flagella and peduncles of antennae 1 and 2 well defined. Mandible with or without molar process; incisive process concealed by clypeus, not greatly elongated. Exite of maxilla 1 with setae or consisting of single, recurved hook. Pleon with four somites in dorsal view plus pleotelson; apex of pleotelson fringed with plumose marginal setae and stout, two-pointed setae. Pleopods natatory, with plumose setae marginally. Last four pairs of pereopods ambulatory.

Remarks: Hourglass collections contained one species, *Alcirona krebsii* Hansen, previously known from the Gulf of Mexico.

Genus *Alcirona* Hansen, 1890

Diagnosis: Corallanidae with articles of maxillipedal palp similar in length, broader than long. Maxilla 1 endite with apical setae. Mandible lacking molar process and lacinia mobilis; incisors short, concealed by clypeus.

Type-species: *Alcirona krebsii* Hansen, 1890.

Alcirona krebsii Hansen, 1890

Figure 21

Alcirona krebsii Hansen, 1890, pp. 285, 391, 392, pl. 8, fig. 1; Richardson, 1901, p. 519; 1902, p. 290; 1905, pp. 157, 158, figs. 137-139; Nordenstam, 1946, p. 12; Schultz, 1969, p. 213, fig. 340.

Alcirona insularis Hansen, 1890, pp. 287, 391; Stebbing, 1893, p. 346; 1901, p. 637; Nordenstam, 1946, pp. 10-12, figs. 6-9; Menzies and Glynn, 1968, pp. 43, 44, figs. 18, 19.

Alcirona hirsuta Moore, 1902, p. 170, pl. 9, figs. 6-10; Richardson, 1905, pp. 159-161, fig. 140; Nordenstam, 1946, p. 10; Schultz, 1969, p. 214, fig. 342.

Alcirona maldivensis Stebbing, 1904, pp. 708, 709; Searle, 1914, p. 361, figs. 1, 2; Nordenstam, 1946, pp. 12-14, figs. 10, 11.

Material examined: HOURGLASS STATION B: 1 ♂, 1 ♀; 4 October 1965; trawl; FSBC I 18434. — 1 ♂, 2 ♀; 20 February 1966; trawl; FSBC I 18406. — 3 ♀; 26 March 1966; dredge; FSBC I 18407. — 1 ♂, 1 ♀, 1 juv.; 15 April 1966; dredge; FSBC I 18435. — 1♀; 17 June 1966; trawl; FSBC I 18436. — 1 ♂, 1 ♀; 2 July 1966; dredge; FSBC I 18409. — 2 ♀; 18 July 1966; trawl; FSBC I 18410. — 2 ♂, 6 ♀; 8 September 1966; trawl; FSBC I 18411. — 1 ♂; 18 October 1966; dredge; FSBC I 18412. — 1 ♂, 2 ♀; 19 November 1966; trawl; FSBC I 18413. — 2 ♀; 19 November 1966; dredge; FSBC I 18437. — 2 ♂, 4 ♀; 1 December 1966; trawl; FSBC I 18414. — 1 ♂, 1 ♀; 13 December 1966; trawl; FSBC I 18416. — 1 ♂, 1 ♀; 13 December 1966; dredge; FSBC I 18417. — 1 ♀; 6 January 1967; trawl; FSBC I 18418. — 2; 5 February 1967; dredge; FSBC I 18420. — 2 ♀; 2 March 1967; trawl; FSBC I 18422. — 1 ♂; 14 March 1967; dredge; FSBC I 18423. — 3 ♂, 4 ♀; 3 April 1967; trawl; FSBC I 18424. — 1 ♂, 3 ♀; 11 April 1967; dredge; FSBC I 18427. — 3 juv.; 2 June 1967; dredge; FSBC I 18428. — 1 ♂; 11 July 1967; dredge; FSBC I 18429. — 26 + brood; 11 September 1967; trawl; USNM 170828. — 4 ♂, 4 ♀; 11 September 1967; dredge; FSBC I 18430. — 1 ♀; 5 October 1967; trawl; FSBC I 18431. — 1 ♂; 20 November 1967; trawl; FSBC I 18433. — HOURGLASS STATION D: 1 ♀; 27 March 1966; dredge; FSBC I 18408. — 1 ♀; 4 April 1967; dredge; FSBC I 18425. — HOURGLASS STATION J: 1 ♂, 3 ♀, 1 specimen; 6 December 1966; dredge; FSBC I 18438. — 1 ♂, 1 ♀; 12 January 1967; dredge; FSBC I 18419. — 1 ♀; 7 April 1967; trawl; FSBC I 18426. — 1 ♀; 14 November 1967; trawl; FSBC I 18432. — HOURGLASS STATION K: 1 ♀; 6 December 1966; dredge; FSBC I 18415. — 1 ♂; 15 February 1967; trawl; FSBC I 18421.

Diagnosis: Pleotelson and pleon hirsute, lacking dorsal tubercles or furrows. Margins of pleotelson crenulate. Inferior margin of propod of pereopod 1 with or without comb of short teeth; dactyl with (male) or without comb of teeth.

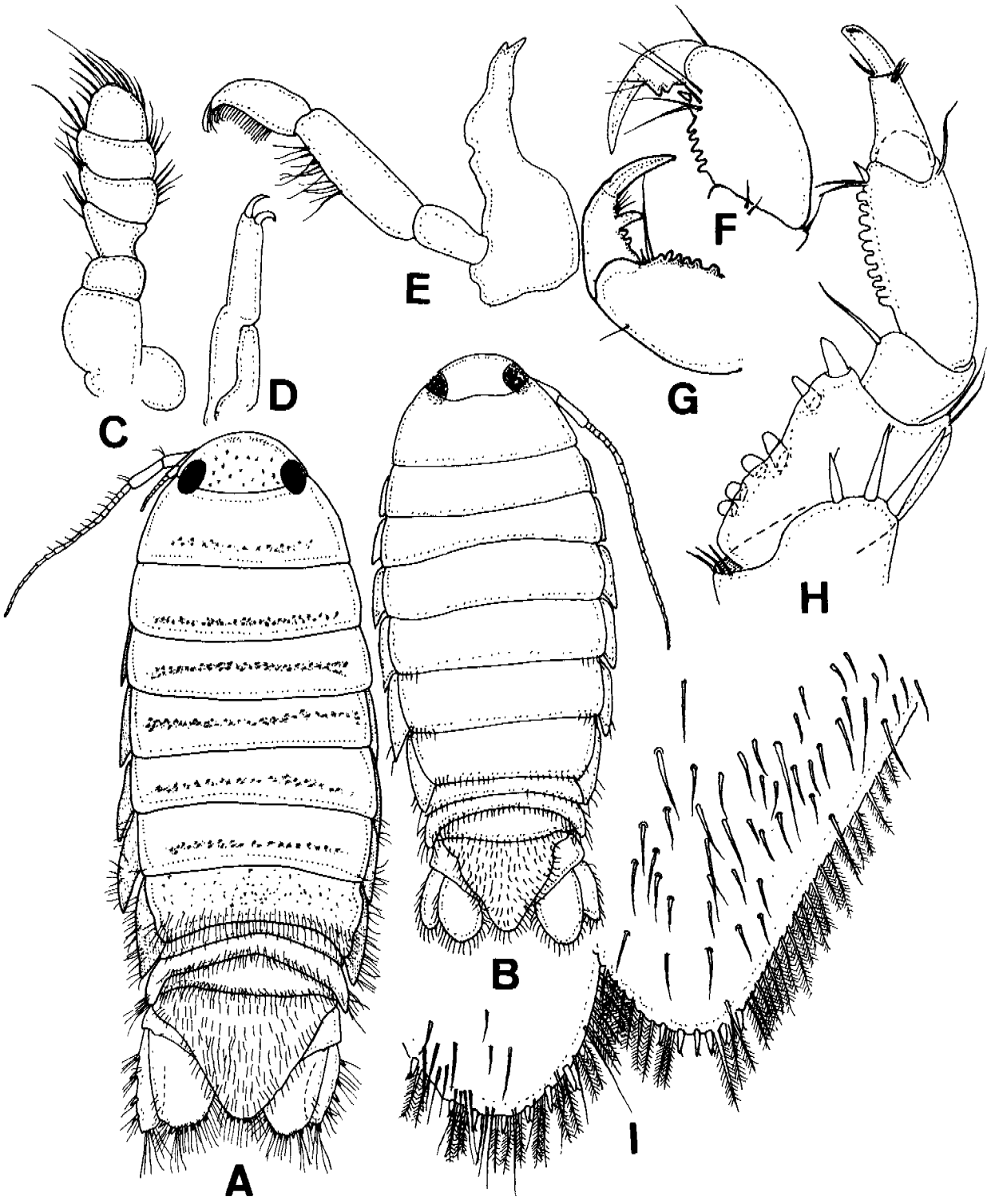

Figure 21. *Alcirona krebsii* Hansen. Male: length 5.0 mm. A. whole animal from Puerto Rico (after Menzies and Glynn, 1968). Male, FSBC I 18414: length 9.1 mm, width 2.9 mm. B. whole animal; C. maxilliped; D. maxilla 1; E. mandible; H. pereopod 1; I. apex of pleotelson and uropodal endopod. Male, FSBC I 18409: F. pereopod 1. Male, FSBC I 18423: G. pereopod 1. Uropodal two-pointed setae not shown on whole animal in B, but present as shown in A.

TABLE 10. MONTHLY ABUNDANCES OF *Alcirona krebsii*; DREDGE AND TRAWL SAMPLES COMBINED.

Alcirona krebsii

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1			2									2	2					6	1		2	2	7		3				1		28
B_2							3	3	3		1				8	1	5	4				1	4			1		34+		1	69+
C_1																															
C_2																															
D_1																							1								1
D_2								1																							1
E																															
I																															
J																		5	2				1							1	9
K																		1			1										2
L																															
M																															
TOT			2				3	4	3		1	2	2		8	1	5	16	3		3	3	13		3	1		34+	1	2	110+

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Distribution: Pantropical cosmopolite (Tethys relict: Pacific and Indian Oceans; Gulf and Caribbean).

Remarks: The wide variation in degree of hairs on the pereon and pleon and the fact that male specimens may or may not have combs of teeth on the propod (article 6) lead us to agree with Nordenstam (1946) that *insularis=hirsuta=krebsii=maldivensis*.

This is a fish parasite. All but four specimens were collected at 18 m depths along both transects, but the species was more common in the northern transect (Table 10). It was found during all months except May, and was captured more frequently by trawling than by dredging.

Gravid females were found in January and August. Thirty-five percent of all females were gravid. The maximum number of embryos was 8, found in two specimens. Embryos appear to easily fall out of the brood pouch.

The species has been previously reported from sponge cavities, dead coral, and from the fins of the Hamlet grouper at depths of about 50 m (Richardson, 1905).

Family Excorallanidae Stebbing, 1904

Diagnosis: Cirolanid-type Flabellifera with flagella and peduncles of antennae 1 and 2 clearly defined. Mandible lacking molar process and lacinia mobilis; incisive process very long, sharp, plus two or more smaller teeth. Maxillipedal palp with all articles narrow. Exite of maxilla 1 with recurved tooth instead of setae at apex. Last four pairs of pereopods ambulatory. Pleon with five somites in dorsal view, plus pleotelson; apex of pleotelson margin with plumose setae and stout, two-pointed setae. Pleopods with plumose setae marginally.

Remarks: Hourglass collections contained three species of *Excorallana* and one species of *Nalicora*; all were previously known from the Gulf of Mexico.

We follow the suggestion by Menzies and Glynn (1968) to include *Nalicora* Moore in Excorallanidae because the genus possesses elongated articles of the maxillipedal palp. *Nalicora* is distinguished from *Excorallana* Stebbing in that the former has the second article of the maxillipedal palp elongate while the latter has the third article elongate. Schultz (1969) included Moore's species in *Excorallana*; in this we disagree (see Stebbing, 1904).

Genus *Excorallana* Stebbing, 1904

Diagnosis: Excorallanidae with third article of maxillipedal palp longest, longer than combined lengths of fourth and fifth. Exite of maxilla 1 with single apical recurved tooth lacking mesial lobe.

Type-species: No type species has been designated from among the several species Stebbing (1904) placed in this genus.

Remarks: Dana (1853) erected *Corallana* and described *Corallana hirticauda*. Hansen (1890) erected *Alcirona* and *Lanocira* and also described seven new species of *Corallana* (*tricornis*, *quadricornis*, *subtilis*, *antillensis*, *fissicauda*, *oculata*, and *warmingii*). Richardson (1901) added *Corallana sexticornis* to this group. Hansen (1895) combined the Corallanidae and Alcironidae into one family. Stebbing (1904) concluded that the above species of Hansen and Richardson belong in a different genus than *Corallana* since they are very different from *C. hirticauda*. Thus, he referred Hansen's and Richardson's species to a new genus, *Excorallana*, and placed them in a new family, Excorallanidae. Stebbing maintained *Corallana*, *Tachaea*, *Alcirona* and *Lanocira* in the Corallanidae. He described *Excorallana*, but did not designate a type species. We defer arbitrarily designating a type species until the group is revised.

Excorallana tricornis tricornis (Hansen, 1890)

Figure 22

Corallana tricornis Hansen, 1890, pp. 379-381, pls. 6, 7; Richardson, 1901, p. 518; Moore, 1902, p. 169, pl. 9, figs. 2-5.

Excorallana tricornis: Stebbing, 1904, p. 704; Pearse, 1934b, p. 113; Lemos de Castro, 1960, p. 61; Menzies and Glynn, 1968, p. 42, figs. 7A, B; Schultz, 1969, p. 210, fig. 335.

Exocorallana tricornis: Richardson, 1905, pp. 139-141, figs. 120, 121; Rouse, 1969, p. 133.

Excorallana tricornis tricornis: Bowman, 1977, p. 659, figs. 21, 22, 26.

Material examined: HOURGLASS STATION B: 1 ♀; 20 October 1965; dredge; FSBC I 18439. — 1; 19 November 1965; dredge; FSBC I 18440. — 1 ♂; 7 February 1966; dredge; FSBC I 18441. — 1 ♂; 20 February 1966; trawl; FSBC I 18442. — 2 ♀; 17 June 1966; trawl; FSBC I 18444. — 1 ♀; 10 July 1966; trawl; FSBC I 18445. — 1 juv.; 10 July 1966; dredge; FSBC I 18446. — 1 ♀; 10 August 1966; trawl; FSBC I 18447. — 1 ♀; 18 October 1966; dredge; FSBC I 18451. — 2 ♂; 1 December 1966; trawl; FSBC I 18453. — 6 ♂, 6 ♀; 27 February 1967; trawl; USNM 170829. — 1 ♂, 1 ♀; 11 April 1967; trawl; USNM 170830. — 1 ♂, 1 ♀; 11 April 1967; dredge; FSBC I 18459. — 1 juv.; 1 August 1967; trawl; FSBC I 18460. — 2 ♂, 2 ♀; 11 September 1967; trawl; FSBC I 18462. — 3 ♂; 5 October 1967; trawl; FSBC I 18463. — 1 ♂; 25 October 1967; dredge; FSBC I 18466. — HOURGLASS STATION C: 1 ♂, 1 ♀; 3 April 1967; dredge; FSBC I 18458. — HOURGLASS STATION D: 1 ♂; 11 August 1966; dredge; FSBC I 18448. — 2; 20 November 1966; dredge; FSBC I 18452. — 1 ♀; 28 February 1967; dredge; FSBC I 18455. — 1 ♀; 2 March 1967; dredge; FSBC I 18456. — 1 ♀; 21 November 1967; dredge; FSBC I 18467. — HOURGLASS STATION J:

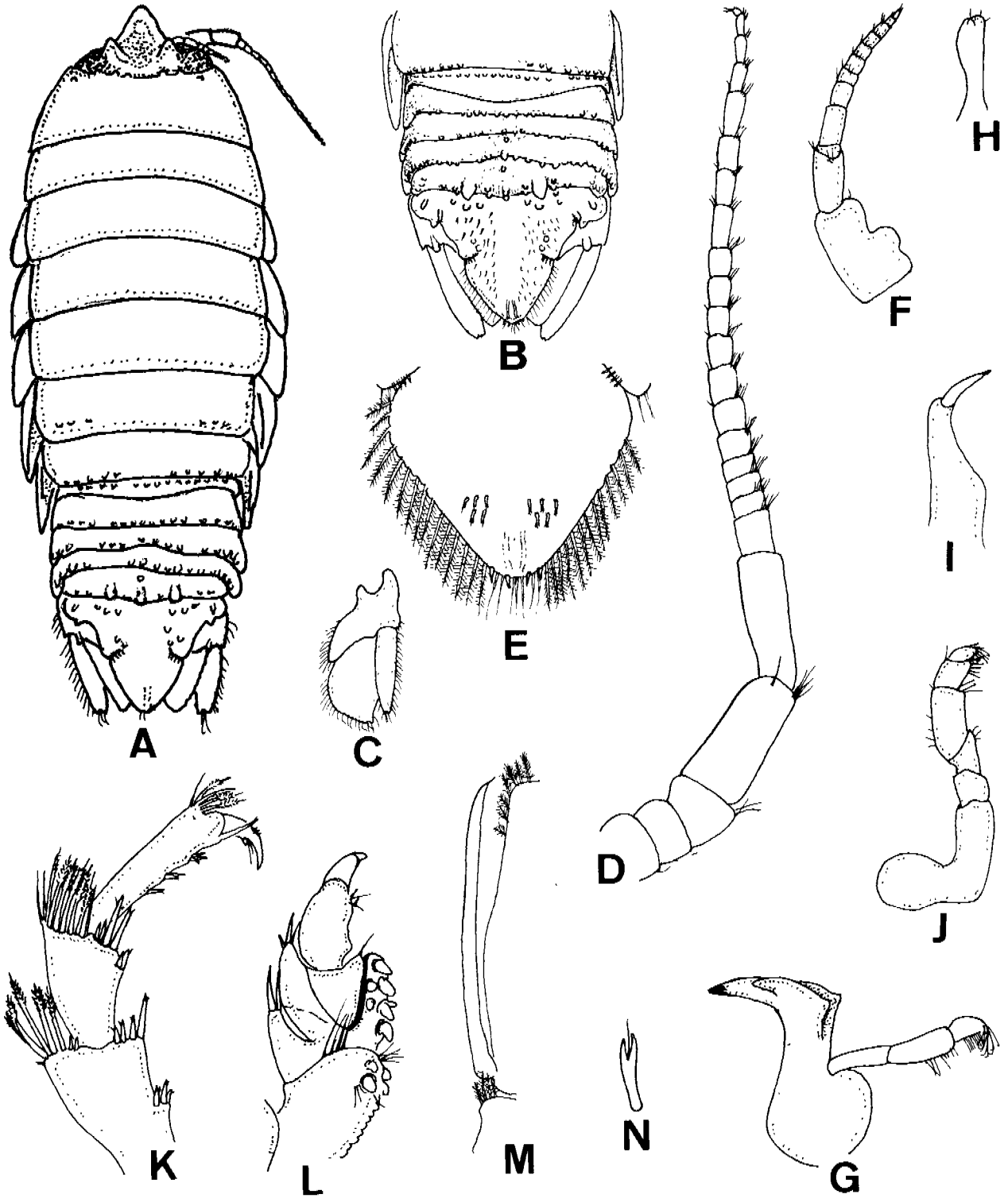

Figure 22. *Excorallana tricornis tricornis* (Hansen). Male, FSBC I 18462: length 11. 5 mm, width 3.3 mm. A. whole animal; B. pleon; C. uropod; D. antenna 2; E. apex of pleotelson; F. antenna 1; G. mandible; H. maxilla 2; I. maxilla 1; J. maxilliped; K. pereopod 7; L. pereopod 1; M. pleopod 2; N. seta of dorsum of pleotelson.

1; 12 June 1966; dredge; FSBC I 18443. — 2; 8 March 1967; dredge; FSBC I 18457. — 1; 11 October 1967; trawl; FSBC I 18464. — HOURGLASS STATION K: 1 ♂; 4 September 1966; dredge; FSBC I 18449. — 2; 15 February 1967; trawl; FSBC I 18454. — 2; 4 September 1967; trawl; USNM 170831. — 1 ♂, 2 ♀; 4 September 1967; dredge; FSBC I 18461. — HOURGLASS STATION L: 1; 12 October 1967; trawl; FSBC I 18465. — HOURGLASS STATION M: 2 ♀; 13 October 1966; dredge; FSBC I 18450.

Diagnosis: Eyes large, separated at midline of cephalon. Left mandible with trifid incisor. Basal article of antenna 1 peduncle without spine. Cephalon of male with three horns (bumps, large tubercles), two on dorsum above eyes, one medial. Pereon not tuberculate. Exopod of uropod apically bifid; endopod with short spine at outer apex. Dorsum of pleon with slight medial sulcus and many tubercles on posterior margin of each somite. Fifth pleonal somite with stout tubercle on either side of sulcus. Pleotelson with semilunar slits laterally near junction of uropodal rami. "Hairs" of pleotelson consisting of simple bifid hair with midapical seta. Apex of pleotelson with four stout two-pointed setae.

Distribution: Gulf of Mexico: Florida to Yucatan; Caribbean: Jamaica, Puerto Rico, Virgin Islands; Central America: Belize, Nicaragua.

Remarks: This species appears to vary considerably in the extent of tuberculation on the dorsum of the pleon. For example, Puerto Rican populations reported by Menzies and Glynn (1968) are devoid of tuberculation so evident on Florida samples, especially on the pleon and pleotelson. Florida specimens resemble the description given by Richardson (1905) in tuberculation. The *E. tricornis* of Menzies and Glynn may represent a distinct species or subspecies.

Hosts of Hourglass specimens were not determined. Menzies and Glynn (1968) reported *E. tricornis* parasitic on gills of rays [*Aetobatus narinari* (Euphrasen) and *Dasyatis americana* Hildebrand and Schroeder] and on young squirrelfish (Holocentridae), but as we have pointed out, their specimens from Puerto Rico may represent a distinctly different species or subspecies. Pearse (1934b) reported *Excorallana tricornis* from the nose of *Promicrops* (= *Epinephelus*) *itajara* (Lichtenstein) and from gills of *E. morio* (Valenciennes) at Dry Tortugas, Florida.

The species was collected along both transects, occurring primarily at 18 m, although two were found as deep as 73 m (Table 11). It was found during all months except January and May. Three gravid females were found in June and August. More specimens were collected in trawls than in dredges.

Excorallana mexicana Richardson, 1905

Figure 23

Exocorallana mexicana Richardson, 1905, pp. 142, 143, figs. 122, 123.

Excorallana mexicana: Lemos de Castro, 1960, p. 61; Schultz, 1969, p. 209, fig. 333.

Material examined: HOURGLASS STATION B: 1; 2 June 1967; dredge; FSBC I 18488. — HOURGLASS STATION C: 1; 2 November 1967; dredge; FSBC I 18498. — HOURGLASS STATION D: 1; 4 March 1966; dredge; FSBC I 18469. — 1; 27 March 1966; dredge; USNM 170832. — 1; 11 August 1966; dredge; FSBC I 18471. — 1; 19 October 1966; trawl; FSBC I 18475. — 1; 20 November 1966; trawl; USNM 170833. — 1; 20 November 1966; dredge; USNM

TABLE 11. MONTHLY ABUNDANCES OF *Excorallana tricornis*; DREDGE AND TRAWL SAMPLES COMBINED.

