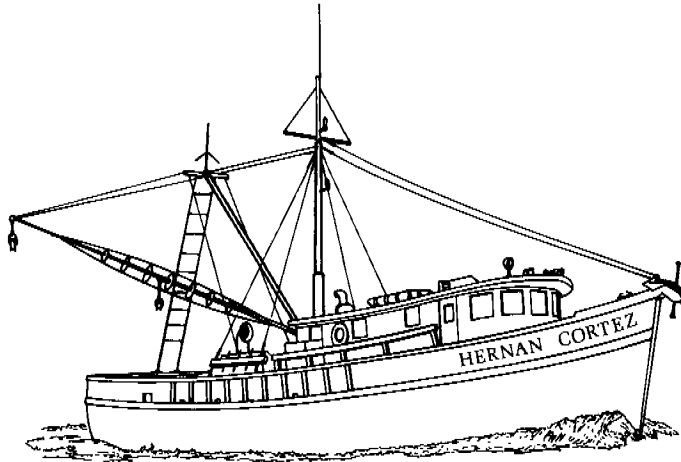


MEMOIRS
OF THE
HOURGLASS CRUISES



FLORIDA MARINE RESEARCH INSTITUTE
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MEMOIRS OF THE HOURGLASS CRUISES

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PART I

AMPHIPODA CRUSTACEA IV.
FAMILIES ARISTIIDAE, CYPHOCARIDIDAE, ENDEVOURIDAE,
LYSIANASSIDAE, SCOPELOCHEIRIDAE, URISTIDAE

By

JAMES K. LOWRY and HELEN E. STODDART¹

ABSTRACT

Nineteen species of lysianassoid amphipods, including 2 new genera and 14 new species, are reported from the Gulf of Mexico and the Caribbean Sea, bringing the total number of species now known from these two areas to 27. Sixteen species (*Aristias captiva* n. sp.; *Aroui americana* n. sp.; *Aruga holmesi* J. L. Barnard, 1955; *Boca campi* n. gen., n. sp.; *B. elvae* n. sp.; *B. megachela* n. sp.; *Cyphocaris tunicola* n. sp.; *Dissiminassa homosassa* n. sp.; *Eclecticus eclecticus* n. gen., n. sp.; *Ensayara entrichoma* Gable and Lazo-Wasem, 1990; *Hippomedon pensacola* n. sp.; *Lysianopsis ozona* n. sp.; *Orchomenella perdido* n. sp.; *O. thomasi* n. sp.; *Rimakoroga floridiana* n. sp.; and *Tryphosella apalachicola* n. sp.) are reported for the first time from the Gulf of Mexico or the Caribbean Sea or both. Four other species, *Bonassa bonairensis* (Stephensen, 1933a), *Concarnes concavus* (Shoemaker, 1933a), *Lysianopsis hummelincki* (Stephensen, 1933b), and *Shoemakerella cubensis* (Stebbing, 1897), previously known from the area are redescribed in detail. Four new families (Aristiidae, Cyphocarididae, Endevouridae, and Scopelocheiridae) and one new subfamily (Tryphosinae) are established within the Lysianassoidea. The new genus and species *Eclecticus eclecticus* is considered to be a demersal scavenger in the Lysianassinae. However, strongly convergent characters, particularly the setal-tooth arrangement of maxilla 1 and the ornamentation of the dactylus on gnathopod 1, confuse our understanding of the relationships of this taxon with other family-level taxa in the Lysianassoidea. This understanding is further complicated by the possibility that this species has two forms of reproductive males. Three examples of species pairs occurring across the Isthmus of Panamá are reported for the first time: *Dissiminassa dissimimalis* (Stout, 1913) and *D. homosassa*; *Ensayara ramonella*

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J. L. Barnard, 1964b, and *E. entrichoma* Gable and Lazo-Wasem, 1990; *Rimakoroga rima* Barnard and Karaman, 1987, and *R. floridiana*. *Aruga holmesi*, previously known from the Pacific coast, is newly recorded in the Gulf of Mexico. Forty-four species of lysianassoid amphipods are currently recorded from the Western North Atlantic Ocean south of Cape Hatteras; a key is provided for these species. Only 4 of the 16 shallow-water species in the Gulf of Mexico are also known to occur outside the area, 4 have very closely related species across the Isthmus of Panamá, and 2 have closely related species in the Mediterranean Sea. Four of the five deep-water Gulf of Mexico species have wide geographical ranges. Because there are few reports of lysianassoid amphipods from the area, it would be naive to consider the apparent high endemism of the shallow-water Gulf of Mexico lysianassoid fauna to be authentic.

INTRODUCTION

For 28 months between 1965 and 1967, the Florida Department of Natural Resources Marine Research Laboratory (now the Florida Department of Environmental Protection, Florida Marine Research Institute) made a series of cruises, known as the Hourglass Cruises, using the R/V *Hernan Cortez* on the central West Florida Shelf between Tampa Bay and Sanibel Island (Joyce and Williams, 1969). Staff researchers conducted monthly benthic trawl and dredge sampling at a fixed series of stations located at depths ranging from 6 to 73 m and on a variety of bottom types (Figure 1). These collections contained 13 species of lysianassoid amphipods, including one new genus and nine new species.

The Gulf Coast Research Laboratory at Ocean Springs, Mississippi, has amassed collections based on a number of surveys and ecological studies done between 1977 and 1993, mainly from the northern shelf of the Gulf of Mexico. These collections include 15 lysianassoid species, 9 of which were not present in the Hourglass collections. Six of the nine were in good enough condition to describe in this study.

We have also included material from other sources. From the field studies of Cohen (Los Angeles County Museum of Natural History) and Morin (University of California at Los Angeles) in the Caribbean Sea, we received trap collections that contained abundant material of a very interesting new genus and species, *Eclecticus eclecticus*. We borrowed material from the Smithsonian Institution, Washington, D.C., and the Zoological Museum, Copenhagen, to study and redescribe three poorly known species: *Bonassa bonairensis*, *Lysianopsis alba*, and *L. hummelincki*.

The collections from the Hourglass Cruises have formed the basis for numerous studies. In regard to the Amphipoda, Myers (1981) has studied the aorid, Ortiz (1991) has studied the bateid, and LeCroy (1995) has studied the colomastigid amphipods. In this paper, we report on the lysianassoid amphipods. We have documented, in a checklist, all known lysianassoid amphipods from the warm-temperate and tropical western Atlantic Ocean and have developed a key to aid in identification. In this paper, we describe 4 new families, 1 new subfamily, 2 new genera and 14 new species (Table 1).

Lysianassoids are an abundant and diverse part of many marine environments and are apparently most successful in cold water. However, recent work by Ledoyer (1986) and Lowry and Stoddart (1993, 1994, 1995b) indicates that lysianassoids are more important in low-latitude environments than previously thought.

The present study should not be considered to be a comprehensive study of lysianassoids from the Gulf of Mexico and Caribbean Sea area. The fact that 9 of the 15 species in the Gulf Coast Research Laboratory collections did not occur in the Hourglass collections suggests that more species are probably pre-

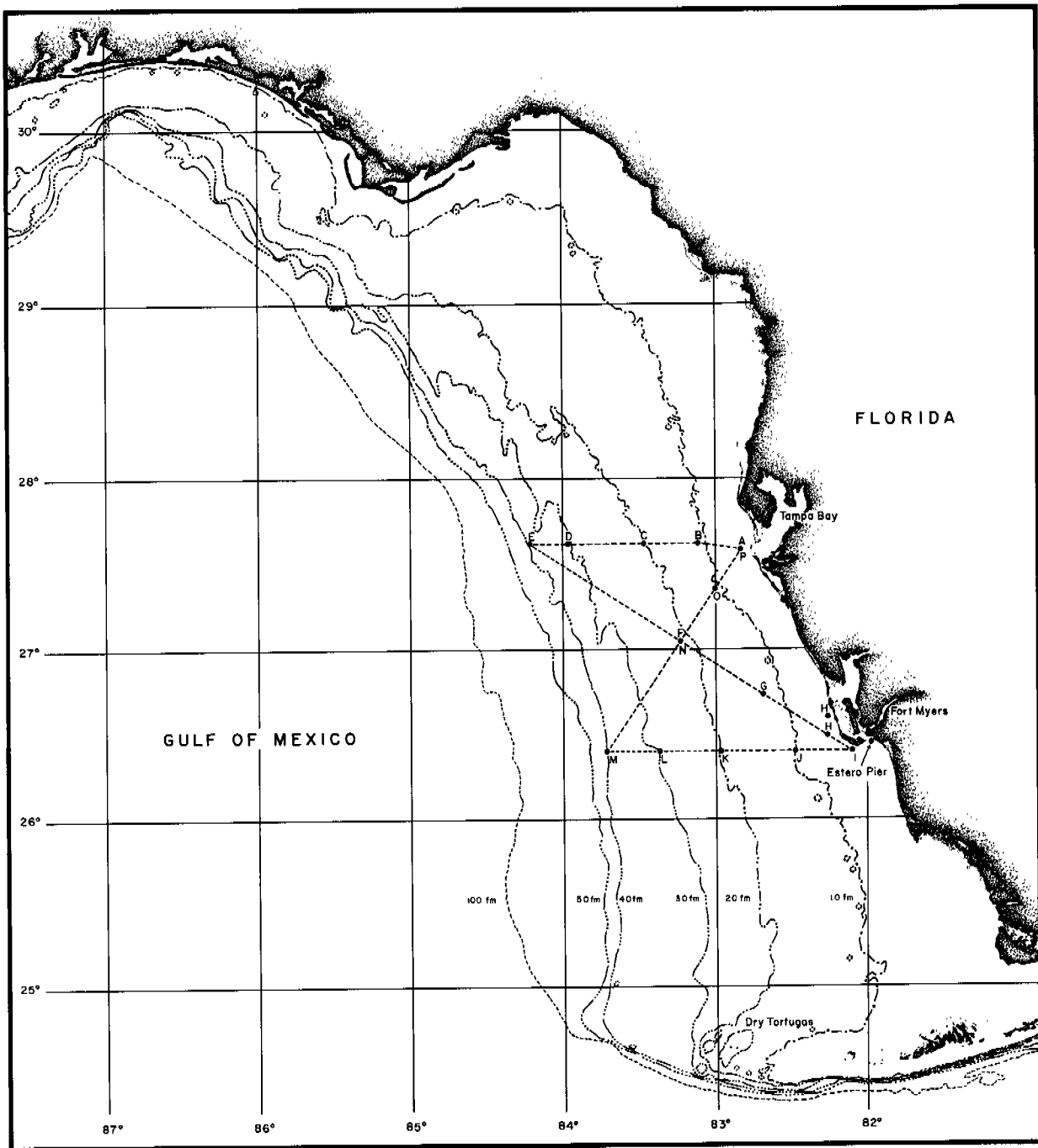


Figure 1. Hourglass Cruise pattern and station locations.

sent. Collecting methods specific for these types of crustaceans need to be used (Lowry and Stoddart, 1995b). For instance, only two species have been taken in traps and only six species in the study can be considered to be scavengers, yet scavenging lysianassoids are diverse in other areas. Lowry and Stoddart (1995b) reported 11 scavenging species from the Madang Lagoon area of Papua New Guinea. Only two pelagic species have been reported, yet at least five such species are known from the warm-water western Atlantic. Wolff (1979) reported a possible new genus of *Onesimoides*-like amphipod that was found in dead vegetation on the bottom of the Caribbean Sea, but unfortunately the specimens are lost (Wolff, personal communication). No ectoparasites (such as *Opisa* or *Trischizostoma*) and very few free-living bot-

TABLE 1. SYSTEMATIC ARRANGEMENT OF TAXA TREATED IN THIS PAPER. THE NUMBER IN PARENTHESES FOLLOWING A NAME REFERS TO THE PAGE IN THIS REPORT WHERE THAT TAXON'S ACCOUNT BEGINS.

Aristiidae, new family (p. 12)
<i>Aristias</i> Boeck, 1871 (p. 14)
<i>Aristias captiva</i> , new species (p. 14)
<i>Boca</i> , new genus (p. 20)
<i>Boca campi</i> , new species (p. 20)
<i>Boca elvae</i> , new species (p. 25)
<i>Boca megachela</i> , new species (p. 29)
Cyphocarididae, new family (p. 34)
<i>Cyphocaris</i> Boeck, 1871 (p. 36)
<i>Cyphocaris tunicola</i> , new species (p. 36)
Endevouridae, new family (p. 41)
<i>Ensayara</i> J. L. Barnard, 1964 (p. 42)
<i>Ensayara entrichoma</i> Gable and Lazo-Wasem, 1990 (p. 42)
Lysianassidae Dana, 1849 (p. 42)
Lysianassinae Dana, 1849 (p. 43)
<i>Aruga</i> Holmes, 1908 (p. 46)
<i>Aruga holmesi</i> J. L. Barnard, 1955 (p. 47)
<i>Bonassa</i> Barnard and Karaman, 1991 (p. 53)
<i>Bonassa bonairensis</i> (Stephensen, 1933a) (p. 54)
<i>Concarnes</i> Barnard and Karaman, 1991 (p. 58)
<i>Concarnes concavus</i> (Shoemaker, 1933a) (p. 58)
<i>Dissiminassa</i> Barnard and Karaman, 1991 (p. 64)
<i>Dissiminassa homosassa</i> , new species (p. 64)
<i>Eclecticus</i> , new genus (p. 69)
<i>Eclecticus eclecticus</i> , new species (p. 69)
<i>Lysianopsis</i> Holmes, 1903 (p. 79)
<i>Lysianopsis alba</i> Holmes, 1903 (p. 80)
<i>Lysianopsis hummelincki</i> (Stephensen, 1933b) (p. 82)
<i>Lysianopsis ozona</i> , new species (p. 87)
<i>Lysianopsis subantarctica</i> (Schellenberg, 1931) (p. 91)
<i>Shoemakerella</i> Pirlot, 1936 (p. 92)
<i>Shoemakerella cubensis</i> (Stebbing, 1897) (p. 92)
Tryphosinae, new subfamily (p. 98)
<i>Hippomedon</i> Boeck, 1871 (p. 99)
<i>Hippomedon pensacola</i> , new species (p. 99)
<i>Orchomenella</i> Sars, 1890 (p. 104)
<i>Orchomenella perdido</i> , new species (p. 104)
<i>Orchomenella thomasi</i> , new species (p. 109)
<i>Rimakoroga</i> Barnard and Karaman, 1987 (p. 113)
<i>Rimakoroga floridiana</i> , new species (p. 113)
<i>Tryphosella</i> Bonnier, 1893 (p. 118)
<i>Tryphosella apalachicola</i> , new species (p. 118)
Scopelochciridae, new family (p. 122)
<i>Aroui</i> Chevreux, 1911 (p. 124)
<i>Aroui americana</i> , new species (p. 124)
Uristidae Hurley, 1963 (p. 129)
<i>Stephonyx</i> Lowry and Stoddart, 1989c (p. 129)
<i>Stephonyx biscayensis</i> (Chevreux, 1908) (p. 129)

tom dwellers are reported. Four species with presumed invertebrate associates and 10 species taken in dredges, for which we have no information on lifestyles, are also reported. Little is known about the lysianassoids living below 200-m depths in the Gulf of Mexico or the Caribbean Sea.

TABLE 2. LOCATIONS AND DEPTHS OF BENTHIC HOURGLASS STATIONS.

Station	Latitude*	Longitude*	Established Depth (meters)	Approximate Nautical Miles Offshore [†]
A	27°35'N	82°50'W	6.1	4, due W of Egmont Key
B	27°37'N	83°07'W	18.3	19, due W of Egmont Key
C	27°37'N	83°28'W	36.6	38, due W of Egmont Key
D	27°37'N	83°58'W	54.9	65, due W of Egmont Key
E	27°37'N	84°13'W	73.2	78, due W of Egmont Key
I	26°24'N	82°06'W	6.1	4, due W of Sanibel Island Light
J	26°24'N	82°28'W	18.3	24, due W of Sanibel Island Light
K	26°24'N	82°58'W	36.6	51, due W of Sanibel Island Light
L	26°24'N	83°22'W	54.9	73, due W of Sanibel Island Light
M	26°24'N	83°43'W	73.2	92, due W of Sanibel Island Light

*U. S. Coast and Geodetic Chart 1003, dated June 1966.

ACKNOWLEDGMENTS

We are particularly grateful to David Camp, who originally encouraged us to study the amphipods from the Hourglass collections and arranged funds to help with illustrations. We thank Gerhard Scholtz, Humboldt-Universität, Berlin, and George Wilson, Australian Museum, for critically reading the essay on convergent evolution in *Eclecticus eclecticus*. For loan material, donations, and inquiries about collections, we thank Ed Bousfield, then of the Museum of Natural Sciences, Ottawa; Jan Clark, Elizabeth Harrison, and Jim Thomas, Smithsonian Institution; Anne Cohen, Los Angeles County Museum of Natural History; Richard Heard and Sara LeCroy, Gulf Coast Research Laboratory; Arthur Humes, Marine Biological Laboratory, Woods Hole; Torben Wolff, Zoological Museum, Copenhagen. We are particularly indebted to Kate Dempsey, Stephen Keable, and Rachael Evans, who made the illustrations, and to Roger Springthorpe, who made the plates.

METHODS AND MATERIALS

Joyce and Williams (1969) provide complete descriptions of stations, sampling gear, methods, and hydrographic data for the Hourglass collections. A summary of the stations is given in Table 2.

Richard Heard (Gulf Coast Research Laboratory) provided additional collections from the Gulf of Mexico. These collections came from various sources: the Bureau of Land management MAFLA Survey, 1977–1978; the MARFIN-*Geryon* survey, 1987–1988; the Texas A&M MMS Survey, 1987–1988; the Perdido Key Project, 1989; and the GINS Inventory Project, 1993. Anne Cohen (Los Angeles County Natural History Museum) provided collections from the Caribbean Sea. We borrowed material from the National Museum of Natural History, Washington, D.C., and the Zoological Museum, Copenhagen, to redescribe some previously described species from the Gulf of Mexico and the Caribbean Sea.

We implement recent changes (Lowry and Stoddart, 1995a) to the terminology we have previously used to describe setae and spines. These changes are based primarily on arguments about the homology of setae and spines presented by Oshel and Steele (1988) and Watling (1989). The terminology mainly follows that of Watling (1989) with a few modifications. What we have previously referred to as setae are now referred to as slender setae, and what we previously referred to as spines are now called robust setae.

What we previously referred to mainly as teeth (nonarticulating extrusions of the cuticle), are now referred to as spines. All setal teeth on maxilla 1 are numbered according to codes first introduced by Lowry and Stoddart (1992).

Material is lodged in the Australian Museum, Sydney (AM); the Gulf Coast Research Laboratory, Ocean Springs, Mississippi (GCRL); the Los Angeles County Museum of Natural History (LACM); the Marine Invertebrate Collection of the Florida Marine Research Institute, St. Petersburg, Florida (FSBC I); the Canadian Museum of Nature, Ottawa (CMN); the National Museum of Natural History, Washington, D.C. (USNM); and the Zoological Museum, Copenhagen (ZMC).

The following abbreviations are used on the plates: A, antenna; E, epistome and upper lip; EP, epimeron; G, gnathopod; H, head; MD, mandible; MDP, mandibular palp; MP, maxilliped; MPIP, maxilliped inner plate; MPOP, maxilliped outer plate; MPP, maxilliped palp; MX, maxilla; MXIIP, maxilla 1 inner plate; MXIOP, maxilla 1 outer plate; MX1P, maxilla 1 palp; P, pereopod; ST, setal-tooth; T, telson; U, uropod; UR, urosome; juv, juvenile; l, left; r, right; lat, lateral.

LIST OF LYSIANASSOID SPECIES RECORDED FROM THE GULF OF MEXICO AND ADJACENT AREAS

Bermuda Region

Less than 200-m depths

Ensayara entrichoma Gable and Lazo-Wasem, 1990.

Shoemakerella lowryi Gable and Lazo-Wasem, 1990 (also recorded by Kunkel, 1910, and Johnson, 1986, as *Lysianassa punctata* (Costa, 1857)).

Deeper than 200 m

Crybelocephalus megalurus Tattersall, 1906 (recorded by Shoemaker, 1945).

Crybelocyphocaris tattersalli Shoemaker, 1945.

Cyphocaris anonyx Boeck, 1871 (recorded by Shoemaker, 1945).

Cyphocaris challengerii Stebbing, 1888 (recorded by Shoemaker, 1945).

Cyphocaris richardi Chevreux, 1905a (recorded by Shoemaker, 1945).

Eurythenes gryllus (Lichtenstein, 1822) (recorded by Shoemaker, 1945).

Koroga megalops Holmes, 1908 (recorded by Shoemaker, 1945).

Metacyphocaris helgae Tattersall, 1906 (recorded by Shoemaker, 1945).

Paracallisoma alberti Chevreux, 1903 (recorded by Shoemaker, 1945, as *Scopelocheirus coecus* Holmes, 1908).

Paracyphocaris praedator Chevreux, 1905b (recorded by Shoemaker, 1945).

Thoriella islandica Stephensen, 1915 (recorded by Shoemaker, 1945).

Eastern United States: Cape Hatteras to Florida

Less than 200-m depths

Lysianopsis alba Holmes, 1903 (recorded by Williams and Bynum, 1972; Fox and Bynum, 1975; Nelson, 1979, 1980; and Nelson et al., 1982).

Deeper than 200 m

Concarnes sp. (recorded by Biernbaum and Wenner, 1993).
Eurythenes gryllus (Lichtenstein, 1822) (recorded by Bowman and Manning, 1972).
Hippomedon propinquus Sars, 1890 (recorded by Biernbaum and Wenner, 1993).
Onesimoides sp. (recorded by Wolff, 1979).
Orchomene sp. (recorded by Biernbaum and Wenner, 1993).
Schisturella sp. (recorded by Biernbaum and Wenner, 1993).
Tmetonyx sp. (recorded by Biernbaum and Wenner, 1993, as *Tmetonyx cicada* (Fabricius, 1780)²).
Tryphosella sp. (recorded by Biernbaum and Wenner, 1993).

Bahamas

Less than 200-m depths

Socarnopsis catacumba (Clark and Barnard, 1985).³

Deeper than 200 m

Bathymaryllis cf. *pulchellus* (recorded by Lawson et al., 1993).
Concarnes sp. (recorded by Lawson et al., 1993).
Scopelocheirus sp. (recorded by Lawson et al., 1993).

Gulf of Mexico

Less than 200-m depths⁴

Aristias captiva n. sp.
Aroui americana n. sp.
Aruga holmesi J. L. Barnard, 1955 (recorded here).
Boca campi n. gen., n. sp.
Boca elvae n. sp.
Boca megachela n. sp.
Concarnes concavus (Shoemaker, 1933a) (also recorded here).
Dissiminassa homosassa n. sp.
Ensayara entrichoma Gable and Lazo-Wasem, 1990 (recorded here).
Hippomedon pensacola n. sp.
Lysianopsis alba (recorded by Pearse, 1912; Shoemaker, 1933b; and Stoner, 1979, 1980a, 1980b).
Lysianopsis ozona n. sp.
Orchomenella perdido n. sp.
Orchomenella thomasi n. sp.
Rimakoroga floridiana n. sp.

²We have examined specimens of this material (USNM 266435) and have closely compared them with specimens of *Tmetonyx cicada* from near the type locality. Biernbaum and Wenner's material differs from *T. cicada* in having a serrate inner margin on the palp of maxilla 1, long setae on the propodus of pereopods 3 and 4, and a more rounded head lobe.

³This species was originally described in the genus *Lucayarina* Clark and Barnard, 1985; it is here transferred to the genus *Socarnopsis*. See p. 45.

⁴The name *Lysianopsis hirsuta* occurs in Stoner (1979, 1980). No authorship is given and the name appears to be a *nomen nudum*.

Shoemakerella cubensis (Stebbing, 1897) (recorded by Pearse, 1912, as *Lysianopsis alba* Holmes, 1903; and by Pirlot, 1939⁵ as *S. nasuta* (Dana, 1849)).

Tryphosella apalachicola n. sp.

Deeper than 200 m

Aroui americana n. sp.

Cyphocaris tunicola n. sp.

Cyphocaris sp. (recorded by Springer and Bullis, 1956).

Eurythenes gryllus (Lichtenstein, 1822) (recorded by Springer and Bullis, 1956).

Eurythenes obesus (Chevreux, 1905c) (recorded by Shoemaker, 1956).

Stephonyx biscayensis (Chevreux, 1908) (recorded here).

Caribbean Sea

Less than 200-m depths

Bonassa bonairensis (Stephensen, 1933a).

Concarnes concavus (Shoemaker, 1933a) (recorded here).

Eclecticicus eclecticus n. gen., n. sp.

Ensayara jumane Barnard and Thomas, 1990.

Lysianopsis hummelincki (Stephensen, 1933b).

Orchomenella magdalenensis Shoemaker, 1942 (recorded by Ortiz, 1978)⁶.

Shoemakerella cubensis (Stebbing, 1897) (also recorded by Shoemaker, 1921, as *Lysianopsis alba* Holmes, 1903; by Shoemaker, 1935, as *Lysianassa cubensis*; by Ortiz, 1978, 1979, Lalana Rueda and Pérez Moreno, 1985, Lalana Rueda et al., 1989, Lalana Rueda and Ortiz, 1990, and Ortiz and Lalana Rueda, 1992, as *Lysianassa nasuta* Dana, 1853; and by Shoemaker, 1948, Ortiz and Lalana Rueda, 1993, and Ortiz and Lemaitre, 1994, as *Shoemakerella nasuta* (Dana, 1853)).

Socarnopsis catacumba (Clark and Barnard, 1985) (recorded by Ortiz and Lalana Rueda, 1989⁷).

Deeper than 200 m

Elimedon carabicus (J. L. Barnard, 1964a).⁸

Eurythenes gryllus (Lichtenstein, 1822) (recorded by Poupin, 1994).

cf. *Onesimoides* sp. (recorded by Wolff, 1979).

Stephonyx biscayensis (Chevreux, 1908) (recorded by Poupin, 1994, and Paulmier, 1993, as *Stephonyx* sp.; recorded here).

⁵This record, from Cay Sal Bank, could equally be placed as eastern United States, Bahamas, or Gulf of Mexico.

⁶Recorded only as "Cuban." This species does not appear in the subsequent checklists of Ortiz (1979) or Ortiz and Lalana Rueda (1993).

⁷Recorded from the north coast of Cuba, which may be more closely associated with the Gulf of Mexico fauna than with the Caribbean Sea fauna.

⁸This species was originally described in the genus *Paracentromedon* Chevreux and Fage, 1925. *Elimedon* J. L. Barnard, 1962, was at the time a junior subjective synonym of *Paracentromedon*. Barnard and Karaman (1991) reinstated *Elimedon*. This species, because of its short mandibular palp article 3 and long gnathopod 1 carpus, belongs in *Elimedon*.

Puerto Rico Trench area

Deeper than 200 m

Bathycallisoma schellenbergi (Birstein and Vinogradov, 1958) (recorded by Schellenberg, 1955, as *Paracallisoma* sp.; and by Demming et al., 1981, as *Scopelocheirus shellengi* [sic]).

Cebocaris grutesca J. L. Barnard, 1964a.

Cyphocaris johnsoni Shoemaker, 1934.

Lepiduristes lepidus (J. L. Barnard, 1964a).

SYSTEMATICS

KEY TO LYSIANASSOID TAXA RECORDED FROM THE WARM-TEMPERATE AND TROPICAL WESTERN ATLANTIC OCEAN (Cape Hatteras to Caribbean Sea, including Bermuda)

All species-level taxa known from the area are included in the key. Taxa not identified to species level are included at the generic level. Barnard and Karaman (1991) considered *Orchomene* Boeck, 1871, to be a supergenus that included a number of genera, two of which (*Orchomene* and *Orchomenella* Sars, 1890) have been recorded in this area. *Orchomene* is included in this key in its most restricted sense.

1. Gnathopod 1, coxa very reduced or vestigial 2
1. Gnathopod 1, coxa slightly reduced, tapering 18
1. Gnathopod 1, coxa about as large as coxa 2 19

2. Peraeopods 3–7, some or all prehensile 3
2. Peraeopods 3–7 simple 7

3. Uropod 3, inner ramus reduced 4
3. Uropod 3, rami subequal in length *Crybelocephalus megalurus* Tattersall, 1906

4. Telson cleft 5
4. Telson entire 6

5. Peraeopod 6 simple. Uropod 3, inner ramus greatly reduced, about 25% of outer ramus. Telson moderately cleft, about 33% *Metacyphocaris helgae* Tattersall, 1906
5. Peraeopod 6 prehensile. Uropod 3, inner ramus reduced, about 66% of outer ramus. Telson deeply cleft, about 60% *Paracyphocaris praedator* Chevreux, 1905b

6. Urosomites 1–3 free *Cebocaris grutesca* J. L. Barnard, 1964a
6. Urosomites 2–3 fused *Crybelocyphocaris tattersalli* Shoemaker, 1945

7. Peraeopods 5–7, propodus with anterodistal spur 8
7. Peraeopods 5–7, propodus without anterodistal spur, with anterodistal locking setae or nothing . . 11

8. Gnathopod 1 parachelate or subchelate. Telson present 9
8. Gnathopod 1 simple. Telson absent *Thoriella islandica* Stephensen, 1915

9.	Maxillipedal palp 2-articulate. Maxilla 1, inner plate with 3 to 4 apical setae	10
9.	Maxillipedal palp 4-articulate. Maxilla 1, inner plate with setae along entire medial margin	
	<i>Aristias captiva</i> n. sp.
10.	Gnathopod 1, carpus and propodus without strong robust setae; dactylus over-reaching very small palm	<i>Boca campi</i> n. sp.
10.	Gnathopod 1, carpus and propodus without strong robust setae; dactylus closing along entire posterior margin	<i>Boca megachela</i> n. sp.
10.	Gnathopod 1, carpus and propodus with strong robust setae; dactylus closing about halfway along posterior margin	<i>Boca elvae</i> n. sp.
11.	Gnathopod 1 simple	12
11.	Gnathopod 1 parachelate, dactylus over-reaching palm	17
11.	Gnathopod 1 chelate	<i>Stephonyx biscayensis</i> (Chevreux, 1908)
11.	Gnathopod 1 subchelate; rostrum small or absent	<i>Schisturella</i> Norman, 1900
12.	Coxae 1–3 vestigial or very small. Maxilla 1 with palp	13
12.	Coxa 1 vestigial; coxae 2–3 large. Maxilla 1 without palp	<i>Bathymaryllis</i> Pirlot, 1933
13.	Peraeopod 5, basis produced into serrate lobe or short spur	14
13.	Peraeopod 5, basis produced into long, narrow spur	15
14.	Eyes present. Peraeonite 1 produced into sharp spur. Peraeopod 5, basis produced into blunt, serrate lobe	<i>Cyphocaris richardi</i> Chevreux, 1905a
14.	Eyes absent. Peraeonite 1 produced into blunt lobe. Peraeopod 5, basis produced into short, serrate spur	<i>Cyphocaris anonyx</i> Boeck, 1871
15.	Peraeopod 5 basis, upper margin of spur dentate	16
15.	Peraeopod 5 basis, margins of spur smooth	<i>Cyphocaris challengerii</i> Stebbing, 1888
16.	Peraeonite 1 forming long, narrow, slightly up-turned process in male, not developed in female. Telson 1.5 × as long as uropod 3	<i>Cyphocaris johnsoni</i> Shoemaker, 1934
16.	Peraeonite 1 forming long, narrow, slightly down-turned process in both sexes. Telson 1.8 × as long as uropod 3	<i>Cyphocaris tunicola</i> n. sp.
17.	Peraeopods 3–7, dactylus short, slightly curved	<i>Eurythenes gryllus</i> (Lichtenstein, 1822)
17.	Peraeopods 3–7, dactylus long, strongly curved	<i>Eurythenes obesus</i> (Chevreux, 1905c)
18.	Eyes absent. Gnathopod 1, carpus shorter than propodus. Peraeopods 5–7, basis strongly crenate. Urosomite 1 without boss	<i>Lepiduristes lepidus</i> (J. L. Barnard, 1964a)
18.	Eyes present. Gnathopod 1, carpus subequal in length to propodus. Peraeopods 5–7, basis minutely crenate. Urosomite 1 with rounded dorsal boss	<i>Tryphosella apalachicola</i> n. sp.
19.	Gnathopod 1 subchelate or chelate	20
19.	Gnathopod 1 simple	28
20.	Telson cleft less than 50%, notched or entire	21
20.	Telson cleft more than 50%	23
21.	Mandibular molar a reduced column with triturating surface, not setose	22

21. Mandibular molar a reduced setose ridge	<i>Orchomene</i> Boeck, 1871	
21. Mandibular molar a setose tongue	<i>Koroga megalops</i> Holmes, 1908	
22. Telson notched	<i>Orchomenella perdido</i> n. sp.	
22. Telson entire	<i>Onesimoides</i> Stebbing, 1888	
22. Telson cleft 40–45%	<i>Rimakoroga floridiana</i> n. sp.	
23. Urosomite 1 with dorsodistally acute carina		24
23. Urosomite 1 without dorsodistal carina		25
24. Mandibular palp, article 1 about 4× as long as broad. Gnathopod 1, carpus as long as propodus. Epimeron 3 with subquadrate posteroventral corner	<i>Orchomenella magdalenensis</i> Shoemaker, 1942	
24. Mandibular palp, article 1 about 2× as long as broad. Gnathopod 1, carpus shorter than propodus. Epimeron 3 with acutely produced posteroventral corner	<i>Orchomenella thomasi</i> n. sp.	
25. Maxilla 2, inner and outer plates subequal		26
25. Maxilla 2, inner plate half length of outer plate	<i>Tmetonyx</i> Stebbing, 1906	
26. Epimeron 3 with smooth posteroventral margin; posteroventral corner produced into well-defined spine. Urosomite 1 with smooth dorsal margin		27
26. Epimeron 3 with minutely serrate posteroventral margin; posteroventral corner produced into broad cusp. Urosomite 1 with acute dorsodistal spine	<i>Elimedon carabicus</i> (J. L. Barnard, 1964a)	
27. Epimeron 3, posteroventral corner with notch at base of spine	<i>Hippomedon pensacola</i> n. sp.	
27. Epimeron 3, posteroventral corner without notch at base of spine	<i>Hippomedon propinquus</i> Sars, 1890	
28. Gnathopod 1, dactylus complex, with dense setae or cuticular spines or both		29
28. Gnathopod 1, dactylus simple		32
29. Mandibular molar a narrow column with weak triturating surface. Telson cleft		30
29. Mandibular molar a nonsetose triangular tongue or flap. Telson cleft		31
29. Mandibular molar a strongly setose tongue. Telson entire	<i>Eclecticicus eclecticus</i> n. sp.	
30. Coxae 1–4, ventral margin with strong setal fringe	<i>Aroui americana</i> n. sp.	
30. Coxae 1–4, ventral margin without setal fringe	<i>Scopelocheirus</i> Bate, 1857	
31. Peraeopod 5, basis strongly expanded posteriorly, with short posteroventral lobe	<i>Bathycallisoma schellenbergi</i> Birstein and Vinogradov, 1958	
31. Peraeopod 5, basis expanded posteroventrally, with long posteroventral lobe	<i>Paracallisoma alberti</i> Chevreux, 1903	
32. Peraeopod 3 subchelate		33
32. Peraeopod 3 simple		34
33. Coxae 1–4 with fringe of long setae on ventral margin	<i>Ensayara entrichoma</i> Gable and Lazo-Wasem, 1990	
33. Coxae 1–4 without fringe of long setae on ventral margin	<i>Ensayara jumane</i> Barnard and Thomas, 1990	

34. Telson entire35
34. Telson notched. Peraeopods 5–7, basis minutely serrate
Concarnes concavus (Shoemaker, 1933a)
34. Telson deeply cleft. Peraeopods 5–7, basis deeply serrate
Socarnopsis catacumba (Clark and Barnard, 1985)
35. Uropod 3, outer ramus 1-articulate36
35. Uropod 3, outer ramus 2-articulate (article 2 may be weakly defined)39
36. Maxilla 2, inner plate much broader than outer plate37
36. Maxilla 2, inner plate about as broad as outer plate38
37. Peraeopod 7, propodus length 5–6 × breadth*Shoemakerella cubensis* (Stebbing, 1897)
37. Peraeopod 7, propodus length 9.5 × breadth
Shoemakerella lowryi Gable and Lazo-Wasem, 1990
38. Epistome produced, rounded, subequal to produced upper lip. Male gnathopod 1 not prehensile ...
Bonassa bonairensis (Stephensen, 1933a)
38. Epistome not produced, upper lip produced, rounded. Male gnathopod 1 prehensile
Lysianopsis hummelincki (Stephensen, 1933b)
39. Epistome not produced40
39. Epistome produced, acute*Dissiminassa homosassa* n. sp.
40. Maxilla 1 outer plate, ST4–6 with 8–10 cusps. Male gnathopod 1 not prehensile. Uropod 3 outer
ramus clearly 2-articulate41
40. Maxilla 1 outer plate, ST4–6 with 3–4 cusps. Male gnathopod 1 weakly prehensile. Uropod 3 outer
ramus with article 2 poorly defined*Lysianopsis alba* Holmes, 1903
41. Upper lip projecting well beyond epistome. Telson with 2 short apical robust setae
Aruga holmesi J. L. Barnard, 1955
41. Upper lip projecting only slightly beyond epistome. Telson with 2 long apical robust setae
Lysianopsis ozona n. sp.

Aristiidae, new family

Diagnosis: Head: deeper than long. Antennae: calceoli absent. Epistome and upper lip: fused, usually with a central notch. Mandible: incisors small or large, usually asymmetrical, left straight, minutely serrate, right straight or slightly convex, smooth; left lacinia mobilis a small peg or absent; accessory setal row without distal setal tuft; molar present or absent, if present a smooth, weakly setose flap. Maxilla 1: inner plate usually strongly setose, always more than 2 pappose setae; outer plate broad or very broad, setal-teeth in a modified 7/4 arrangement; palp large, 2-articulate. Maxilliped: outer plate with or without apical simple, slender setae, without apical robust setae. Gnathopod 1: simple, subchelate or parachelate. Coxa 1: vestigial; coxa 2 small or large; coxa 3 large. Peraeopods 3–7: simple, propodus with distal spur (rarely absent). Telson: entire or cleft.

Description: Head: exposed, deeper than long; rostrum present or absent, if present short; eyes present or absent, if present round, oval or reniform, with ommatidia. Body: laterally compressed.

Antenna 1: shorter than or subequal to antenna 2; peduncular article 1 longer than article 2; article 2 longer than article 3; accessory flagellum short, 2- to 6-articulate; primary flagellum multiarticulate, callynophore present, calceoli absent. Antenna 2: short; flagellum shorter than peduncle, multiarticulate, calceoli absent.

Mouthpart bundle: subquadrate. Epistome and upper lip: fused, usually with a central notch. Mandible: incisors small or large, usually asymmetrical, left straight, minutely serrate, right straight or slightly convex, smooth; left lacinia mobilis present or absent, if present a small peg; accessory setal row without distal setal tuft; molar present or absent, if present a smooth, weakly setose flap; palp 3-articulate. Maxilla 1: inner plate usually strongly setose, always more than 2 pappose setae; outer plate broad or very broad, with 7–16 setal-teeth in a modified 7/4 arrangement; palp large, 2-articulate, with terminal robust setae. Maxilla 2: inner plate with strongly setose medial margin. Maxilliped: inner plate well developed; outer plate very large or large; palp 4- to 1-articulate.

Coxae: coxa 1 vestigial, coxae 2–4 longer than broad, overlapping. Gnathopod 1: simple, subchelate or parachelate; smaller than or subequal to gnathopod 2; coxa vestigial, hidden or partially hidden by coxa 2; carpus shorter than, subequal to or longer than propodus; dactylus large. Gnathopod 2: subchelate or chelate; coxa usually subequal to but not hidden by coxa 3, occasionally reduced and partly hidden by coxa 3; ischium elongate; carpus elongate, longer than propodus; dactylus minute.

Peraeopods 3–7: not prehensile; propodus usually with distal spur. Peraeopod 3: coxa longer than broad; merus not elongate; carpus shorter than propodus, produced anteriorly. Peraeopod 4: coxa larger than coxa 3, with small posteroventral lobe; merus shorter than propodus; carpus shorter than propodus, not produced. Peraeopod 5: subequal in length to peraeopod 6; coxa smaller than coxa 4, with ventrally produced posterior lobe; basis expanded, with or without posteroventral lobe; merus expanded, weakly expanded or not expanded, posterior margin weakly setose; carpus not expanded. Peraeopod 6: subequal in length to peraeopod 7; coxa with posteroventral lobe; basis expanded; merus expanded, weakly expanded or not expanded, posterior margin weakly setose. Peraeopod 7: subequal in length to peraeopod 5; similar in structure to peraeopod 6; basis expanded; merus expanded, weakly expanded or not expanded.

Pleonites 1–3: without dorsal teeth; pleonite 3 without dorsal carina. Epimera 2–3: without setae.

Urosome: urosomite 1 longer than or much longer than urosomite 2, not carinate; urosomite 3 sometimes carinate. Uropods 1–3: similar in structure and size. Uropod 1: biramous, rami lanceolate. Uropod 2: biramous, rami lanceolate; inner ramus subequal to or shorter than outer ramus, not incised. Uropod 3: not sexually dimorphic; peduncle short; biramous, rami lanceolate; outer ramus longer than peduncle, 2-articulate; inner ramus shorter than or subequal to outer ramus. Telson: laminar; deeply cleft, moderately cleft, emarginate or entire; longer than broad, as long as broad or broader than long; dorsal robust setae usually absent, apical robust and slender setae present or absent.

Type genus: Aristias Boeck, 1871.

Generic composition: Aristias Boeck, 1871; *Boca* new genus; *Perrierella* Chevreux and Bouvier, 1892.

Remarks: A number of lysianassoid genera, including all genera in the cebocarid group, have asymmetrical incisors of which the left is minutely serrate and the right is smooth. However, the presence of distal spurs on peraeopods 3 to 7 is a synapomorphic character that defines the Aristiidae. The absence of spurs in two closely related South Pacific species is considered to be a secondary loss.

Where known, aristiids are associated with marine invertebrates such as sea anemones (Vader, 1984c), brachiopods (Vader, 1970), echinoderms (Vader, 1978), sponges, and tunicates (Vader, 1984a, 1984b).

Diagnosis: Head: deeper than long, lateral cephalic lobe weak, ventrolateral flap well developed. Epistome and upper lip: fused, usually with central notch. Mandible: incisors small, usually asymmetrical, left straight, minutely serrate, right straight or slightly convex, smooth; left lacinia mobilis a small peg or absent; accessory setal row well developed or absent, if present with more than 5 accessory setae, usually with intermediate setae; molar a smooth, weakly setose flap or absent; palp without B2-setae, D2-setae or A3-setae. Maxilla 1: outer plate broad or very broad, setal-teeth in a modified 7/4 arrangement; palp 2-articulate. Maxilliped: outer plate without apical robust setae; palp well developed, 4-articulate. Gnathopod 1: simple or parachelate; coxa vestigial; posterior margin of propodus serrate. Peraeopods 3–7: simple, propodus usually with distal spur, spur occasionally absent. Peraeopod 4: coxa deeper than wide with weak posteroventral lobe. Peraeopod 5: coxa with well-developed posteroventral lobe. Gills: from gnathopod 2 to peraeopod 6, not pleated. Telson: deeply to moderately cleft.

Type species: *Anonyx tumidus* Krøyer, 1846.

Composition: Barnard and Karaman (1991) recorded 21 species in *Aristias*. Since then five species have been described: *Aristias captiva* n. sp.; *A. coriolis* Lowry and Stoddart, 1993; *A. thio* Lowry and Stoddart, 1994; *A. uokonia* Lowry and Stoddart, 1994; and *A. verdensis* Lowry and Stoddart, 1993.

Aristias captiva, new species

Figures 2–4

Type material examined: **HOLOTYPE:** ♀; 5.0 mm; ovigerous (3 eggs); 78 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 84°13'W; crushed shell, dead bryozoans and calcareous algae; 73.2 m; 9 October 1966; 0325–0340 hours; dredge; HOURGLASS Cruise HC 32, Station E; USNM 282672.—**PARATYPE:** 1 specimen; same locality; 8 February 1966; 0415–0525 hours; dredge; HOURGLASS Cruise HC 24, Station E; AM P 45327.—**PARATYPES:** 2 specimens; same locality; 3 March 1967; 0420–0435 hours; dredge; HOURGLASS Cruise HC 37, Station E; FSBC I 59928.—**PARATYPE:** 1 ♀; 4.5 mm; with non-setose oostegites; 65 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°58'W; crushed shell, *Lithothamnion* spp., brown silt with sponges and bryozoans; 54.9 m; 2 August 1967; 0310–0340 hours; trawl; HOURGLASS Cruise HC 42, Station D; USNM 282673.—*Additional material examined:* **HOURGLASS MATERIAL:** STATION E: 1 specimen; 1 September 1967; trawl; FSBC I 59930.—1 specimen; 3 November 1967; dredge; FSBC I 59931.—STATION L: 1 specimen; 15 November 1967; trawl; FSBC I 59933.—STATION M: 2 ♀; 7 December 1966; dredge; FSBC I 59932.—1 ♀; 9 March 1967; dredge; FSBC I 59934.