Excorallana tricornis

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1							1											2									1		3		7
B_2			1	1			1				2	2		1		1					12		4					4	1		30
C_1																							2								2
C_2																															
D_1																						1									1
D_2														1			2				1									1	5
E																															
I																															
J											1																		1		2
K															1						2							5			8
L																													1		1
M																2															2
TOT			1	1			2				3	2		2	1	3	2	2			15	1	6				1	9	6	1	58

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

170834. — 1; 14 December 1966; trawl; FSBC I 18479. — 1; 28 February 1967; dredge; FSBC I 18483. — 5; 3 March 1967; dredge; FSBC I 18484. — 3; 4 April 1967; dredge; FSBC I 18486. — 1; 12 May 1967; dredge; FSBC I 18487. — 1; 3 June 1967; dredge; FSBC I 18489. — 3; 21 June 1967; dredge; FSBC I 18490. — 1; 2 July 1967; dredge; FSBC I 18491. — 1; 27 October 1967; trawl; FSBC I 18496. — 1; 27 October 1967; dredge; FSBC I 18497. — HOURGLASS STATION K: 2; 4 September 1966; dredge; FSBC I 18472. — 1; 12 November 1966; trawl; FSBC I 18476. — 2; 12 January 1967; dredge; FSBC I 18480. — 1; 30 January 1967; trawl; FSBC I 18481. — 1 ♀ (ovigerous); 11 October 1967; dredge; FSBC I 18493. — HOURGLASS STATION L: 1; 13 November 1965; trawl; FSBC I 18468. — 4; 6 July 1966; dredge; FSBC I 18470. — 1; 5 September 1966; dredge; FSBC I 18473. — 1; 13 November 1966; dredge; FSBC I 18477. — 3; 7 December 1966; dredge; FSBC I 18478. — 1; 16 February 1967; dredge; FSBC I 18482. — 1; 9 March 1967; trawl; FSBC I 18485. — 1; 6 July 1967; trawl; FSBC I 18492. — 2; 12 October 1967; trawl; FSBC I 18494. — 2; 12 October 1967; dredge; FSBC I 18495. — 1; 15 November 1967; trawl; FSBC I 18499. — HOURGLASS STATION M: 1; 13 October 1966; dredge; FSBC I 18474. — DATA UNKNOWN: two specimens given erroneous sample number.

Diagnosis: Eyes separated at midline by two eye widths. Left mandible incisor trifid. Basal article of antenna 1 peduncle without spine. Cephalon with two tubercles on dorsum between eyes, none medially. Hinder part of pereon tuberculate. Exopod of uropod with two stout, two-pointed setae at apex; endopod with outer margin evenly rounded at apex, bearing stout, two-pointed setae. Dorsum of pleon multituberculate, without pronounced sulcus. Pleotelson with medial sulcus dorsally, bordered by longitudinal row of eight tubercles. Hairs of dorsum bifid at apex, with many scales along sides. Pleotelson with lateral semilunar slits open; apex with four stout, two-pointed setae, lateral margins crenulate, bearing plumose setae.

Distribution: Northeastern Gulf of Mexico.

Remarks: This species is possibly a parasite or predator. It was captured between 18 and 73 m depths but was most frequently taken at 55 m along both transects (Table 12). This species was previously reported from 48 m depth (Richardson, 1905). Most specimens were captured by dredge. Specimens were taken in all months of the year; six gravid females were observed in January, June, October, and November.

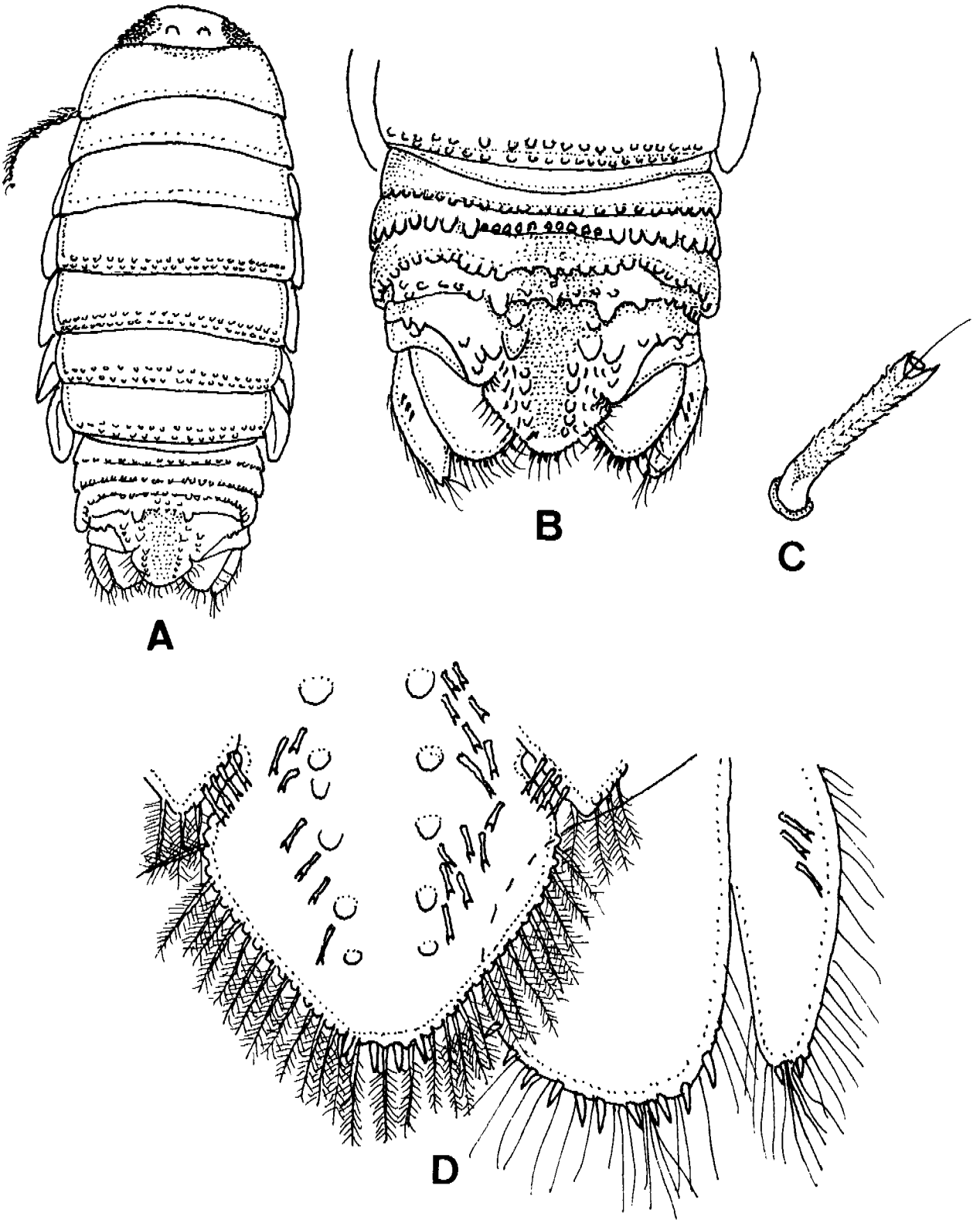

Figure 23. *Excorallana mexicana* Richardson. Male, FSBC I 18495: length 9.2 mm, width 3.3 mm. A. whole animal; B. pleon; C. seta of dorsum of pleotelson; D. apex of pleotelson and uropod.

TABLE 12. MONTHLY ABUNDANCES OF *Excorallana mexicana*; DREDGE AND TRAWL SAMPLES COMBINED.

Excorallana mexicana

STA	1965					1966													1967										TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																														
B_1																								1						1
B_2																														
C_1																													1	1
C_2																														
D_1								1														5	3	1	1	1				12
D_2								1						1		1	2	1			1				3				2		12
E																														
I																														
J																														
K															2		1		2	1									1		7
L				1								4			1		1	3			1	1				1			4	1	18
M																1														1
TOT				1				2				4		1	3	2	4	4	2	1	2	6	3	1	5	2			7	2	52*

*Plus 2 specimens; no data.
Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Excorallana antillensis (Hansen, 1890)

Figure 24

Corallana antillensis Hansen, 1890, pp. 383, 384, pl. 7; Richardson, 1901, p. 519.

Excorallana antillensis: Stebbing, 1904, p. 704; Lemos de Castro, 1960, p. 61; Schultz, 1969, p. 211, fig. 337.

Exocorallana antillensis: Richardson, 1905, pp. 148-150, figs. 131, 132.

Material examined: HOURGLASS STATION B: 2; 15 April 1966; dredge; FSBC I 18502. — 1 ♀ (ovigerous); 2 July 1966; dredge; FSBC I 18731. — 1 ♀; 10 August 1966; dredge; FSBC I 18504. — 7; 8 September 1966; trawl; FSBC I 18506. — 2; 8 September 1966; dredge; USNM 170835. — 1; 18 October 1966; trawl; FSBC I 18507. — 1 ♀; 18 October 1966; dredge; FSBC I 18508. — 1; 19 November 1966; trawl; USNM 170836. — 1 ♂, 1 ♀; 13 December 1966; dredge; FSBC I 18509. — 1 ♂; 25 January 1967; trawl; FSBC I 18510. — 2 ♀; 5 February 1967; trawl; FSBC I 18511. — 1 ♀; 27 February 1967; trawl; FSBC I 18513. — 2 ♀; 2 March 1967; trawl; USNM 170837. — 1 ♀; 3 April 1967; trawl; FSBC I 18515. — 2; 11 April 1967; trawl; FSBC I 18517. — 1 ♀; 31 August 1967; dredge; FSBC I 18519. — 3 ♀; 11 September 1967; trawl; FSBC I 18520. — 1 ♀; 11 September 1967; dredge; FSBC I 18521. — 3 ♀; 5 October 1967; trawl; USNM 170838. — HOURGLASS STATION J: 7 ♀; 13 January 1966; trawl; FSBC I 18501. — 1 ♂; 15 February 1967; dredge; FSBC I 18512. — 1 ♀, 2 juv.; 8 March 1967; dredge; FSBC I 18514. — 5; 7 April 1967; trawl; FSBC I 18516. — 1 ♂; 5 July 1967; dredge; FSBC I 18518. — 1 ♂; 11 October 1967; trawl; FSBC I 18522. — HOURGLASS STATION K: 1 juv.; 4 September 1966; dredge; FSBC I 18505. — DATA UNKNOWN: 1 ovigerous ♀ given erroneous sample number.

Diagnosis: Eyes separated at midline by half an eye width. Cephalon not ornamented dorsally. Basal article of antenna 1 peduncle much dilated. Apex of uropodal exopod bifid; lateral border of endopod straight, apex with long spine, inner border with stout, two-pointed seta near apex. Dorsum of pleon with median sulcus containing obvious large tubercles arranged linearly on somites 3 to 5 inclusive; large, carina-like tubercle bordering each side of sulcus, tuberculate at

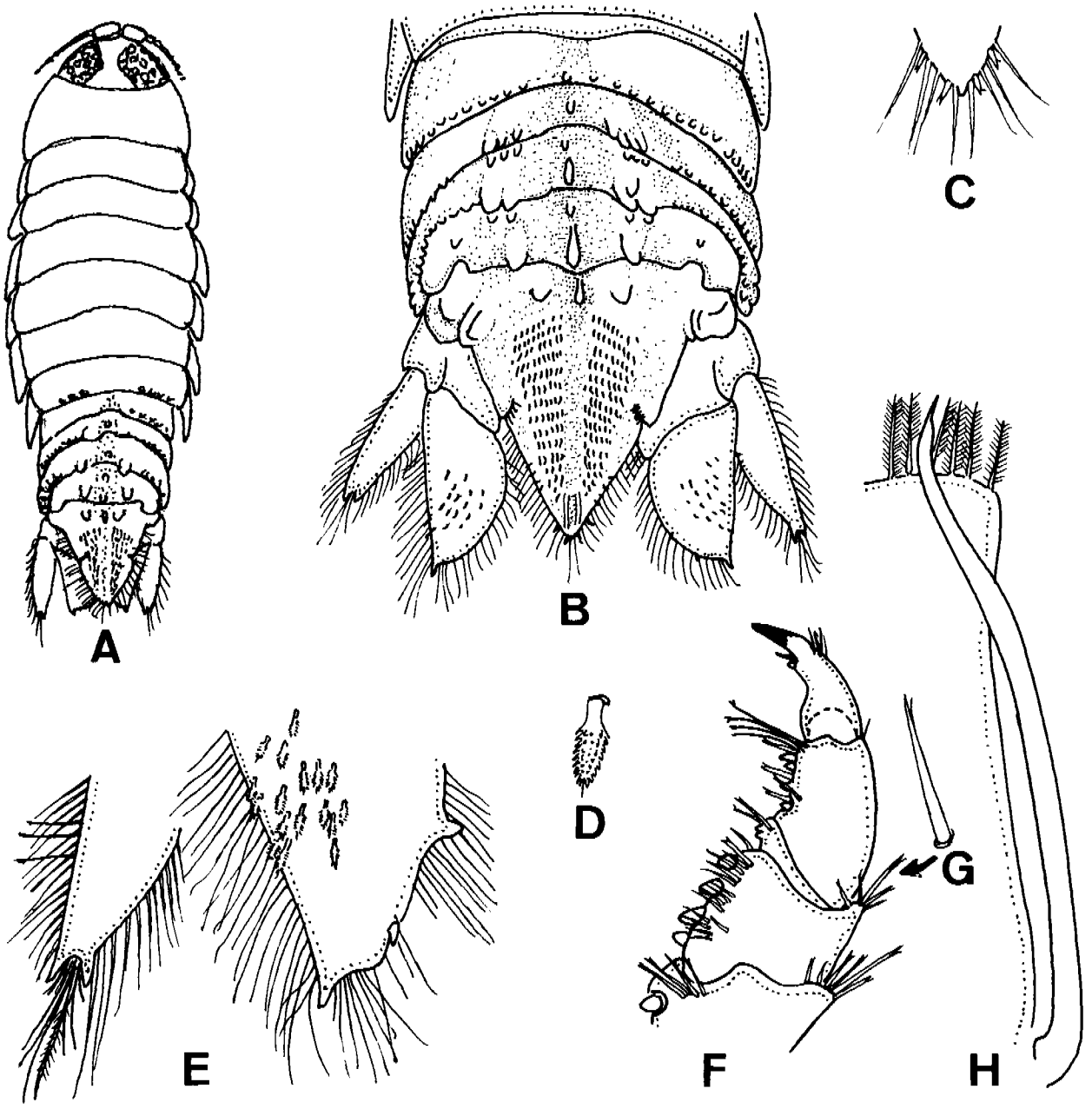

Figure 24. *Excorallana antillensis* (Hansen). Male, FSBC I 18516: length 11.3 mm, width 3.9 mm. A. whole animal; B. pleon; C. apex of pleotelson; D. seta of dorsum of pleotelson; E. uropodal apex; F. pereopod 1; G. two-pointed seta on pereopod 1; H. appendix masculinum.

distal end; distal margins of somites 2 to 4 transversely multituberculate. Pleotelson longer than wide, sharply pointed, with median sulcus, one central and two lateral tubercles on each side of sulcus anteriorly, two short carinae near apex; apex with medial spine and two, two-pointed setae in addition to plumose marginal setae. "Hairs" of dorsum arranged in triangular patch on either side of sulcus.

Distribution: West Florida shelf to St. Thomas, West Indies.

TABLE 13. MONTHLY ABUNDANCES OF *Excorallana antillensis*; DREDGE AND TRAWL SAMPLES COMBINED.

Excorallana antillensis

STA	1965					1966												1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																				1	2	2	1					1	3		10
B_2									2			1		1	9	2	1	2			1		2					4			25
C_1																															
C_2																															
D_1																															
D_2																															
E																															
I																															
J						7															1	3	5			1			1		18
K															1																1
L																															
M																															
TOT						7			2			1		1	10	2	1	2		1	4	5	8			1		5	4		54*

*Plus 1 specimen; no data.
Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Remarks: Feeding habits of this species are not known. Specimens were collected along both transects, all except one (from 37 m) occurring at 18 m depths (Table 13). The species was not collected during May or June but was found during all other months. Four gravid females were observed, one in July and two in September; we have no data for the remaining specimen. Most specimens were collected in the dredge.

The species was previously taken from reefs at low tide (Richardson, 1905).

Genus *Nalicora* Moore, 1902

Diagnosis: Excorallanidae with second article of maxillipedal palp longest, third article shorter than combined lengths of fourth and fifth. Exite of maxilla 1 with single, apical recurved tooth bearing mesial lobe.

Type-species: *Nalicora rapax* Moore, 1902.

Remarks: This genus resembles *Excorallana* in having articles of the maxillipedal palp narrow and in having the first maxilla consisting of a recurved claw. For this reason, Menzies and Glynn (1968) proposed transferal of this genus to Excorallanidae. It must be noted, however, that it is the second article of the maxillipedal palp that is elongated, not the third as is the case in *Excorallana*. The mesial lobe of maxilla 1 is similarly distinctive.

Nalicora rapax Moore, 1902

Figure 25

Nalicora rapax Moore, 1902, pp. 169, 170, pl. 9; Richardson, 1905, pp. 164-166, figs. 146, 147.

Excorallana rapax: Schultz, 1969, p. 211, fig. 336.

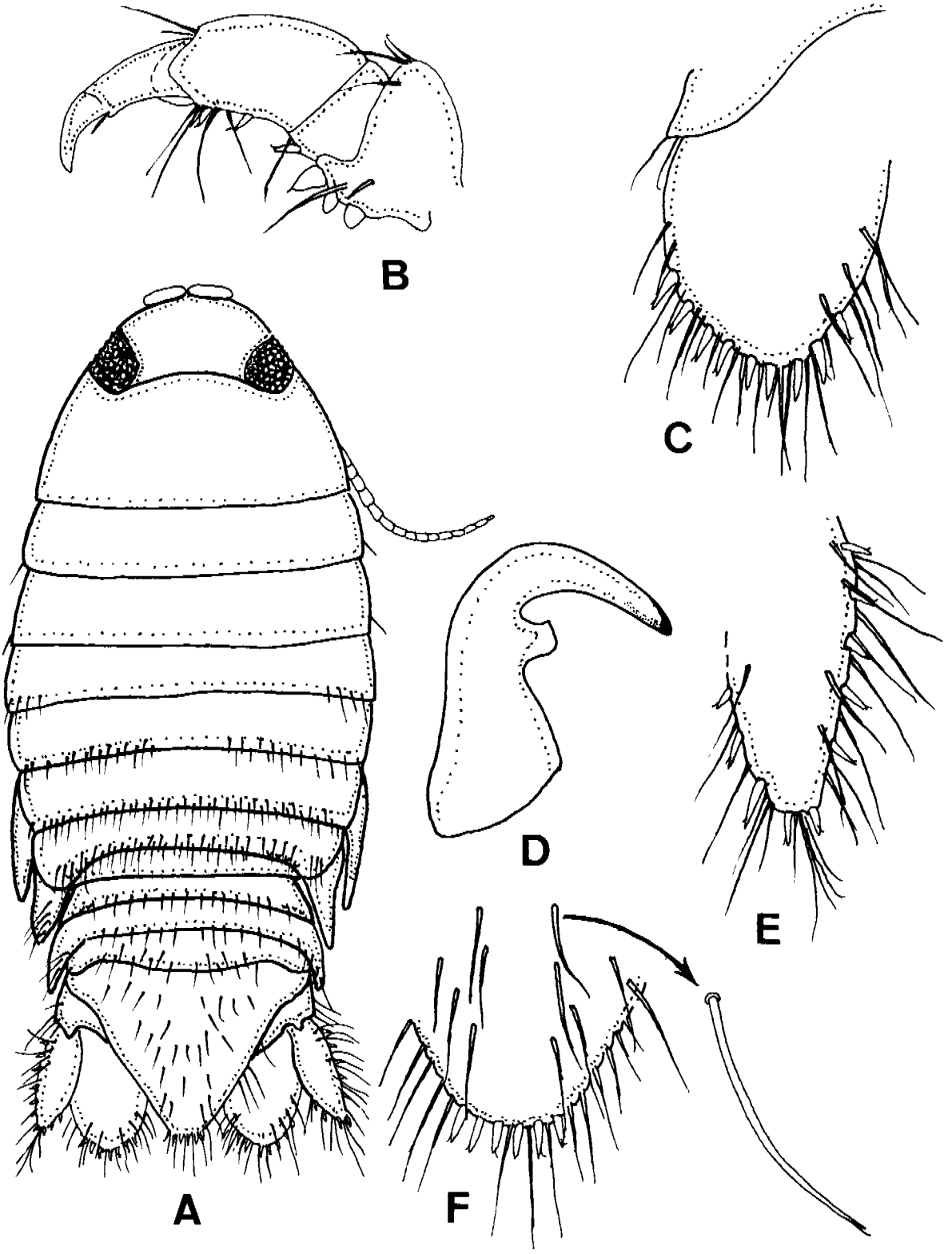

Figure 25. *Nalicora rapax* Moore. Male, FSBC I 18525: length 6.0 mm, width 2.2 mm. A. whole animal; B. pereopod 1; C. uropodal endite; D. maxilla 1; E. uropodal exite; F. apex of pleotelson.

Material examined: HOURGLASS STATION C: 1 ♂; 11 September 1967; dredge; FSBC I 18544. — HOURGLASS STATION D: 1; 3 August 1965; dredge; FSBC I 18523. — 1 ♂; 7 June 1966; dredge; FSBC I 18525. — 1 ♀; 3 July 1966; trawl; FSBC I 18526. — 2 ♀; 11 August 1966; dredge; FSBC I 18527. — 1 ♀; 19 October 1966; trawl; FSBC I 18529. — 2 ♀; 6 February 1967; dredge; FSBC I 18532. — 2 ♀; 3 March 1967; dredge; FSBC I 18533. — 1 ♂, 2 ♀; 4 April 1967; dredge; FSBC I 18535. — 1 ♂, 1 ♀; 21 June 1967; trawl; FSBC I 18537. — 2 ♀; 21 June 1967; dredge; FSBC I 18538. — 1 ♀; 1 September 1967; trawl; USNM 170840. — 1 ♂; 1 September 1967; dredge; FSBC I 18540. — 2 ♂; 21 November 1967; trawl; FSBC I 18545. — 8; 21 November 1967; dredge; USNM 170841. — HOURGLASS STATION E: 1 ♂; 3 March 1967; dredge; FSBC I 18534. — 1 ♂; 2 August 1967; dredge; FSBC I 18539. — 1; 1 September 1967; trawl; FSBC I 18541. — HOURGLASS STATION M: 1 ♂; 14 January 1966; dredge; FSBC I 18524. — 1 ♂, 2 ♀; 6 August 1966; dredge; USNM 170839. — 1 ♀; 13 October 1966; dredge; FSBC I 18528. — 1 ♀; 7 December 1966; dredge; FSBC I 18530. — 1 ♀; 13 January 1967; dredge; FSBC I 18531. — 1 juv.; 8 April 1967; dredge; FSBC I 18536. — 1 ♀; 5 September 1967; trawl; FSBC I 18542. — 2 ♂, 4 ♀; 5 September 1967; dredge; FSBC I 18543.

Diagnosis: Monotypic; same as generic diagnosis.

Distribution: Puerto Rico and northeastern Gulf of Mexico.

Remarks: This species is moderately hirsute and is easily confused with *Excorallana* species. The unusual maxilla 1 and absence of lateral incisions and mesial sulcus on the pleotelson serve to distinguish it.

Hosts and habits of this species are unknown. Specimens were collected between 37 and 73 m depths, with most captures at 55 m along the northern transect and 73 m along the southern transect (Table 14). Most were taken in dredge samples. They were captured during all months except May. Gravid females occurred throughout the year except during January, March, May, and August.

TABLE 14. MONTHLY ABUNDANCES OF *Nalicora rapax*; DREDGE AND TRAWL SAMPLES COMBINED.

Nalicora rapax

STA	1965					1966													1967										TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																															
B_2																															
C_1																															
C_2																												1			1
D_1	1										1	1									2	2	3					2			12
D_2														2		1								4						9	16
E																						1					1	1			3
I																															
J																															
K																															
L																															
M						1								3		1		1	1				1					7			15
TOT	1					1					1	1		5		2		1	1		2	3	4		4		1	11		9	47

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Family Cirolanidae Hansen, 1890

Diagnosis: Cirolanid-type Flabellifera with expanded, flattened, saw-toothed molar process; maxillipedal palp with five ovate articles. Pleotelson and uropods with stout, two-pointed setae, plumose setae, or both.

Remarks: Hourglass collections included two genera and five previously known species.

Genus *Cirolana* Leach, 1818

Diagnosis: Cirolanid-type Flabellifera with first article of peduncle of antenna 1 not extending in front at right angle to second article. Peduncle of antenna 2 composed of five articles. Fifth pleonal somite not extending to lateral margin of pleon, covered by fourth somite laterally. Pleopods 1 and 2 similar, inner rami submembranaceous, outer rami indurated. Uropods insert laterally, peduncles with inner angle strongly produced (modified from Menzies and Glynn, 1968).

Type-species: *Cirolana cranchii* Leach, 1818.

Cirolana parva Hansen, 1890

Figure 26

Cirolana parva Hansen, 1890, pp. 340, 341, pls. 2, 3; Richardson, 1900, p. 217; 1901, p. 514; Moore, 1902, p. 167, pl. 8; Richardson, 1905, pp. 111-114, figs. 93-95; 1912b, p. 187; Boone, 1921, pp. 92, 93; Pearse, 1934a, pp. 119-122; Tabb and Manning, 1961, p. 593; Menzies and Frankenberg, 1966, p. 51, fig. 27; Menzies and Glynn, 1968, pp. 37, 38, fig. 14; Miller, 1968, pp. 15, 16, fig. 4; Rouse, 1969, p. 133; Schultz, 1969, p. 185, fig. 290; Lyons et al., 1971, p. 27; Bowman, 1977, pp. 653, 654, figs. 1-3.

Cirolana albida Richardson, 1901, pp. 514, 515; 1905, p. 114, figs. 96, 97.

Cirolana cranchi: Nordenstam, 1946, pp. 3-8 [part, non *Cirolana cranchii* Leach, 1818].

Cirolana diminuta Menzies, 1962b, pp. 343, 344, fig. 6; Schultz, 1969, p. 184, fig. 288.

Material examined: HOURGLASS STATION B: 2; 20 October 1965; dredge; FSBC I 18547. — 1; 19 November 1965; dredge; FSBC I 18549. — 1; 3 December 1965; trawl; FSBC I 18550. — 1; 7 February 1966; dredge; FSBC I 18552. — 1; 20 February 1966; trawl; FSBC I 18553. — 2; 26 March 1966; dredge; FSBC I 18554. — 1; 15 April 1966; dredge; FSBC I 18555. — 6; 18 May 1966; dredge; USNM 170842. — 3; 6 June 1966; trawl; FSBC I 18556. — 12; 17 June 1966; trawl; USNM 170843. — 4; 10 July 1966; dredge; FSBC I 18557. — 1; 18 July 1966; trawl; FSBC I 18558. — 1; 1 August 1966; trawl; FSBC I 18559. — 4; 10 August 1966; dredge; FSBC I 18561. — 1; 31 August 1966; dredge; FSBC I 18562. — 3; 8 September 1966; trawl; FSBC I 18564. — 7; 8 September 1966; dredge; USNM 170844. — 3; 18 October 1966; dredge; FSBC I 18567. — 1; 19 November 1966; trawl; FSBC I 18570. — 5; 19 November 1966; dredge; FSBC I 18571. — 1; 1 December 1966; trawl; FSBC I 18572. — 9; 6 January 1967; trawl; FSBC I 18575. — 3; 20 January 1967; dredge; FSBC I 18577. — 1; 27 February 1967; dredge; FSBC I 18580. — 3; 2 March 1967; trawl; FSBC I 18581. — 8; 3 April 1967; trawl; FSBC I 18583. — 2; 3 April 1967; dredge; FSBC I 18584. — 2; 11 May 1967; trawl; FSBC I 18585. — 5; 11 May 1967; dredge; FSBC I 18586. — 7; 20 May 1967; dredge; FSBC I 18589. — 11; 2 June 1967; dredge; FSBC I 18590. — 2; 20 June 1967; trawl; FSBC I 18592. — 1; 1 July 1967; trawl; FSBC I 18593. — 1; 11 August 1967; dredge; FSBC I 18596. — 40; 11 September 1967; trawl; FSBC I 18597. — 11; 11

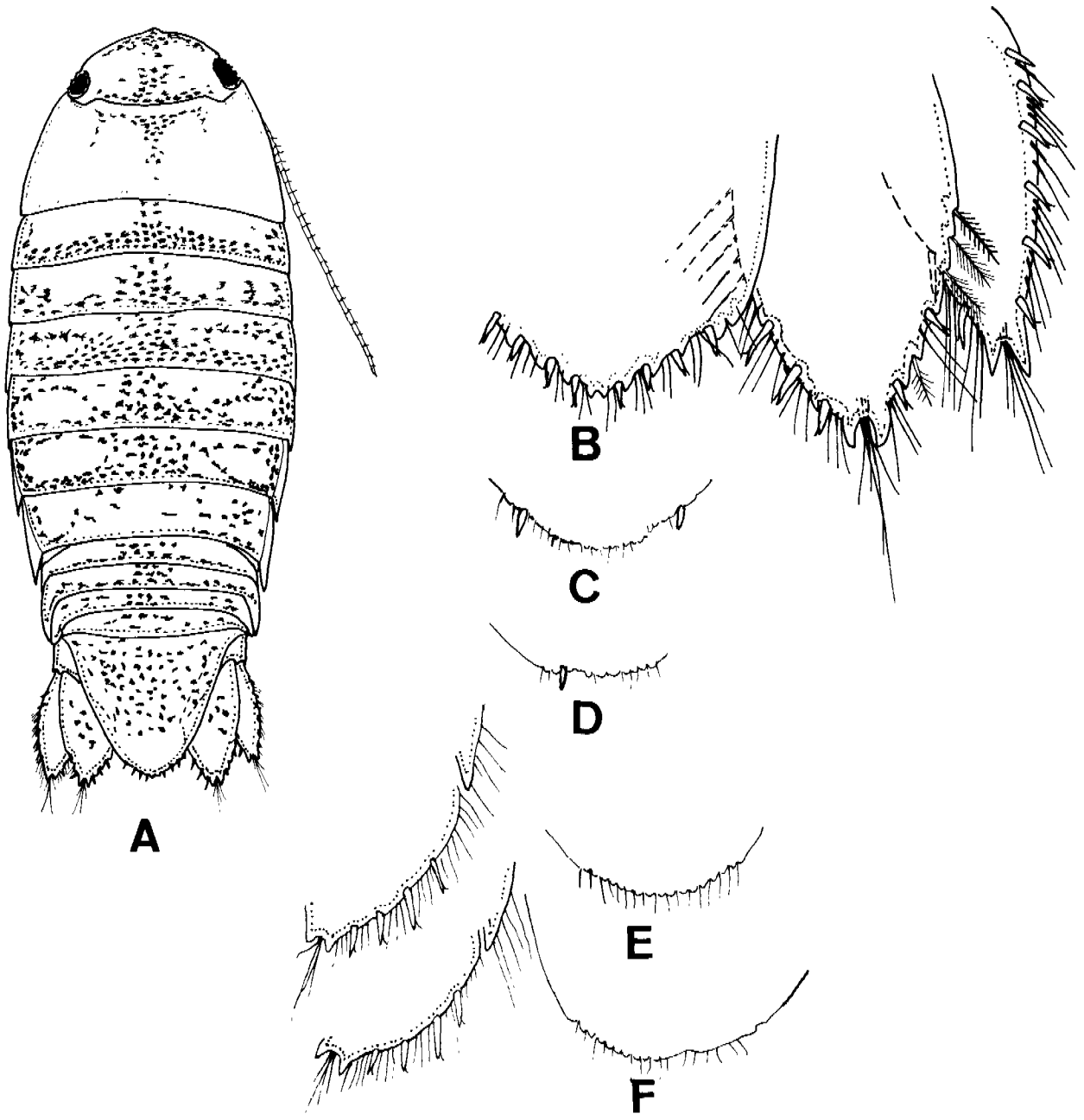

Figure 26. *Cirolana parva* Hansen. Male: length 2.5 mm. A. whole animal; B. uropod and apex of pleotelson (from Menzies and Glynn, 1968). C-F. apex of pleotelson on four females: C: FSBC I 18573; D: FSBC I 18572; E: FSBC I 18573; F: FSBC I 18551.

September 1967; dredge; FSBC I 18598. — 1; 5 October 1967; trawl; FSBC I 18600. — 4; 5 October 1967; dredge; FSBC I 18601. — HOURGLASS STATION C: 1; 11 September 1967; dredge; FSBC I 18599. — HOURGLASS STATION I: 1; 5 August 1966; trawl; FSBC I 18560. — HOURGLASS STATION J: 1; 13 January 1966; dredge; FSBC I 18551. — 12; 12 November 1966; trawl; FSBC I 18568. — 8; 6 December 1966; dredge; FSBC I 18573. — 1; 15 February 1967; trawl; FSBC I 18578. — 3; 15 February 1967; dredge; FSBC I 18579. — 1; 8 March 1967;

dredge; FSBC I 18582. — 1; 15 May 1967; dredge; FSBC I 18587. — 1; 6 June 1967; trawl; FSBC I 18591. — 1; 5 July 1967; dredge; FSBC I 18594. — 3; 14 November 1967; dredge; FSBC I 18602. — HOURGLASS STATION K: 2; 14 November 1967; dredge; FSBC I 18603. — HOURGLASS STATION L: 1; 4 September 1965; trawl; FSBC I 18546. — 1; 13 November 1965; trawl; FSBC I 18548. — 1; 5 September 1966; dredge; FSBC I 18563. — 1; 13 October 1966; dredge; FSBC I 18565. — 3; 13 November 1966; dredge; FSBC I 18569. — 2; 7 December 1966; dredge; FSBC I 18574. — 1; 13 January 1967; dredge; FSBC 18576. — 1; 16 May 1967; dredge; FSBC I 18588. — 1; 8 August 1967; dredge; FSBC I 18595. — HOURGLASS STATION M: 3; 13 October 1966; dredge; FSBC I 18566.

Diagnosis: Frontal lamina broad, not produced forward to form a horn. Endopod of uropod not incised on lateral margin, apex distinctly bifid; exopod narrower than endopod, bifid, not lanceolate. Apex of pleotelson minutely bifid, margin usually with eight, two-pointed setae. Articles of antenna 1 flagellum as wide as long, not compressed together. Apex of appendix masculinum lanceolate, pointed.

Distribution: Northeastern Gulf of Mexico to the Bahamas and West Indies; Ceylon and South Pacific Islands. West Africa. Apparently a Tethys relict.

Remarks: Usually the configuration of armament and border of the pleotelson is consistent, but after pleotelson damage and regeneration some two-pointed setae are lost. Figures 26 C-F show extremes of this variation in four females. This observation is in agreement with Nordenstam's (1946) findings for Pacific specimens. His union of *C. parva* with *C. cranchii* Leach may not be valid, but we agree with his placement of *C. albida* Richardson as a synonym of *C. parva* Hansen.

This species is a free living carnivore. Specimens were collected from all depths, mainly in the northern transect, but with most captures at 18 m (Table 15). It was found during all months and occurred in equal numbers in dredge and trawl. Twenty-one percent of specimens examined were gravid females; these occurred in all months except March and April. As many as 20 embryos were found in the brood pouches.

TABLE 15. MONTHLY ABUNDANCES OF *Cirolana parva*; DREDGE AND TRAWL SAMPLES COMBINED.

Cirolana parva

STA	1965					1966													1967											TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1					1		1				3		1	1	1			1	9			3	10	7	11	1			5		55
B_2			2	1			1	2	1	6	12	4		4	10	3	6		3		1			7	2		1	51			117
C_1																															
C_2																												1			1
D_1																															
D_2																															
E																															
I														1																	1
J						1											12	8			4	1		1	1	1				3	32
K																														2	2
L		1		1											1	1	3	2	1					1			1				12
M																3															3
TOT		1	2	2	1	1	2	2	1	6	15	4	1	6	12	7	21	11	13		5	4	10	16	14	2	2	52	5	5	223

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

Pearse (1934a) found *Cirolana parva* associated with the sponges *Speciospongia vespara* (Lamarck), *Spongia officinalis* Linné, *Stematumenia foetida* (Schmidt), *S. strobilina* (Lamarck), and *S. variabilis* (Schulze) at Dry Tortugas.

Cirolana polita (Stimpson, 1854)

Figure 27

Aega polita Stimpson, 1854, p. 41; Lütken, 1859, p. 77; Verrill, 1873, p. 16.

Conilera polita: Harger, *in* Smith and Harger, 1874, pp. 3, 22; Verrill, 1874, p. 411.

Cirolana polita: Harger, 1880a, p. 161; 1880b, pp. 381, 382; Richardson, 1900, p. 217; 1901, p. 514; 1905, pp. 99-101, figs. 80-82; Menzies and Frankenberg, 1966, pp. 50, 51, fig. 26; Schultz, 1969, p. 183, fig. 285.

Material examined: HOURGLASS STATION L: 1 ♂, 11.9 mm; 16 May 1967; dredge; FSBC I 18604.

Diagnosis: Fifth pleonal somite not extending to lateral margin of pleon, covered by fourth somite laterally. Frontal lamina not produced forward to form a horn. Endopod of uropod deeply incised on lateral margin, apex rounded; exopod lanceolate. Apex of pleotelson rounded, armed with stout, two-pointed setae and plumose marginal setae. Articles of antenna 1 flagellum wider than long, compressed.

Distribution: Bay of Fundy to Georgia; Gulf of Mexico off Fort Myers, Florida. Not previously recorded from Florida.

Remarks: Occurrence of this species in the Gulf of Mexico is expected due to its previous record from Georgia. Only one specimen was collected and little can be said of its distribution in the Hourglass study area.

Cirolana borealis Lilljeborg, 1851

Figure 28

Cirolana borealis Lilljeborg, 1851, p. 23; Hansen, 1890, pp. 321, 322, pl. 1; Scott, 1898, p. 222; G. O. Sars, 1899, pp. 70, 71, pl. 29; Richardson, 1900, p. 216; 1901, p. 513; Ohlin, 1901, pp. 23, 24; Dollfus, 1903, pp. 5, 6; Norman, 1904, p. 487; Hansen, 1905a, pp. 342, 343; Richardson, 1905, pp. 101-104, figs. 83-85 [all *vide* Richardson, 1905]; Schultz, 1969, p. 182, fig. 284.

Cirolana spinipes Bate and Westwood, 1868, p. 299; Harger, 1883, pp. 91-93, pls. 1, 2 [both *vide* Richardson, 1905].

Material examined: HOURGLASS STATION L: 1 ♂; 12 October 1967; dredge; FSBC I 18605.

Diagnosis: Fifth pleonal somite not extending to lateral margin of pleon, covered by fourth somite laterally. Frontal lamina of cephalon not produced forward to form a horn. Endopod of uropod not incised laterally, apex rounded; exopod lanceolate, apex pointed. Apex of pleotelson rounded, with eleven two-pointed setae. Articles of antenna 1 flagellum as wide as long, compressed. Apex of appendix masculinum expanded, trifid.

Distribution: Atlantic coast of North America south to Cape Florida; Mediterranean; Norway to France; now also from off Fort Myers, Florida west coast.

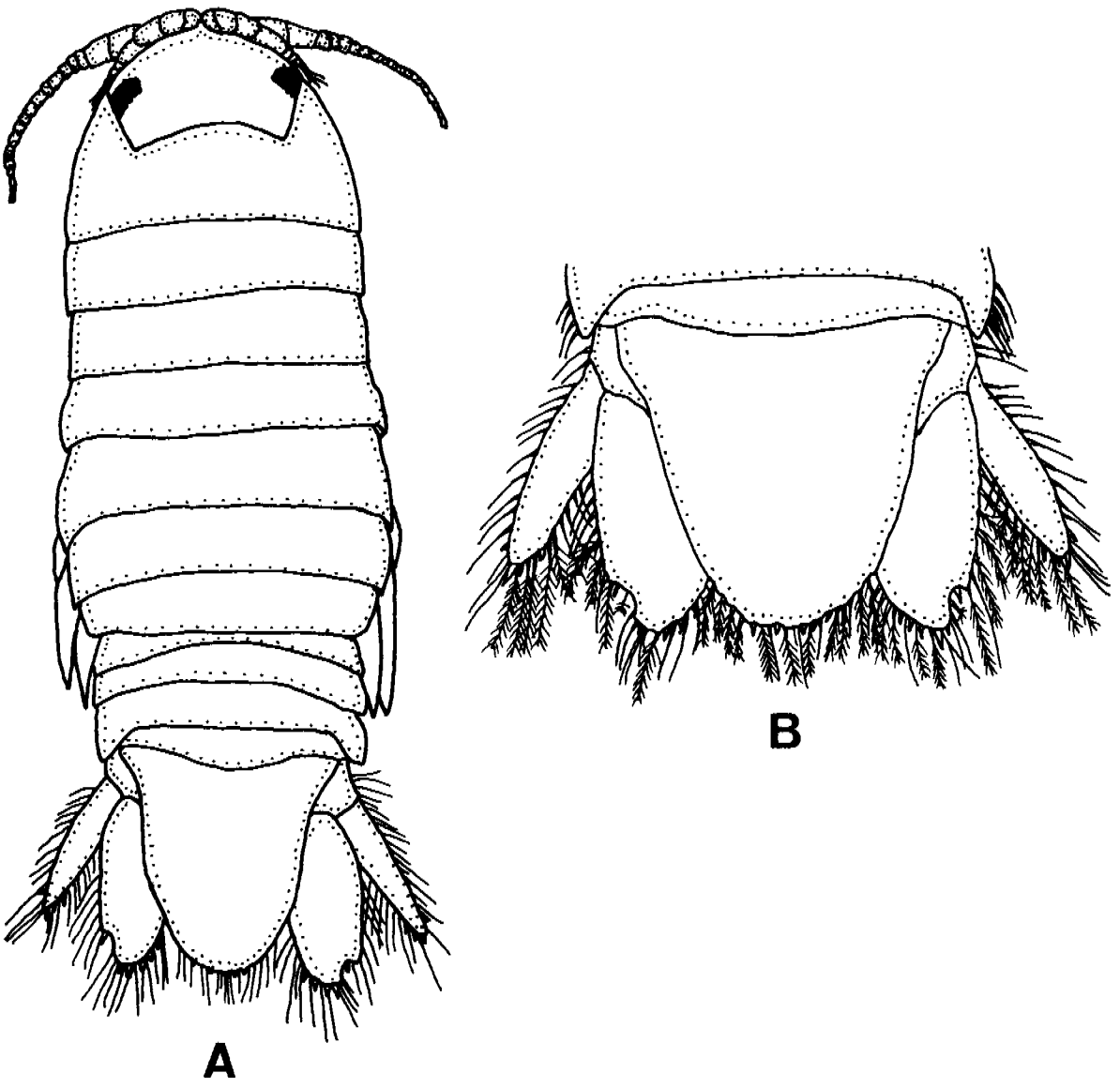

Figure 27. *Cirolana polita* (Stimpson). Female: length 6.0 mm, width 2.0 mm. A. whole animal; B. pleotelson (from Menzies and Frankenberg, 1966).

Remarks: This is primarily a North Atlantic boreal species, but has been reported in south Florida waters off Cape Florida (Richardson, 1905), so its occurrence off Fort Myers is not totally unexpected. It has not been recorded previously from the Gulf or Caribbean.

Genus *Eurydice* Leach, 1815

Diagnosis: Cirolanid-type Flabellifera with first article of peduncle of antenna 1 extended in front at right angle to second article. Peduncle of antenna 2 composed of four articles. Pleopods 1 and 2 similar, both rami submembranaceous. Uropods insert ventrally, peduncles with inner angle very little produced.

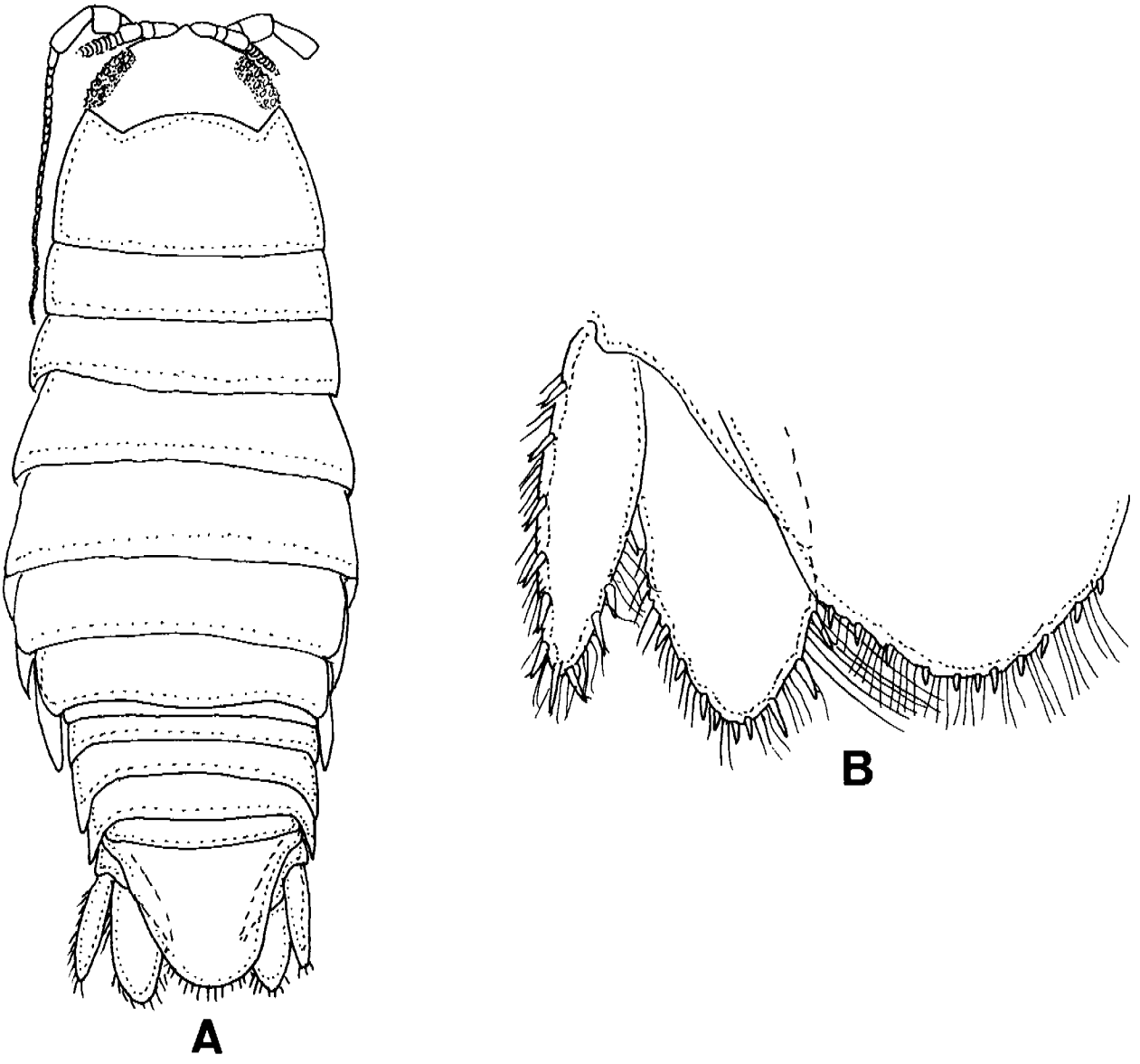

Figure 28. *Cirolana borealis* Lilljeborg. Male, FSBC I 18605: length 12.1 mm, width 4.1 mm. A. whole animal; B. apex of pleotelson and uropod.