Diagnosis: Eyes: present, not enlarged. Antenna 1: accessory flagellum 2-articulate. Epistome and upper lip: fused, with central notch. Mandible: with peg-like lacinia mobilis; molar a small smooth flap with finely setose margins. Maxilla 1: outer plate with 8 setal-teeth. Gnathopod 1: parachelate. Coxa 2: smaller than coxa 3. Peraeopods 5–6: coxae with well-developed posteroventral lobe. Peraeopods 5–7: propodus with anterodistal spur. Uropod 3: inner ramus as long as outer. Telson: each lobe with 1 apical robust seta.

Description: Based on holotype female, 5.0 mm (USNM 282672); male unknown. Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, dark. Antenna 1: short, $0.18 \times$ body; peduncular article 1 short, length $1.1 \times$ breadth; peduncular article 2 long, $0.5 \times$ article 1; peduncular article 3 short, $0.11 \times$ article 1; accessory flagellum long, $0.5 \times$ primary flagellum, 2-articulate, article 1 long, $5.5 \times$ article 2; flagellum 4-articulate, with weak 2-field calyptophore in female, without flagellar robust setae, calceoli absent in female. Antenna 2: slightly longer

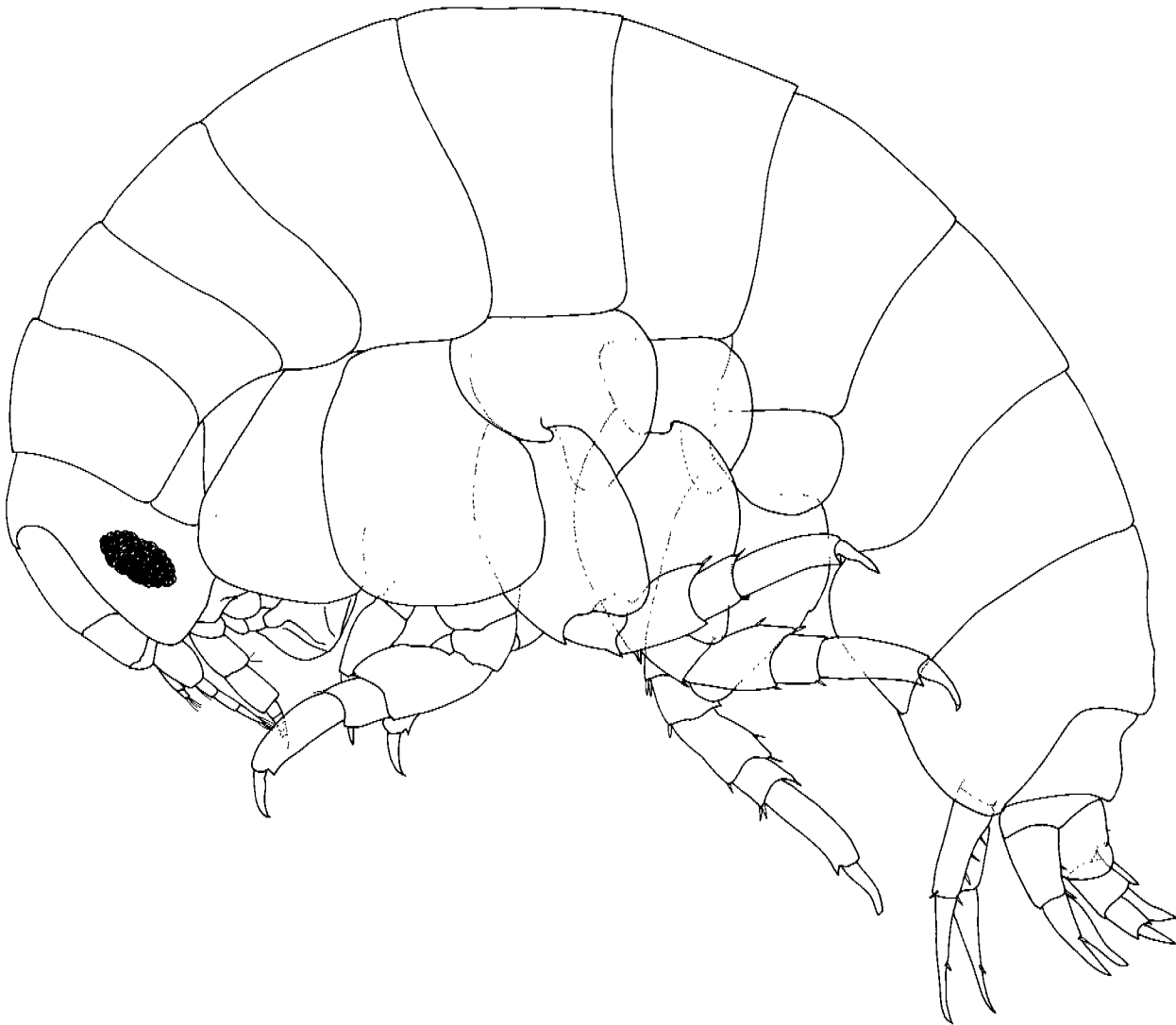


Figure 2. *Aristias captiva* new species, paratype female, 4.5 mm (USNM 282673), west of Egmont Key, Gulf of Mexico.

than antenna 1; peduncle without brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, $0.5 \times$ article 4, peduncular articles 4 and 5 not enlarged in female; flagellum 4-articulate, calceoli absent in female.

Mouthpart bundle: subquadrate. Epistome and upper lip: fused, straight dorsally, rounded ventrally, with central notch. Mandible: incisors asymmetrical, small, left straight with minutely serrate margin, right slightly convex with smooth margin; lacinia mobilis a small, apically acute peg; without accessory setae; intermediate setae absent; molar a small, smooth flap with finely setose margins; mandibular palp attached proximally; article 1 short, length $1 \times$ breadth; article 2 broadened centrally, length $2.4 \times$ breadth, $1.3 \times$ article 3, with 3 submarginal posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length $3 \times$ breadth, without A3-setae, with 2 proximal D3-setae and 2 apical E3-setae. Maxilla 1: inner plate tapering distally, inner margin fully setose, with 10 pappose setae; outer plate broad with 8 setal-teeth, ST1 to ST3 large, stout, multicuspidate, ST4 large, slender, 14-cuspidate, ST5 large, slender, 14-cuspidate, ST6 probably absent, ST7 large, slender, 13-cuspidate medially, STA large, slender, displaced from STB, 8-cuspidate along entire medial margin, STB absent, STC absent, STD long, slender, 1- to 2-cuspidate along entire medial margin; palp large, 2-articulate, with 2 short terminal robust setae and

serrate apical margin, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate. Maxilla 2: inner plate broad, outer plate narrow; inner plate length $1 \times$ outer plate. Maxilliped: inner plate small, subrectangular, without nodular setae, oblique setal row reduced with 8 pappose setae; outer plate medium size, subrectangular, with 1 apical slender seta, without apical robust setae, medial setae small, blunt, submarginal setae absent; palp large, 4-articulate, article 2 very broad, length $1 \times$ breadth, $0.9 \times$ article 3, article 3 short, broad, length $1.5 \times$ breadth, dactylus well developed, with 2 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: parachelate; coxa vestigial; basis long, slender, length $3 \times$ breadth, anterior margin smooth, without setae; ischium short, length $1 \times$ breadth; merus, posterior margin with patch of short setae; carpus wedge-shaped, produced anteriorly, short, length $1 \times$ breadth, shorter than ($0.7 \times$) propodus, with patch of very fine setae near posterior margin and long simple setae along posterior margin; propodus large, subtriangular, length $1.5 \times$ breadth, tapering distally, posterior margin serrate, strongly sinusoidal, with 2 simple robust setae, palm transverse, margin straight, serrate, posterodistal corner with 1 lateral robust seta; dactylus simple, without subterminal setae, with minute denticles along posterior margin. Gnathopod 2: minutely chelate; coxa reduced, partially covered by coxa 3; ischium long, length $3 \times$ breadth; carpus long, length $3 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2 \times$ breadth, palm obtuse, with straight, serrate margin, posterodistal corner with 1 medial robust seta; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus and carpus without plumose setae in female; propodus with small posterodistal spur, without setae; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin straight; merus weakly expanded anteriorly; merus and carpus without plumose setae in female; propodus without setae, with small posterodistal spur; dactylus short, slender. Peraeopod 5: coxa bilobate, posterior lobe strongly produced ventrally; basis expanded, posterior margin smooth; merus slightly expanded posteriorly; propodus with minutely denticulate surface, without setae, with small anterodistal spur; dactylus short, slender. Peraeopod 6: coxa small, strongly lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with smooth posterior margin; merus slightly expanded posteriorly; propodus with minutely denticulate surface, without setae, with small anterodistal spur; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin tapering distally, with minutely crenate posterior margin, posteroventral corner rounded, posteroventral margin straight; merus slightly expanded posterodistally, with 2 robust setae; propodus with minutely denticulate surface, without setae, with small anterodistal spur; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner broadly rounded. Epimeron 3: posterior margin with small notch above narrowly rounded posteroventral corner. Urosomites: urosomite 1 with rounded boss; urosomite 3 with 1 small dorsolateral seta. Uropod 1: with serrate margins; peduncle with 3 dorsolateral, 1 apicolateral, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus with 1 dorsal robust seta. Uropod 2: with serrate margins; peduncle with 1 dorsolateral, 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus without dorsal robust setae; inner ramus without constriction. Uropod 3: peduncle short, length $0.8 \times$ breadth, without dorsolateral flange, with 1 apicolateral and 1 apicomедial robust setae, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae in female; rami lanceolate, inner ramus slightly shorter than (about $0.9 \times$) outer ramus; outer ramus 2-articulate, article 2 short; rami without simple robust setae, slender plumose setae absent in female. Telson: longer than broad, length $1.2 \times$ breadth, moderately cleft (50%), without dorsal robust or

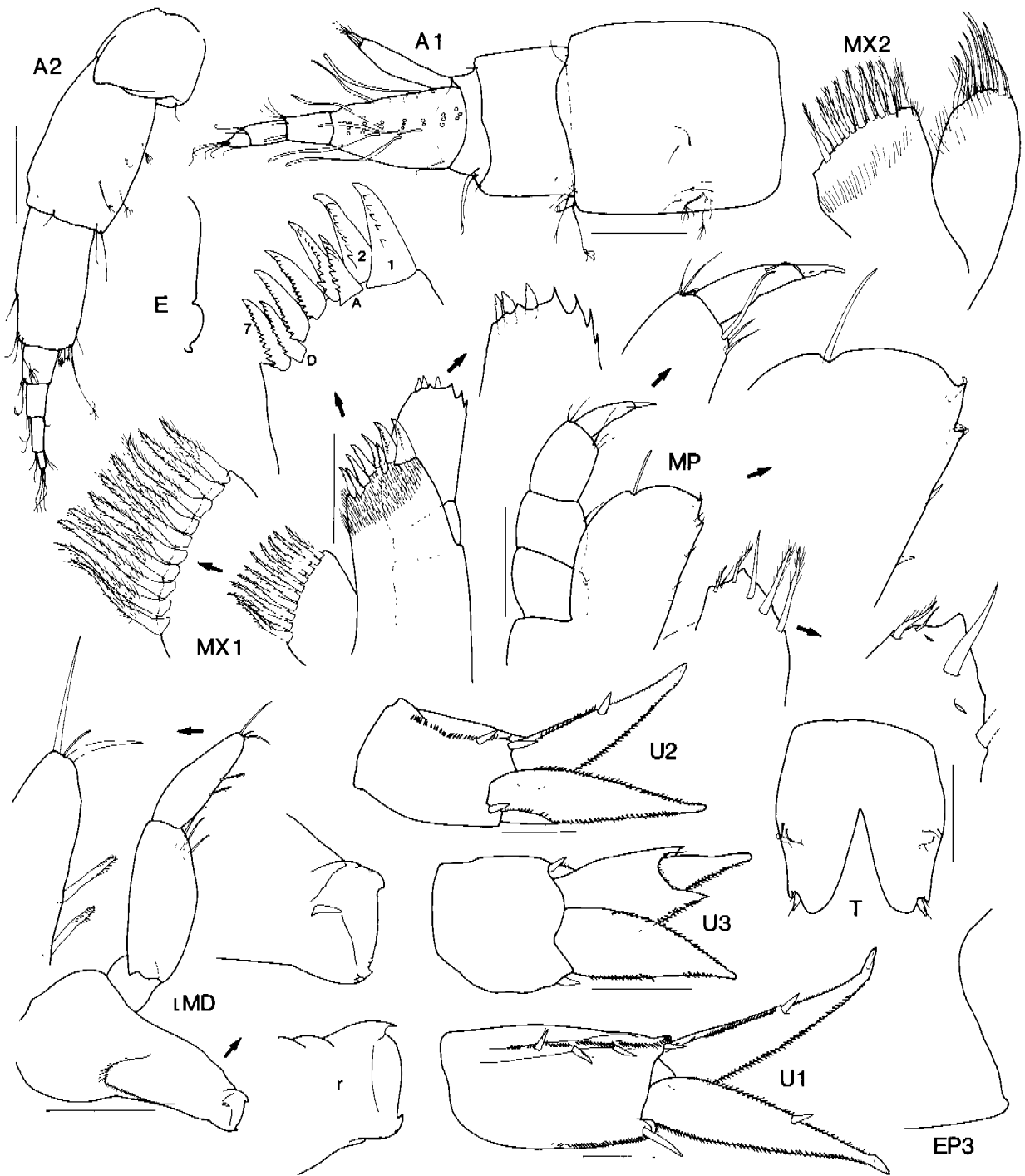


Figure 3. *Aristias captiva* new species, holotype female, 5.0 mm (USNM 282672), west of Egmont Key, Gulf of Mexico. Scales represent 0.1 mm.

slender setae, distal margins truncated, without apical penicillate setae, with 1 apical slender seta and 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, 78 nautical miles due west of Egmont Key, Florida, 27°37'N 84°13'W, 73.2 m.

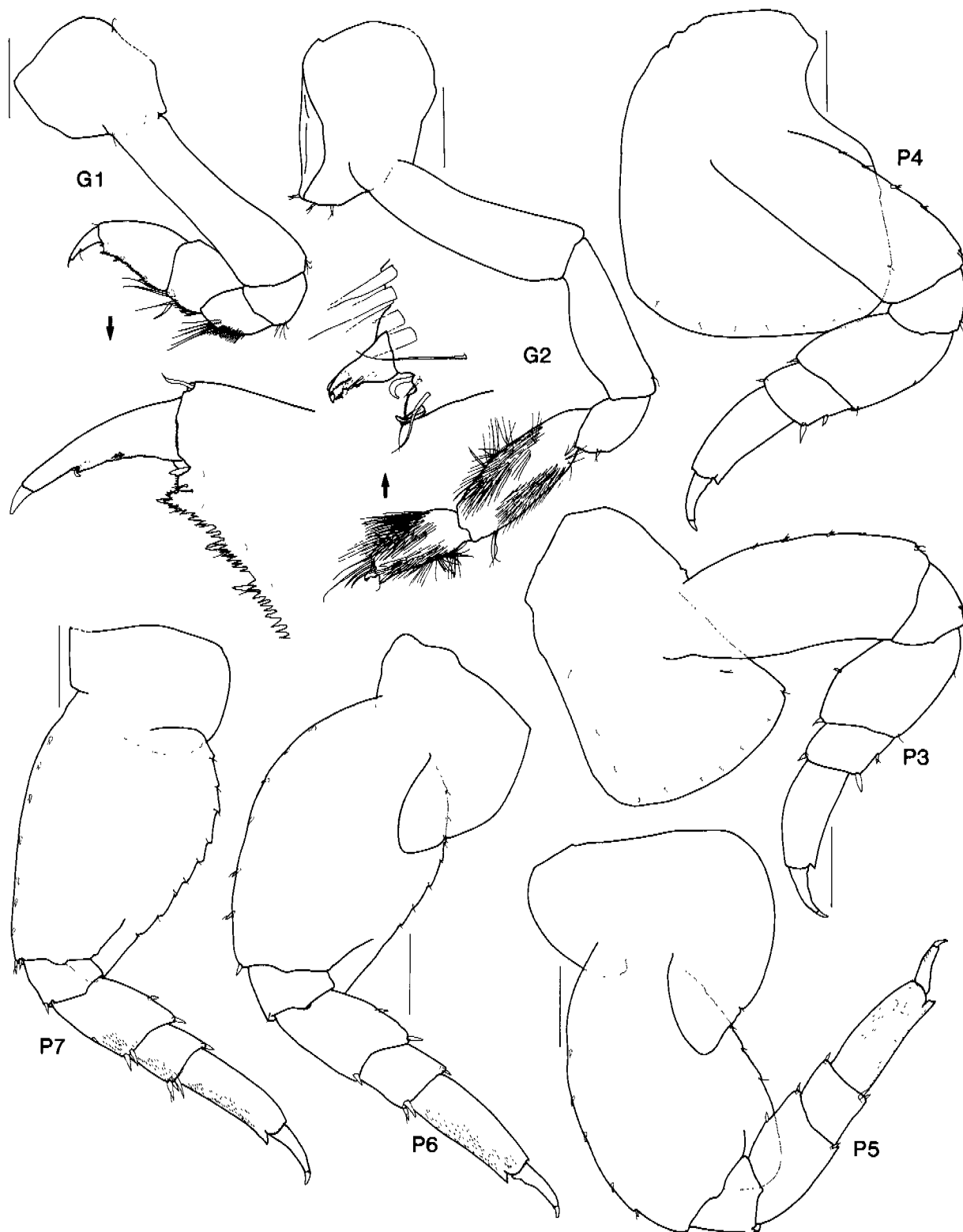


Figure 4. *Aristias captiva* new species, holotype female, 5.0 mm (USNM 282672), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

Distribution: Eastern Gulf of Mexico in 55- to 73-m depths.

Etymology: Named for Captiva Island near Fort Myers, Florida.

Remarks: It is difficult to assess relationships between species of *Aristias* because the genus has never been revised. *Aristias captiva* shares with *A. madagascarensis* Ledoyer, 1972, the characters of a 2-articulate accessory flagellum and a reduced coxa 2; but *A. madagascarensis* has fewer setae on the inner plate of maxilla 1, a wider basis on peraeopods 6 and 7, and a broader telson without apical robust setae. *Aristias captiva* has abruptly tapering lateral margins on the telson, a character it shares with *A. spinipes* Gurjanova, 1962; but *A. spinipes* has a 4-articulate accessory flagellum, only three pappose setae on the inner plate of maxilla 1, and longer, more slender uropods and telson. *Aristias verdensis* Lowry and Stoddart, 1993, has a 2-articulate accessory flagellum, a similar setal-tooth arrangement on the outer plate of maxilla 1, and only one apical robust seta on each telsonic lobe; but the inner plate of maxilla 1 has only four pappose setae, and the lateral margins of the telson do not taper distally.

Three species are known from the eastern Pacific Ocean. *Aristias veleronis* Hurley, 1963, differs from *A. captiva* in having a 3-articulate accessory flagellum, longer flagella on antennae 1 and 2, 6 pappose setae on the inner plate of maxilla 1, a broader palm on gnathopod 1, and dorsal robust setae on the telson. *Aristias expers* J. L. Barnard, 1967, differs from *A. captiva* in having no eyes, coxa 2 not reduced, coxa 6 with a weak posteroventral lobe, and the telson cleft about 33 per cent. *Aristias pacificus* Schellenberg, 1936, has never been illustrated; but according to information from Schellenberg's description recorded by Gurjanova (1962), it differs from *A. captiva* in having an 8- to 9-articulate flagellum on antenna 1, a short maxillipedal palp that does not reach beyond the outer plate, a strongly produced posteroventral lobe on the meri of peraeopods 5 to 7, and 2 robust setae on the distal margin of each lobe of the telson.

Bousfield (1973) reported *Aristias microps* Sars, 1895, to be an amphiatlantic species that reaches south to Newfoundland in the northwestern Atlantic. Watling (1979) reported two amphiatlantic species, *Aristias topsenti* Chevreux, 1900, and *A. tumidus* (Krøyer, 1846), but not *A. microps*. The mouthparts of *A. microps* are not well described. However, the large coxa 2, poorly developed posteroventral lobes on coxae 5 and 6, and deeply cleft telson distinguish it from *A. captiva*. *Aristias topsenti* can be distinguished from *A. captiva* by its lack of eyes, large coxa 2, at least 9 setal-teeth on the outer plate of maxilla 1, inner ramus of uropod 3 shorter than outer ramus, and the large flanged keel on urosomite 3. Like *A. captiva*, *A. tumidus* has a lacinia mobilis and a similar setal-tooth arrangement on maxilla 1; but it has a 4-articulate accessory flagellum, longer multiarticulate flagella on antennae 1 and 2, more setose mandibular palp, 8 pappose setae on the inner plate of maxilla 1, more than 11 setal-teeth on the outer plate of maxilla 1, and more deeply cleft telson.

The only species reported from the Mediterranean Sea, *Aristias neglectus* Hansen, 1887, has a 4-articulate accessory flagellum, longer multiarticulate flagella on antennae 1 and 2, more setose mandibular palp, about 5 pappose setae on the inner plate of maxilla 1, more than 11 setal-teeth on the outer plate of maxilla 1, and more distal robust setae on the telson. *Aristias captiva* does not appear to be closely related to any known species.

Species of *Aristias* are often reported in association with other invertebrates (Arndt, 1933; Vader, 1970a, 1970b, 1978, 1984b, 1984c). We have no information about the life-style of *A. captiva*; however, alcyonarians, bryozoans, and sponges also occurred on the bottom where it was living.

Boca, new genus

Diagnosis: Head: deeper than long, lateral cephalic lobe weak, ventrolateral flap well developed. Epistome and upper lip: fused, with or without central notch. Mandible: incisors large, straight, asymmetrical, left minutely serrate, right smooth; left lacinia mobilis a small peg; molar a smooth flap with setose margins; palp without B2-setae, D2-setae, or A3-setae. Maxilla 1: outer plate broad, setal-teeth in a modified 7/4 arrangement; palp 2-articulate. Maxilliped: outer plate without apical robust setae; palp well developed, 2-articulate. Gnathopod 1: simple or subchelate; coxa vestigial; posterior margin of propodus serrate or smooth. Peraeopods 3–7: simple, propodus with distal spur. Peraeopod 4: coxa deeper than wide, with weak posteroventral lobe. Peraeopod 5: coxa with well-developed posteroventral lobe. Gills: from gnathopod 2 to peraeopod 6, not pleated. Telson: moderately cleft.

Type species: *Boca campi* new species.

Composition: *Boca* contains *B. campi* n. sp., *B. elvae* n. sp., and *B. megachela* n. sp.

Etymology: Named for the Spanish word “Boca” used frequently for place names in the Gulf of Mexico area.

Remarks: *Boca* is distinguished from other aristiid genera by its 2-articulate maxillipedal palp.

Boca campi, new species

Figures 5–7

Type material examined: **HOLOTYPE:** ♀; 4.2 mm; 92 nautical miles due west of Sanibel Island Light, Gulf of Mexico; 26°24'N 83°43'W; dead bryozoans and calcareous algae; 73.2 m; 8 August 1967; 0555–0610 hours; dredge; HOURGLASS Cruise HC 42, Station M; USNM 282674.—**PARATYPE:** 1 ♀; 3.8 mm; same data; USNM 282675.—**PARATYPE:** 1 ♀; 78 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 84°13'W; crushed shell, dead bryozoans and calcareous algae; 73.2 m; 2 August 1967; 0600–0615 hours; dredge; HOURGLASS Cruise HC 42, Station E; AM P45328.—**PARATYPE:** 1 ♀; same locality; 6 October 1967; 0545–0600 hours; dredge; HOURGLASS Cruise HC 44, Station E; FSBC I 59938.—**PARATYPE:** 1 ♀; same locality; 3 November 1967; 0430–0500 hours; trawl; HOURGLASS Cruise 45, Station E; USNM 282676.—*Additional material examined:* **HOURGLASS MATERIAL:** STATION D: 1 specimen; 3 March 1967; dredge; FSBC I 59940.—**OTHER MATERIAL:** 1 ♀; southwest of Tampa Bay, Florida, northeastern Gulf of Mexico; 27°24.2'N 84°07.3'W; medium fine sand; 74 m; summer 1977; Bureau of Land Management MAFLA OCS Station 2747-04; USNM 284119.

Diagnosis: Eyes: present, not enlarged. Antenna 1: accessory flagellum 2-articulate. Epistome and upper lip: fused, with central notch. Mandible: lacinia mobilis a cuspidate peg; molar a smooth flap with setose margins. Maxilla 1: outer plate with 7 setal-teeth. Gnathopod 1: weakly subchelate, dactylus large, curved. Coxae 1–3: without robust setae lining ventral margin. Coxa 2: subequal to coxa 3. Peraeopods 5–6: coxa with well-developed posteroventral lobe. Peraeopods 5–7: propodus each with articulating anterodistal spur. Uropod 3: inner ramus slightly shorter than outer ramus. Telson: without apical robust setae.

Description: Based on holotype female, non-ovigerous, 4.2 mm (USNM 282674); male unknown. Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrow, subacute; rostrum absent; eyes oval, dark. Antenna 1: medium length, 0.2 × body; peduncular article 1 short, length 1.3 × breadth; peduncular article 2 long, 0.5 × article 1; peduncular article 3 long, 0.3 × article 1; accessory flagellum long, 0.5 × primary flagellum, 2-articulate, article 1 long, 4 × article 2; flagellum 4-articulate, with

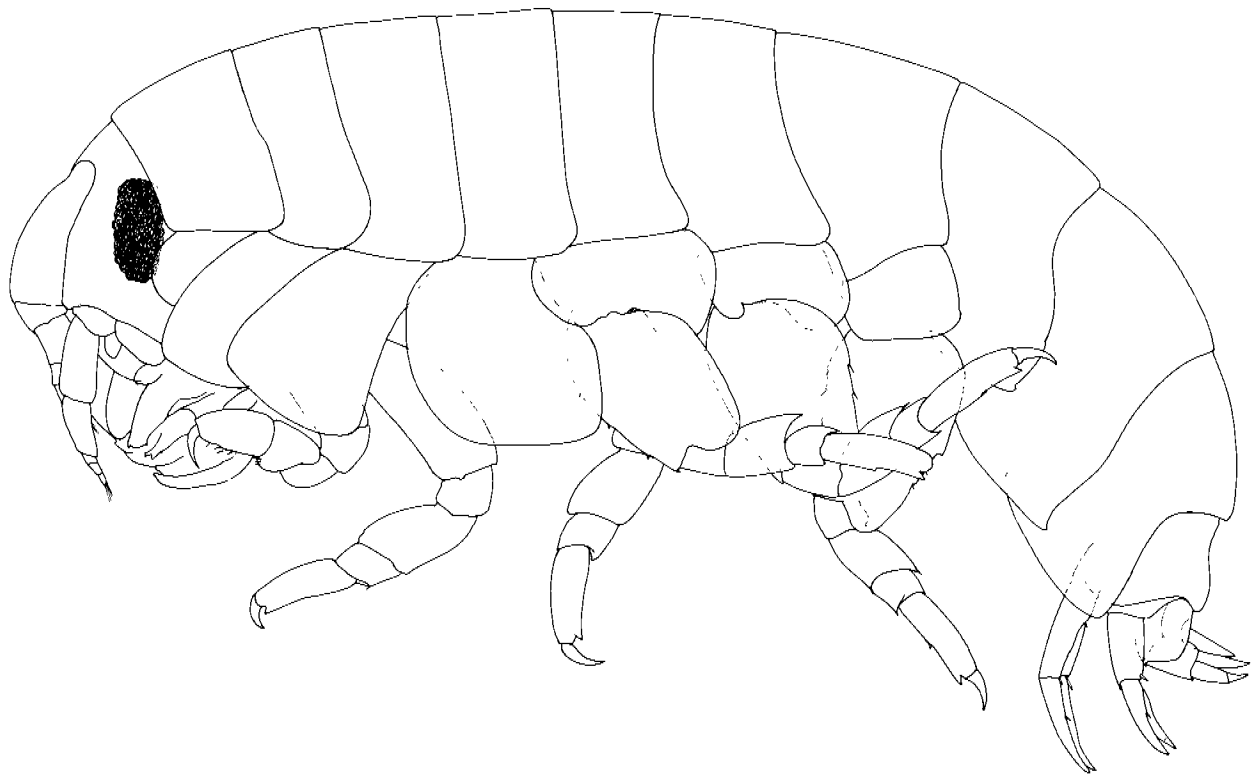


Figure 5. *Boca campi* new species, paratype female, 3.8 mm (USNM 282675), west of Sanibel Island Light, Gulf of Mexico.

weak 2-field callynophore in female, without flagellar robust setae, calceoli absent in female. Antenna 2: slightly longer than antenna 1; peduncle without brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, $0.5 \times$ article 4, peduncular articles 4 and 5 not enlarged in female; flagellum 4-articulate, calceoli absent in female.

Mouthpart bundle: subquadrate. Epistome and upper lip: fused, concave with central notch. Mandible: incisors asymmetrical, large with straight margins, left with minutely serrate margin, right smooth; lacinia mobilis a cuspidate peg; accessory setal row absent or represented by (left 10, right 10) short, robust, simple setae (see *Remarks*); intermediate setae absent; molar a smooth flap with basal row of slender setae and finely setose margins; mandibular palp attached midway; article 1 short, length $0.4 \times$ breadth; article 2 broad, length $2.8 \times$ breadth, $1.6 \times$ article 3, with 2 submarginal posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length $2.5 \times$ breadth, without A3- or D3-setae, with 2 apical E3-setae. Maxilla 1: inner plate broad, short, at least half of inner margin setose, with 4–5 pappose setae; outer plate broad with 7 setal-teeth, ST1 to ST3 large, stout, weakly cuspidate, ST4 large, slender, 2-cuspidate, ST5 and ST6 absent, ST7 small, slender, without cusps, STA small, 2-cuspidate, STB and STC absent, STD short, slender, 2-cuspidate; palp large, 2-articulate, with 2 short terminal robust setae and serrate apical margin, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate, distolateral margin without small robust setae. Maxilla 2: inner plate broad, outer plate narrow, inner plate length $1 \times$ outer plate. Maxilliped: inner plate small, subrectangular, with 1 apical nodular seta, oblique setal row reduced, with 3 pappose setae; outer plate large, subovate, with 1 apical simple seta, without apical robust setae, medial setae large, robust, submarginal setae absent; palp 2-articulate, article 2 slender, dactylus absent.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: parachelate; coxa vestigial; basis long, slender,

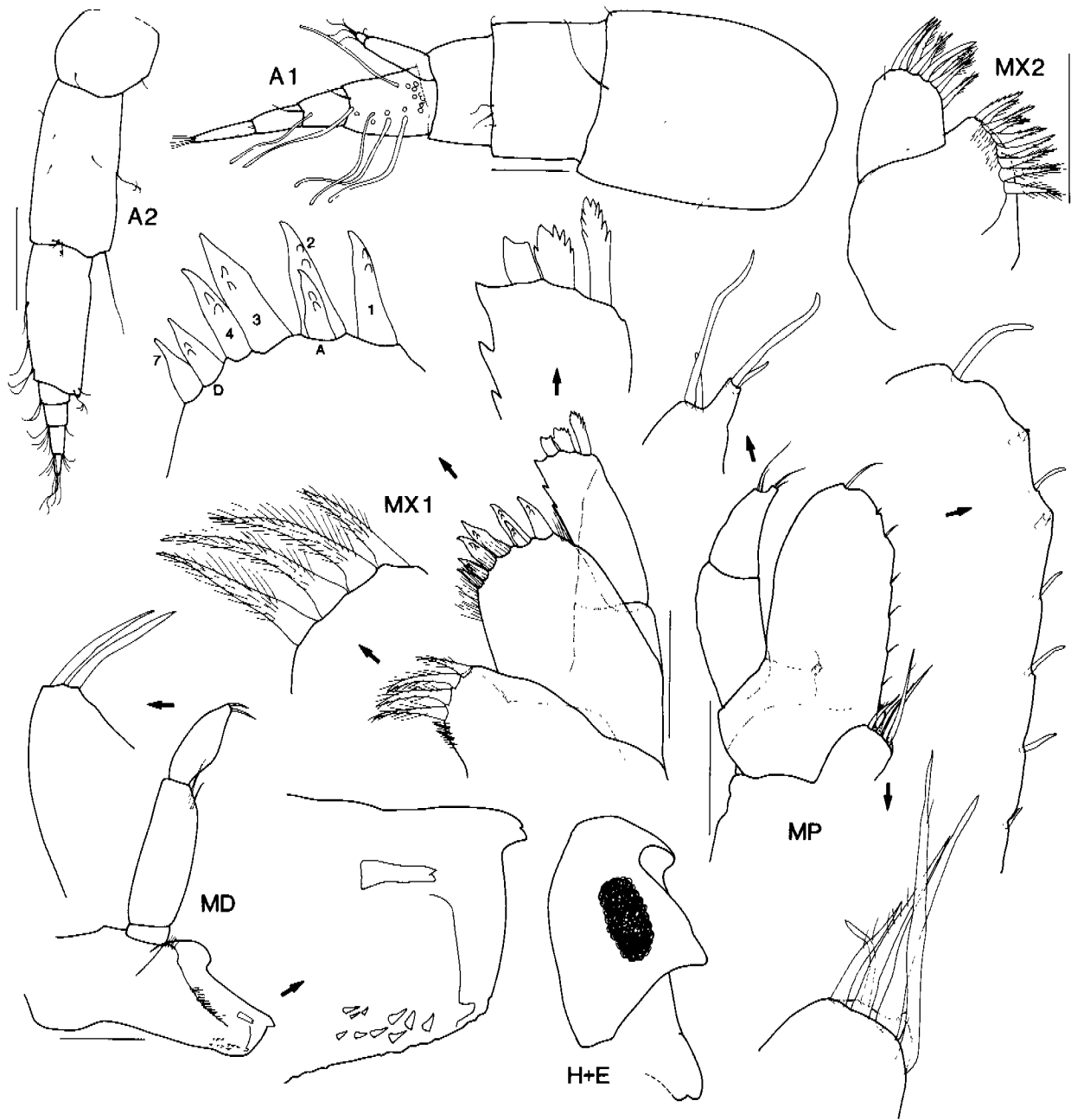


Figure 6. *Boca campi* new species, holotype female, 4.2 mm (USNM 282674), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

length $3.4 \times$ breadth, anterior margin smooth, without setae; ischium short, length $1.1 \times$ breadth; merus, anterior margin without patch of strong robust setae, posterior margin with patch of short setae and with a few simple setae; carpus wedge-shaped, produced anteriorly, short, length $1 \times$ breadth, shorter than ($0.7 \times$) propodus, with strong robust setae along anterior margin, with patch of very fine setae near posterior margin and long plumose setae along posterior margin; propodus large, subrectangular, length $1.7 \times$ breadth, margins slightly converging distally, posterior margin serrate, convex, with 4 simple robust setae, palm extremely acute, margin convex, smooth; dactylus large, curved, simple, without subterminal spines or simple setae. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long,

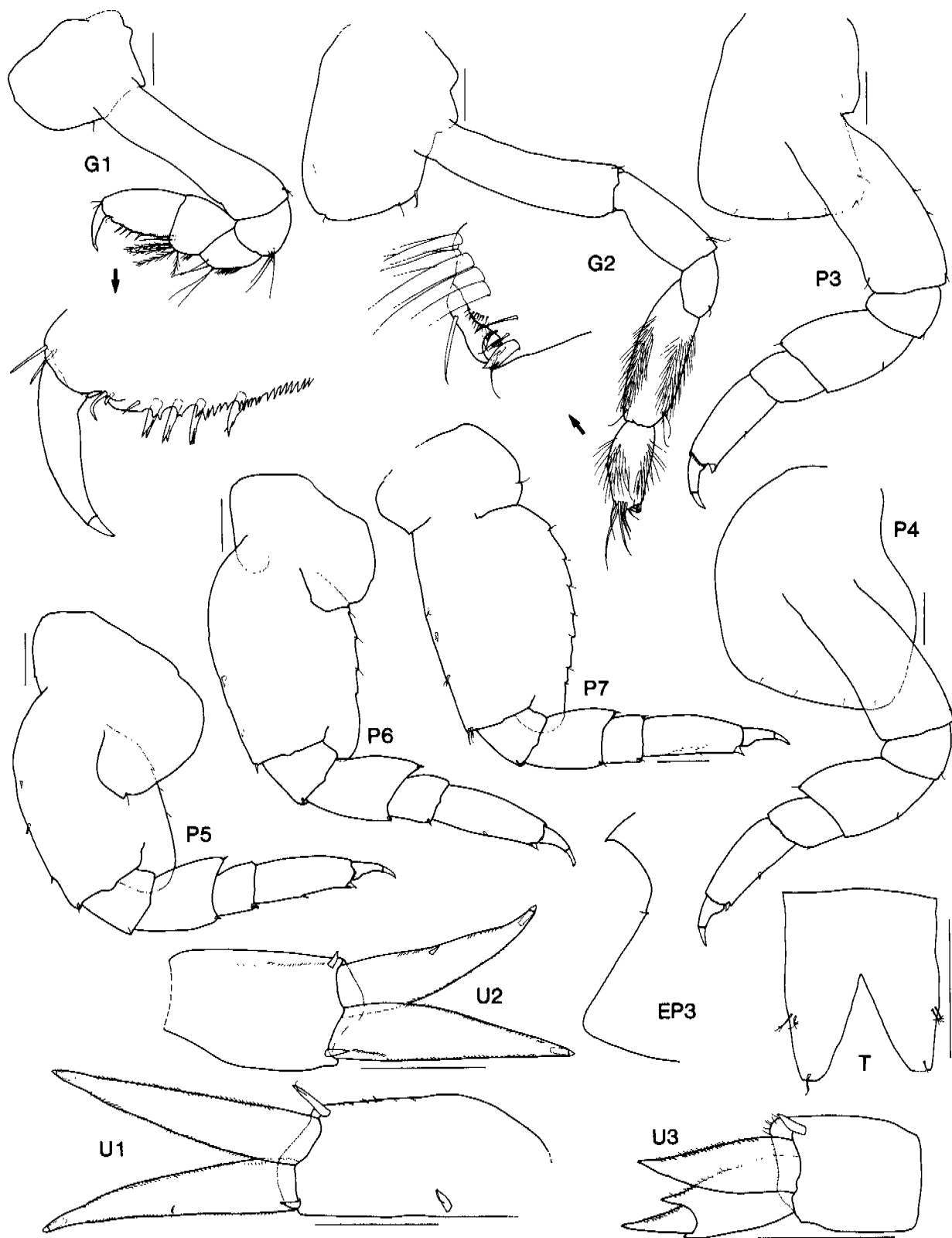


Figure 7. *Boca campi* new species, holotype female, 4.2 mm (USNM 282674), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

length $2.4 \times$ breadth; carpus long, length $2.9 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2.1 \times$ breadth, palm obtuse, with concave, smooth margin, posterodistal corner with 1 medial lateral robust seta; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with small posterodistal spur (setal-like), with 1 robust seta along posterior margin, without distal locking setae; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin straight; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with small posterodistal spur (setal-like), with 1 robust seta along posterior margin, without distal locking setae; dactylus short, slender. Peraeopod 5: coxa bilobate, posterior lobe strongly produced ventrally; basis expanded, posterior margin smooth; merus slightly expanded posteriorly; propodus with small anterodistal spur (setal-like), with 1 robust seta along anterior margin, without distal locking setae; dactylus short, slender. Peraeopod 6: coxa small, strongly lobate posteriorly (damaged); basis, anterior margin rounded, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded posteriorly; propodus with small anterodistal spur (setal-like), with 1 robust seta along anterior margin, without distal locking setae; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; propodus with minutely denticulate surface, with small anterodistal spur (setal-like), with 1 robust seta along anterior margin, without distal locking setae, without slender setae along posterior margin; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner produced, narrowly rounded. Urosomites: urosomite 1 with slight dorsal depression and small, rounded dorsodistal carina; urosomite 3 without small dorsolateral seta. Uropod 1: with serrate margins; peduncle with 1 dorsolateral, 1 apicolateral, and 1 apicomедial robust setae; rami subequal in length, without robust setae. Uropod 2: with serrate margins; peduncle with 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus without dorsal robust setae, without constriction. Uropod 3: peduncle short, length $0.9 \times$ breadth, without dorsolateral flange, without dorsal robust setae, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae; rami lanceolate, inner ramus slightly shorter than (about $0.9 \times$) outer ramus; outer ramus 2-articulate, article 2 long; rami without simple robust setae, slender plumose setae absent in female. Telson: longer than broad, length $1.2 \times$ breadth, moderately cleft (56%), without dorsal robust or slender setae, distal margins truncated, without apical penicillate setae, with 1 apical slender seta on each lobe, without apical robust setae.

Type locality: Gulf of Mexico, 92 nautical miles due west of Sanibel Island Light, Florida, $26^{\circ}24'N$ $83^{\circ}43'W$, 73.2 m.

Distribution: Eastern Gulf of Mexico in 55- to 73-m depths.

Etymology: Named for David K. Camp in recognition of his efforts to make known the fauna of the Gulf of Mexico.

Remarks: We find the robust setae on the posterodistal margin of the mandible difficult to interpret. If they are accessory setae, then they are peculiarly positioned. It is possible that the setae at the base of the molar represent the accessory setal row.

Boca campi is most easily distinguished from *B. megachela* by its weakly parachelate gnathopod

1. *Boca campi* also has articulating spurs on pereopods 5 to 7 and a more deeply cleft telson. *Boca campi* differs from *B. elvae* in not having large, conspicuous robust setae on its anterior coxae or its gnathopods.

Boca elvae, new species

Figures 8–10

Type material examined: **HOLOTYPE:** ♀ with non-setose oostegites; 2.8 mm; northwest of the Dry Tortugas, Gulf of Mexico; 25°40'N 84°15'W; silt and fine sand; 180 m; summer 1977; Bureau of Land Management MAFLA Survey, station 2957-09; USNM 282677.—**HOURLASS MATERIAL:** None.

Diagnosis: Eyes: present, not enlarged. Antenna 1: accessory flagellum 2-articulate. Epistome and upper lip: fused, with central notch. Mandible: lacinia mobilis a stemmed, distally serrate blade. Maxilla 1: outer plate with 7 setal-teeth. Gnathopod 1: subchelate, dactylus large, bent at right angle proximally. Coxa 2–4: with robust setae along ventral margin. Coxa 2: subequal to coxa 3. Pereopods 5–6: coxa with well-developed posteroventral lobe. Pereopods 5–7: propodus with anterodistal spur. Uropod 3: inner ramus slightly shorter than outer ramus. Telson: with apical robust setae.

Description: Based on holotype female, non-ovigerous, 2.8 mm (USNM 282677); male unknown. Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, broad, down-turned, distally rounded; rostrum absent; eyes round, dark. Antenna 1: medium length, $0.2 \times$ body; peduncular article 1 short, length $1.4 \times$ breadth; peduncular article 2 long, $0.5 \times$ article 1; peduncular article 3 long, $0.3 \times$ article 1; accessory flagellum short, $0.3 \times$ primary flagellum, 2-articulate, article 1 long, $5.3 \times$ article 2; flagellum 4-articulate, with weak 1-field callynophore, without flagellar robust setae, calceoli absent. Antenna 2: subequal in length to antenna 1; peduncle without brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, $0.5 \times$ article 4, peduncular articles 4 and 5 not enlarged in female; flagellum 4-articulate, calceoli absent.