Type-species: *Eurydice pulchra* Leach, 1815.

Remarks: Hourglass collections contained two species, *E. littoralis* (Moore) and *E. piperata* Menzies and Frankenberg. Neither has been recorded previously from the Gulf of Mexico. The species are planktonic as well as benthonic.

Eurydice littoralis (Moore, 1902)

Figure 29A, B

Branchuropus littoralis Moore, 1902, p. 168, pl. 8; Richardson, 1905, pp. 128-130, figs. 110, 111.

Eurydice littoralis: Menzies and Frankenberg, 1966, p. 49, fig. 24; Menzies and Glynn, 1968, pp. 39, 40, fig. 4; Schultz, 1969, p. 171, fig. 261; Moreira, 1972, pp. 76-79, figs. 21-23; Bowman, 1977, p. 657 [discussion].

Material examined: HOURGLASS STATION B: 1; 3 December 1965; dredge; FSBC I 18606. — 1; 13 December 1966; trawl; FSBC I 18611. — 1; 14 March 1967; dredge; FSBC I 18612. — 1; 1 August 1967; dredge; FSBC I 18613. — HOURGLASS STATION C: 1; 2 June 1967; dredge;

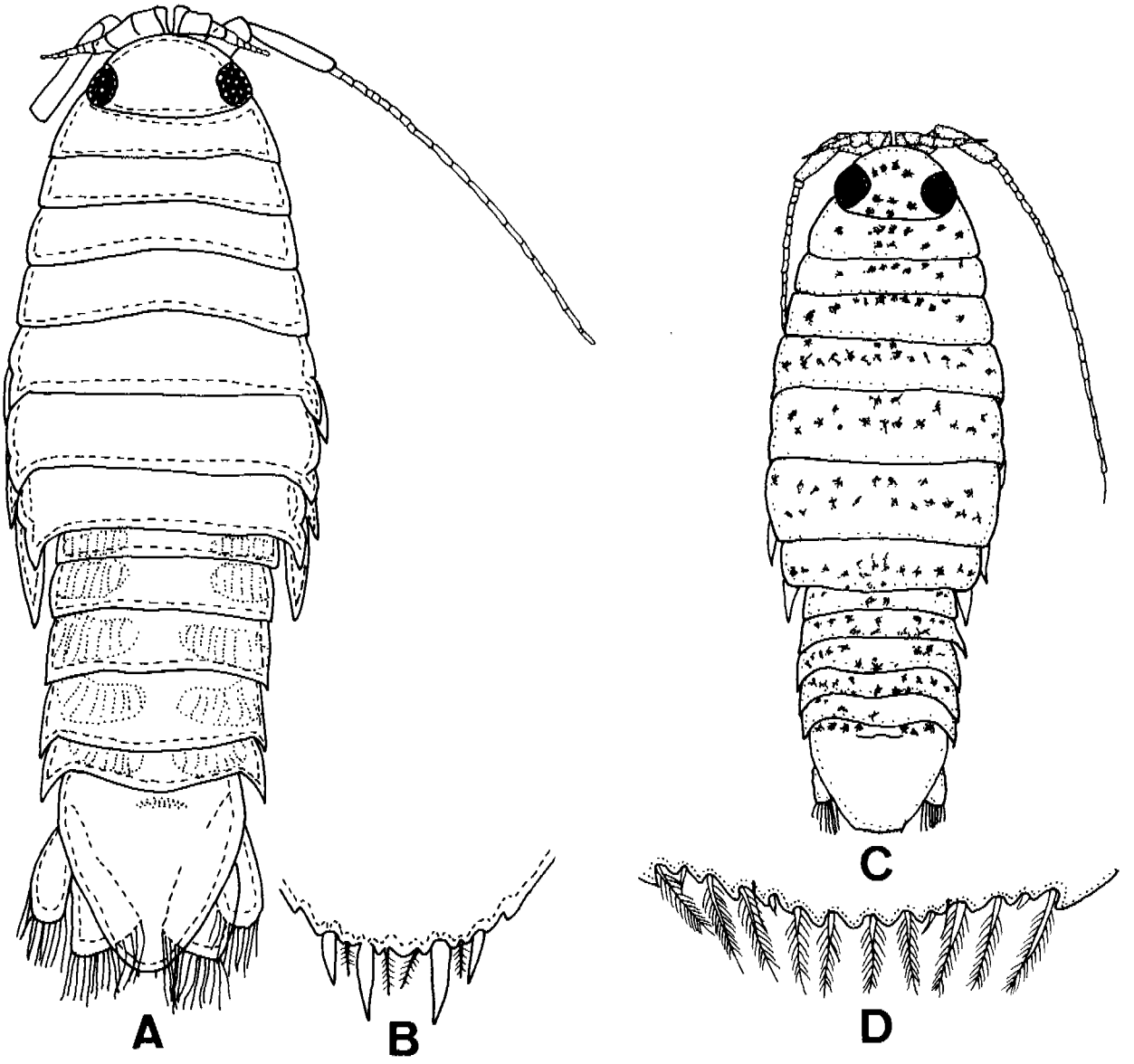

Figure 29. *Eurydice littoralis* (Moore). A. whole animal, length 3.9 mm, width 1.2 mm; B. apex of pleotelson (from Menzies and Glynn, 1968). *Eurydice piperata* Menzies and Frankenberg. C. whole animal, length 5.0 mm, width 1.5 mm; D. apex of pleotelson (from Menzies and Frankenberg, 1966).

USNM 170849. — HOURGLASS STATION D: 1; 2 August 1966; dredge; FSBC I 18607. — 1; 11 August 1966; dredge; FSBC I 18608. — 1; 6 October 1967; dredge; USNM 170850. — HOURGLASS STATION E: 1; 1 September 1967; trawl; FSBC I 18615. — HOURGLASS STATION L: 1; 5 September 1966; dredge; USNM 170848. — 2; 13 October 1966; dredge; FSBC I 18610. — 2; 8 August 1967; dredge; FSBC I 18614. — HOURGLASS STATION M: 1; 5 September 1966; dredge; FSBC I 18609. — 1; 12 October 1967; dredge; FSBC I 18616.

Diagnosis: Four stout, two-pointed spines at apex of pleotelson, inner pair longer; shorter, plumose setae between stout spines. Chromatophores evenly distributed, giving body light to dark brown color (modified from Menzies and Glynn, 1968).

Distribution: Atlantic Coast from Georgia to Florida; Gulf of Mexico; Caribbean; southern Brazil.

Remarks: Long plumose setae and long, two-pointed spines at the apex of the pleotelson, as well as the more pointed nature of the pleon, separate this species from *E. piperata*. Although not seen since its original description, *E. convexa* Richardson, 1900 from off Cape San Blas reportedly bears eight two-pointed spines at the apex of the pleotelson, not four as do *E. littoralis* and *E. piperata*.

TABLE 16. MONTHLY ABUNDANCES OF *Eurydice littoralis*; DREDGE AND TRAWL SAMPLES COMBINED.

Eurydice littoralis																													
STA	1965					1966													1967										TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1					1																						1				2
B_2																		1				1									2
C_1																									1						1
C_2																															
D_1														1															1		2
D_2														1																	1
E																												1			1
I																															
J																															
K																															
L															1	2											2				5
M															1														1		2
TOT					1									2	2	2		1				1			1		3	1	2		16

Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

This species was captured occasionally between 18 and 73 m depths along both transects (Table 16). Most specimens were captured in the summer, but winter specimens were also found. The species occurred more frequently in dredge samples. Seven gravid females, bearing up to 6 embryos, were found in March, August, and September to December samples.

Eurydice piperata Menzies and Frankenberg, 1966

Figure 29C, D

Eurydice piperata Menzies and Frankenberg, 1966, pp. 49, 50, fig. 25; Schultz, 1969, p. 172, fig. 264.

Material examined: HOURGLASS STATION D: 1; 12 May 1967; dredge; FSBC I 18619. — HOURGLASS STATION E: 1; 2 August 1966; trawl; FSBC I 18617. — HOURGLASS STATION K: 1 (destroyed); 6 December 1966; dredge. — HOURGLASS STATION L: 1; 16 February 1967; dredge; FSBC I 18618. — 1; 16 May 1967; dredge; FSBC I 18620. — 1; 5 September 1967; dredge; USNM 170846. — 1; 15 November 1967; trawl; FSBC I 18621. — 1; 15 November 1967; dredge; USNM 170847. — HOURGLASS STATION M: 2; 5 September 1966; dredge; USNM 170845.

Diagnosis: Uropods concealed below pleotelson; latter with crenulate margin, fringed with four stout, two-pointed spines and some plumose setae; stout spines not projecting much beyond margin of crenulations; plumose setae much longer than stout spines (modified from Menzies and Frankenberg, 1966).

Distribution: Georgia to west Florida shelf, Gulf of Mexico.

Remarks: Specimens of *E. piperata* were captured only at depths of 37 to 73 m. One female with a developed marsupium was taken in August.

Family Serolidae Dana, 1853

Diagnosis: Isopoda with cephalon and first pereonite fused, leaving only six pereonites free in dorsal view. Body flattened, not compressed. Pleopoda not concealed in pleotelson; pleopods 4 and 5 large, indurated, operculiform.

Remarks: This family has not previously been reported from the Gulf of Mexico. It is represented here by *Serolis mgrayi* Menzies and Frankenberg, 1966.

Genus *Serolis* Leach, 1818

Diagnosis: Coxal plates marked off from terga of second through fourth pereonites only. Third article of maxillipedal palp well developed. Lappets of outer lobe of maxilla 2 provided with few setae. Article 2 of pleopods 1-3 each with setiferous triangular expansion at inner proximal angle; endopod of pleopod 3 entire (after Nordenstam, 1933).

Type-species: *Oniscus paradoxus* Fabricius, 1775 (= *Serolis fabricii* Leach, 1818).

Remarks: Nordenstam (1933), a major revisor of this genus, attributed *Serolis* to Fabricius, but this appears to be incorrect.

Serolis mgrayi Menzies and Frankenberg, 1966

Figure 30

Serolis mgrayi Menzies and Frankenberg, 1966, pp. 31, 32, fig. 12; Schultz, 1969, p. 137, fig. 201; Paul and Menzies, 1971, pp. 46, 47, figs. 29, 30; Hessler, 1972, pp. 1-6, figs. 1, 2.

Material examined: HOURGLASS STATION B: 2 ♀; 5 February 1967; dredge; USNM 170851.

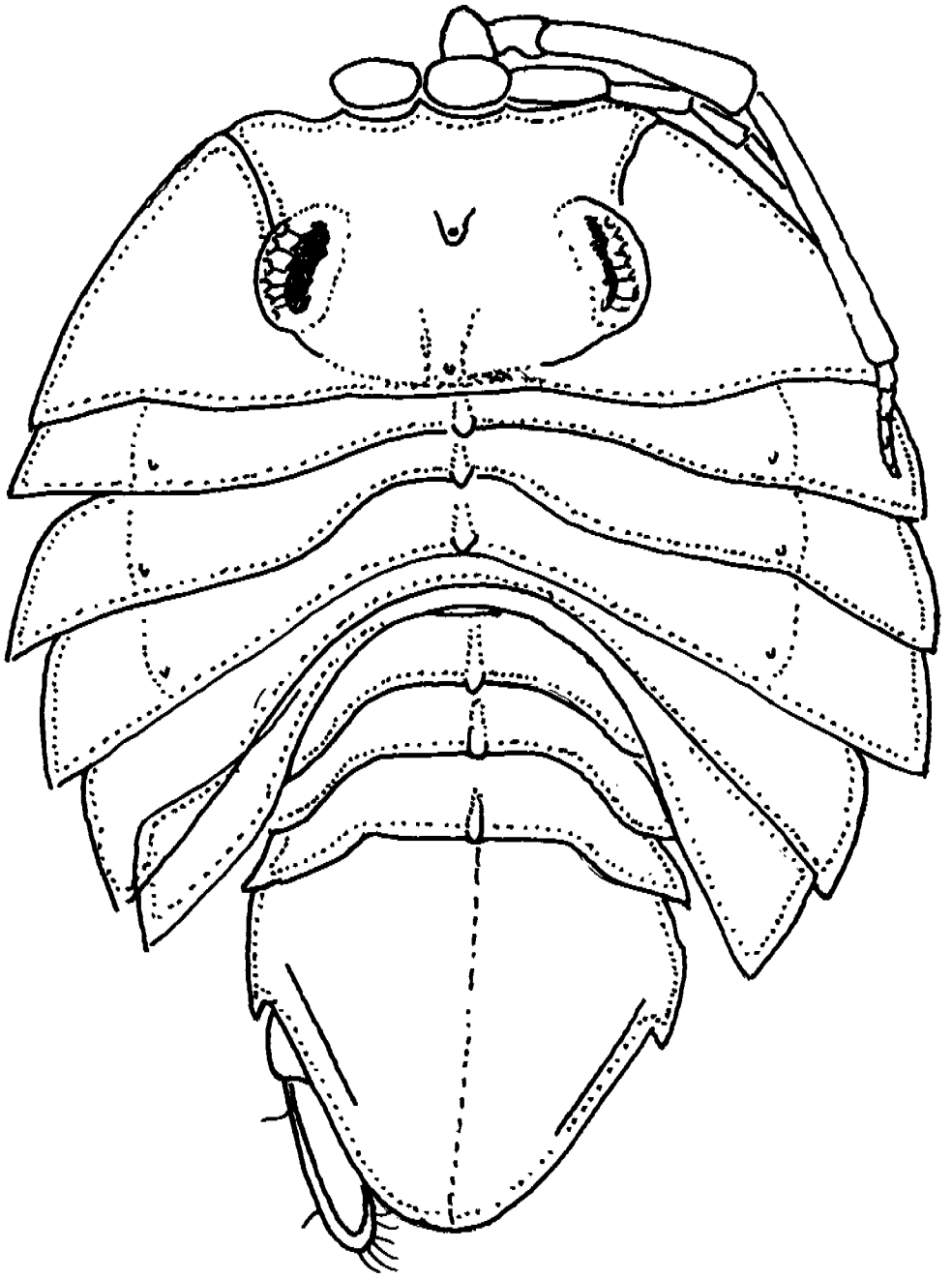

Figure 30. *Serolis mgrayi* Menzies and Frankenberg. Female, FSBC I 18624: length 3.2 mm, width 3.2 mm.

— 1 ♂; 2 November 1967; dredge; FSBC I 18639. — HOURGLASS STATION D: 1 ♂, 2 ♀, 1 juv.; 2 August 1966; dredge; FSBC I 18729. — 1 ♀; 3 June 1967; dredge; FSBC I 18630. — 2 ♂; 12 July 1967; dredge; FSBC I 18632. — 1; 2 August 1967; trawl; FSBC I 18633. — 5; 1 September 1967; dredge; USNM 170852. — 1 ♀; 6 October 1967; trawl; FSBC I 18636. — 1; 6 October 1967; dredge; FSBC I 18637. — HOURGLASS STATION E: 1 ♀; 8 February 1966; dredge; FSBC I 18622. — 1 ♂; 2 August 1966; dredge; FSBC I 18730. — 1 ♂, 1 ♀, 2 juv.; 9 October 1966; dredge; FSBC I 18624. — 3 ♀; 2 December 1966; dredge; FSBC I 18626. — HOURGLASS STATION J:

2; 14 November 1967; dredge; FSBC I 18640. — HOURGLASS STATION K: 1 ♂; 5 July 1967; dredge; FSBC I 18631. — 1; 4 September 1967; dredge; FSBC I 18635. — HOURGLASS STATION L: 2; 6 August 1966; dredge; FSBC I 18623. — 1; 13 November 1966; dredge; FSBC I 18625. — 1 ♀; 16 May 1967; dredge; FSBC I 18629. — 16; 8 August 1967; dredge; FSBC I 18634. — 4; 12 October 1967; dredge; FSBC I 18638. — 8; 15 November 1967; trawl; USNM 170853. — 8; 15 November 1967; dredge; FSBC I 18641. — HOURGLASS STATION M: 2 ♀; 9 March 1967; dredge; FSBC I 18628. — 1 ♀; 15 November 1967; dredge; FSBC I 18642. — DATA UNKNOWN: 1 ♀ from Hourglass Station L; vial breakage lost data.

Diagnosis: Uropoda biramous, rami flattened, subequal in length. Coxal areas of pereonal somites not extending beyond apex of pleotelson. Antennae 1 and 2 subequal in length. Uropods extending slightly beyond apex of pleotelson. Dorsum of cephalon with two small, spine-like tubercles on midline. All pereonites except fifth bearing median tubercle at posterior margins, II to IV with spine-like tubercles at posterolateral corners (from Menzies and Frankenberg, 1966).

Distribution: Georgia and west Florida shelf to Venezuela.

Remarks: Hessler (1972) compared adult males of *S. mgrayi* from the Atlantic with adult males of *S. carinata* Lockington, 1877, from the Pacific and concluded that, because of the greater relief on the tergum of *S. mgrayi*, they remain separate species. In the large series of specimens available to us, we have found that tubercles on the dorsum near the coxa vary in strength of development. On some they are stout and large, and on others they are minute or obscure. Similarly, the separations of the coxal plates were not always evident. This finding renews the possibility that *S. mgrayi* and *S. carinata* are the same species. Hessler (1972) suggests that the two species had a common northern history and were isolated from each other by the Central American land bridge.

Specimens of *S. mgrayi* were captured between 18 and 73 m depths, occurring most often at 55 m (Table 17). Most were from dredge samples. The species was captured in all months except January and April. Gravid females occurred in all months of capture except July and December.

TABLE 17. MONTHLY ABUNDANCES OF *Serolis mgrayi*; DREDGE AND TRAWL SAMPLES COMBINED.

Serolis mgrayi																													
STG	1965					1966													1967										TOT
	A	S	O	N	D	J	F	M	A	M	J	J	J sp	A	S	O	N	D	J	J sp	F	M	A	M	J	J	A	S	O	N	
A																															
B_1																					2									1	3
B_2																															
C_1																															
C_2																															
D_1														4											1		1	5	2		13
D_2																										2					2
E							1							1		4		3													9
I																															
J																														2	2
K																										1		1			2
L														2			1							1			16		4	16	40
M																						2								1	3
TOT							1							7		4	1	3			2	2		1	1	3	17	6	6	20	74*

*Plus 1 specimen; no data.
Subscripts 1, 2 and sp. represent regular (night), post (day) and supplementary (45 ft trawl) cruises

TABLE 18. ASELLOTA PREVIOUSLY KNOWN OR EXPECTED TO OCCUR IN THE GULF OF MEXICO AND CARIBBEAN.

1. *Carpias bermudensis* Richardson, 1902 [= *Janira minuta* Richardson, 1902]	6. *Stenetrium minocule* Menzies and Glynn, 1968
2. *Carpias serricaudus* (Menzies and Glynn, 1968)	7. *Stenetrium serratum* Hansen, 1905
3. *Carpias stylodactylus* (Nobili, 1906)	*8. *Stenetrium stebbingi* Richardson, 1902
*4. *Jaeropsis rathbunae* Richardson, 1902	*9. *Antias milleri* Menzies and Glynn, 1968
5. *Jaeropsis coralicola* Schultz and McCloskey, 1967	10. *Munnoides caribea* Carvacho, 1977

*Species in Hourglass collections

Suborder Asellota

Diagnosis: Isopoda having first and second pairs of pleopods modified, unlike succeeding biramous pairs. Uropods usually biramous, tubular, leaf-like, or absent. Pleon composed of one to three somites inclusive of pleotelson. Antenna 2 with or without antennal scale.

Remarks: Ten species of this suborder were previously known from the Caribbean, and could have been expected to occur in the Gulf of Mexico (Table 18). Hourglass collections contained single species of *Carpias*, *Jaeropsis*, *Stenetrium*, and *Antias*, and included one previously undescribed species.

A KEY TO GULF AND CARIBBEAN MARINE ASELLOTA

1. Pleon consisting of three somites inclusive of pleotelson 2
1. Pleon consisting of one or two somites inclusive of pleotelson 4
2. Eyes each with four pigmented ocelli ..... *Stenetrium minocule* Menzies and Glynn
2. Eyes with many ocelli 3
3. Lateral borders of pleotelson each with one spine-like serration ..... *Stenetrium stebbingi* Richardson
3. Lateral borders of pleotelson with five to seven serrations or spines ..... *Stenetrium serratum* Hansen
4. Uropod lacking peduncle; mandible lacking palp ..... *Munnoides caribea* Carvacho
4. Uropod with peduncle; mandibular palp present 5
5. Uropoda with obvious rami, usually longer than peduncle 6
5. Uropoda with rami minute, shorter than peduncle; no dorsally visible coxal plates 10
6. Eyes on short, immovable stalks at lateral borders of cephalon ..... *Antias milleri* Menzies and Glynn
6. Eyes dorsal or bulging near lateral borders, not on stalks 7

7. Lateral borders of pleotelson minutely serrate; uropoda shorter than pleotelson..... ..... *Carpias serricaudus* (Menzies and Glynn)

7. Lateral borders of pleotelson without minute serrations; uropoda as long as or longer than pleotelson..... 8

8. Body speckled with chromatophores; male gnathopod with three or four teeth on upper margin of article 5, dactyls (article 7) bilobed on inferior margin, propod much shorter than article 5 ..... *Carpias bermudensis* Richardson

8. Body colorless; male gnathopod with less than three teeth on upper margin of article 5..... 9

9. Male gnathopod with two teeth close together on upper margin of article 5; lateral apex of male pleopod 1 pointed, curved toward midline ..... *Carpias stylodactylus* (Nobili)

9. Male gnathopod with two widely separated teeth, a lobe between them; lateral apex of male pleopod 1 straight, pointed, not curved mesially..... *Carpias floridensis*, n. sp.

10. Distinct spines on lateral margins of pleotelson ..... *Jaeropsis rathbunae* Richardson

10. Without spines on lateral margins of pleotelson .... *Jaeropsis coralicola* Schultz and McCloskey

Family Janiridae G. O. Sars, 1899

Diagnosis: Asellota with pleon of two somites. Antenna 1 short; antenna 2 longer than width of cephalon. Cephalon without articulated rostrum. Mandibular molar process well developed, expanded, truncated. Uropods biramous, peduncle and rami elongate. Antenna 2 with scale. Posterior pereopods with three claws. Maxillipeds with first three articles of palp expanded, over half as wide as endite, much wider than last two articles (from Menzies and Glynn, 1968).

Genus *Carpias* Richardson, 1902

Carpias Richardson, 1902, p. 294; 1905, p. 452; Schultz, 1969, p. 260.

Bagatus Nobili, 1906, p. 267; 1907, p. 418; Nordenstam, 1946, pp. 14, 15; Menzies and Glynn, 1968, p. 77.