Mouthpart bundle: subquadrate. Epistome and upper lip: fused, concave with central notch. Mandible: incisors asymmetrical; large; left with straight, minutely serrate margin; right with slightly convex smooth margin; lacinia mobilis a stemmed distally serrate blade; accessory setal row absent or represented by (left 4, right 7) short, robust, simple setae (see *Remarks* under *B. campi*); intermediate setae absent; molar a smooth flap with basal row of slender and robust setae and finely setose margins; mandibular palp attached midway; article 1 short, length $1.4 \times$ breadth; article 2 broad, length $3.7 \times$ breadth, $1.7 \times$ article 3, with 1 submarginal posterodistal A2-seta, without B2- or D2-setae; article 3 slender, blade-like, long, length $2.5 \times$ breadth, without A3- or D3-setae, with 2 apical E3-setae. Maxilla 1: inner plate broad, short, with 3 pappose apical setae; outer plate broad, with 7 setal-teeth, ST1 to ST3 large, stout, weakly cuspidate, ST4 large, slender, 2-cuspidate, ST5–ST6 absent, ST7, small, slender, without cusps, STA small, 1-cuspidate, STB–STC absent, STD short, slender, 1-cuspidate; palp large, 2-articulate, with 2 short terminal robust setae and serrate apical margin, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate; distolateral margin lined with short robust setae. Maxilla 2: inner plate broad, outer plate narrow; inner plate, length $1 \times$ outer plate. Maxilliped: inner plate small, subovate, with 1 apical nodular seta, without distal short robust setae on lateral face, oblique setal row reduced, with 2 simple setae; outer plate large, subovate, with 1 apical simple seta, without apical robust setae, medial setae large, robust, submarginal setae absent; palp 2-articulate, article 2 slender, dactylus absent.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: subchelate; coxa vestigial; basis long, slender, length $3.8 \times$ breadth, anterior margin smooth, without setae; ischium short, length $1.5 \times$ breadth; merus,

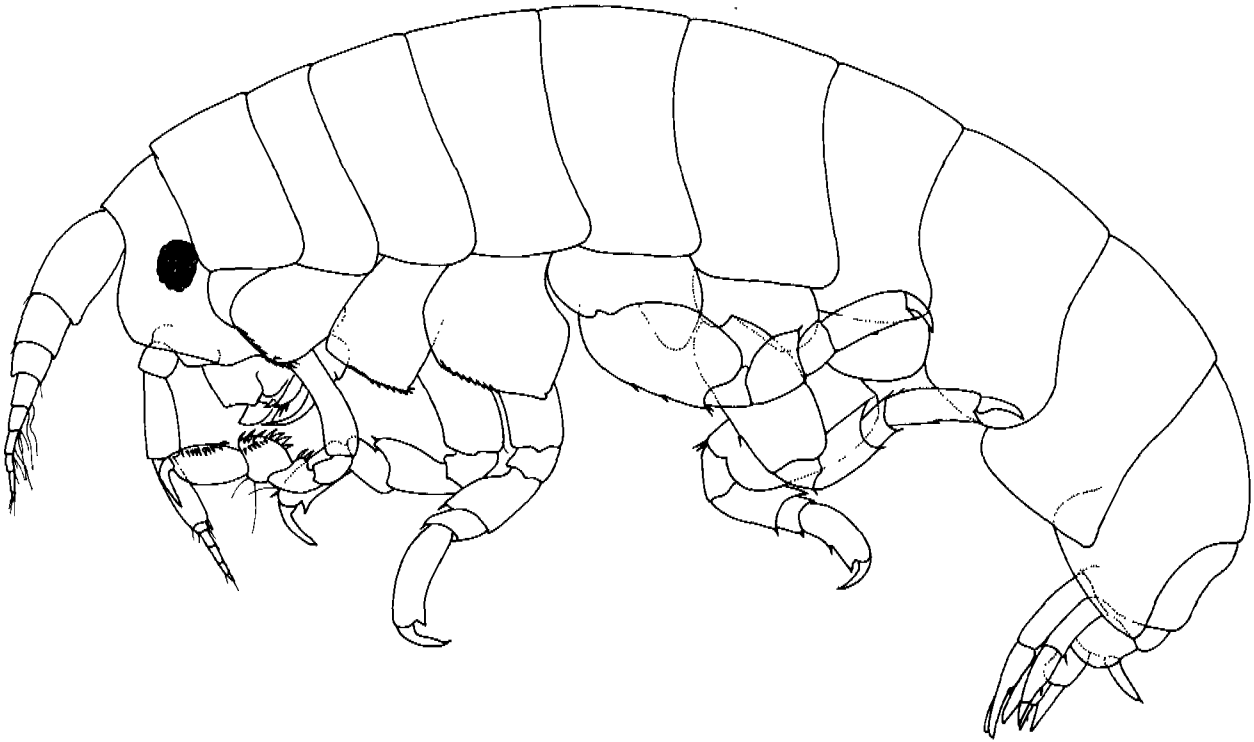


Figure 8. *Boca elvae* new species, holotype female, 2.8 mm (USNM 282677), northwest of the Dry Tortugas, Gulf of Mexico.

anterior margin with patch of strong robust setae, posterior margin with group of long plumose setae; carpus wedge-shaped, produced anteriorly, short, length $1.4 \times$ breadth, subequal to ($1.1 \times$) propodus, with strong robust setae along anterior margin, with patch of short robust setae and 2 long, slender, plumose setae near posterodistal margin; propodus large, subrectangular, length $1.3 \times$ breadth, margins subparallel, anterior margin with strong robust setae, posterior margin smooth, straight, with row of small, closely spaced robust setae, palm acute, margin convex, scalloped, posterodistal corner without robust setae; dactylus large, bent at right angle proximally, simple, without subterminal spines or simple setae. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3, ventral margin lined with short robust setae; ischium long, length $2.4 \times$ breadth; carpus long, length $3 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2.2 \times$ breadth, palm transverse, with straight margin and serrate pad, posterodistal corner with 1 medial robust seta; dactylus over-reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large, ventral margin lined with short robust setae; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with 1 robust seta (midway), a small posterodistal spur, and 1 large distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: coxa slightly deeper than wide, with weakly produced posteroventral lobe, anterior margin slightly rounded, posterior margin straight, ventral margin lined with short robust setae; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with 1 robust seta (midway), a small posterodistal spur, and 1 large distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa bilobate, posterior lobe strongly produced ventrally; basis expanded, posterior margin smooth; merus slightly expanded posteriorly; propodus with minutely denticulate surface, with 1 robust seta (midway), a small anterodistal spur, and 1 large distal locking seta along anterior margin; dactylus short, slender. Peraeopod 6: coxa small, slightly lobate posteriorly; basis, anterior margin rounded, basis expanded; merus slightly expanded posteriorly; propodus with minutely denticulate anterior margin, with 1 robust seta (midway), a small anterodistal spur, and 1 large distal locking seta along anterior margin; dactylus

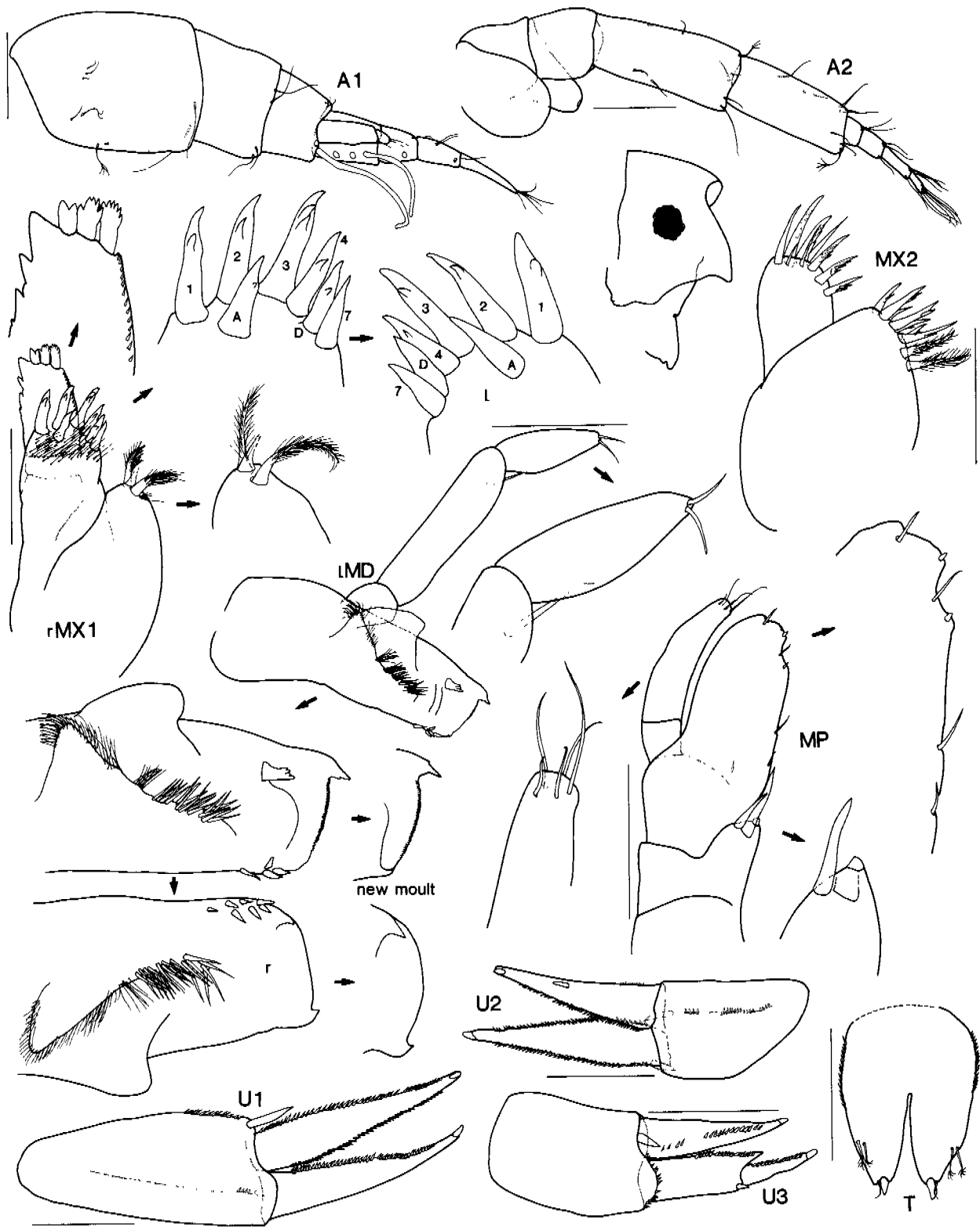


Figure 9. *Boca elvae* new species, holotype female, 2.8 mm (USNM 282677), northwest of the Dry Tortugas, Gulf of Mexico. Scales represent 0.1 mm.

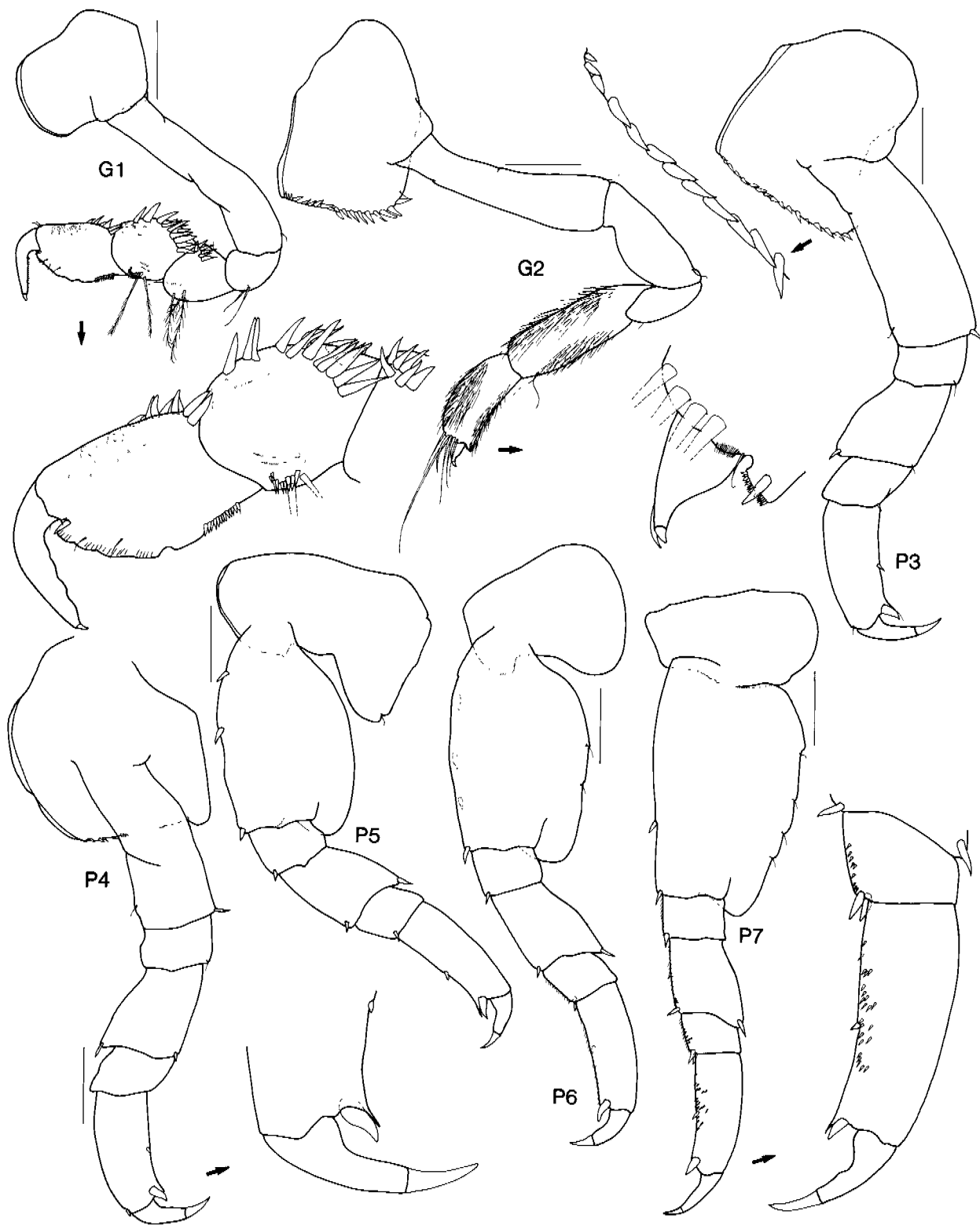


Figure 10. *Boca elvae* new species, holotype female, 2.8 mm (USNM 282677), northwest of the Dry Tortugas, Gulf of Mexico. Scales represent 0.1 mm.

short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, scalloped, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded posterodistally, with robust seta; propodus with minutely denticulate surface, with 1 robust seta (midway), a small anterodistal spur, and 1 large distal locking seta along anterior margin, without setae along posterior margin; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner produced, narrowly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorso-lateral seta. Uropod 1: with serrate margins; peduncle with 1 apicolateral and 1 apicomедial robust setae, without plumose setae; rami subequal in length, without robust setae. Uropod 2: with serrate margins; peduncle with 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus without dorsal robust setae, without constriction. Uropod 3: peduncle short, length $1.5 \times$ breadth, without dorsolateral flange, with 1 apicomедial robust seta, without midlateral slender or robust setae, distoventral robust setae or plumose setae; rami lanceolate, inner ramus shorter than (about $0.8 \times$) outer ramus; outer ramus 2-articulate, article 2 long, article 1 with 1 lateral robust seta; inner ramus without robust setae. Telson: longer than broad, length $1.3 \times$ breadth, moderately cleft (48%), without dorsal robust or slender setae, with serrate lateral margins, distal margins truncated, without apical penicillate setae, with 1 apical slender seta and 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, northwest of the Dry Tortugas, 25°40'N 84°15'W, 180 m.

Distribution: Eastern Gulf of Mexico in 180-m depths.

Etymology: Named for Elva Escobar Briones, who organized the very successful workshop on the “State of Knowledge of the Amphipoda of Mexico” held in Mexico City in April 1995.

Remarks: *Boca elvae* is most easily distinguished from the other species in the genus by the short, strong robust setae on the ventral margins of coxae 2 to 4 and on the merus, carpus, and propodus of gnathopod 1. The species is also distinguished by the strong locking seta on each of peraeopods 3 to 7.

Boca megachela, new species

Figures 11–13

Type material examined: **HOLOTYPE:** ♀; 3.0 mm; course 270° from Egmont Channel Seabuoy, Gulf of Mexico; 27°37.5'N 83°59.3'W; 54.8 m; E. L. Bousfield and D. K. Camp; 15 October 1976; Station D2; CMN C1996-0020.—**PARATYPES:** 5 specimens, including illustrated ♂, 2.8 mm; same data; CMN C1996-0022.—**PARATYPES:** 4 specimens; same data; USNM 282678.—**PARATYPES:** 4 specimens; same data; AM P 45329.—**PARATYPES:** 3 specimens; course 270° from Egmont Channel Seabuoy, Gulf of Mexico; 27°37.6'N 84°13.5'W; 67.6 m; E. L. Bousfield and D. K. Camp; 15 October 1976; Station E3; CMN C1996-0021.—**PARATYPE:** 1 specimen; 19 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°07'W; sponges, alcyonarians, corals, algae, and seagrasses on bottom of shell and quartz sand between limestone outcrops; 18.3 m; 11 May 1967; 2000–2015 hours; dredge; HOURGLASS Cruise HC 39, Station B; FSBC I 59947.—**PARATYPE:** 1 ♀; 3.1 mm; 65 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°58'W; crushed shell, *Lithothamnion* spp., brown silt with sponges and bryozoans; 54.9 m; 27 August 1965; 0835–0905 hours; trawl; HOURGLASS Cruise Post HC 18, Station D; USNM 282679.—**PARATYPE:** 1 specimen; 92 nautical miles due west of Sanibel Island Light; Gulf of Mexico; 26°24'N 83°43'W; dead bryozoans and calcareous algae; 73.2 m; 2 October 1967; 0615–0630

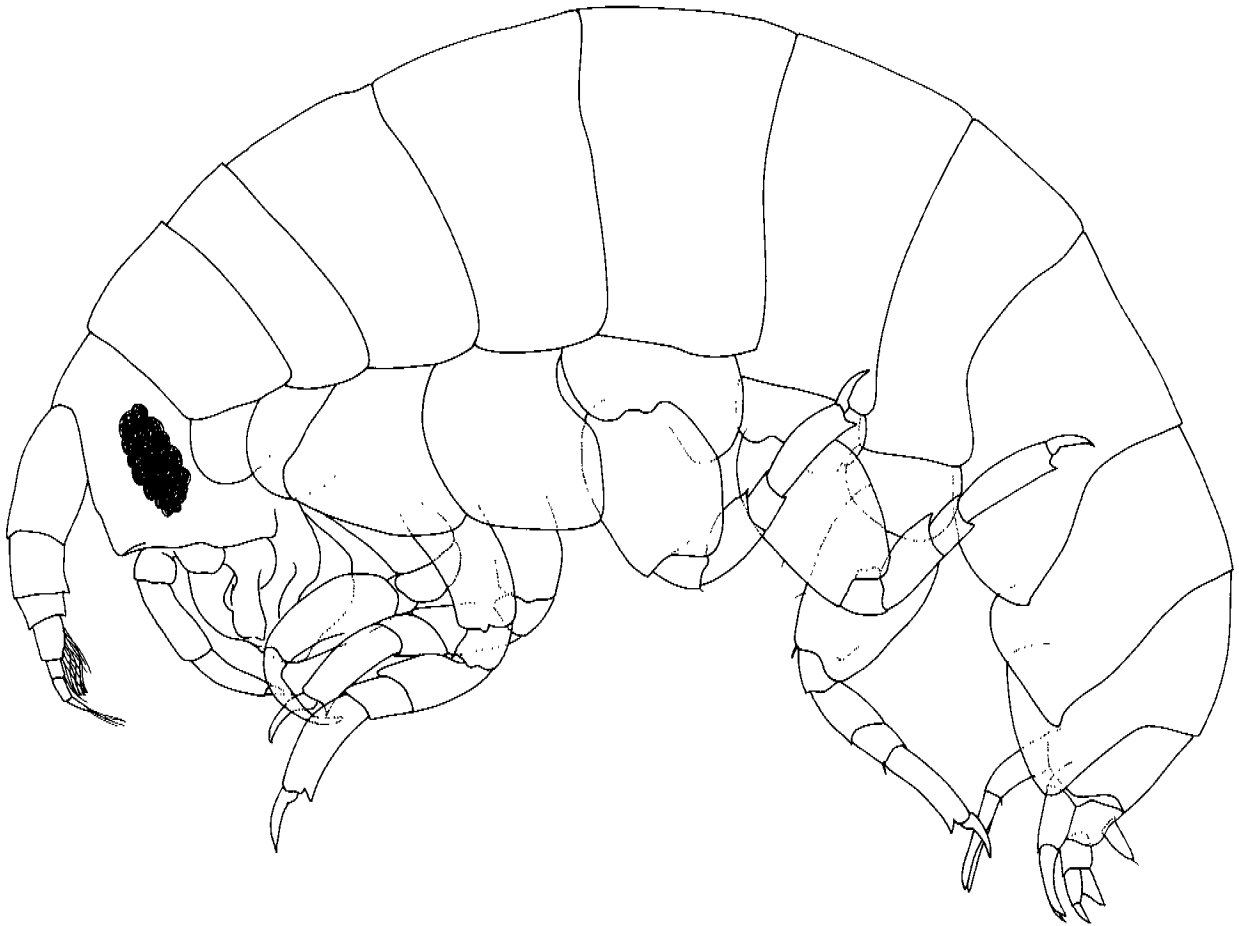


Figure 11. *Boca megachela* new species, paratype female, 3.1 mm (USNM 282679), west of Egmont Key, Gulf of Mexico.

hours; dredge; HOURGLASS Cruise HC 44, Station M; FSBC I 59949.

Diagnosis: Eyes: present, not enlarged. Antenna 1: accessory flagellum 2-articulate. Epistome and upper lip: fused, without central notch. Mandible: lacinia mobilis a smooth peg. Maxilla 1: outer plate with 7 setal-teeth. Gnathopod 1: massively subchelate, dactylus very large, curved. Coxae 1–3: without robust setae lining ventral margin. Coxa 2: subequal to coxa 3. Peraeopods 5–6: coxa with well-developed posteroventral lobe. Peraeopods 5–7: propodus with anterodistal spur. Uropod 3: inner ramus slightly shorter than outer ramus. Telson: without apical robust setae.

Description: Based on holotype female, 3.0 mm (CMN C1996-0020); paratype male, 2.8 mm (CMN C1996-0022). Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrow, subacute; rostrum absent; eyes oval, dark, enlarged in adult male. Antenna 1: medium length, $0.2 \times$ body; peduncular article 1 medium length, length $1.5 \times$ breadth; peduncular article 2 long, $0.5 \times$ article 1; peduncular article 3 long, $0.3 \times$ article 1; accessory flagellum medium length, $0.4 \times$ primary flagellum, 2-articulate, article 1 long, $5.2 \times$ article 2; flagellum 4-articulate (male 4), with weak 2-field callynophore in female and male, without flagellar robust setae, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (same in male); peduncle without brush setae in female and male, weakly geniculate between peduncular articles 3–4, article 3 short, $0.44 \times$ article 4, peduncular articles 4 and 5 not enlarged in female or male; flagellum 4-articulate (male 4), calceoli absent in female and male.

Mouthpart bundle: subquadrate. Epistome and upper lip: fused, concave, without central notch.

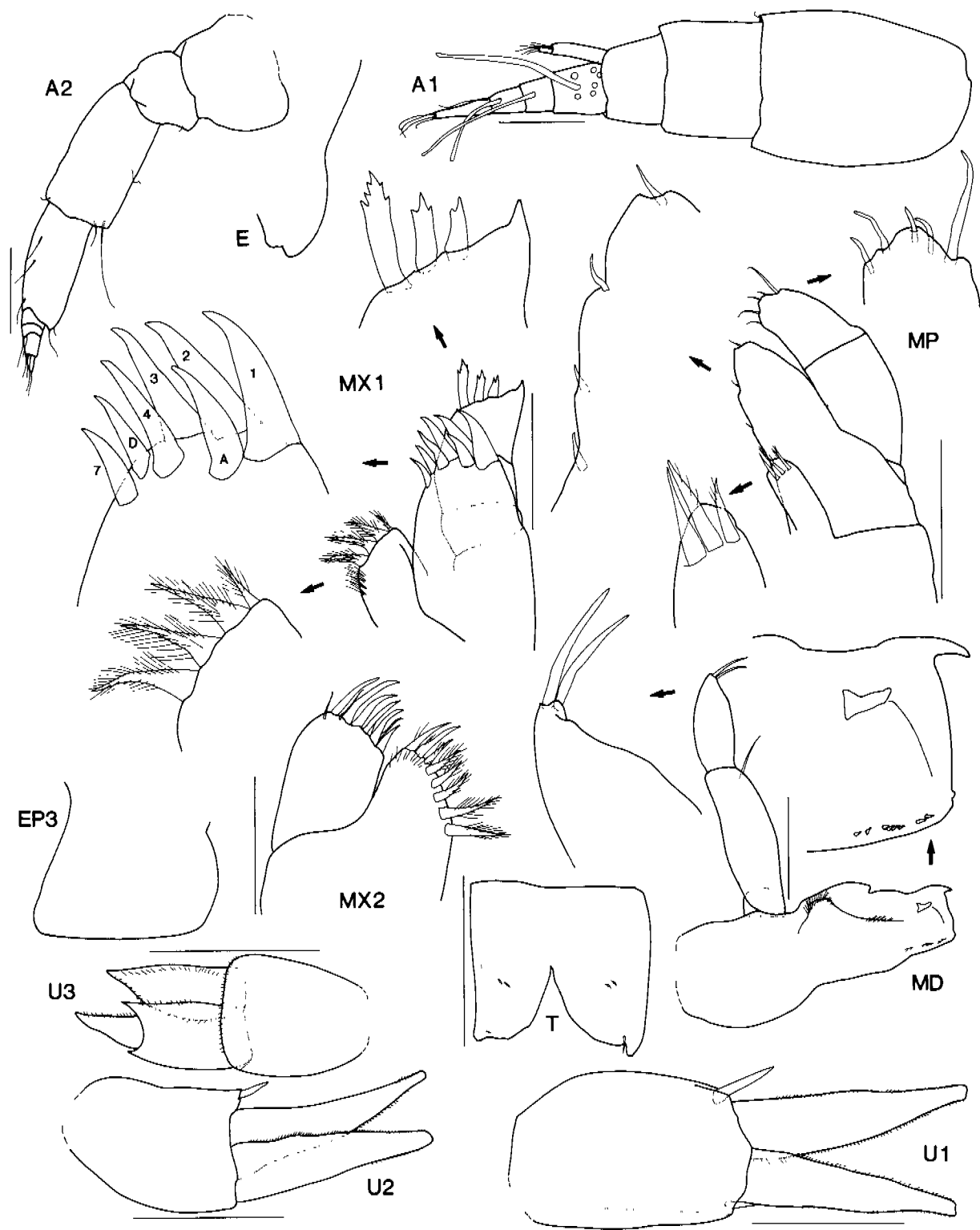


Figure 12. *Boca megachela* new species, holotype female, 3.0 mm (CMN C1996-0020), west of Egmont Channel Seabuoy, Gulf of Mexico. Scales represent 0.1 mm.

Mandible: incisors asymmetrical, large, with straight margins, left with minutely serrate margin; lacinia mobilis a small, apically acute peg; accessory setal row absent or represented by (left 8, right 5) short,

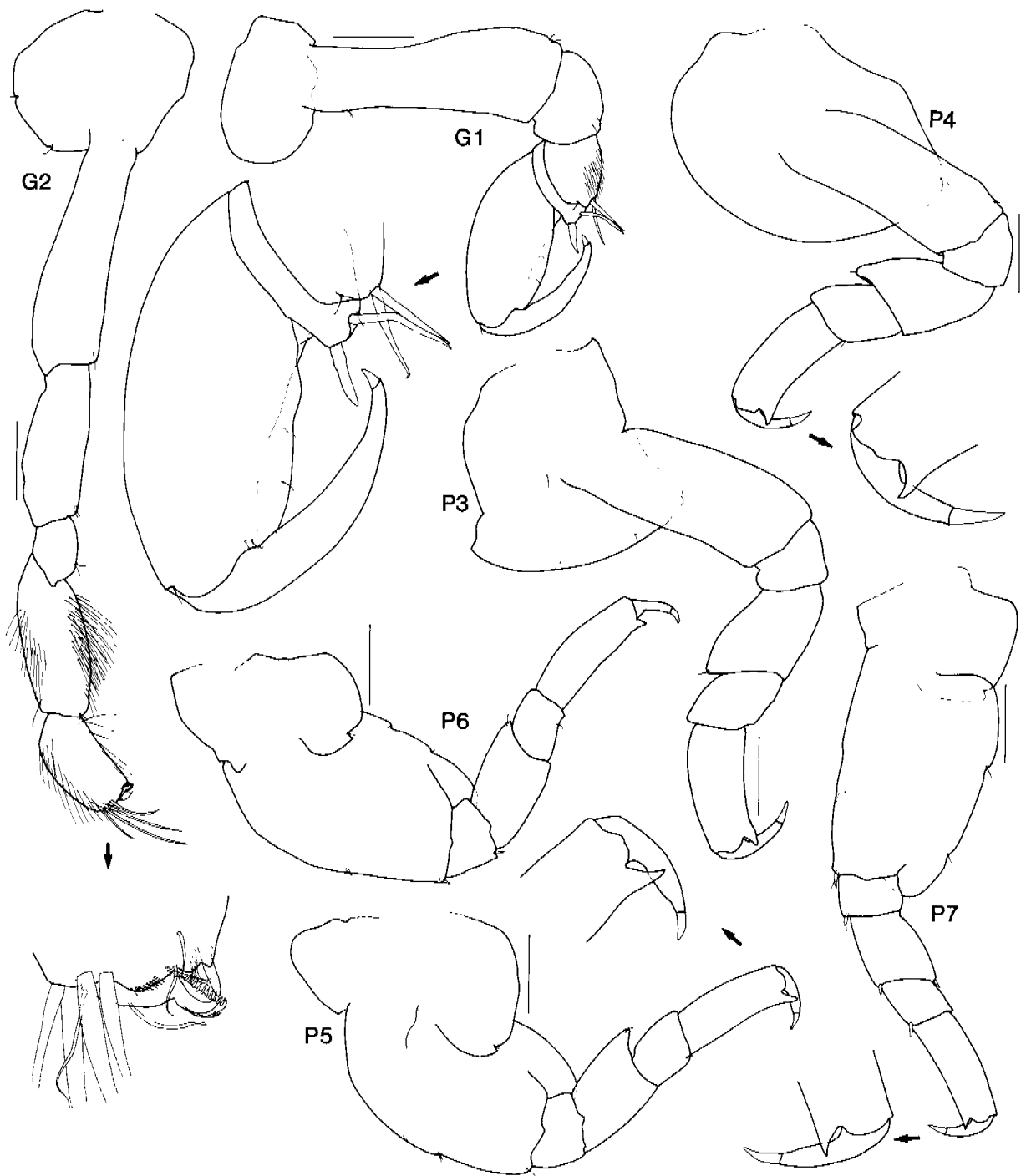


Figure 13. *Boca megachela* new species, holotype female, 3.0 mm (CMN C1996-0020), west of Egmont Channel Seabuoy, Gulf of Mexico. Scales represent 0.1 mm.

robust, simple setae (see *Remarks* under *B. campi*); intermediate setae absent; molar a smooth flap with basal row of slender setae and finely setose margins; mandibular palp attached proximally; article 1 short, length $0.7 \times$ breadth; article 2 broad, length $2.8 \times$ breadth, $1.5 \times$ article 3, with 1 (male 1) sub-marginal posterodistal A2-seta, without D2-setae; article 3 slender, blade-like, long, length $2.4 \times$ breadth, without A3- or D3-setae, with 2 apical E3-setae. Maxilla 1: inner plate broad, short, at least half

of inner margin setose, with 3 pappose setae; outer plate broad with 7 setal-teeth, ST1 to ST3 large, stout, without cusps, ST4 large, slender, without cusps, ST5 and ST6 absent, ST7 small, slender, without cusps, STA large, broad, without cusps, STB and STC absent, STD short, slender, without cusps; palp large, 2-articulate, with 2 short terminal robust setae, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin smooth, distolateral margin without robust setae. Maxilla 2: inner and outer plates broad; inner plate length $1 \times$ outer plate. Maxilliped: inner plate small, subrectangular, without nodular setae, oblique setal row reduced with 3 pappose setae; outer plate large, subovate, with 1 apical slender seta, without apical robust setae, medial setae large, robust, submarginal setae absent; palp 2-articulate (articles 1 and 2 fused, articles 3 and 4 fused), article 2 broad, dactylus absent.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: chelate; coxa vestigial; basis long, slender, length $2.7 \times$ breadth, anterior margin smooth, without setae; ischium short, length $1.2 \times$ breadth; merus, anterior margin without patch of strong robust setae, posterior margin with a few simple setae and several long robust setae; carpus subrectangular, compressed, length $0.2 \times$ breadth, shorter than ($0.1 \times$) propodus, without strong robust setae along anterior margin, with several long robust setae along posterior margin; propodus large, subovate, length $2.4 \times$ breadth, anterior and posterior margins both convex, posterior margin smooth, convex, without setae, palm vestigial, margin straight, smooth, posterodistal corner without setae; dactylus very large, curved, simple, without subterminal spines or simple setae. Gnathopod 2: minutely subchelate; coxa reduced, partially covered by coxa 3; ischium long, length $2.5 \times$ breadth; carpus long, length $2.6 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2 \times$ breadth, palm slightly acute, with convex, smooth margin, posterodistal corner with 1 lateral robust seta; dactylus reaching corner of palm, with rows of short robust setae.

Peraeopod 3: coxa small, adze-shaped; merus weakly expanded anteriorly; merus and carpus without plumose setae in male and female; propodus without setae, with small posterodistal setal-like spur, without distal locking setae; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with weak posteroventral lobe; merus weakly expanded anteriorly; merus and carpus without plumose setae in male and female; propodus without setae, with small setal-like posterodistal spur, without distal locking setae; dactylus short, slender. Peraeopod 5: coxa bilobate, posterior lobe strongly produced ventrally; basis expanded, posterior margin smooth; merus slightly expanded posteriorly; propodus without setae, with small anterodistal setal-like spur, without distal locking setae; dactylus short, slender. Peraeopod 6: coxa small, strongly lobate posteriorly; basis, anterior margin rounded proximally, straight distally, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded posteriorly; propodus without setae, with small anterodistal setal-like spur, without distal locking setae; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, tapering distally, with minutely crenate posterior margin, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 1 posterodistal robust seta; propodus without setae, with small anterodistal spur, without distal locking setae; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner produced, narrowly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorso-lateral seta. Uropod 1: with serrate margins; peduncle with 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; rami without robust setae. Uropod 2: with serrate margins; peduncle with 1 apicolateral robust seta; rami subequal in length, without robust setae; inner ramus without constriction. Uropod 3: peduncle short, length $1.2 \times$ breadth, without dorsolateral flange, without dorsal robust setae, without midlateral slender or robust setae, without distoventral robust setae, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than (about $0.9 \times$) outer ramus, outer ramus 2-artic-

ulate, article 2 long; rami without simple robust setae, slender plumose setae absent in female and male. Telson: shorter than broad, length $0.9 \times$ breadth, moderately cleft (50%), without dorsal robust setae, without dorsal slender setae, distal margins truncated, without apical penicillate setae, with 1 apical slender seta on each lobe, without apical robust setae.

Type locality: Gulf of Mexico, off Florida, west of Egmont Channel Seabuoy, 27°37.5'N 83°59.3'W, 54.8 m.

Distribution: Eastern Gulf of Mexico in 18- to 73-m depths.

Etymology: Named for the extremely well-developed first gnathopods in both sexes.

Remarks: *Boca megachela* has no notch on the epistome and upper lip complex. *Boca campi* and *B. megachela* both have a 2-articulate accessory flagellum in which article 1 is large and long; in *B. elvae* it is small and short. For differences between *Boca megachela* and *B. campi*, see *Remarks* section for *B. campi*.

Cyphocarididae, new family

Diagnosis: Head: much deeper than long. Antennae: calceoli present or absent. Epistome and upper lip: separate. Mandible: incisors small, convex, symmetrical; left lacinia mobilis a stemmed, distally serrate blade; accessory setal row without distal setal tuft; molar columnar, triturating. Maxilla 1: inner plate usually strongly setose, always more than 2 pappose setae; outer plate broad, setal-teeth in a 6/5 arrangement; palp large, 2-articulate. Maxilliped: outer plate with or without apical slender pappose setae, without apical robust setae. Gnathopod 1: simple or weakly subchelate. Coxa 1: vestigial; coxa 2 very small; coxa 3 vestigial or large. Peraeopods 3–7: simple or weakly prehensile, propodus without distal spur. Telson: deeply cleft.

Description: Head: exposed, concealed or partially concealed, much deeper than long, anteroventral margin moderately recessed, straight or oblique, deeply excavate or not, corner rounded or subquadrate; rostrum present or absent, if present short; eyes present or absent, if present oval or subrectangular, with ommatidia. Body: laterally compressed.

Antenna 1: shorter than or subequal to antenna 2; peduncular article 1 longer than article 2; article 2 subequal to or longer than article 3; accessory flagellum short, 2- to 6-articulate; primary flagellum 5-articulate or more, calynophore present, calceoli present or absent. Antenna 2: short, medium length, long, or greater than body length; flagellum longer than peduncle, 5-articulate or more, calceoli present or absent.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate; upper lip produced. Mandible: incisors smooth; left lacinia mobilis a stemmed, distally serrate blade; accessory setal row without distal setal tuft; molar columnar, triturating; palp 3-articulate. Maxilla 1: inner plate usually strongly setose, sometimes weakly setose, always more than 2 setae; outer plate broad with 11 setal-teeth in a modified 6/5 arrangement; palp large, 2-articulate, with terminal robust setae. Maxilla 2: with strongly or weakly setose medial margin. Maxilliped: inner plate well developed; outer plate small; palp 4-articulate.

Peraeonite 1: may be produced anterodorsally into hump or spur. Coxa 1: vestigial; coxa 2 very small; coxa 3 vestigial or large. Gnathopod 1: simple or subchelate; smaller than or subequal to gnathopod 2; coxa vestigial; carpus subequal to or longer than propodus; dactylus large. Gnathopod

2: subchelate; coxa very small, larger than or smaller than coxa 3; ischium elongate; carpus elongate, longer than propodus; dactylus minute.

Peraeopods 3–4: may be weakly prehensile. Peraeopod 3: coxa longer than broad or vestigial; merus shorter or longer than propodus; carpus shorter than or subequal to propodus, not produced anteriorly. Peraeopod 4: coxa larger than coxa 3, with posteroventral lobe; merus shorter than or longer than propodus; carpus shorter than or subequal to propodus, not produced anteriorly. Peraeopod 5: shorter than peraeopod 6; coxa smaller than, subequal to or larger than coxa 4, posteroventral lobe weak or absent; basis expanded, subtriangular or expanded into posterodistal spur, posterior margin usually with large, deep serrations; merus weakly expanded or linear, posterior margin weakly setose; carpus not expanded. Peraeopod 6: length shorter than or subequal to peraeopod 7; basis slightly expanded or linear; merus weakly expanded or linear, posterior margin weakly setose. Peraeopod 7: longer than peraeopod 5; similar in structure to peraeopod 6; basis expanded; merus weakly expanded or linear.

Pleonites 1–3: without dorsal teeth or carinae. Epimera 2–3: without setae.

Urosome: urosomite 1 longer than or much longer than urosomite 2, not carinate; urosomite 3 not carinate. Uropod 1: biramous, rami lanceolate. Uropod 2: biramous, rami lanceolate; inner ramus shorter than or subequal to outer ramus, not incised. Uropod 3: not sexually dimorphic; peduncle short or elongate; biramous, rami lanceolate; outer ramus longer than peduncle, 2-articulate; inner ramus shorter than or subequal to outer ramus. Telson: laminar, deeply cleft, longer than broad, dorsal and apical robust setae present or absent, apical slender setae present or absent.

Type genus: Cyphocaris Boeck, 1871.

Generic composition: Cyphocaris Boeck, 1871; *Procyphocaris* J. L. Barnard, 1961.

Remarks: Cyphocaridids are probably the least specialized of the lysianassoids that have a 6/5 setal-tooth arrangement. Plesiomorphic characters in the family include the following: male and female with a calynophore; left lacinia mobilis a broad, distally serrate blade; accessory setal row with intermediate setae, molar columnar and triturating; inner plate of maxilla 1 with pappose setae along the medial margin; outer plate of maxilliped with pappose distal setae and well-developed medial robust setae; inner plate of maxilliped with three nodular setae and a well-developed oblique setal row; peraeopods 3 to 7 simple; and telson cleft.

Only three groups of lysianassoid amphipods have coxae 1–3 extremely reduced: the *Cebocaris* group, the Cyphocarididae, and the Wandinidae. All members of these three groups show some tendency, weak or strong, towards associations with other invertebrates.

Cyphocaridids differ from the *Cebocaris* group in having a well-developed lacinia mobilis, intermediate setae in the accessory setal row, a fully triturating molar, inner plate of maxilla 1 with pappose setae along the medial margin, outer plate of maxilla 1 with an unmodified 6/5 setal-tooth arrangement, and outer plate of the maxilliped with pappose distal setae and well-developed medial robust setae.

Cyphocaridids differ from the wandinids in having a well-developed lacinia mobilis, intermediate setae in the accessory setal row, a fully triturating molar, inner plate of maxilla 1 with pappose setae along the medial margin, outer plate of the maxilliped with pappose distal setae and well-developed medial robust setae, coxae 2 to 4 not immensely broadened, peraeopods 6 and 7 similar in structure, outer ramus of uropod 3 2-articulate and longer than the peduncle, a deeply cleft telson, and no hook-like process on article 3 of antenna 2.

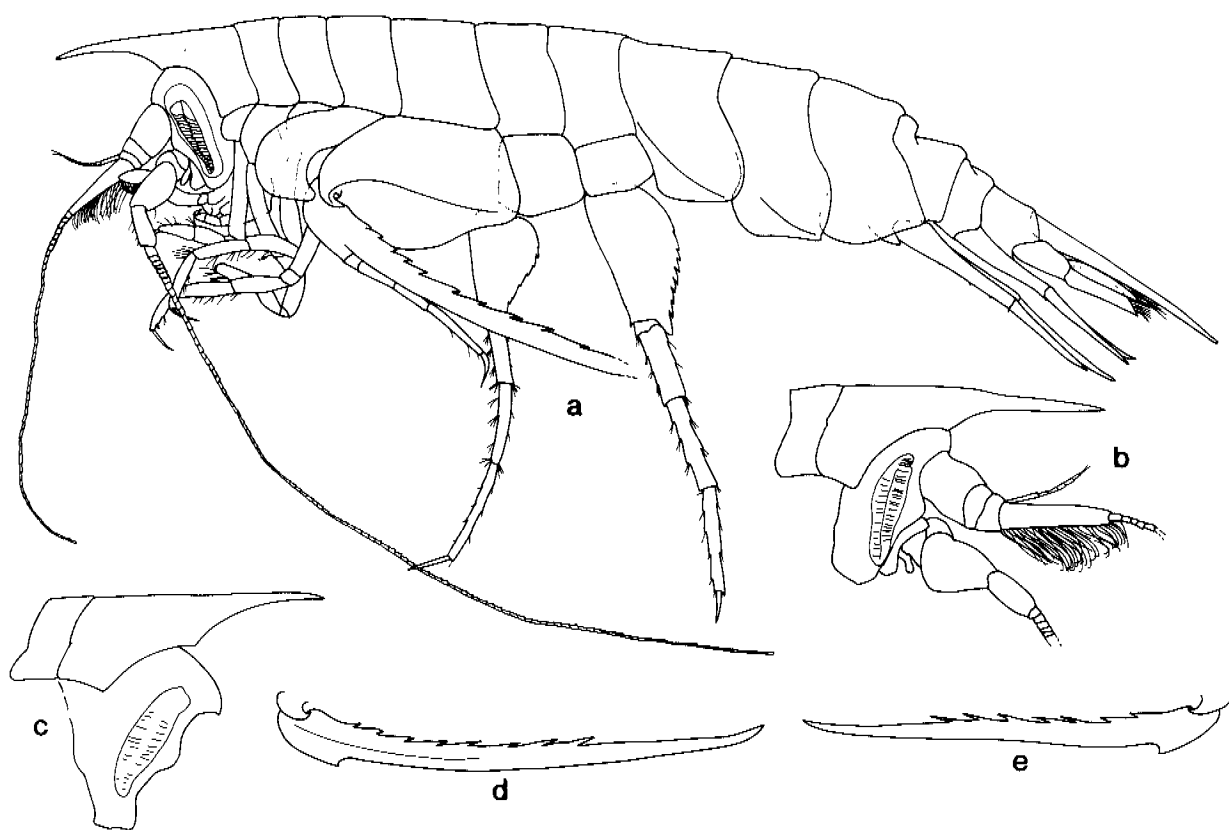


Figure 14. *Cyphocaris tunicola* new species; a: holotype female, 13 mm (USNM 282680); b: paratype male, 11.6 mm (USNM 282682); c: paratype juvenile, 7.0 mm (USNM 282683); d: spur on P5 basis, paratype male, 10.5 mm (USNM 282683); e: spur on P5 basis, paratype female, 8.5 mm (USNM 282683); northeastern Gulf of Mexico.