Diagnosis: Mature male pereopod 1 greatly swollen, as long as body when extended, article 7 reduced, article 6 as long as inner margin of article 5. Male pleopod 1 not expanded laterally at apex.

Type-species: *Carpias bermudensis* Richardson, 1902.

Remarks: When Menzies and Glynn (1968) united *Carpias* and *Bagatus*, they erroneously listed the former as a junior synonym of the latter.

Carpias floridensis, new species

Figure 31

Material examined: HOURGLASS STATION A: 1 ♂ (HOLOTYPE); 11 May 1967; dredge; USNM 170810. — 1 ♂, 1 ♀ (PARATYPES); 5 October 1967; dredge; FSBC I 18644. —

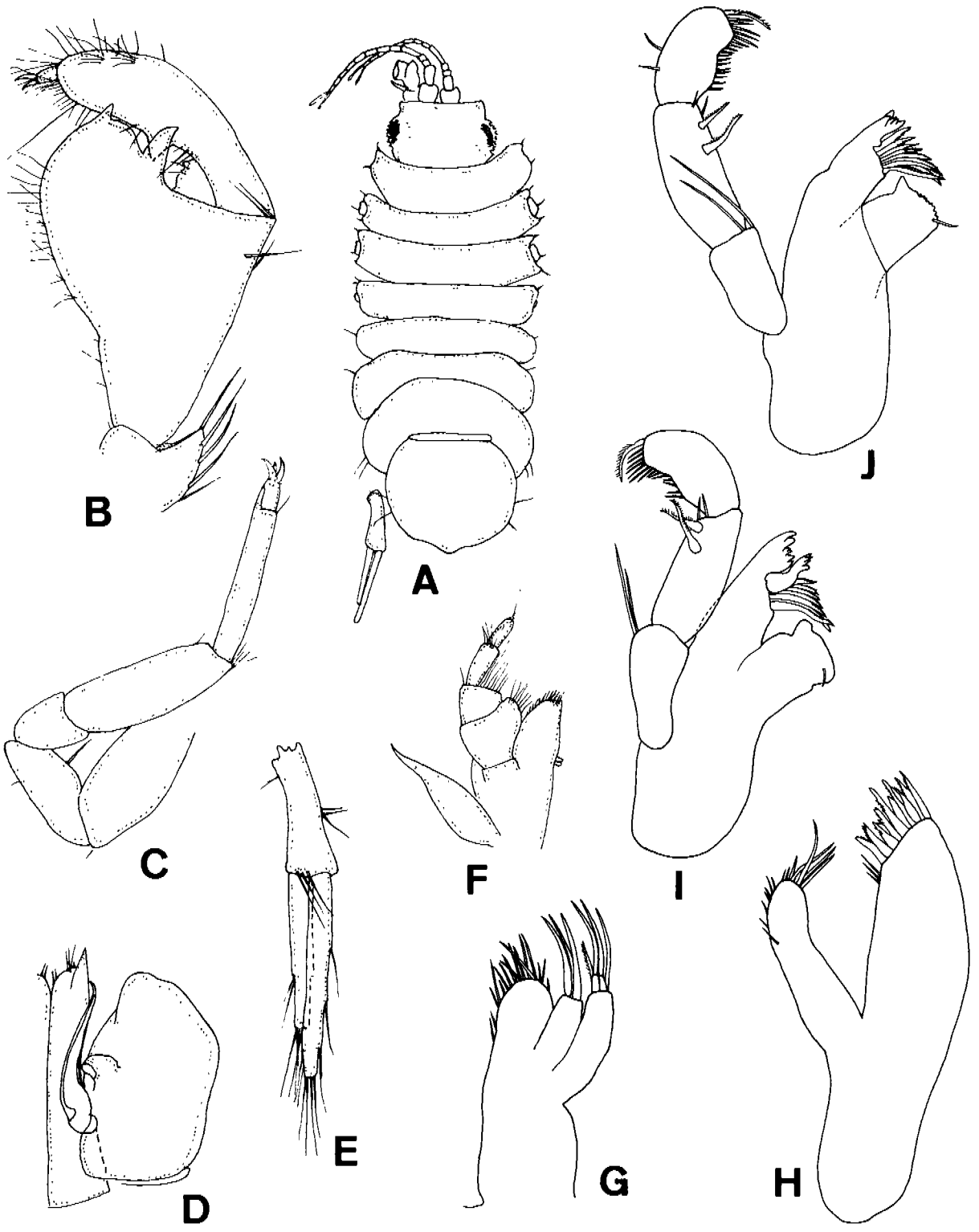

Figure 31. *Carpias floridensis*, n. sp. Holotype male, USNM 170810: length 2.1 mm, width 0.9 mm. A. whole animal; B. gnathopod; C. pereopod 6; D. male pleopods 1 and 2; E. uropod; F. maxilliped. Paratype male, FSBC I 18644: G. maxilla 2; H. maxilla 1; I. left mandible; J. right mandible.

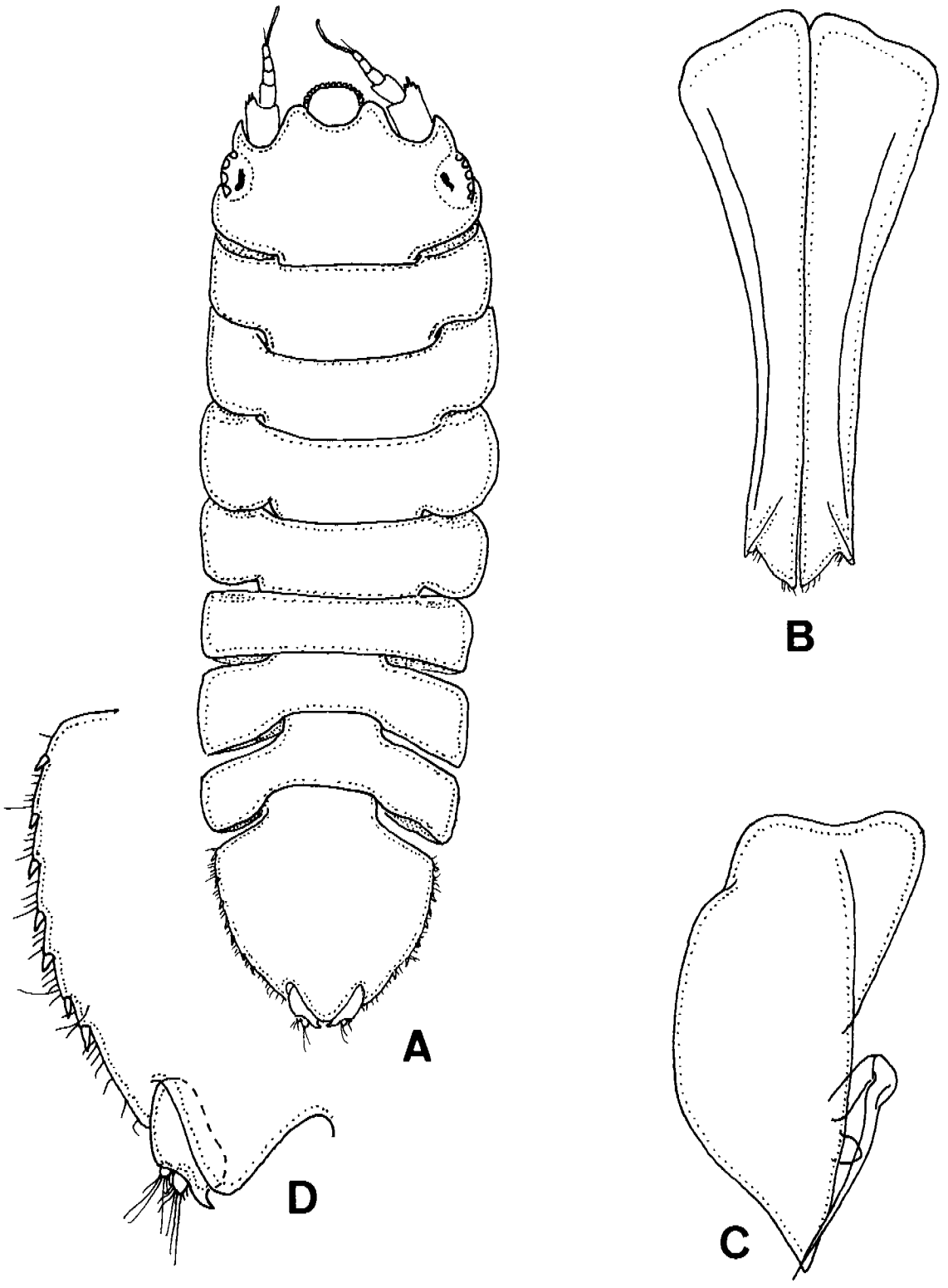

Figure 32. *Jaeropsis rathbunae* Richardson. Male, FSBC I 18647: length 4.0 mm, width 0.8 mm. A. whole animal; B. pleopod 1; C. pleopod 2; D. lateral border, pleotelson, enlarged.

Stenetrium stebbingi Richardson, 1902

Figure 33

Stenetrium stebbingi Richardson, 1902, pp. 295, 296, pl. 39, figs. 46-49; Hansen, 1905c, pp. 325, 326; Richardson, 1905, pp. 444-446, figs. 499-501; Menzies and Glynn, 1968, pp. 71, 72; Schultz, 1969, p. 240, fig. 377.

Stenetrium occidentale Hansen, 1905c, pp. 324, 325, pl. 20, figs. 2a-n; Richardson, 1905, pp. 441-444, fig. 498; Wolff, 1962, p. 25; Menzies and Glynn, 1968, pp. 71, 72, figs. 34A-E, 35A-F, 36D; Schultz, 1969, p. 239, fig. 375.

Stenetrium antillense Hansen, 1905c, pp. 326, 327, pl. 20, figs. 3a-i, pl. 21, figs. 1a-e; Richardson, 1905, pp. 446-448, fig. 502; Wolff, 1962, p. 25; Menzies and Glynn, 1968, p. 71; Schultz, 1969, p. 240, fig. 376.

Stenetrium medipacificum Miller, 1941, pp. 308-311, fig. 1.

Stenetrium gilbertense Nordenstam, 1946, pp. 23-26, figs. 22-24.

Material examined: HOURGLASS STATION B: 1 ♀; 14 March 1967; dredge; FSBC I 18653.

Diagnosis: Acute anterolateral and preantennular spines at front of cephalon; lateral margin entire. Eyes large, multifaceted, separated medially by less than three eye diameters (long axis). Frontal process of cephalon slightly emarginate. Pleotelson longer than wide, with pronounced spine on lateral margin anterior to uropoda. Apex of endopod of male pleopod 2 with expanded cup bearing circle of sharp setae and lateral spiniferous knob. Uropoda shorter than pleotelson; outer ramus shorter than inner ramus (from Menzies and Glynn, 1968).

Distribution: Atlantic: Bermuda to Florida, Gulf of Mexico, and Caribbean; Pacific: Hawaii and Gilbert Islands.

Family Antiasidae Menzies, 1962

Diagnosis: All articles of maxillipedal palp narrow, similar in width, at least half width of endite. Mandible normal, expanded apically, with grinding edge. Dactyls of pereopods with two claws. All pereonites and pleonites wider than long. Coxal plates visible in dorsal view on last three pereonites. Pleon of two somites including pleotelson. Uropods insert dorsally, with long peduncle and long rami.

Genus *Antias* Richardson, 1906

Diagnosis: Same as for family.

Type-species: *Antias charcoti* Richardson, 1906.

Antias milleri Menzies and Glynn, 1968

Figure 34

Munna "B" Monod, 1933, p. 173, fig. 77/5-7.

Antias milleri Menzies and Glynn, 1968, pp. 74, 75, fig. 39.

Material examined: HOURGLASS STATION L: 1 (damaged); 6 August 1966; dredge; FSBC I 18654.

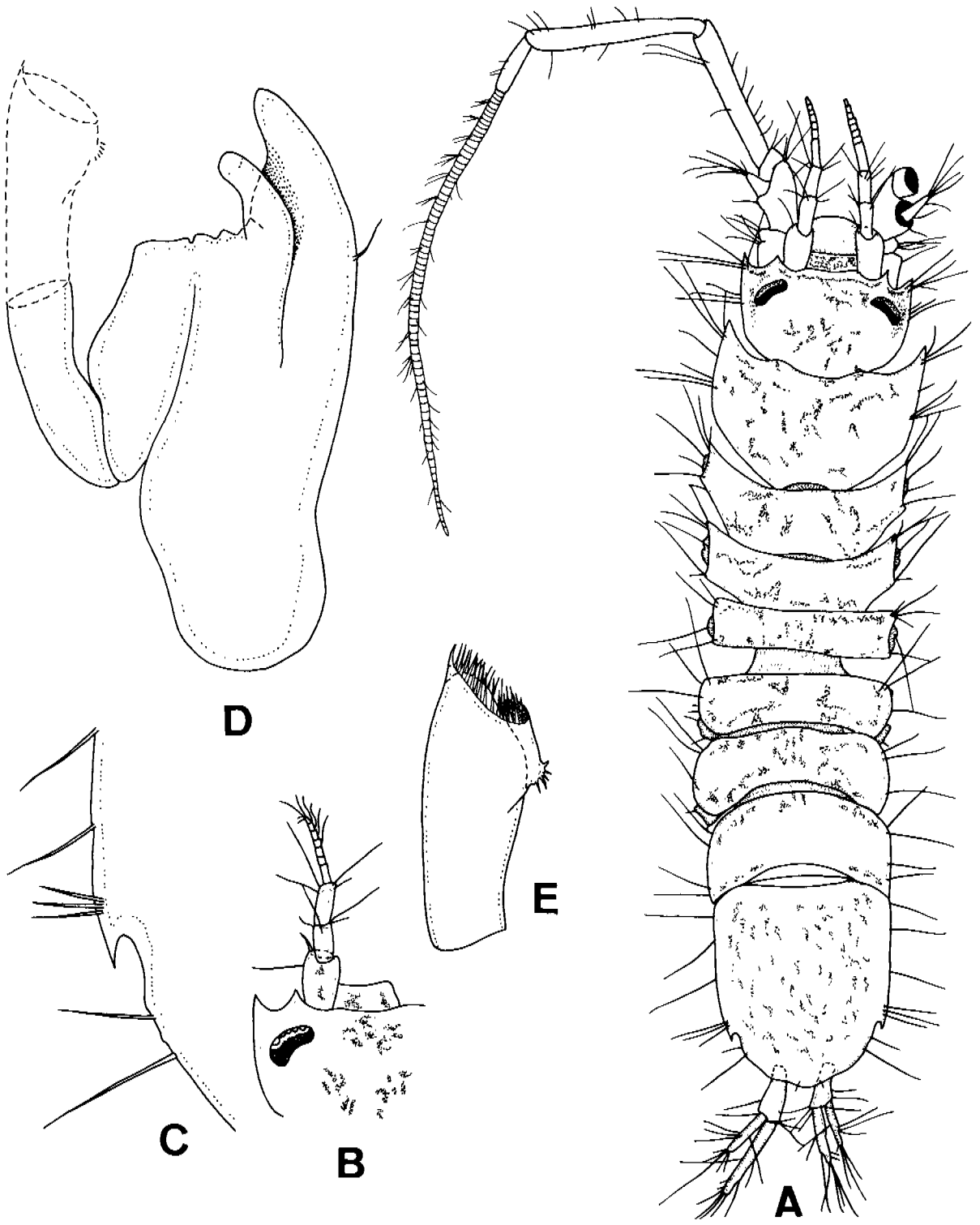

Figure 33. *Stenetrium stebbingi* Richardson. Holotype male: length 4.0 mm. A. whole animal; B. laterofrontal margin of cephalon and antenna 1; C. lateral margin of pleotelson. Paratype male: D. pleopod 2; E. apex of stylus, pleopod 2 (from Menzies and Glynn, 1968).

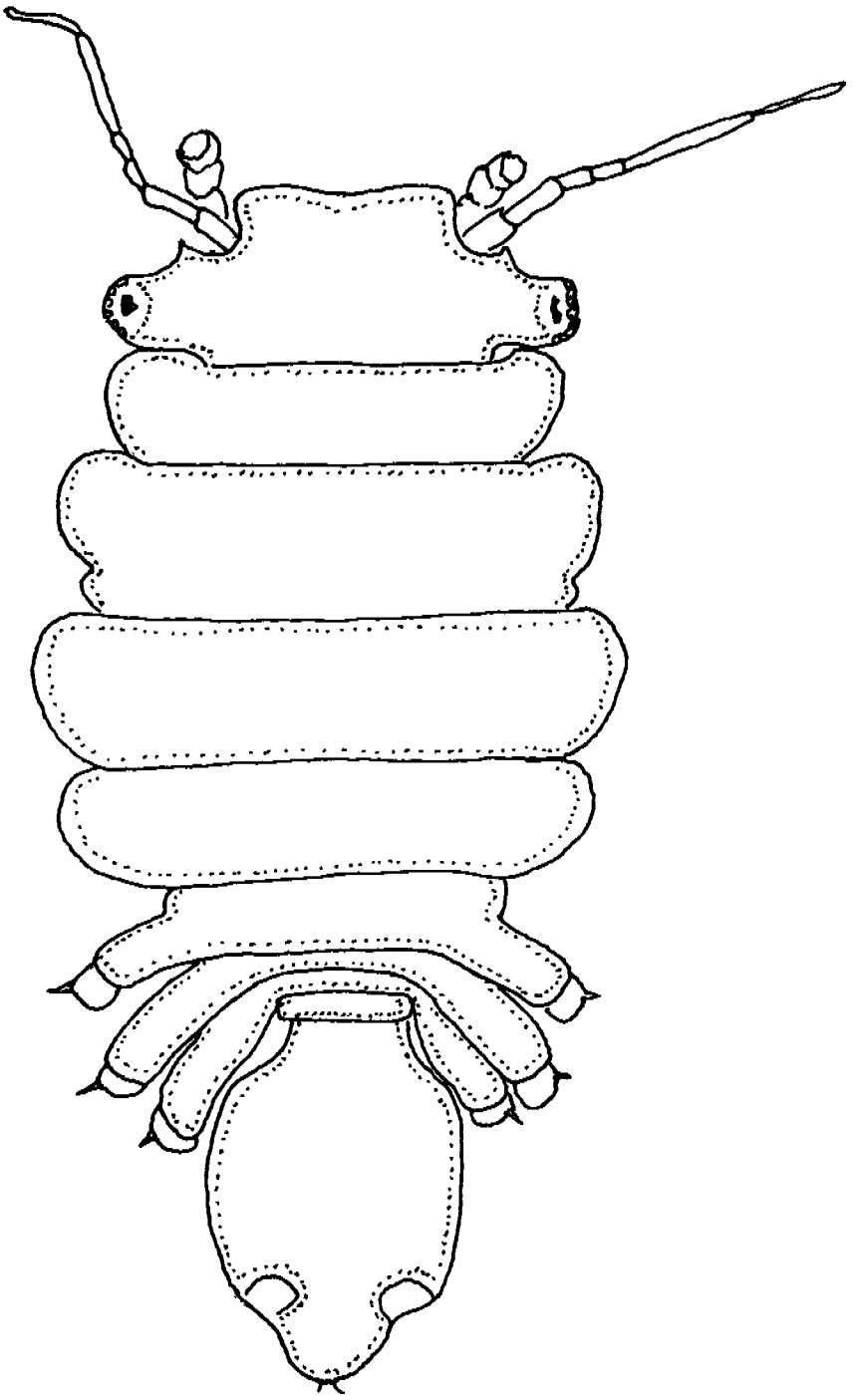

Figure 34. *Antias milleri* Menzies and Glynn. Female, FSBC I 18654: length 1.2 mm, width 0.5 mm; dorsal view, uropods missing.

Diagnosis: Frons of cephalon convex. Pereonite I shorter than II. Pleotelson devoid of stout setae laterally or dorsally. Uropoda large, biramous (from Menzies and Glynn, 1968).

Distribution: Bermuda, Puerto Rico, and central west Florida shelf, Gulf of Mexico.

DISCUSSION

GENERAL STRUCTURAL AND FUNCTIONAL CHARACTERISTICS OF THE ISOPODA

It is exceptionally difficult to characterize the members of the crustacean order Isopoda on a structure-function basis. They have elaborated many independent evolutionary strategies, and, because of this, no single existing genus may be considered the archetype from which the other genera can be derived. A few general statements can be made; for instance, all cymothoids are parasitic on fishes as adults and all epicarideans are parasitic on crustaceans. However, this is about where the generalizations cease. Isopods are found in many environments, from hot springs on land to the greatest depths of the sea. They may be herbivorous, carnivorous, detritophagous, filter-feeders, parasitic, commensal, free-living, wood-boring or even rock-boring. They are planktonic, benthonic and demersal. In size, isopods range from the giant *Bathynomus* that reaches 30 cm in length to the miniscule *Munna* that may be less than one millimeter long. Most isopods from shallow water have eyes, but numerous eyeless species exist. Generally one would think that mouthparts would suggest the habits of a group, and usually this is so, but mouthparts have had their own evolutionary mode independent of other body characteristics. For example, in the suborder Asellota most species have a grinding mandibular molar, but in one genus, *Sugoniscus*, the mouthparts are modified for piercing and sucking. This morphological divergence within the anatomy of a given taxon makes the characterization of suborders a most difficult task. A study to redetermine the general features of the Isopoda, redefining suborders and recharacterizing families, is needed. We have seen examples of this need in the Hourglass collections. For example, several species that have been assigned to *Rocinela* lack a mesial lobe on the maxilla, a prime characteristic of the genus, yet they continue to be placed in that genus. Clearly the genus will have to be split in the future. This is not an isolated example, and almost every family and genus now have species assigned to them that should be placed in a different taxon. The kind of revision that is required should not be done within the framework of one collection. It should best be done on a world-wide basis with a thorough knowledge of the characteristics of each known genus.

DISTRIBUTION AND ABUNDANCE

Isopods of the Hourglass collections represent a unique inner and middle shelf assemblage that has very little in common with the intertidal or estuarine assemblages in the Gulf of Mexico. For example, Estevez (pers. comm.) has collected nineteen species of marine isopods (exclusive of Oniscidea) from Tampa Bay; only four of these species (21 percent) are also found in Hourglass collections (Table 19). Of sixteen isopod species (exclusive of Oniscidea and Epicaridea, and considering synonyms) in Menzel's (1971) checklist of fauna of the more northern Apalachee Bay and St. George's Sound, only three (18 percent) were found in Hourglass collections. Likewise, only seven (41 percent) of seventeen species listed by Rouse (1969) from estuaries in southwest Florida also occurred in Hourglass collections. Only eight (25 percent) of the thirty-two Hourglass species are known from any of these west Florida estuaries (Table 19). As previously mentioned, occurrence within Hourglass collections of *Sphaeroma quadridentata* (one specimen only) was probably an artifact of collecting. Similarly, *Cymodoce faxoni* was represented by only one specimen, and it too could represent a collecting artifact. The balance of Hourglass species appear to be confined, in the main, to the continental shelf and are not presently known in estuarine habitats.

TABLE 19. ISOPOD SPECIES KNOWN FROM WEST FLORIDA ESTUARIES AND ALSO CONTAINED IN HOURGLASS COLLECTIONS.