Cyphocaris Boeck, 1871

Cyphocaris tunicola, new species

Figures 14–16

Type material examined: **HOLOTYPE:** ♀; 13 mm; ovigerous; northeastern Gulf of Mexico; 27°00'N 84°57'W; 200–500 m over bottom depth of 677 m; associated with tunicate colony; 1-m closing net; 21 March 1988; 0212 hours; R/V *Suncoaster*, MARFIN *Geryon* deep-water plankton collections; USNM 282680.—**PARATYPE:** ♂; same data; USNM 282681.—**PARATYPE:** 1 ♂; 11.6 mm; northeastern Gulf of Mexico; 27°54'N 85°16'W; 200–400 m over bottom depth of 494 m; 1-m closing net; 25 February 1988; 2219 hours; R/V *Suncoaster*, MARFIN *Geryon* deep-water plankton collections; USNM 282682.—**PARATYPES:** 4 specimens; same data; USNM 282683.—**PARATYPES:** 4 specimens; same data; AM P45330.—**PARATYPES:** 2 specimens; same data; GCRL 1343.—**HOURLASS MATERIAL:** None.

Diagnosis: Peraeonite 1: produced into long, narrow, nearly straight or slightly down-turned process. Gnathopod 2: palm acute with convex, smooth margin, posterodistal corner with patch of small robust setae. Peraeopod 5: posteroventral corner of basis produced into elongate, dorsoproximally serrate spur. Uropod 2: rami subequal in length. Telson: 1.8 × as long as uropod 3, cleft about 75%.

Description: Based on holotype female, ovigerous, 13 mm (USNM 282680), paratype male, 11.6 mm (USNM 282682). Head and body: without setae. Head: positioned under produced peraeonite 1, narrow,

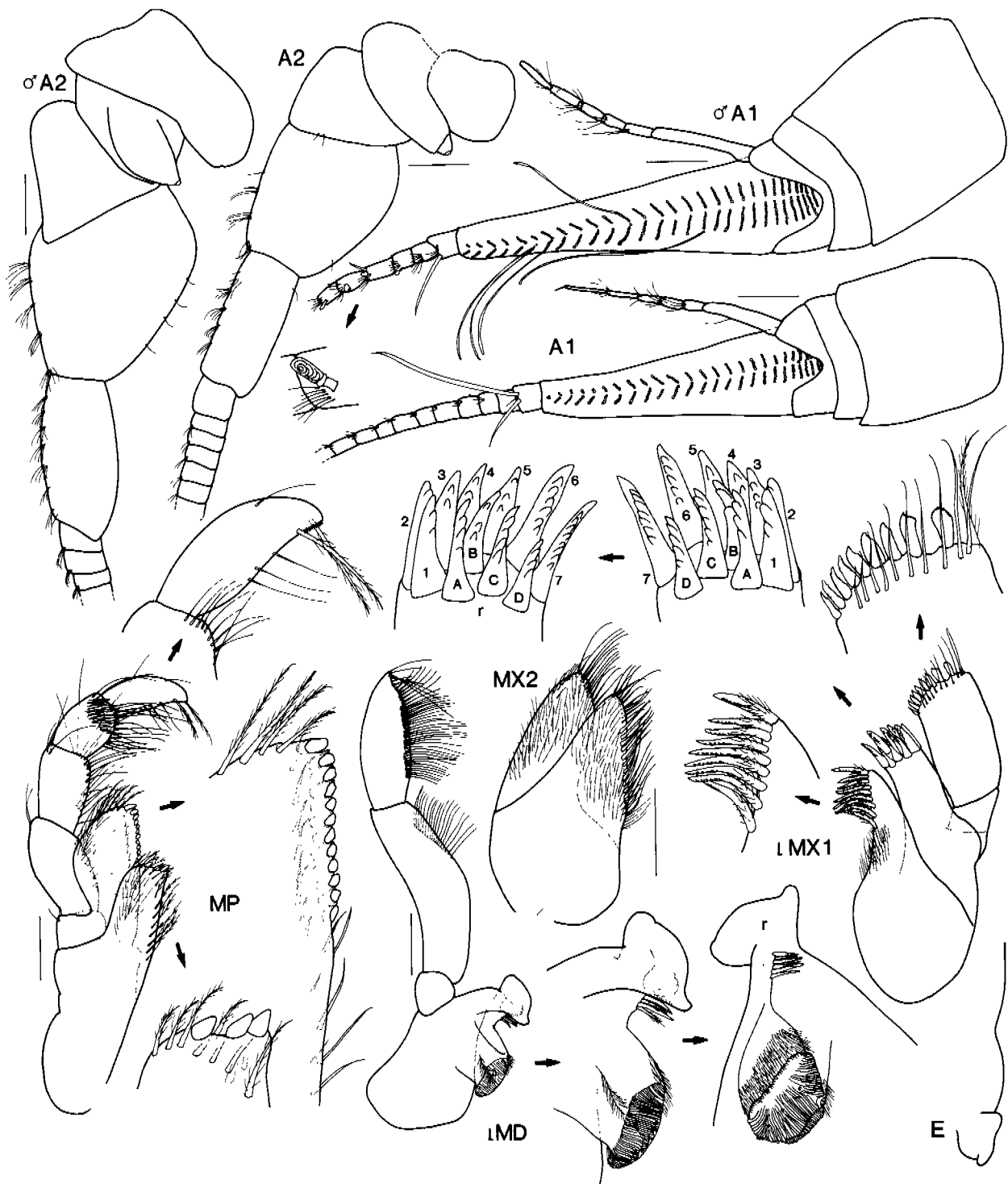


Figure 15. *Cyphocaris tunicola* new species; holotype female, 13 mm (USNM 282680); paratype male, 11.6 mm (USNM 282682); northeastern Gulf of Mexico. Scales represent 0.2 mm.

deeper than long, lateral cephalic lobe small, narrowly rounded; rostrum absent; eyes narrow, dorsoventrally elongate, with two rows of pigment in ladder-like arrangement, not enlarged in male. Antenna 1: elongate, $0.4 \times$ body; peduncular article 1 short, length $1 \times$ breadth; peduncular article 2 short, $0.2 \times$ article

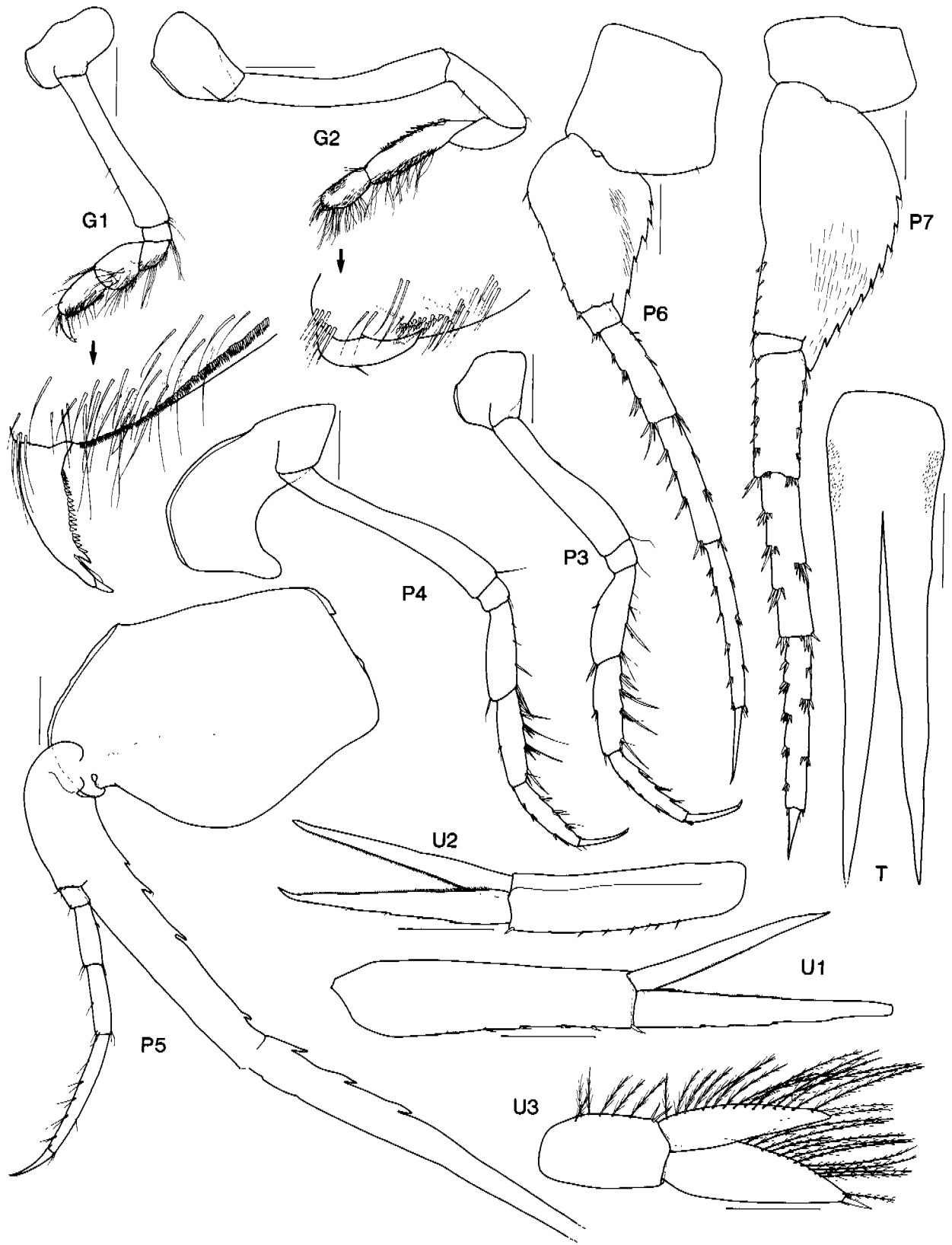


Figure 16. *Cyphocaris tunicola* new species, holotype female, 13 mm (USNM 282680), northeastern Gulf of Mexico. Scales represent 0.5 mm.

1; peduncular article 3 long, $0.3 \times$ article 1; accessory flagellum very short, $0.13 \times$ primary flagellum, 6-articulate, article 1 long, $3.5 \times$ article 2 (male long, $5.4 \times$ article 2); flagellum 36-articulate (male 37+), with strong 2-field calyophore in female and male, with 2 robust setae on flagellar article 2, calceoli absent (present in male). Antenna 2: length $2 \times$ antenna 1 ($2.4 \times$ antenna 1 in male and $1.4 \times$ body length); peduncle with weak brush setae in female and male, weakly geniculate between peduncular articles 3–4, article 3 short, $0.75 \times$ article 4 (male weakly geniculate between peduncular articles 3–4, article 3 short, peduncular article 4 enlarged in male); flagellum 105-articulate (male 137+), calceoli absent (present in male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate; epistome long, straight dorsally, with broad central notch, ventrally convex; upper lip slightly produced, rounded. Mandible: incisors small, with slightly convex margins; lacinia mobilis a stemmed, distally cusped blade; accessory setal row, left and right rows each with 3 long, robust, simple setae; intermediate setae multiserrate; molar with reduced column, proximally setose, distally triturating; mandibular palp attached distally; article 1 short, length $1 \times$ breadth; article 2 broadened centrally, length $3.1 \times$ breadth, $1.3 \times$ article 3, with 19 submarginal posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length $2.8 \times$ breadth, without A3-setae, with 37 submarginal B3-setae, with 11 D3-setae and 3 apical E3-setae. Maxilla 1: inner plate tapering distally, at least half of inner margin setose, with 9 pappose setae; outer plate broad with 11 setal-teeth, ST1–ST3 large, stout, multicuspidate, ST4–ST5 large, stout, 3-cuspidate, ST6 large, stout, 5- to 6-cuspidate, ST7, contiguous with ST6, large, broad, 7- to 8-cuspidate medially, STA large, slightly displaced from STB, 2-cuspidate, STB large, broad, 3-cuspidate, STC–STD large, broad, 4-cuspidate; palp large, 2-articulate, with 9 long terminal robust setae, with 10 subterminal setae, robust flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner plate broad, outer plate narrow; inner plate length $1 \times$ outer plate, without oblique setal row. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, without distal robust setae on lateral face, oblique setal row strong, with 15 pappose setae; outer plate small, subovate, with 4 apical pappose setae, without apical robust setae, medial setae large, robust, submarginal setae long, simple; palp large, 4-articulate, article 2 broad, length $1.6 \times$ breadth, $1.2 \times$ article 3, article 3 short, broad, length $1.3 \times$ breadth, dactylus very large, blade-like, with 5 subterminal pappose setae, unguis absent.

Peraeonite 1: produced anteriorly into long, narrow, slightly down-turned process. Gnathopod 1: simple; coxa vestigial (broader than deep); basis very long, slender, length $5 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.4 \times$ breadth; merus, posterior margin with group of long simple setae and with patch of short setae; carpus subrectangular, short, length $1.5 \times$ breadth, subequal to ($1 \times$) propodus, with patch of very fine setae near posterior margin and long slender setae along posterior margin; propodus large, subtriangular, length $1.8 \times$ breadth, tapering distally, posterior margin serrate, slightly convex, with simple, slender setae, palm absent; dactylus simple, with large subterminal spine and row of 28 small robust setae along posterior margin. Gnathopod 2: minutely subchelate; coxa vestigial (deeper than broad); ischium long, length $3.6 \times$ breadth; carpus very long, length $4.4 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2.1 \times$ breadth, palm acute, with convex, smooth margin, posterodistal corner with patch of small robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa vestigial; merus weakly expanded anteriorly; merus and carpus without plumose setae in male and female; propodus with 6 robust setae, 3 slender setae, and 2 tiny distal locking setae along posterior margin; dactylus long, slender. Peraeopod 4: coxa deeper than wide, with acutely produced posteroventral lobe, anterior margin broadly rounded, posterior margin sinusoidal; merus weakly expanded anteriorly; merus and carpus without plumose setae in male and female; propodus with 5 robust setae, 3 slender setae, and 2 tiny distal locking setae along posterior margin; dactylus long, slender. Peraeopod 5: coxa bilobate, posterior lobe slightly produced ventrally; with distinct lateral ridge; basis expanded pos-

terovertrally to form elongate spur with serrate dorsoproximal margin; merus not expanded posteriorly; propodus with 9 slender setae, and 2 tiny distal locking setae along anterior margin, and 4 small, slender setae along posterior margin; dactylus long, slender. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded proximally, straight distally, basis slightly expanded posteriorly, with incised posterior margin; merus not expanded posteriorly; propodus with 9 robust setae and 2 tiny distal locking setae along anterior margin, and 8 robust setae along posterior margin; dactylus long, slender. Peraeopod 7: basis expanded posteriorly, posterior margin sinusoidal, crenate, forming a large, narrow posteroventral lobe produced less than halfway along merus, posteroventral margin straight; merus not expanded posteriorly, with 15 robust setae; propodus with 19 robust setae and 1 tiny distal locking seta along anterior margin, and 12 robust setae along posterior margin; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner subquadrate. Urosomites: urosomite 1 with anterodorsal notch; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 6 dorsolateral and 1 apicolateral robust setae, without plumose setae; outer ramus shorter than ($0.78 \times$) inner ramus; outer ramus without robust setae; inner ramus with 5 lateral robust setae, each in weak acclivity. Uropod 2: without fine setae; peduncle with 7 dorsomedial and 1 apicomедial robust setae; rami subequal in length; outer ramus without robust setae; inner ramus with 5 lateral robust setae, each in weak acclivity, inner ramus without constriction. Uropod 3: peduncle short, length $1.7 \times$ breadth, without dorsolateral flange, with 2 apicomедial and 1 apicolateral robust setae, without midlateral slender or robust setae, without distoventral robust setae, with 6 plumose setae (male 8); rami lanceolate, inner ramus shorter than (about $0.78 \times$) outer ramus; outer ramus 2-articulate, article 2 short; rami without simple robust setae; slender plumose setae present in female and male. Telson: longer than broad, length $3.1 \times$ breadth, deeply cleft (76%), without dorsal robust or slender setae, margins converging distally, apically subacute, without apical penicillate, slender, or robust setae.

Type locality: Northeastern Gulf of Mexico, $27^{\circ}00'N$ $84^{\circ}57'W$, 200–500 m.

Distribution: Northeastern Gulf of Mexico in 200- to 500-m depths.

Etymology: Named for its reported association with pelagic tunicates.

Remarks: *Cyphocaris tunicola*, *C. johnsoni* Shoemaker, 1934, and *C. bellona* Lowry and Stoddart, 1994, form a group in which only the dorsal margin of the spur on the basis of peraeopod 5 is serrated. *Cyphocaris geysereensis* Ledoyer, 1986, with a serrated posterior margin and only one serration on the anterior margin, may also belong in this group. None of these species is particularly well known. *Cyphocaris johnsoni* was briefly described based on males and females from the Puerto Rico Trench and has not been recorded since; *C. geysereensis* was described, based on one female, from the southwest Indian Ocean; and *C. bellona* was recently described from the Coral Sea. *Cyphocaris tunicola* and *C. johnsoni* both have large ladder-like eyes, antenna 1 shorter than antenna 2, and a short propodus on gnathopod 2, characters not shared with *C. bellona* or *C. geysereensis*. *Cyphocaris tunicola* differs most significantly from *C. johnsoni* in the morphology of peraeonite 1. In both sexes of *C. tunicola*, peraeonite 1 is developed into a long, narrow, slightly down-turned process, whereas in *C. johnsoni* this process is long, narrow, and slightly up-turned in the male and not developed at all in the female. *Cyphocaris tunicola* differs further from *C. johnsoni* in the serrations on the spur of the basis of peraeopod 5, which line approximately two-thirds of the dorsal length in both sexes, and in the telson, which is 1.5 times as long as the third uropods. In *C. bellona*, the serrations on the spur of the basis of peraeopod 5 line about one-half of the dorsal length in both sexes, and the third uropods reach almost to the tip of the telson. In *C. geysereensis* the serrations on the spur reach more than halfway, and the third uropods reach to the end of the telson.

Endevouridae, new family

Diagnosis: Head: as long as deep or deeper than long. Antennae: calceoli absent. Epistome and upper lip: separate. Mandible: incisors small, convex, symmetrical; lacinia mobilis absent; accessory setal row without distal setal tuft; molar smooth or weakly ridged, setose or not. Maxilla 1: inner plate with less than 2 apical setae; outer plate narrow, with setal-teeth in a modified 6/5 arrangement; palp large, 2-articulate. Maxilliped: outer plate without apical slender or robust setae. Gnathopod 1: simple. Coxae 1–4: large, longer than broad, overlapping. Peraeopod 3: subchelate or chelate, propodus enlarged. Peraeopods 4–7: simple, propodus without distal spur. Telson: entire.

Description: Head: exposed or partially concealed, as long as deep or deeper than long; rostrum absent; eyes oval or reniform, with ommatidia. Body: laterally compressed.

Antenna 1: subequal to antenna 2; peduncular article 1 longer than article 2; article 2 longer than article 3; article 3 may be concealed by article 2; accessory flagellum long, 3- to 6-articulate; primary flagellum 5-articulate or more, calynophore present or absent, calceoli absent. Antenna 2: short; flagellum shorter than peduncle, less than 6-articulate, calceoli absent.

Mouthpart bundle: subquadrate. Mandible: incisors smooth; lacinia mobilis absent; molar smooth or weakly ridged, setose or not; palp 3-articulate. Maxilla 1: inner plate weakly setose, with 1 or no apical setae; outer plate with 6 to 10 setal-teeth; palp large, 2-articulate, with terminal robust setae. Maxilla 2: without setae on medial margin. Maxilliped: inner plate well developed; outer plate small; palp 4-articulate.

Coxae 1–4: longer than broad, overlapping. Gnathopod 1: simple, subequal to gnathopod 2; coxa smaller than or subequal to coxa 2; carpus shorter than propodus; dactylus large. Gnathopod 2: subchelate or chelate; coxa subequal to but not hidden by coxa 3; ischium elongate; carpus elongate, longer than propodus; dactylus minute.

Peraeopod 3: subchelate or chelate; coxa longer than broad; carpus shorter than or subequal to propodus, not produced anteriorly. Peraeopod 4: coxa larger than coxa 3, with well-developed posteroventral lobe; carpus shorter than or subequal to propodus, not produced anteriorly. Peraeopod 5: subequal in length to peraeopod 6; coxa smaller than coxa 4, with ventrally produced posterior lobe; basis expanded, subovate, with posteroventral lobe; merus expanded, posterior margin weakly setose; carpus not expanded. Peraeopod 6: subequal in length to peraeopod 7; basis expanded; merus expanded or weakly expanded, posterior margin weakly setose. Peraeopod 7: subequal in length to peraeopod 5, similar in structure to peraeopod 6; basis expanded; merus weakly expanded.

Pleonites 1–3: without dorsal teeth or carinae. Epimera 2–3: without setae.

Urosome: urosomite 1 subequal to or longer than urosomite 2, not carinate; urosomite 3 not carinate. Uropod 1: biramous, rami lanceolate. Uropod 2: biramous, rami lanceolate; inner ramus shorter than or subequal to outer ramus, not incised. Uropod 3: not sexually dimorphic; peduncle short or elongate; biramous, rami lanceolate; outer ramus subequal to or longer than peduncle, 2-articulate; inner ramus shorter than or subequal to outer ramus. Telson: laminar, entire, longer than broad, dorsal robust setae absent, apical robust setae absent, apical slender setae present or absent.

Type genus: *Endevoura* Chilton, 1921.

Generic composition: *Endevoura* Chilton, 1921; *Ensayara* J. L. Barnard, 1964b.

Remarks: Endeavourids are distinguished from all other lysianassoids by their subchelate third peraeopods. Although they are not a diverse group in genera or species, they are widespread in warm waters.

Ensayara J. L. Barnard, 1964

Ensayara entrichoma Gable and Lazo-Wasem, 1990

Ensayara entrichoma Gable and Lazo-Wasem, 1990, pp. 121–126, figs. 1–4.

Material examined: **HOURGLASS MATERIAL:** STATION E: 1 juvenile; 2 December 1966; trawl; FSBC I 59950.

Diagnosis: Mandible: palp article 3 with 2 D3-setae. Coxae 1–4: with fringe of simple setae along ventral margin. Peraeopod 7: basis posteroventrally excavate. Uropods 1–2: without robust setae on inner ramus.

Type locality: Cove west of Bermuda Biological Station, Ferry Reach, Bermuda, 2–3 m.

Distribution: Bermuda in 2- to 7-m depths; eastern Gulf of Mexico in 73-m depths.