Species	Florida West Coast		
	North (Menzel, 1971)	Central (Estevez, unpub.)	South (Rouse, 1969)
Cirolana parva		X	X
Cymodoce faxoni		X	X
Cymothoa caraibica			X
Excorallana tricornis			X
Nerocila acuminata			X
Paracerceis caudata	X	X	X
Rocinela signata	X		X
Sphaeroma quadridentata	X	X	

Analysis of distribution of fourteen species found in eight or more samples and represented by 15 or more specimens revealed some very interesting distributional patterns (Table 20; Figure 35). Of maximum importance is the observation that peak frequencies of capture of the more abundant species occurred at different depths. Only *Skuphonura lindae* and *Cirolana parva* were taken at all depths. None of the abundant species were found most frequently at the shallowest (6 m) stations; five were most frequently found at 18 m, one was most frequent at 37 m, seven were most often captured at 55 m, and one was most frequent at 73 m. Twelve of the fourteen species showed at least 50 percent affinity for a single depth zone, and ten of the species were captured at

TABLE 20. DEPTH AFFINITIES OF FREQUENTLY CAPTURED* SPECIES.

Species	Abundance	Number of captures	Percent captures at depths (m)				
			6	18	37	55	73
Paracerceis caudata	90	42	2	93	5	0	0
Excorallana antillensis	54	26	0	96	4	0	0
Alcirona krebsii	110+	34	0	88	6	6	0
Cirolana parva	223	61	2	79	3	15	2
Excorallana tricornis	58	31	0	61	16	19	3
Skuphonura lindae	15	14	7	7	57	21	7
Rocinela signata	31	25	8	12	16	64	0
Excorallana mexicana	54	35	0	3	17	77	3
Jaeropsis rathbunae	21	8	0	0	0	100	0
Eurydice littoralis	16	14	0	29	7	43	21
Serolis mgrayi	75	25	0	12	8	56	24
Accalathura crenulata	98	51	0	8	12	57	23
Nalicora rapax	47	26	0	0	4	54	42
Lironeca tropicalis	48	34	0	3	9	41	47
Number of species most frequently captured at depth			0	5	1	7	1

*Captured eight or more times and represented by fifteen or more specimens

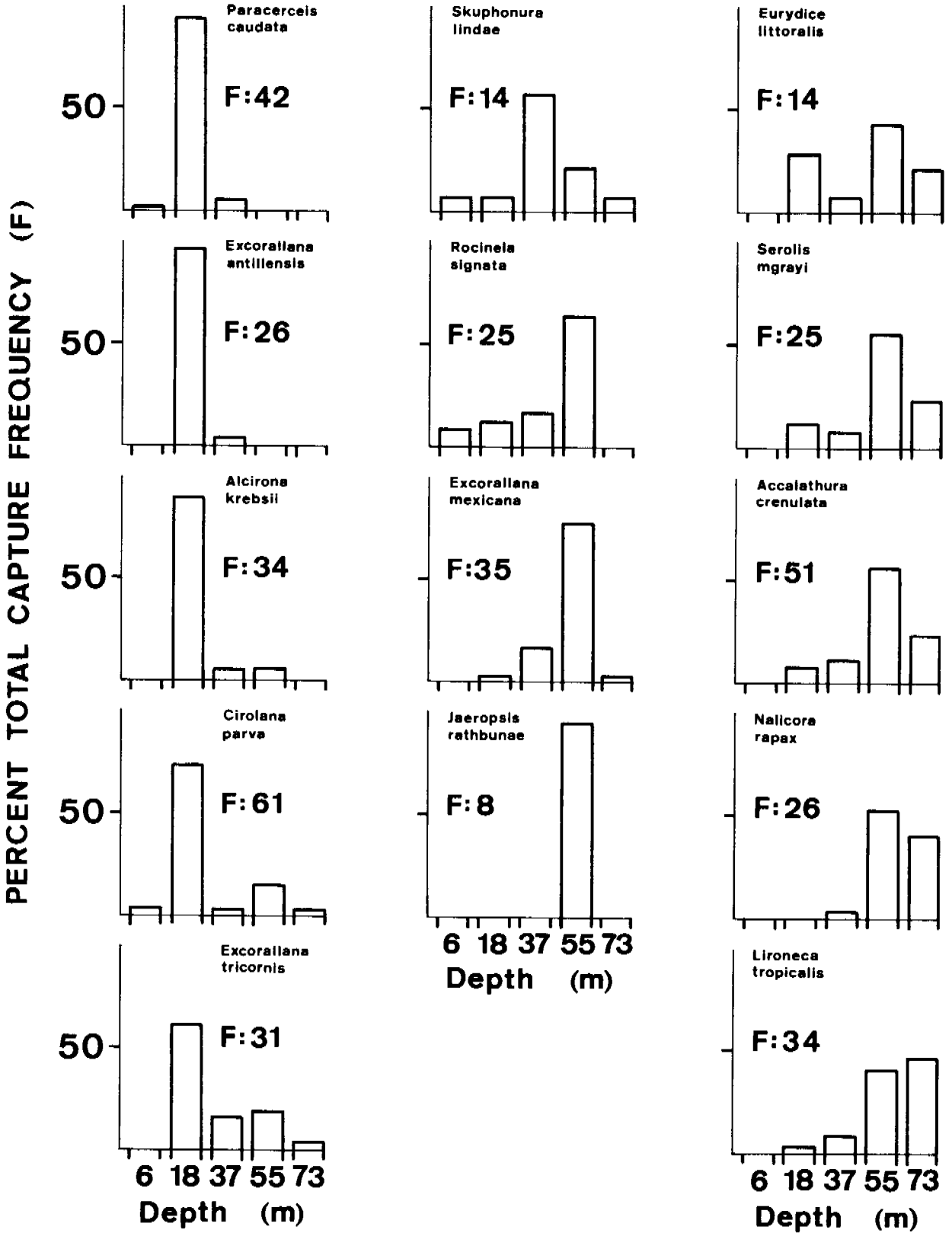

Figure 35. Relative distributions by depth of fourteen most frequently collected species; F = number of samples containing the species.

least 80 percent of the time within two adjacent depth zones. Quite clearly the abundant members of the isopod fauna are partitioned with reference to depth, and this may represent one mechanism to reduce species competition.

Certain abundant species, for reasons that are not clear, were found at stations on one transect and not at comparable stations in the other transect. Thus, *Nalicora rapax* was found between 37 and 73 m at Stations C, D, and E in the northern transect but only at 73 m at Station M in the southern transect. Similarly, *Cirolana parva* was found at 55 m only at Station L in the southern transect and not at northern Station D, although collecting effort at Station D was nearly twice that at Station L.

Perhaps the most important aspect of the distribution of the abundant species is that there is no faunal break between 18 and 73 m. Qualitatively the fauna is the same throughout these depths, and all of the abundant species are present except *Jaeropis rathbunae*. As we have seen, however, there exist significant quantitative differences between species at the different depths. Concentrations of most frequent captures at 18 and 55 m depth zones may indicate partitioning into inner and middle shelf assemblages. The 6 m depth zone is unique only in having so few of the abundant as well as the rarer species.

The remaining 18 species were collected so infrequently that quantitative distributional relationships cannot be determined. Only three species were captured at 6 m (Table 21). As noted previously, the record for *Aega antillensis* at that depth may be incorrect. Five species were found at 18 m, and three of these were found only at this depth. Four species were found at 37 m depths, and two were found only at these depths. Nine species were found at 55 m depths, but only four were captured exclusively there. Seven species were found at 73 m; two species occurred only there, and another, *Aega antillensis*, should probably be added to this group.

TABLE 21. DEPTHS OF OCCURRENCE OF INFREQUENTLY CAPTURED SPECIES.

Species	Depths (m) 6	18	37	55	73
Cymothoa caraibica	X				
Carpias floridensis	X	X		X	
Cymodoce faxoni		X			
Stenetrium stebbingi		X			
Tropedotea lyonsi		X			
Mesanthura floridensis		X	X		
Sphaeroma quadridentata			X		
Eurydice piperata			X	X	X
Nerocila acuminata			X	X	X
Antias milleri				X	
Cirolana borealis				X	
Cirolana polita				X	
Gnathia floridensis				X	
Arcturella bispinata				X	X
Arcturella spinata				X	X
Aega antillensis	X(?)				X
Paranthura floridensis					X
Edwinjoycea horologium					X

None of the less common species was found at all depths, although two species, *Nerocila acuminata* and *Eurydice piperata*, were found at depths from 37 to 73 m. *Mesanthura floridensis* was found only at 18 and 37 m stations. However, these observations are tentative at best. For example, *Nerocila acuminata* has a much broader depth range than these data indicate (see Table 19). More material must be obtained before true depth affinities of these seemingly uncommon species can be ascertained.

ZOOGEOGRAPHY

As Topp and Hoff (1972) have pointed out, the Gulf of Mexico has three zoogeographic elements: a small endemic component, a West Indian component, and a temperate component. It is tempting to speculate on the geographic affinities of the Hourglass fauna as indicated by the Isopoda, but because many new species were found, no quantitative statements can be made that have much merit. It is possible, however, to recognize that the temperate and West Indian components are present. Clearly the fauna contains temperate elements as exemplified by *Cirolana polita*, *C. borealis*, and *Eurydice piperata*. West Indian elements are suggested by *Excorallana tricornis*, *Accalathura crenulata*, *Rocinela signata*, *E. mexicana*, *E. antillensis*, *Jaeropsis rathbunae*, *Antias milleri*, *Alcirona krebsii*, and *Cirolana parva*. It would thus seem that the Hourglass isopod fauna might have greater affinities to the West Indian fauna than to the temperate Atlantic fauna. This is especially so when one realizes that the West Indian elements are represented by the most abundant species (Table 20). Two species, *Paracerceis caudata* and *Serolis mgrayi*, cross the boundaries of the temperate and West Indian faunas. It is quite possible that endemic components may be represented among the new species that we report. We are not in a position to conduct the kind of detailed analysis made by Topp and Hoff (1972) and believe that this kind of study should best be delayed until isopods are better known from the Gulf of Mexico and the Caribbean. At present, too many of the isopods are known only from one or two localities.

DIEL ACTIVITY

The majority of the species were captured in night-time samples, probably because there were 3.4 times more night-time collections than day-time ones, and accordingly the collection data do not reveal much about day or night activity. Other methods of sampling might have shown more. For example, the young swimming stages of the Cymothoidae, certain species of *Cirolana*, *Eurydice* and *Aega* are often taken at "night lights" but even this method does not prove a preference for night-time activity.

Isopods are relatively small. Free-living species can live under debris and thus escape the impact of sunlight. Those that are parasites are captured with the host, giving an indication of parasitized host activity and not the activity of the isopods. With these cautions in mind, the capture of the eight isopod species most frequently collected only at Stations B, C, and D, where equal effort occurred, has been analyzed (Table 22).

Only two species, *Accalathura crenulata* and *Nalicora rapax*, appeared to be more nocturnal than diurnal, and evidence for this is not strong. The remaining 6 abundant species tended to be captured more frequently during day than at night. Among these, only *Alcirona krebsii*, *Excorallana tricornis*, and *E. antillensis* exhibited relatively strong tendencies toward daytime capture.

TABLE 22. PERCENTAGES DAY AND NIGHT CAPTURES
OF EIGHT MOST FREQUENTLY COLLECTED SPECIES, STATIONS B, C, D.

Species	Total Captures	Percent Night Captures	Percent Day Captures
Accalathura crenulata	20	55	45
Nalicora rapax	15	53	47
Excorallana tricornis	23	26	74
Excorallana antillensis	19	37	63
Alcirona krebsii	28	39	61
Excorallana mexicana	18	44	56
Cirolana parva	39	44	56
Paracerceis caudata	36	47	53

CAPTURE SELECTIVITY

Certain species were captured more frequently by one kind of gear than another. Usually fish parasites were captured by the trawl but seldom with their hosts. Fish were preserved before examination for parasites, which may have caused most isopods to abandon their hosts.

The fourteen most frequently collected isopod species were analyzed for susceptibility to capture by dredge or trawl in terms of both numerical abundance and capture frequency (Table 23). Species demonstrating at least 60 percent occurrence in both abundance and frequency for one gear type were arbitrarily judged to be more susceptible to capture by that method. Six

TABLE 23. PERCENTAGES TRAWL AND DREDGE CAPTURE BY FREQUENCY AND ABUNDANCE.

	Frequency			Abundance		
Species	Total Samples	Percent Dredge Samples	Percent Trawl Samples	Total Specimens	Percent in Dredge	Percent in Trawl
Serolis mgrayi	25	88	12	74	86	14
Eurydice littoralis	14	86	14	16	88	12
Accalathura crenulata	51	75	25	98	81	19
Nalicora rapax	26	73	27	47	81	19
Excorallana mexicana	35	69	31	52	75	25
Skuphonura lindae	14	64	36	15	60	40
Cirolana parva	61	62	38	223	52	48
Paracerceis caudata	42	55	45	90	54	46
Excorallana tricornis	31	55	45	58	40	60
Alcirona krebsii	34	50	50	110	38	62
Excorallana antillensis	26	46	54	54	31	69
Jaeropsis rathbunae	8	38	62	21	57	43
Rocinela signata	25	40	60	31	42	58
Lironeca tropicalis	34	21	79	48	17	83

species were more frequently caught by and were more abundant in dredge collections. Only *Lironeca tropicalis*, a fish parasite, was more frequently and abundantly taken with trawls. Of the remaining species, *Excorallana antillensis*, *E. tricornis*, and *Alcirona krebsii* were numerically more abundant in trawls, but were captured with nearly equal frequency by both gear types. *Cirolana parva* was more frequently captured in the dredge, but differed little in abundance between gear types. Conversely, *Rocinela signata* and *Jaeropsis rathbunae* occurred more frequently in trawls, but again showed little differences in abundance between gear types. No clear distinctions were apparent for *Paracerceis caudata*.

A more frequent capture by dredge not only suggests a free-living benthic habit but also suggests that the species is more common than trawlings alone would indicate, due to the fact that the dredge sampled a small area in comparison with the large trawl.

REPRODUCTION

Isopods are generally dioecious. However, the anthurids are known to be protogynous, i.e., starting development as females and later becoming functional males. Protandry is also known in cymothoids. Some Asellota go through an intersex stage that has external characteristics of both sexes. Ambisexual specimens of *Limnoria* have been found that have both testes and ovaries. Sex cells of bopyrids develop from hermaphroditic primordia; young bopyrids that first attach to a host become females, and later arrivals become males.

Sexual dimorphism is marked in some isopod groups such as gnathiids, arcturids, anthurids, sphaeromids, and epicarideans. Male epicarideans are much reduced in size and, in Bopyridae, often cling to the ventral surface of the female pleon; males of other epicaridean groups are often internal hyperparasites of the females. Some groups have prominent secondary sex characteristics like the large mandibles of male gnathiids, the brush-like antennae of male anthurids, and the elongated uropods of some male sphaeromids. In most other groups, males are quite similar to females in gross morphology, and only presence of penes and appendix masculinum and absence of female oostegites externally serve to distinguish males. The appendix masculinum develops from the inner surface of the endopod of the second male pleopod, and penes develop at the midventral surface of the last pereonite; together they serve as sperm transfer organs. In male Paraselloidea, a superfamily of Asellota, the first two pleopods jointly function as sperm transfer organs.

In many isopods the male carries the female for a short time until the female moults, after which copulation ensues. The sperm may or may not be stored in a seminal receptacle. Eggs are fertilized as they pass along the oviducts into the brood pouch or marsupium. Several types of brood pouches are known; the most common consists of foleaceous oostegites or brood plates arising from the medial base of the coxae of pereopods 1-5. These plates enclose a cavity below the sternum of the female. There are numerous variations of this type of marsupium. In the genus *Serolis*, only four pairs of oostegites are present. In the genus *Sphaeroma*, the ventral body wall invaginates and receives the fertilized eggs. Gnathiids have another type in which pereonites III, IV and V enlarge and become full of developing embryos; fate of the mother at hatching is unknown. In others, oostegites are reduced and only cover the openings into the brood chamber. Some epicaridean females are little more than feeding brood pouches and lack legs, pleopods, antennae and other identifying characteristics.

TABLE 24. SEX RATIOS OF ISOPODS IN HOURGLASS COLLECTIONS.

Species	Total Specimens	Percent Females
Accalathura crenulata	98	97
Jaeropsis rathbunae	21	90
Skuphonura lindae	15	79
Eurydice littoralis	16	69
Alcirona krebsii	110+	55
Nalicora rapax	47	53
Excorallana antillensis	55	49
Paracerceis caudata	90	40
Serolis mgrayi	75	31
Excorallana tricornis	58	26
Cirolana parva	223	25
Lironeca tropicalis	48	23
Excorallana mexicana	54	11
Rocinela signata	31	10

Incubation is generally one to two months in duration, and brood size seems to be correlated with female size at any one locality. The eggs undergo direct development, and the "hatched" young resemble the adults or emerge as free swimming larval forms. In many isopods the young have only six pairs of pereopods and develop the seventh later.

Among the Hourglass isopods, six species show marked male secondary sex characteristics. *Accalathura crenulata* has elongate, brush-like antennae 1, enlarged eyes and a unique appendix masculinum. *Arcturella bispinata* is reduced in size and lacks dorsal tuberculations on the body. *Carpias floridensis* has enlarged subchelate first pereopods. *Excorallana tricornis* has enlarged cephalic horns or tubercles. *Gnathia floridensis* has enlarged mandibles. *Paracerceis caudata* has elongated uropods and a multituberculate pleon.

Although it is difficult to determine the sex of many juvenile isopods, some generalizations can be made on sex ratios of abundant species in the collection. Four of the most frequently collected Hourglass species had high percentages of females in the population (Table 24). Two of these species were anthurids, in which juveniles were counted as females, and the estimate is likely to be high in this protogynic group. Nevertheless, adult males were collected only rarely. Four species had similar numbers of males and females, and six had low proportions of females. Among less abundant species, all eight *Arcturella spinata* and eleven of twelve *A. bispinata* were females, although sexual dimorphism is marked in this group. Twelve *Mesanthura floridensis* were all female, but, as in *Accalathura* and *Skuphonura*, this total may include juveniles.

Monthly occurrence and gravidity of the fourteen most abundant species is summarized in Table 25. Gravid females were found in most months of the year in four species, namely, *Alcirona krebsii*, *Cirolana parva*, *Nalicora rapax*, and *Serolis mgrayi*. Gravid females of *Excorallana mexicana* were found scattered through the year. *Lironeca tropicalis* was gravid in winter-spring, and *Paracerceis caudata* was reproductively active in most months except winter (November-February). Other species appeared to show less certain seasonal patterns of reproductive activity.

TABLE 25. SEASONAL OCCURRENCE AND GRAVIDITY OF THE MOST COMMON HOURGLASS ISOPODS.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	N	Gravid	%
Accalathura crenulata	X	X	G	G	X	X	X	X	X	X	X	X	98	2	2
Alcirona krebsii	X	G	G	G		X	G		G	G	G	G	110+	28	25
Cirolana parva	G	G	X	X	G	G	G	G	G	G	G	G	223	47	21
Eurydice littoralis			G			X		G	G	G		G	16	7	44
Excorallana antillensis	X	X	X	X			G	X	G	X	X	X	54*	3	6
Excorallana mexicana	G	X	X	X	X	G	X	X	X	G	G	X	52**	6	12
Excorallana tricornis		X	X	X		G	X	G	X	X	X	X	58	3	5
Jaeropsis rathbunae			X			G	G	G	G		G		21	7	33
Lironeca tropicalis	X	X	G		X	X	X	X	X	X	G	G	48	6	13
Nalicora rapax	X	G	X	G		G	G	X	G	G	G	G	47	9	19
Paracerceis caudata	X	X	G	G	X	G	G	X	G	G	X	X	90	13	14
Rocinela signata	X	X		X	X	X	X	X	G	X	G	X	31	3	10
Serolis mgrayi		G	G		G	G	X	G	G	G	G	G	74*	22	30
Skuphonura lindae	X	X	X	X	G				G	X	G	X	15	3	20

X = specimens occurred; G = gravid females collected

* + 1 no data
** + 2 no data

Brood size is known to be correlated with size of the female and with geographic area. The number of developing embryos within the marsupium was counted for Hourglass species whenever possible. Findings are summarized in Table 26, together with some added published

TABLE 26. BROOD SIZE OF HOURGLASS AND OTHER ISOPODS.

	Species	Brood Size
Valvifera		
Idotheidae	*Idothea resecata* *	46
Arcturidae	*Arcturella bispinata*	8**
	Arcturella spinata	20**
Gnathiidea		
Gnathiidae	*Gnathia formica* *	100+
Anthuridea		
Anthuridae	*Skuphonura lindae*	30**
Flabellifera		
Cymothoidae	*Anilocra physodes* *	100-350
	Lironeca convexa *	60-130
	Nerocila acuminata	50+**
Cirolanidae	*Eurydice littoralis*	6**
	Cirolana parva	20**
Corallanidae	*Alcirona krebsii*	8**
Excorallanidae	*Nalicora rapax*	2**
Limnoriidae	*Limnoria* spp. *	6-21
Sphaeromidae	*Sphaeroma rugicauda* *	63
Asellota		
Janiridae	*Jaera albifrons* *	5-60
	Jaeropsis rathbunae	4**

* = from Menzies (1954)
** = maximum brood size in Hourglass specimens

data (Menzies, 1954) for comparable species and genera elsewhere. Small brood size in Hourglass specimens probably relates more to a loss of eggs and embryos from the pouch during preservation and handling. Nevertheless, tropical species usually have smaller broods than their cold-water counterparts.

ISOPODS AS FOOD OF FISHES

Isopods are an important link in the food chain in many marine environments. Not only do they serve to reduce other food organisms into smaller components, but they also serve as food for predatory fishes.

Topp and Hoff (1972) reported unspecified isopods in stomachs of several Hourglass flatfish species. Only isopods from stomachs of a few *Scorpaena brasiliensis* (Scorpaenidae) were available for our study. One *S. brasiliensis* contained two cirolanid isopods too badly decomposed to allow specific identification, and another contained a species of *Cirolana*. Two anthurids were found in scorpionfish stomachs; one was identifiable as *Accalathura crenulata*, but the other could not be identified. The latter had a cryptoniscid larva of a bopyrid attached to a pleopod. A female specimen of *Rocinela signata* was also found in a scorpaenid stomach.

PARASITISM

Four groups of isopods are well-known for parasitic activity, namely the Gnathiidea, Flabellifera, Anthuridea, and Epicaridea. In gnathiids, juveniles and young females have piercing and sucking mouthparts and are often ectoparasites of fishes. It is not known whether adult males can feed; Schultz (1969) speculated that they strain food with maxillipeds. Flabellifera have parasitic representatives in the Cymothoidae, Aegidae, and perhaps also in Excorallanidae and Corallanidae. Cymothoids and aegids are the most specialized parasites in the suborder and have pereopods modified for clinging. All seven pereopod pairs are so modified in the Cymothoidae, and the first three pairs are modified in the Aegidae. Most species are ectoparasites on bony fishes, although they have also been reported from sharks, skates and squids. It is not uncommon to find a species in the mouth or gill chamber of a host. Some are parasites of commercially important fishes such as cod, haddock, snappers, and groupers, and need to be studied in detail to ascertain their impact on fisheries. Excorallanids and corallanids are occasionally found externally on fishes, but are considered to be primarily free-living. One group of anthurids (Paranthuridae) has piercing and sucking mouthparts and is reported to feed on bryozoans, but whether they are parasites or predators is not known.

The Epicaridea, a completely parasitic group utilizing other crustaceans as hosts, will be treated further in a separate Hourglass report. This group is still poorly known and shows many distinctive forms. For example, female entoniscids appear to be a mass of undifferentiated tissue, and female cryptoniscids are little more than an egg sack. Among the Epicaridea, Bopyridae are the most isopod-like in body form, although only the word "bizarre" describes many of the distinctive body plans exhibited in this group.

Adult bopyrids are parasites on decapod crustaceans. Adult females are usually asymmetrical and much larger than males. The latter are minute and symmetrical and cling to pleons or occupy the marsupia of females. The parasites are usually quite host specific, although

some have been reported from closely related hosts. All are ectoparasites in the adult stage, either within the branchial chamber or on the abdomen of the host. Larval bopyrids parasitize other crustaceans including isopods and are usually attached to a plumose seta on a pleopod although other sites are common also.

The effect of bopyrids on their host is poorly understood. Anderson (1975) studied the metabolism of a larval bopyrid and its effects on its copepod intermediate host. As adults, branchial parasites cause a swelling of the branchial chamber, and abdominal parasites cause swelling of lateral plates of the host's abdomen. They might retard respiration, hinder swimming, or hinder egg attachment of the host. Some species have been shown to cause sex reversal of hosts, but Pike (1954, 1960) found that hosts may resume a normal reproductive state if they outlive the parasites.

Two young female *Gnathia floridensis* were found in the Hourglass collections. One was collected by a trawl with a stretch mesh of 2 in, and it seems likely that this minute animal was attached to a fish on collection and later fell off. The other female was taken in a dredge sample, indicating that gnathiids may detach from a host and spend some time as free-living benthonic animals.

Three cymothoid species were observed. One specimen of *Nerocila acuminata* (USNM 170820) was collected from the fin of *Monocanthus ciliatus*, and one specimen of *Lironeca tropicalis* (FSBC I 18378) was found on the right operculum of *Ogcocephalus parvus*. However, most specimens of these two species, and of *Cymothoa caraibica*, were collected "free" in trawl samples, and hosts are accordingly not known.

Two species of Aegidae were found, *Aega antillensis* and *Rocinela signata*; both are known to be parasites of fishes. The specimens were collected both from trawls and dredges, suggesting that they need not always be attached to a host. The latter species is a strong swimmer and has been collected at night lights without a host.

None of the Excorallanidae were collected with a host, and none have been recorded from a fish host. They have been found among sponges on which they may be parasitic or predaceous. We would not, however, be surprised if one or more species is parasitic in the manner of *Aega* and its relatives.

LITERATURE CITED

ANDERSON, G.

1975. Larval metabolism of the epicaridean isopod parasite *Probopyrus pandalicola* and metabolic effects of *P. pandalicola* on its copepod intermediate host *Acartia tonsa*. Comp. Biochem. and Physiol. A, 50: 746-750.

BARNARD, K. H.

1914. Contributions to the crustacean fauna of South Africa. 3. Additions to the marine Isopoda, with notes on some previously incompletely known species. Ann. S. Afric. Mus. 10: 325a-358a, 359-442, pls. XXVII-XXXVIII.

1925. A revision of the family Anthuridae (Crustacea, Isopoda) with remarks on certain morphological peculiarities. J. Linn. Soc. London Zool. 36: 109-160, pl. 4.

BATE, C. S.

1866. Carcinological gleanings. II. Ann. Mag. Nat. Hist. 17: 24-30.

BATE, C. S., and J. O. WESTWOOD

1868. A History of the British Sessile-eyed Crustacea, II. John Van Voorst, Paternoster Row, London. lvi + 536 pp.

BOONE, P. L.

1918. Descriptions of ten new isopods. Proc. U. S. Natl. Mus. 54: 591-604, pls. 89-92.

1921. Report on the Tanaidacea and Isopoda collected by the Barbados Antigua Expedition from the University of Iowa in 1918. Univ. Iowa Studies 9: 91-98, 1 pl.

1930. New decapod and isopod crustaceans from Gonave Bay, Haiti. Zoologica 12: 41-53, 10 figs.

BOSC, L. A. G.

1802. Histoire Naturelle des Crustacés. II. Paris.

BOVALLIUS, C.

1885. New or imperfectly known Isopoda. Pt. I. Bihang till K. Svenska Vetensk. Akad. Handlingar X, No. 11: 1-32, pls. i-v.

BOWMAN, T. E.

1977. Isopod crustaceans (except Anthuridae) collected on the Presidential Cruise of 1938. Proc. Biol. Soc. Wash. 89 (57): 653-666.

BOWMAN, T. E., and C. DIAZ-UNGRÍA

1957. Isópodes quimotoideos párasitos de peces de la aguas venezolanos. Mem. Soc. Cienc. Nat. La Salle 17 (47): 112-124, 4 pls.

BRIGGS, J. C.

1974. Marine Zoogeography. McGraw-Hill Book Co., New York. 475 pp.

CALMAN, W. T.

1910. On two new species of wood-boring Crustacea from Christmas Island. Ann. Mag. Nat. Hist., Ser. 8, 5: 181-186, pl. V.

CARVACHO, A.

1977. Isopodes de la mangrove de la Guadeloupe, Antilles Françaises. Stud. Fauna Curaçao Other Carib. Isl. 174: 1-24.

COLLARD, S. B., and C. N. D'ASARO
1973. G. Benthic invertebrates of the eastern Gulf of Mexico. Pp. IIIG-1 - IIIG-27 *in* J. I. Jones, R. E. Ring, M. O. Rinkel, and R. E. Smith, eds. A Summary of Knowledge of the Eastern Gulf of Mexico. State Univ. Syst. Fla. Inst. Oceanogr., St. Petersburg, Florida.

DANA, J. D.
1853. Crustacea, U. S. Expl. Exped. XIV: 696-805, atlas, pls. XLVI-LIII. Philadelphia.

DOLLFUS, A.
1903. Note préliminaire sur les éspeces du genre *Cirolana* recueillies pendant les campagnes de l'*Hirondelle* et de la *Princesse Alice* sur la direction de s. a. s. le prince Albert 1er, de Monaco. Bull. Soc. Zool. France 28: 5-10.

ESTEVEZ, E. D., and J. L. SIMON
1975. Systematics and ecology of *Sphaeroma* (Crustacea: Isopoda) in the mangrove habitats of Florida. Proc. Int. Symposium on Biology and Management of Mangroves 1: 286-304.

FABRICIUS, J. C.
1775. Systema entomologiae, sistens insectorum classes, ordines, genera, species, adjectis synonymis, locis, descriptionibus, observationibus. Libraria Kortii (Flensburgi et Lipsiae). 832 pp.
1787. Mantissa insectorum sistens eorum species nuper detectas adjectis characteribus genericis, differentiis specificis, emendationibus, observationibus, 1. Christ. Gottl. Proft, Hafniae. 348 pp.
1798. Supplementum entomologiae systematicae. Hafniae. 572 pp.

FRANKENBERG, D.
1965. A new species of *Cyathura* (Isopoda, Anthuridae) from coastal waters off Georgia, U. S. A. Crustaceana 8: 206-212, 3 figs.

GLYNN, P. W.
1970. A systematic study of the Sphaeromatidae (Crustacea: Isopoda) of Isla Margarita, Venezuela, with descriptions of three new species. Mem. Soc. Cienc. Nat. La Salle 85 (30): 5-48.

GUÉRIN-MENEVILLE, F. E.
1836. Magasin Zool. Cl. VII, pl. XX.

HALE, H. M.
1925. Review of Australian isopods of the cymothoid group. Part I. Trans. R. Soc. S. Aust. Adelaide 49: 128-185.

HALLER, G.
1880. Ueber einige neue Cymothoinen. Archiv. fur Natur. Geschichte. 46th year, Vol. 1: 383-386, 391, figs. 13-15.

HANSEN, H. J.
1890. Cirolanidae et familiae nonnullae propinguae Musei Hauniensis. Vidensk. Selsk. Skr. (6), V: 238-426, 10 pls.
1895. Isopoden, Cumaceen und Stomatopoden der Plankton Expedition: 3-50.
1905a. Revision of the European marine forms of the Cirolaninae, a subfamily of Crustacea, Isopoda. J. Linn. Soc. London Zool.: 337-372, pls. XXXIII-XXXV.

1905b. On the propagation, structure and classification of the Sphaeromatidae. Q. J. Microsc. Sci. (n.s.) 49: 69-135.

1905c. On the morphology and classification of the Asellota-group of crustaceans, with descriptions of the genus *Stenetrium* Hasw. and its species. Proc. Zool. Soc. London (1904) 2: 302-331.

HARGER, O.

1880a. Notes on New England Isopoda. Proc. U. S. Natl. Mus. 2: 157-165.

1880b. Report on the marine Isopoda of New England and adjacent waters. Rep. U. S. Comm. Fish. (1878) 6: 297-462, pls. I-XIII.

1883. Reports on the results of dredging, under the supervision of Alexander Agassiz, on the east coast of the United States during the summer of 1880, by the U. S. Coast Survey steamer *Blake*, Commander J. R. Bartlett, U. S. Navy, commanding. XXIII. Report on the Isopoda. Bull. Mus. Comp. Zool. Harv. Univ. XI (4): 91-104, pls. I-IV.

HARPER, D. E., JR.

1974. *Chiridotea excavata* n. sp. (Crustacea, Isopoda) from marine waters of Texas. Contrib. Mar. Sci. Texas A & M 18: 229-239.

HASWELL, W. A.

1881. On some new Australian marine Isopoda. Proc. Linn. Soc. N. S. W. 4: 183-186.

HESSLER, R. R.

1972. The relationship between *Serolis carinata* Lockington and *Serolis mgrayi* Menzies and Frankenberg (Isopoda, Flabellifera). Crustaceana 3 (suppl.): 1-6.

HOLTHUIS, L. B.

1969. Thomas Say as a carcinologist. Pp. v-xv *in* Thomas Say. An account of the Crustacea of the United States, with an introduction by L. B. Holthuis. Historiae Naturalis Classica LXXIII. J. Cramer, Lehre, West Germany.

HUFF, J. A.

1975. Life history of Gulf of Mexico sturgeon, *Acipenser oxyrhynchus desotoi*, in Suwannee River, Florida. Fla. Mar. Res. Publ. No. 16. 32 pp.

IVES, J. E.

1892. Crustacea from the northern coast of Yucatan, the harbor of Vera Cruz, the west coast of Florida and the Bermuda Islands. Proc. Acad. Nat. Sci. Phila. (1891): 176-207, 2 pls.

JOYCE, E. A., JR., and J. WILLIAMS

1969. Rationale and pertinent data. Mem. Hourglass Cruises 1 (1): 45 pp.

KAESTNER, A.

1970. Invertebrate Zoology, Vol. 3. Interscience Publ., New York. 523 pp.

KOEHLER, R.

1885. Description d'un isopode nouveau, le *Jaeropsis brevicornis*. Ann. Sci. Nat. Zool. Biol. Anim., Ser. 6, 19: 1-19.

KRUCZYNSKI, W. L., and G. J. MYERS

1976. Occurrence of *Apanthura magnifica* Menzies and Frankenberg, 1966 (Isopoda: Anthuridae) from the west coast of Florida, with a key to the species of *Apanthura* Stebbing, 1900. Proc. Biol. Soc. Wash. 89 (28): 353-360.

KUSSAKIN, O. G.
1972. Isopoda from the coastal zone of the Kurile Islands. III. Three new arcturids from the middle Kuriles with taxonomic remarks on the Family Arcturidae. Crustaceana 3 (suppl.): 178-189.

LATROBE, B. H.
1802. A drawing and description of the *Clupea tyrannus* and *Oniscus praegustator*. Trans. Am. Philos. Soc. V: 77-81, pl. I.

LEACH, W. E.
1814. Crustaceology. Edinburgh Encyclopedia 7: 221-277, also appendix: 429-437. Edinburgh.
1815. A tabular view of the external characters of four classes of animals which Linné arranged under Insecta; with the distribution of the genera composing three of these classes into orders, etc., and descriptions of several new genera and species. Trans. Linn. Soc. London 11: 306-400.
1818. Cymothoadees. Dict. des Sci. Nat. 12: 338-354.

LEMOS de CASTRO, A.
1960. Quatro espécies novas, Brasileiras, de *Excorallana* Stebbing, 1904 (Isopoda, Excorallanidae). Arqui. Mus. Nacion. Bras. 50: 61-77.

LILLJEBORG, W.
1851. Norger Crustaceer. Ofversigt af Kongl. Vetenskaps-Akademiens Fornandingar 8: 19-25.

LINNÉ, C.
1758. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Ed. 10. Vol. 1: iii + 824 pp.
1761. Fauna suecica. 2nd ed., Stockholm.

LOCKINGTON, W. N.
1877. Remarks on the Crustacea of the Pacific coast, with descriptions of some new species. Proc. Calif. Acad. Sci. (1) 7: 28-36.

LUCAS, H.
1849. Histoire naturelle des Animaux articulés. Exploration scientifique de l'Algérie pendant les anneés 1840, 1841, 1842. Zool. I: 59-88. Paris.

LUTKEN, C. Fr.
1859. Nogle bemaerkninger om de Nordiske Aega-arter samt om Aega-slaegtens rette begraendsning. Vidensk. Medd. Dan. Naturhist. Foren. Kjobenhavn: 65-78, pl. I a.

LYONS, W. G., S. P. COBB, D. K. CAMP, J. A. MOUNTAIN, T. SAVAGE, L. LYONS, and E. A. JOYCE, JR.
1971. Preliminary inventory of marine invertebrates collected near the electrical generating plant, Crystal River, Florida, in 1969. Fla. Dep. Nat. Resour. Mar. Res. Lab. Prof. Pap. Ser. 14: 45 pp.

MARKHAM, J. C.
1974. A systematic study of parasitic bopyrid isopods in the West Indian faunal region. Ph.D. Dissertation. University of Miami, Coral Gables, Florida. 344 pp.

MARTENS, E. von
1869. Südbrasilische Süss- und Brakwasser-Crustacean nach den Sammlungen des Dr. Reinh. Hensel. Arch. f. Naturgeschichte XXXV (1869): 1-37, pls. 1, 2.

MENZEL, R. W., ed.
1971. Checklist of the marine fauna and flora of the Apalachee Bay and the St. George's Sound Area. Dep. Oceanography Fla. State Univ. Tallahassee. 3rd edition. 126 pp.

MENZIES, R. J.
1951a. A new subspecies of marine isopod from Texas. Proc. U. S. Natl. Mus. 101 (3289): 575-579.
1951b. A new species of *Limnoria* (Crustacea: Isopoda) from southern California. Bull. S. Calif. Acad. Sci. 50 (2): 86-88, 1 pl.
1954. A comparative biology of reproduction in the wood-boring isopod crustacean *Limnoria*. Bull. Mus. Comp. Zool., Harvard Univ., 112 (5): 364-388.
1957. The marine borer family Limnoriidae (Crustacea, Isopoda). Bull. Mar. Sci. Gulf Caribb. 7 (2): 101-200, 42 figs.
1962a. The isopods of abyssal depths in the Atlantic Ocean. Pp. 79-206 *in* J. Laurens Barnard, Robert J. Menzies, and Mihai C. Băcescu. Abyssal Crustacea. Columbia Univ. Press, New York. ix + 223 pp.
1962b. The marine isopod fauna of Bahia de San Quintin, Baja California, Mexico. Pac. Nat. 3 (11): 337-348.
1962c. The zoogeography, ecology and systematics of the Chilean marine isopods. Lund Univ. Årsskr., N. F., Avd. 2, 56: 1-162.

MENZIES, R. J., and T. E. BOWMAN
1956. Emended description and assignment to the new genus *Ronalea* of the Idotheid isopod *Erichsonella pseudoculata* Boone. Proc. U. S. Natl. Mus. 106 (3371): 339-343.

MENZIES, R. J., and D. FRANKENBERG
1966. Handbook on the common marine isopod Crustacea of Georgia. University Georgia Press, Athens, Georgia. 93 pp.

MENZIES, R. J., and P. W. GLYNN
1968. The common marine isopod Crustacea of Puerto Rico. Stud. Fauna Curaçao Other Caribb. Isl. 37: 133 pp.

MENZIES, R. J., and M. A. MILLER
1955. A redescription of the marine isopod crustacean "*Exosphaeroma*" *faxoni* Richardson from Texas. Bull. Mar. Sci. Gulf Caribb. 5 (4): 292-296.

MILLER, M. A.
1941. The isopod Crustacea of the Hawaiian Islands. II. Asellota. Occas. Pap. Bernice Pauahi Bishop Mus. 16 (13): 305-320.
1968. Isopoda and Tanaidacea from buoys in coastal waters of the continental United States, Hawaii, and the Bahamas (Crustacea). Proc. U. S. Natl. Mus. 125 (3652): 1-53.

MILNE EDWARDS, A.
1879. Sur un Isopode gigantesque des grandes profondeurs de la mer. C. r. Acad. Sci. Paris 88: 21-23.

MILNE EDWARDS, H.
1840. Histoire naturelle des Crustacés. III: 115-284, pls. XXXI-XXXIII.

MONOD, T.
1926. Les Gnathiidae, essai monographique (morphologie, biologie, systematique). Mem. Soc. Sci. Nat. Phys. Maroc. Bot. 13: 667 pp., 1 pl.
1933. Mission Robert-Ph. Dollfus en Égypte (Dec. 1927-Mar. 1929). Tanaidacea et Isopoda. Mém. Inst. Égypte 21: 161-264.

MONTAGU, G.
1804. Description of several marine animals found on the south coast of Devonshire. Trans. Linn. Soc. London VII: 61-85, pls. I-VII.

MOREIRA, P. S.
1972. Species of *Eurydice* (Isopoda, Flabellifera) from southern Brazil. Bolm. Inst. Oceanogr. São Paulo 21: 69-91.

NICOLET, H.
1849. Crustaceos. Pp. 1-547 *in* C. Gay, ed. Historia fisica y politica de Chile Zoologia. Vol. 3. Paris.

NOBILI, G.
1906. Diagnoses préliminaires de Crustacés, Décapodes et Isopodes nouveaux recueillis par M. le Dr. G. Seurat aux îles Touamotou. Bull. Muséum Paris 12: 256-270.
1907. Ricerce sui Crostacei della Polinesia: Decapoda, Stomatopodi, Anisopodi e Isopodi. Mem. Reale Acad. Sci. Torino, Ser. 2, 57: 351-430.

NORDENSTAM, A.
1933. Marine Isopoda of the families Serolidae, Idotheidae, Pseudidotheidae, Arcturidae, Parasellidae, and Stenetriidae mainly from the South Atlantic. Further Zool. Res. Swedish Antarctic Exped. 1901-1903, 3 (1): 1-284.
1946. Marine Isopoda from Professor Dr. Sixten Bock's Pacific Expedition, 1917-1918. Ark. Zool. 37 (7): 1-31.

NORMAN, A. M.
1904. British Isopoda of the families Aegidae, Cirolanidae, Idoteidae and Arcturidae. Ann. Mag. Nat. Hist. 14 (7): 430-450, pls. XII, XIII.

OHLIN, A.
1901. Arctic Crustacea collected during the Swedish Arctic expeditions 1898 and 1899 under the direction of Prof. A. G. Nathorst, I. Leptostraca, Isopoda, Cumacea. Bihang. till K. Svenska Vetensk. Akad. Handlingar XXVI (12): 15-40, pls. I-V.

PAUL, A. Z., and R. J. MENZIES
1971. Subtidal isopods of the Fosa de Cariaco, Venezuela with descriptions of two new genera and twelve new species. Bol. Inst. Oceanogr. Univ. Oriente 10 (1): 29-48.

PEARSE, A. S.
1934a. Inhabitants of certain sponges at Dry Tortugas. Pap. Tortugas Lab., Carnegie Inst. Washington 28 (7): 117-124, pls. 1, 2.
1934b. Observations on the parasites and commensals found associated with crustaceans and fishes at Dry Tortugas, Florida. Pap. Tortugas Lab., Carnegie Inst. Washington 28 (435): 104-115.
1947. Observations on the occurrence of certain barnacles and isopods at Beaufort, N. C. J. Wash. Acad. Sci. 37 (9): 325-328.
1951. Parasitic Crustacea from Bimini, Bahamas. Proc. U. S. Natl. Mus. 101 (3280): 341-372.

1952a. Parasitic Crustacea from the Texas coast. Publ. Inst. Mar. Sci. Univ. Texas 2 (2): 5-42.
1952b. Parasitic crustaceans from Alligator Harbor, Florida. Q. J. Fla. Acad. Sci. 15 (4): 187-243.

PEARSE, A. S., and G. W. WHARTON
1938. The oyster "leech", *Stylochus inimicus* Palombi, associated with oysters on the coasts of Florida. Ecol. Monogr. 8: 606-655.

PERTY, M.
1833. Delectus animalium articulatorum quae in itinere per Braziliam annis 1817-1820 collegerunt J. B. de Spix et C. F. Ph. de Martius. Vol. III: 125-end.

PIKE, R. B.
1954. Life histories of some Clyde prawns and their bopyrid parasites. Rep. Challenger Soc. 3 (6): 20, 21.
1960. The biology and postlarval development of the bopyrid parasites *Pseudione affinis* G. O. Sars and *Hemiarthrus abdominalis* (Krøyer). Proc. Linn. Soc. London (Zoology) 44 (297): 239-251.

RICHARDSON, H.
1897. Description of a new species of *Sphaeroma*. Proc. Biol. Soc. Wash. 11: 105-107, 3 figs.
1898. Description of a new parasitic isopod of the genus *Aega* from the southern coast of the United States. Proc. Biol. Soc. Wash. 12: 39, 40, 2 figs.
1899. Key to the isopods of the Pacific coast of North America, with descriptions of twenty-two new species. Proc. U. S. Natl. Mus. 21: 815-869.
1900. Synopses of North-American Invertebrates. VIII. The Isopoda. Am. Nat. XXXIV: 207-230, 295-309.
1901. Key to the isopods of the Atlantic coast of North America, with descriptions of new and little known species. Proc. U. S. Natl. Mus. 23: 493-579.
1902. The marine and terrestrial isopods of the Bermudas, with descriptions of new genera and species. Trans. Conn. Acad. Arts Sci. 11: 277-310, pls. XXXVII-XL.
1905. Monograph on the isopods of North America. Bull. U. S. Natl. Mus. 108: iii + 580 pp.
1906. Expedition Antarctique Français (1903-1905) commandee por le Dr. Jean Carcot. Sci. Nat. Doc. Scient. "Isopodes": 1-23, pl. 1.
1910a. Description of a new species of *Anilocra* from the Atlantic coast of North America. Proc. U. S. Natl. Mus. 39: 137, 138.
1910b. Marine isopods collected in the Philippines by the U. S. Fisheries steamer *Albatross* in 1907-8. U. S. Bur. Fish., Doc. No. 736: 1-44.
1911. Description of a new species of *Aega* from the Atlantic coast of the United States. Proc. U. S. Natl. Mus. 40: 623, 624.
1912a. Description of a new isopod crustacean belonging to the genus *Livoneca* from the Atlantic coast of Panama. Proc. U. S. Natl. Mus. 42: 173, 174.
1912b. Marine and terrestrial isopods from Jamaica. Proc. U. S. Natl. Mus. 42 (1894): 187-194, figs. 1-3.
1912c. Descriptions of a new genus of isopod crustaceans, and of two new species from South America. Proc. U. S. Natl. Mus. 43: 201-204.

ROUSE, W. L.
1969. Littoral Crustacea from southwest Florida. Q. J. Fla. Acad. Sci. 32 (2): 127-152.

SARS, G. O.
1882. Oversigt af Norges Crustaceer med foreløbige Bemaerkninger over de nye eller mindre bekjendte arter. Forh. i Vidensk. i Christiania. Nr. 18: 1-124.
1897. An account of the Crustacea of Norway. Vol. II. Isopoda, Parts 3-8: 41-144, pls. XVII-LXIV.
1899. An account of the Crustacea of Norway: Isopoda. 2: 270 pp.

SAY, T.
1818a. An account of the Crustacea of the United States. J. Acad. Nat. Sci. Phila. Vol. I, Pt. 2, No. 6: 393-401; No. 7: 423-433.
1818b. Description of three new species of the genus *Naesa*. J. Acad. Nat. Sci. Phila. Vol. I, Pt. 2, No. 8: 482-485.

SCHIÖDTE, J. C., and Fr. MEINERT
1879-1880. Symbolae ad Monographiam, Cymothoarum, Crustaceorum Isopodum Familiae. Naturhistorisk Tidsskrift. XII: 321-415, pls. vii-xiii.
1881-1883. Symbolae ad Monographiam, Cymothoarum, Crustaceorum Isopodum Familiae. Naturhistorisk Tidsskrift. XIII: 281-379, pls. xi-xvi.
1883-1884. Symbolae ad Monographiam, Cymothoarum, Crustaceorum Isopodum Familiae. Naturhistorisk Tidsskrift. XIV: 221-455, pls. vi-xviii.

SCOTT, T.
1898. Notes on some Scottish marine isopods. Ann. Scot. Nat. Hist. pp. 218-225.

SCHULTZ, G. A.
1969. How to know the marine isopod crustaceans. Pictured Key Nature Series. Wm. C. Brown Co., Debuque, Iowa. 359 pp.

SCHULTZ, G. A., and L. R. McCLOSKEY
1967. Isopod crustaceans from the coral *Oculina arbuscula* Verrill. J. Elisha Mitchell Sci. Soc. 83 (2): 103-113.

SEARLE, H. R.
1914. Isopoda. Reports on the scientific results of the expedition to the Eastern Tropical Pacific in charge of Alexander Agassiz by the U. S. Fish. Comm. steamer *Albatross* from October 1904 to March 1905, Lieut. Commander L. M. Garrett, U. S. N., Commanding. Bull. Mus. Comp. Zool., Harvard Univ., 58 (8): 361-372.

SMITH, S. I., and O. HARGER
1874. Report on the dredgings in the region of St. George's Banks in 1872. Trans. Conn. Acad. Arts Sci. 3: 1-57.

STEBBING, T. R. R.
1893. A history of Crustacea. Recent Malacostraca. Internat. Sci. Ser. LXXI: xvii + 466 pp., 19 pls.
1904. Marine crustaceans. XII. Isopoda, with description of a new genus. Pp. 699-721 *in* J. S. Gardiner, ed. The Fauna and Geography of the Maldive and Laccadive Archipelagoes. II (3): pls. XLIX-LIII.
1905. Report on the Isopoda collected by Professor Herdman, at Ceylon, in 1902. Report to the government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar, Part IV, Suppl. Rept. XXIII: 1-64, 12 pls.

STIMPSON, W.
1854. Synopsis of the marine Invertebrata of Grand Manan, or the region of the Bay of

Fundy, New Brunswick. Smithsonian Contrib. Knowledge 6: 39-44.

1855. Descriptions of some new marine Invertebrata. Proc. Acad. Nat. Sci. Phila. 7 (10): 385-394.

SUBRAHMANYAM, C. B., W. L. KRUCZYNSKI, and S. H. DRAKE

1976. Studies on the animal communities in two north Florida salt marshes. Part II. Macroinvertebrate communities. Bull. Mar. Sci. 26 (2): 172-195.

TABB, D. C., and R. B. MANNING

1961. A checklist of the flora and fauna of northern Florida Bay and adjacent brackish waters of the Florida mainland collected during the period July, 1957 through September, 1960. Bull. Mar. Sci. Gulf Caribb. 11 (4): 552-649.

1962. Aspects of the biology of northern Florida Bay and adjacent estuaries. Pp. 39-79 *in* D. C. Tabb, D. L. Dubrow, and R. B. Manning. The ecology of northern Florida Bay and adjacent estuaries. Fla. State Bd. Conserv. Tech. Ser. 39: 79 pp.

TOPP, R. W., and F. H. HOFF, JR.

1972. Flatfishes (Pleuronectiformes). Mem. Hourglass Cruises 4 (2): 135 pp.

VANHÖFFEN, E.

1914. Die Isopoden der Deutschen Südpolar-Expedition 1901-1903. Pp. 447-598 *in* D. Südpolar-Expedition 1901-1903. Bd. 15, H. 4. 132 figs. G. Reimer, Berlin.

VAN NAME, W. G.

1925. The isopods of Kartabo, Bartica district, British Guiana. Zoologica 6: 461-503, 26 figs.

VERRILL, A. E.

1873. Results of recent dredging expeditions on the coast of New England. Am. J. Sci. and Arts (3), V: 1-16; VI: 435-441; VII: 38-46, 131-138, 405-414, 498-505, pls. IV, V.

1874. Explorations of Casco Bay by the U. S. Fish Commission in 1873. Proc. Am. Assoc. Adv. Sci: 340-395, pls. I-VI.

WATLING, L., and D. MAURER

1975. *Chiridotea stenops* Menzies and Frankenberg, a juvenile of *C. arenicola* Wigley (Crustacea: Isopoda). Proc. Biol. Soc. Wash. 88 (13): 121-126.

WIGLEY, H. L.

1960. A new species of *Chiridotea* (Crustacea: Isopoda) from New England waters. Biol. Bull. 119 (1): 153-160.

WOLFF, T.

1962. The systematics and biology of bathyal and abyssal Isopoda Asellota. Galathea Rep. 6: 320 pp., 19 pls.

Milwaukee Journal Photo

Pl. I

ROBERT JAMES MENZIES
1923 - 1976

I met Bob Menzies in the Spring of 1975 after he had recovered from open-heart surgery. He asked me in June of that year to help him prepare the report on the Hourglass Isopoda, an opportunity I excitedly accepted. The intensity with which he approached this project was truly inspiring, and we worked many hours late into the night. I can only guess at the vigor and enthusiasm he must have demonstrated early in his career. Bob and I submitted a preliminary manuscript in May 1976, and he died on 18 December 1976, while the manuscript was being revised. I am sorry that he did not live to see the finished work of a project on which he worked so hard.

Robert Menzies was senior author of the book "Abyssal Environment and Ecology of the World Oceans." He authored nine faunal handbooks, including "Isopods of Abyssal Depths in the Atlantic Ocean," "Zoogeography, Ecology and Systematics of Chilean Marine Isopods," and handbooks on marine isopods of Georgia and Puerto Rico. He described approximately 200 new species of marine isopods. A biography of Robert Menzies and a complete bibliography of his work were published by L. G. Abele [1977; Crustaceana 33 (3): 301-308, pl. 1]. The world lost a truly great scientist with his passing, and those of us who knew him well lost a devoted and ardent friend.

William L. Kruczynski

EDITORS' NOTE

The untimely death of Dr. Robert J. Menzies occurred before this manuscript was sent by the publisher for peer review. This unfortunate circumstance resulted in a considerable delay of the revisionary process. The editors wish to express their deepest appreciation to the following individuals who materially aided in the completion of this report: Dr. Thomas E. Bowman, National Museum of Natural History, who provided information and specimens pertinent to specific revisionary needs; Dr. Douglas H. Farrell, Florida Department of Environmental Regulation, who produced Figures 4M-R; 5G-M; 9E-I; and 18C; and Mr. Allan F. Hooker, Dauphin Island Sea Lab, who produced Figures 10J, K; 18D-K; and 31G-J.

Because of the dynamic nature of isopod research, many pertinent contributions have been published since the manuscript was submitted. A list of these is appended below to alert the reader to recent advances in the knowledge of isopod systematics within this region.

BIRD, P. M.

1981. The occurrence of *Cirolana borealis* (Isopoda) in the hearts of sharks from Atlantic coastal waters of Florida. Fish. Bull. 79 (2): 376-383.
Infestation of the shark *Carcharhinus milberti* by the isopod *Cirolana borealis* in 1978 is documented. Shark pathology and histopathology of shark hearts are discussed. The infestation is thought to be an unusual, short-lived phenomenon, possibly related to upwelling in the area.

BOWMAN, T. E.

1978. Restoration of the subgenus *Emphylia* Koelbel for the parasitic isopod *Nerocila sundaica* Bleeker (Flabellifera, Cymothoidae). Crustaceana 34 (1): 33-44.
Nerocila (*Emphylia*) and *Nerocila* (*Nerocila*) are differentiated. The latter contains *N. acuminata*, *N. lanceolata* and other species. All pereopods are unarmed in *N. acuminata*, whereas, in *N. lanceolata*, pereopods 1-6 are unarmed, but pereopod 7 has spines on the distal segments.

1978. Nomenclatural problems in the cymothoid isopod genera *Ceratothoa*, *Codonophilus*, *Glossobius*, and *Meinertia* — their solution by applying the law of priority. Crustaceana 34 (2): 217-219.
Meinertia Stebbing, 1893 = *Ceratothoa* Dana, 1852, which has priority. Flying fish isopods now referred to *Ceratothoa* should be returned to *Glossobius* Schiödte and Meinert, 1883.

BOWMAN, T. E., and B. F. MORRIS

1979. *Carpias* Richardson 1902, a senior synonym of *Bagatus* Nobili 1906, and the validity of *Carpias minutus* (Richardson 1902) (Isopoda: Asellota: Janiridae). Proc. Biol. Soc. Wash. 92 (3): 650-657.
Carpias Richardson, 1902, is shown to be a senior synonym of *Bagatus* Nobili, 1906. *Janira minuta* Richardson, 1902, is resurrected from synonymy of *C. bermudensis* Richardson, 1902.

BOWMAN, T. E., S. A. GRABE, and J. H. HECHT

1977. Range extension and new hosts for the cymothoid isopod *Anilocra acuta*. Chesapeake Sci. 18 (4): 390-393.
The species, previously known from Georgia and Tampa Bay, is reported from Louisiana, two additional sites in Florida, and the lower Hudson River, New York. Three new host records are presented.

ESTEVEZ, E. D.
1977. Uptake of ion-exchange resin beads by marine isopods in Tampa Bay, Florida. Fla. Sci. 40 (Suppl. 1): 14. [Abstract].
Collections of *Sphaeroma terebrans* and *S. quadridentatum* from mangroves in Tampa Bay produced specimens containing amber ion-exchange resin beads used in water purification plants. Beads occurred in the gut, haemocoel or body wall. Possible methods of bead uptake are assessed.

KELLEY, B. J., JR.
1978. Order Isopoda. Pp. 167-170 *in* R. G. Zingmark, ed. An Annotated Checklist of the Biota of the Coastal Zone of South Carolina. Univ. S. Carolina Press, Columbia. xii + 364 pp.
Seventy-six species are listed.

KENSLEY, B.
1978. Five new genera of anthurid isopod crustaceans. Proc. Biol. Soc. Wash. 92 (3): 775-792.
Venezanthura confixa, n. gen., n. sp., is described from a single male collected at Cubagua Island, Venezuela, 4-10 m depths.
1980. Records of anthurids from Florida, Central America, and South America (Crustacea: Isopoda: Anthuridae). Proc. Biol. Soc. Wash. 93 (3): 725-742.
New Florida records of *Apanthura magnifica* Menzies and Frankenberg are presented. *Malacanthura cumanensis* Paul and Menzies is synonymized with *M. caribbica* Paul and Menzies.

KIMMEL, J. J., and D. W. ARNESON
1979. The response of two species of jacks, *Caranx latus* and *C. hippos* to the isopod ectoparasite, *Cymothoa oestrum*. Proc. Assoc. Is. Mar. Labs. Carib. 14: 27. [Abstract].
The occurrence of *Cymothoa oestrum* on *Caranx hippos* represents a new host record. Various aspects of the association are discussed.

KOENING, M. L.
1972. Ocorrência de *Accalathura crenulata* (Richardson, 1901) no Brasil (Isopoda, Paranthuridae). Trab. Oceanogr. Univ. Fed. Pernambuco 13: 261-270. [Not seen].

KRUCZYNSKI, W. L., and C. B. SUBRAHMANYAM
1978. Distribution and breeding cycle of *Cyathura polita* (Isopoda: Anthuridae) in a *Juncus roemerianus* marsh of northern Florida. Estuaries 1 (2): 93-100.
Cyathura polita was the most common infaunal macroinvertebrate in a northern Florida marsh. Densities were 58 and 75/m^2 in lower and upper marsh zones, respectively. Reproduction was in April; young were common in May, and these produced young the following April.

LEBOEUF, R. D., and N. R. HOWE
1981. Melanophores and their role in color change and the ecology of the marine isopod, *Sphaeroma quadridentatum* Say. Crustaceana 40 (30): 225-234.
Melanophore pigments in *S. quadridentatum* undergo rhythmic diurnal dispersal at Galveston, Texas.

MAKKAVEYEVA, E. B.
1968. Species composition and distribution of Tanaidacea and Isopoda in the coastal region of Cuba. Mater. sov.-kubin. morsk. Eksped. 2: 99-105. [In Russian, English summary].

Twelve species of Isopoda are listed from the northwest coast of Cuba in depths up to 18 m.

MOREIRA, P. S.

1972. Species of marine Isopoda (Crustacea, Peracarida) from southern Brazil. Bolm. Inst. Oceanogr., S. Paulo, 21: 163-179.
Erichsonella filiformis filiformis and *Rocinela signata* are extended to Rio de Janiero, and specimens are diagnosed and illustrated.

1977. Occurrence and ecological notes on *Rocinela signata* (Isopoda, Flabellifera) off Brazil. Bolm. Inst. Oceanogr., S. Paulo, 26: 293-301.
The vertical and horizontal distribution along Brazil are discussed. The southern limit of the species is extended to 27°08'S. The species is concluded to be a facultative and not an obligate fish parasite.

MOREIRA, P. S., and V. SADOWSKY

1978. An annotated bibliography of parasitic Isopoda (Crustacea) of Chondrichthyes. Bolm. Inst. Oceanogr., S. Paulo, 27 (2): 95-152.
Forty-one species of isopods (+6 praniza larvae) known to parasitize chondrichthian fishes are listed; 41 species of Chondrichthyes hosts are listed. Parasite-host records are listed. An annotated bibliography and index are presented.

NEGOESCU, I.

1979. *Cyathura cubana* sp. n. (Isopoda, Anthuridea) from the Caribbean Sea (Cuban waters). Trav. Mus. Hist. nat. "Grigore Antipa" 20: 157-164.
The new species was collected at La Ortigosa, Cuba, at a depth of 4 m.

1979. *Xenanthura bacescui*, sp. n. (Isopoda, Anthuridae) from the south-western Atlantic Ocean (Brazil). Trav. Mus. Hist. nat. "Grigore Antipa" 20 (1): 165-170.
The new species is compared with *X. linearis* Pillai, *X. orientalis* Barnard and *X. brevitelson* Barnard. Aspects of ecology and distribution of *X. bacesui* and *X. brevitelson* are discussed.

PIRES, A. M. S.

1980. Revalidation and description of the genus *Carpias* Richardson, 1902 (Isopoda, Asellota). Crustaceana 39 (1): 95-103.
Bagatus Nobili, 1906, is resurrected from synonymy with *Carpias* Richardson, 1902. *Janira minuta* Richardson, 1902, is transferred to *Bagatus*. *Carpias bermudensis* Richardson, 1902, is redescribed, and a lectotype is designated.

1980. New record of Sphaeromatidae (Isopoda) from the Brazilian southern coast: *Dynamenella dianae* (Menzies, 1962). Crustaceana 39 (2): 133-140.
The species was previously known from West Mexico and Puerto Rico; the species is redescribed, and variations from previous descriptions are noted.

1981. The occurrence of *Antias milleri* (Isopoda, Asellota) on the Brazilian coast and a description of the male. Crustaceana 40 (2): 132-135.
Adult males are smaller than females; other differences involve relative widths of various pereonites. Pleopods of adults are described.

1981. *Carpias harrietae* (Isopoda, Asellota), a new species from Florida. Crustaceana 40 (2): 206-212.
The new species is described from specimens collected in Biscayne Bay, Dade County, Florida, from intertidal to 2 m depths.

ROBERTSON, P. B.

1978. A new species of asellote marine isopod, *Munna* (*Uromunna*) *haysei* (Crustacea:

Isopoda) from Texas. Contrib. Mar. Sci. 21: 39-46.
The new species, *Munna* (*Uromunna*) *hayesi*, was found on algae-covered rocks on the south jetty at Port Aransas, Texas. It is the first of the genus *Munna* to be reported from the Gulf of Mexico and the second species of the subgenus *Munna* (*Uromunna*) known from the western Atlantic.

SCHULTZ, G. A.
1979. Two species of anthurid and exocorallanid isopods from the stomach of the pearlfish *Carapus bermudensis* from Bimini, Bahamas. Crustaceana 37 (2): 224.
Of 1166 fishes examined, *Accalathura crenulata* was found in the stomachs of 15 fishes, and *Exocorallana warmingii* was found in the stomachs of 5 fishes.

SIMBERLOFF, D., B. J. BROWN, and S. LOWRY
1978. Isopod and insect root borers may benefit Florida mangroves. Science 201 (4356): 630-632.
Wood-boring marine isopods, *Sphaeroma terebrans*, may aid the plant to survive wave action by initiating branching of aerial prop roots.

SIMES, E. G.
1981. On the systematic position of *Dynamenella eatoni* (Miers, 1875) and redescription of the species (Isopoda, Sphaeromatidae). Crustaceana 40 (2): 160-172.
Dynamenella barnardi Menzies and Glynn, 1968, should be transferred to *Cymodocella*. Menzies and Glynn (1968) redescribed the holotype of *D. perforata* (Moore, 1901), the type-species of *Dynamenella* Hansen, 1905; that redescription does not agree with Hansen's diagnostic characters of the genus.

STOCK, J. H.
1977. Studies on the fauna of Curaçao and other Caribbean Islands. Part 168. Microparasellidae (Isopoda: Asellota) from Bonaire, with notes on the origin of the family. Uitg. Natuurwet. Studiekring. Suriname ned. Antillen 87: 69-91.
Three members of the family Microparasellidae were found in Bonaire: *Microcharan herrerai* sp. nov. from oligo- and mesohaline wells, *Microcharon* sp. (one specimen) from an oligohaline well, and *Angeliera dubitans* sp. nov. from a marine interstitial habitat.

SUBRAMANYAM, C. B., and C. L. COULTAS
1980. Studies on the animal communities in two north Florida salt marshes. Part III. Seasonal fluctuations of fish and macroinvertebrates. Bull. Mar. Sci. 30 (4): 790-818.
Cyathura polita (Stimpson) was among the dominant macroinvertebrates at St. Marks and Wakulla marshes, northwest Florida.

TREAT, S.-A. F.
1980. New record of *Aega monophthalma* Johnston (Isopoda: Flabellifera: Aegidae) in the tropical western Atlantic. Bull. Mar. Sci. 30 (4): 912-914.
The species, previously known only from eastern Atlantic waters, is reported from near Cay Sal Bank, Bahamas, in 460 m depth.

TRILLES, J. P.
1972. Les Cymothoidae (Isopoda, Flabellifera) du Muséum national d'Histoire naturelle de Paris. Etude critique accompagnée de précisions en particulier sur la répartition géographic et l'ecologie des différentes espéces représentées. I.
Les Ceratothoinae Schioedte et Meinert, 1883. Bull. Mus. natn. Hist. nat., Paris,

ser. 3, 91, Zool. 70: 1231-1268, pls. 1, 2. [Not seen].

1975. Les Cymothoidae (Isopoda, Flabellifera) des collections du Muséum national d'Histoire naturelle de Paris. II. Les Anilocridae Schioedte et Meinert, 1881. Genres *Anilocra* Leach, 1818 et *Nerocila* Leach, 1818. Bull. Mus. natn. Hist. nat., Paris, ser. 3, 290, Zool. 200: 303-346, pls. 1-3. [Not seen].

1976. Les Cymothoidae (Isopoda, Flabellifera) des collections du Muséum national d'Histoire naturelle de Paris. IV. Les Lironecinae Schioedte et Meinert, 1884. Bull. Mus. natn. Hist. nat., Paris, ser. 3, 390, Zool. 272: 773-800, pls. 1, 2. [Not seen].

1979. Les Cymothoidae (Isopoda, Flabellifera; parasites de poissons) du Rijksmuseum van Natuurlijke Historie de Leiden. II. Afrique, Amérique et regions Indo-Ouest-Pacifiques. Zool. Mededelingen 54 (17): 245-275, pl. 1.
Western Atlantic specimens of *Anilocra laticauda* Milne Edwards, *Telotha henselii* (von Martens), *Cymothoa oestrum* (Linné), and *C. brasiliensis* Schiödte and Meinert, represented in the museum, are discussed, and collection records are presented. Undescribed specimens of *Nerocila* (from Suriname) and *Lironeca* (from Pigeon Key, Florida) are listed and illustrated in the plate.

WEINSTEIN, M. P., and K. L. HECK, JR.

1977. Biology and host-parasite relationships of *Cymothoa excisa* (Isopoda, Cymothoidae) with three species of snappers (Lutjanidae) on the Caribbean coast of Panama. Fish. Bull. 75 (4): 875-877.
Cymothoa excisa is reported from *Lutjanus synagris*, *L. analis* and *Ocyurus chrysurus* from Panama. Isopod lengths were positively and highly correlated with fish lengths. All isopods were attached to the fishes' tongues. Males occurring jointly with females displayed a significantly higher femininity index than males which occurred alone.

WILLIAMS, E. H., JR.

1978. Parasitic isopods of some marine fishes from the West Indies. Proc. Eastern Fish Health Workshop 3: 25. [Abstract].
Twenty-nine isopod species are reported from West Indian marine fishes.

WILLIAMS, E. H., JR., and L. B. WILLIAMS

1978. Cymothoid isopods of some marine fishes from the northern Gulf of Mexico. Northeast Gulf Sci. 2 (2): 122-124.
Three species of isopods were found to infest twelve species of fish near Mobile Bay, Alabama.

1979. Isopods of some marine fishes from Puerto Rico and adjacent areas. Proc. Assoc. Is. Mar. Labs. Carib. 13: 14. [Abstract].
Twenty-four isopod species are listed; many new host records are presented.

WILLIAMS, L. B., and E. H. WILLIAMS, JR.

1979. Isopods of the genus *Anilocra*, parasites of some West Indian fishes. Proc. Assoc. Is. Mar. Labs. Carib. 13: 15. [Abstract].
Twenty-four species of fish were parasitized by seven species of *Anilocra*, six of which are undescribed.

1979. The ability of various West Indian cleaners to remove parasitic isopod juveniles of the genus *Anilocra* — a preliminary report. Proc. Assoc. Is. Mar. Labs. Carib. 14: 28. [Abstract].

Two species of cleaner fishes and four species of cleaner shrimps were evaluated in the laboratory for their ability to remove juvenile isopod parasites from the French grunt. *Periclimenes pedersoni* was the only cleaner to successfully remove the isopod juveniles from the fish.

1981. Nine new species of *Anilocra* (Crustacea: Isopoda: Cymothoidae) external parasites of West Indian coral reef fishes. Proc. Biol. Soc. Wash. 94 (4): 1005-1047.

Nine species are described, and detailed host information is given. *Anilocra laticauda* Milne Edwards, 1840, and *A. leachii* Schiödte, 1866, are considered to be *nomina dubia*. The two syntypes of *A. laevis* Miers, 1877, are considered to be two species, *A. laevis* and *A. haemuli* n. sp.