Remarks: Gable and Lazo-Wasem (1990) pointed out that species in *Ensayara* are extremely similar and are separated by minute morphological differences. Two species are known from the western Atlantic area: *E. jumane* Barnard and Thomas, 1990, from Belize in the Caribbean Sea and *E. entrichoma* from Bermuda. On the other side of the Isthmus of Panamá, *E. ramonella* J. L. Barnard, 1964b, is known from Bahía de San Quintin in Baja California.

Our single specimen, although in poor condition, appears to be *E. entrichoma*. It has a fringe of long setae on the ventral margins of coxae 1 to 4; this fringe of setae is the main character used to distinguish *E. entrichoma* from *E. jumane*. The specimen has two D3-setae on the mandibular palp, a posteroventrally excavate basis on peraeopod 7, and no robust setae on the inner rami of uropods 1 and 2. These characters are all shared by *E. entrichoma* and *E. jumane*. *Ensayara ramonella* has only one D3-seta on the mandibular palp and a non-excavate basis on peraeopod 7. Our specimen differs from Gable and Lazo-Wasem's material of *E. entrichoma* in having two robust setae on the posterodistal corner of the peraeopod 3 palm.

Family Lysianassidae Dana, 1849

Hurley (1963) redefined the subfamily Lysianassinae and established the Uristinae (subsequently raised to family level by Lowry and Stoddart, 1992). He gave a diagnosis of the former and intended, in a separate paper, to explain in detail the rearrangement of the latter. Unfortunately, this paper never appeared. Hurley used the chelation of gnathopod 1 and the condition of the molar as important subfamily-level characters. We agree with this but have also included the arrangement of the setal-teeth on the outer plate of maxilla 1 as another important family- or subfamily-level character. The Uristidae is restricted to taxa with a 7/4 crown setal-tooth arrangement (see Lowry and Stoddart, 1992, 1995a). Accepting a uristid family-level group based on the 7/4 crown displaces a group of taxa that Hurley originally included in his Uristinae. These taxa have a subchelate gnathopod 1 and some form of well-developed triturating molar, but they have a 6/5 setal-tooth arrangement (see Lowry and Stoddart, 1995a), which in our view is one of the main defining characters of the Lysianassidae. Based on this, we divide the Lysianassidae into

two subfamilies: an expanded Lysianassinae (*sensu* Hurley, 1963) and a new subfamily to be known as the Tryphosinae.

Lowry and Stoddart (1995a: 8) suggested that the 7/4 crown arrangement is most likely derived from a 6/5 arrangement. If the 7/4 crown is only a subdivision of the 6/5 arrangement, then the uristids may be more properly considered to be a subfamily in the Lysianassidae, rather than a family.

There is also a problem concerning the homoplasy of the 7/4 crown arrangement. We can identify at least 20 genera with this setal-tooth arrangement. If the arrangement has only arisen once, then it is a strong synapomorphy that defines the uristid group, but if it has been independently derived more than once, then it creates a serious dilemma that will only be resolved by careful phylogenetic analyses. At present it is not possible to detect separate lineages, and we prefer to accept the apparently more parsimonious solution of a homologous 7/4 crown, while acknowledging that there are clues suggesting that the 7/4 crown may be homoplastic.

Although the majority of taxa in the subfamilies Tryphosinae and Lysianassinae are easily separated by the molar (tritulating or setose), the apical margin of the outer plate of the maxilliped (with or without robust setae), the first gnathopods (subchelate or simple), and the telson (cleft or entire), there are several genera that confound the subfamily division. *Metambasia* and *Stephensenia* have the well-developed tritulating molar, apical robust setae on the outer plate of the maxilliped, and deeply cleft telson of a tryphosine, but the simple first gnathopod of a lysianassine. We believe that the simple gnathopods are secondarily derived and that *Metambasia* and *Stephensenia* both belong in the tryphosine group. *Socarnopsis* and *Waldeckia*, classified as lysianassines, have weakly developed terminal robust setae on the palp of maxilla 1, weakly subchelate or parachelate first gnathopods, and cleft telsons. The males of species in the genus *Pseudambasia* often have weakly subchelate first gnathopods, which in at least one species are strongly subchelate. This is considered to be a secondarily derived condition, but it obscures the distinction between tryphosines and lysianassines.

Subfamily Lysianassinae Dana, 1849

Diagnosis: Head: exposed, concealed or partially concealed; as long as deep, longer than deep or deeper than long. Antennae: calceoli present or absent. Epistome and upper lip: separate or fused. Mandible: incisor smooth; lacinia mobilis present on left side only or absent; accessory setal row without distal setal tuft; molar present or absent, if present vestigial, small or medium size, setose with reduced tritulating patch, fully setose, or a smooth, nonsetose flap. Maxilla 1: inner plate weakly setose (6 or less) or without setae; outer plate narrow, with 11 setal-teeth in 6/5 or modified 6/5 arrangement; palp small or large, 1- or 2-articulate, with or without terminal robust setae. Maxilliped: without apical robust setae. Coxae 1 to 4 longer than broad, overlapping; coxa 1 fully developed or slightly reduced. Gnathopod 1: simple, occasionally weakly subchelate or parachelate. Peraeopods simple. Telson: usually entire, occasionally deeply, moderately or weakly cleft or notched.

Description: Head: exposed, concealed or partially concealed; as long as deep, longer than deep or deeper than long; anteroventral margin moderately recessed, rounded or oblique, deeply excavate or not excavate, corner rounded; rostrum present or absent, if present short; eyes present or absent, if present round, ovoid, reniform, long, narrow, subsigmoid, or subrectangular, with ommatidia. Body: laterally compressed; cuticle smooth, with sparse slender setae or occasionally covered in short setae or setae absent. Antenna 1: shorter than or subequal to antenna 2; peduncular article 1 longer than article 2; article 2 shorter than, subequal to or longer than article 3; article 3 shorter than article 1; accessory flagellum long, short or minute, 1- to 9-articulate; primary flagellum multiarticulate; callynophore present or absent; calceoli

present or absent. Antenna 2: short to greater than body length; flagellum shorter than to longer than peduncle, multiarticulate; calceoli present or absent.

Mouthparts: well developed or reduced, forming a subquadrate or subconical bundle. Epistome and upper lip: separate or fused. Mandible: incisors smooth; lacinia mobilis present on left side only or absent; accessory setal row present or absent, if present, without distal setal tuft; molar present or absent, if present, vestigial, small or medium size, setose with reduced triturating patch, fully setose or a smooth, non-setose flap; palp 3-articulate. Maxilla 1: inner plate weakly setose (6 or less) or without setae; outer plate with 9–12 setal-teeth; palp present or absent, if present, 1- or 2-articulate. Maxilla 2: inner plate without oblique setal row, with strongly or weakly setose medial margin or without setae on medial margin. Maxilliped: inner plate well developed; outer plate very large, large or small; palp well developed or reduced, 4- or 3-articulate.

Coxae 1–4: longer than broad, overlapping. Gnathopod 1: sexually dimorphic or not; simple, weakly or strongly subchelate or parachelate; smaller than or subequal to gnathopod 2; coxa subequal to or larger than coxa 2; carpus shorter than, subequal to or longer than propodus; propodus, palm acute when present; dactylus large, small or minute, occasionally covered in setae. Gnathopod 2: sexually dimorphic or not; subchelate or chelate; coxa subequal to but not hidden by coxa 3; ischium elongate; carpus elongate, subequal to or longer than propodus; dactylus well developed, minute or absent.

Peraeopods 3–7: simple. Peraeopod 3: coxa longer than broad; merus and carpus, posterodistal margin with or without setal brush; merus shorter than to longer than propodus; carpus shorter than propodus, not produced; dactylus well developed. Peraeopod 4: coxa subequal or larger than coxa 3, with posteroventral lobe; merus and carpus, posterodistal margin with or without setal brush; merus shorter than to longer than propodus; carpus shorter than or subequal to propodus, not produced; dactylus well developed. Peraeopod 5: shorter than or subequal in length to peraeopod 6; coxa smaller than or subequal to coxa 4, with or without ventrally produced posterior lobe; basis expanded, subovate or subquadrate, with or without posteroventral lobe; merus expanded to linear, posterior margin weakly setose; carpus linear; dactylus well developed. Peraeopod 6: shorter than or subequal in length to peraeopod 7; basis expanded or slightly expanded; merus expanded to linear, posterior margin weakly setose. Peraeopod 7: subequal to or longer than peraeopod 5, similar in structure to peraeopod 6; basis expanded, with broad posteroventral lobe, subrectangular or subovate; merus expanded, slightly expanded, or linear; dactylus short or elongate.

Pleonites 1–3: each with dorsal carina or without dorsal carina. Epimera 2–3: without setae.

Urosome: urosomites 1 to 3 free, or 2 and 3 coalesced; urosomite 1 longer than or much longer than urosomite 2; urosomite 1 carinate or not. Uropod 1: peduncle with or without long plumose setae; biramous or uniramous; rami lanceolate. Uropod 2: peduncle with or without long plumose setae; biramous or uniramous; rami lanceolate; if present, inner ramus shorter than or subequal to outer ramus, incised or not. Uropod 3: sexually dimorphic or not; peduncle short or elongate; biramous, uniramous or rami absent; if present, rami lanceolate; with or without plumose setae; outer ramus shorter than, subequal to or longer than peduncle, 1- or 2-articulate, article 2 short or long; if present, inner ramus minute, shorter than or subequal to outer ramus. Telson: laminar or hemiacetabulate; deeply, moderately or weakly cleft or notched, emarginate or entire; longer than broad, as long as broad, or broader than long; dorsal robust setae absent; dorsal slender setae present or absent; apical robust and slender setae present or absent.

Type genus: Lysianassa Milne Edwards, 1830.

Generic composition: Acontiostoma Stebbing, 1888; *Aruga* Holmes, 1908; *Arugella* Pirlot, 1936; *Azotostoma* J. L. Barnard, 1965; *Bonassa* Barnard and Karaman, 1991; *Conicostoma* Lowry and Stoddart, 1983;

Concarnes Barnard and Karaman, 1991; *Dartenassa* Barnard and Karaman, 1991; *Dissiminassa* Barnard and Karaman, 1991; *Eclecticus* new genus; *Kakanui* Lowry and Stoddart, 1983; *Lysianassa* Milne Edwards, 1830; *Lysianopsis* Holmes, 1903; *Macronassa* Barnard and Karaman, 1991; *Nannonyx* Sars, 1891; *Ocosingo* J. L. Barnard, 1964; *Parawaldeckia* Stebbing, 1910; *Pardia* Ruffo, 1987; *Phoxostoma* K. H. Barnard, 1925; *Pronannonyx* Schellenberg, 1953; *Pseudambasia* Stephensen, 1927; *Riwo* Lowry and Stoddart, 1995b; *Scolopostoma* Lowry and Stoddart, 1983; *Shoemakerella* Pirlot, 1936; *Socarnella* Walker, 1904; *Socarnes* Boeck, 1871; *Socarnoides* Stebbing, 1888; *Socarnopsis* Chevreux, 1911; *Stomacontion* Stebbing, 1899; *Thaumodon* Lowry and Stoddart, 1995a; *Waldeckia* Chevreux, 1906.

Taxonomic changes: Based on the illustrations presented here, it is clear that *Falcanassa* Barnard and Karaman, 1991, is a junior subjective synonym of *Lysianopsis* and that *L. hummelincki* is very closely related to *L. alba*. The only characters that separated these two genera were the prehensile first gnathopod of *Falcanassa* and the number of articles on the outer ramus of uropod 3. We have examined the type series of *L. alba* and found that the male gnathopod 1 is weakly prehensile. We have also found that the second article of the outer ramus of uropod 3 in *L. alba* is very poorly defined, a clear gradation between the well-defined second article in *L. ozona* and the 1-articulate ramus of *L. hummelincki*. For these reasons we are synonymizing *Lysianopsis* and *Falcanassa*.

Clark and Barnard (1985) compared their new genus *Lucayarina* to *Aroui* Chevreux, 1911, *Glycerina* Haswell, 1882 (= *Ichnopus*), *Ichnopus* Costa, 1853, and *Menigratopsis* Dahl, 1945. At the time, they published doubts expressed by colleagues (Drs. Andres and Lowry) about the relationship of *Lucayarina* to these genera. Since then we (Lowry and Stoddart) have been able to study material of *Lucayarina* and compare it closely with other lysianassoid genera. Based on morphological similarities between the gnathopods, mouthparts, uropods, and telson, we regard *Lucayarina* as a junior subjective synonym of *Socarnopsis*.

Barnard and Karaman (1991) reestablished *Lysianassina*, originally proposed by Costa (1867) as a subgenus of *Lysianassa*, and gave it full generic status. They considered that the upper lip and epistome were equally produced. In species of *Lysianassa* the epistome is not produced, and the upper lip is rounded and strongly produced. We have examined *L. longicornis* Lucas, 1846 (the type species of *Lysianassina*), and although the epistome is slightly produced, it is not sufficiently different to justify generic status. We therefore place *Lysianassina* as a junior subjective synonym of *Lysianassa*.

Barnard and Karaman (1991) established a new genus, *Septcarnes*, for *Socarnes septimus* Griffiths, 1975. The characters they used to separate *Septcarnes* from *Socarnes* and *Socarnopsis* were the "incised inner ramus of uropod 2 and the plate-like peduncle of uropod 3," and the character used to separate it from *Concarnes* was the "elongate, deeply cleft telson." We have studied specimens of *S. septimus* that have a setose molar with a reduced triturating patch on the molar; asymmetrical left and right setal-tooth 7 on the outer plate of maxilla 1; short, terminal robust setae on the palp of maxilla 1; a weakly subchelate gnathopod 1; a non-incised inner ramus on uropod 2; and a moderately cleft telson. These are all generic characters of *Socarnopsis*. For these reasons, we synonymize *Septcarnes* with *Socarnopsis*.

Remarks: Within the Lysianassinae there are several generic groups. One of these, the *Lysianassa*-group, dominates the lysianassine fauna of the Gulf of Mexico and Caribbean area. This group is characterized by mouthpart bundle subquadrate; upper lip produced and rounded; mandibular molar setose with a distal vestigial triturating patch grading to a sparsely setose flap; lacinia mobilis present as a slender peg or absent; mandibular palp article 3 with a gap between the proximal and distal setae of the posterior margin or the setae absent; maxilla 1 palp apically serrate; maxilla 1 inner plate with 2, 1, or no apical pappose setae; maxilliped outer plate with no apical or medial setae; uropod 2 inner ramus incised; and telson entire. Sexual dimorphism is strong in genera such as *Aruga* but is absent in genera

such as *Arugella*. The genera in this group are *Aruga*, *Arugella*, *Bonassa*, *Dartenassa*, *Dissiminassa*, *Lysianassa*, *Lysianopsis*, *Macronassa*, and *Shoemakerella*.

These genera have been split and amalgamated, in various combinations, several times. The extremes occur in J. L. Barnard (1969), where nearly all of these genera are combined under *Lysianassa* and in Barnard and Karaman (1991), where the complex is split into 12 genera. Until a thorough revision of these genera is complete, problems with generic concepts will remain. We are reluctant to change the status of these genera yet again unless there is very good evidence to do so.

Aruga, *Bonassa*, *Dissiminassa*, *Lysianopsis*, and *Shoemakerella* all occur in the Gulf of Mexico.

At their extremes, *Aruga* and *Lysianopsis* are apparently separable genera. *Aruga oculata* Holmes, 1908, has a strong set of male secondary sexual characters: strong 2-field callynophore, long second antenna, enlarged peduncular article 4 of second antenna, calceoli on antennae, plumose setae on merus/carpus of peraeopods 3/4, plumose setae on uropod 3. It also has symmetrical setal-tooth 7 on maxilla 1 and an elongate peduncle on uropod 3. *Lysianopsis alba* has none of these male secondary sexual characters but develops a weakly prehensile propodus on gnathopod 1 in the male. It has asymmetrical setal-tooth 7 on maxilla 1 and a short flanged peduncle on uropod 3. The new species *L. ozona* has combinations of characters that blur the generic distinction. On characters such as the symmetry of maxilla 1 setal-tooth 7 and the length of uropod 3 peduncle, *L. ozona* belongs in *Lysianopsis*. However, the single male specimen of *L. ozona* has an elongate antenna 2 but no other secondary sexual characters. It is not fully mature as it was about to moult when collected, so it may have developed these characters had it reached its final stage. If so, the species could belong in *Aruga*. This confuses the generic concepts recently established by Barnard and Karaman (1991), but until better male material is known for more species of *Lysianopsis*, we are reluctant to dismantle these genera. There is not as yet a good range of male specimens available for *Lysianopsis*. No male specimens are known for *L. subantarctica*, only one is known for *L. hummelincki* and one for *L. ozona*, and very few are known for *L. alba*.

Aruga Holmes, 1908

Aruga Holmes, 1908, p. 504; Pirlot, 1936, p. 263; J. L. Barnard, 1955, p. 97; Gurjanova, 1962, p. 292; Barnard and Karaman, 1991, p. 468.

Diagnosis: Antenna 1: with strong 2-field callynophore in female and male. Antenna 2 in male: peduncular article 4 enlarged, longer than broad; flagellum elongate. Epistome: not produced; upper lip: produced. Mandible: with protuberance on midposterior margin; lacinia mobilis a long slender peg; molar setose with vestigial distal triturating surface. Maxilla 1: outer plate, left and right ST7 symmetrical or weakly asymmetrical, STA–STD medially cuspidate; palp apically serrate. Gnathopod 1: simple, not sexually dimorphic. Peraeopods 3 and 4 in male: merus and carpus with plumose setae along posterior margin. Uropod 3: peduncle elongate, usually without lateral flange; male peduncle and rami with plumose setae; outer ramus 2-articulate. Telson: entire.

Type species: *Aruga oculata* Holmes, 1908.

Composition: *Aruga* contains *A. holmesi* J. L. Barnard, 1955; and *A. oculata* Holmes, 1908.

Lysianassa falklandica K. H. Barnard, 1932, has been placed in *Arugella* by Pirlot (1936) and in *Aruga* by Barnard and Karaman (1991). Although it belongs in this generic complex, it cannot be placed in a genus until the mouthparts are known. It is excluded from *Aruga* by the short, flanged peduncle of uropod 3, but it may belong in *Arugella* or *Shoemakerella*.

Remarks: See introductory remarks for the relationship between *Lysianopsis* and *Aruga* and remarks under *Dissiminassa* for the relationship of *Aruga* to that genus.

Aruga holmesi J. L. Barnard, 1955

Figures 17–20

Aruga holmesi J. L. Barnard, 1955, p. 100, pls. 27, 28; J. L. Barnard, 1958, p. 90; J. L. Barnard, 1959, p. 18; Gurjanova, 1962, pp. 299–301, figs. 98, 99; J. L. Barnard, 1964b, p. 79, chart 1; Barnard and Karaman, 1991, p. 469.

Lysianopsis holmesi: Hurley, 1963, pp. 74, 75, fig. 21b.

Lysianassa holmesi: J. L. Barnard, 1966a, p. 25; J. L. Barnard, 1966b, p. 69; J. L. Barnard, 1979, pp. 12, 130; Austin, 1985, p. 600; Stepicn and Brusca, 1985, pp. 97–101, fig. 2F; Stretch, 1985, pp. 129–133.

Material examined: **HOURLASS MATERIAL:** STATION A: 5 specimens; 11 May 1967; dredge; FSBC I 59951.—STATION B: 1 ♂; 17 June 1966; dredge; FSBC I 59952.—1 ♂, 8.0 mm; 18 October 1966; dredge; USNM 282684.—6 specimens; 20 January 1967; dredge; FSBC I 59954.—2 specimens; 20 May 1967; dredge; FSBC I 59955.—1 ♀; 31 August 1967; trawl; AM P47156.—1 specimen; 2 November 1967; dredge; FSBC I 59957.—STATION C: 1 specimen; 11 July 1967; dredge; FSBC I 59958.—1 specimen; 11 August 1967; dredge; FSBC I 59959.—1 specimen; 31 August–1 September 1967; trawl; FSBC I 59960.—1 specimen; 21 November 1967; dredge; FSBC I 59961.—STATION E: 2 specimens; 7 April 1966; trawl; FSBC I 59962.—1 specimen; 9 October 1966; dredge; FSBC I 59963.—11 specimens; 3 March 1967; dredge; FSBC I 59964.—1 specimen; 2 August 1967; dredge; FSBC I 59965.—STATION J: 8 specimens; 5 July 1967; dredge; AM P45332.—1 specimen; 7 August 1967; dredge; FSBC I 59967.—15 specimens; 14 November 1967; trawl; 13 specimens, including ♀, 8.5 mm, USNM 282685; 1 ♀, 1 ♂, 8.4 mm, AM P45331.—STATION K: 1 specimen; 30 January 1967; trawl; FSBC I 59969.—1 ♂; 5 July 1967; dredge; AM P47155.—1 specimen; 4 September 1967; trawl; FSBC I 59971.—STATION L: 5 specimens; 5 September 1966; dredge; FSBC I 59972.—1 specimen; 7 December 1966; dredge; FSBC I 59973.—1 specimen; 13 January 1967; trawl; FSBC I 59974.—1 ♂, 8.5 mm, 1 juvenile; 8 April 1967; dredge; USNM 282686.—1 ♂; 7 June 1967; dredge; FSBC I 59976.—2 specimens; 8 August 1967; trawl; FSBC I 59977.—4 specimens; 8 August 1967; dredge; FSBC I 59978.—1 specimen; 5 September 1967; dredge; FSBC I 59979.—2 ♀, 1 juvenile; 12 October 1967; dredge; FSBC I 59980.—1 specimen; 15 November 1967; trawl; FSBC I 59981.—STATION M: 1 ♀; 5 September 1967; dredge; FSBC I 59982.—**OTHER MATERIAL:** Bureau of Land Management MAFLA OCS stations; northeastern Gulf of Mexico: 1 specimen; west of Panama City; 30°08'02.1"N 86°30'00.0"W; medium sand; 40 m; September 1977; Station 2855C; USNM 284101.—5 specimens; 29°46'59.8"N 84°05'00.2"W; medium-fine sand; 10 m; September 1977; Station 2419G; USNM 284102.—1 specimen; 29°37'00.8"N 84°17'00.2"; silty, fine sand; 19 m; September 1977; Station 2423D; USNM 284103.—1 specimen; same locality; September 1977; Station 2423J; USNM 284104.—1 specimen; south of Panama City; 29°24'00.1"N 85°42'02.0"W; medium-fine sand; 42 m; August 1977; Station 2854G; USNM 284105.—1 specimen; northeastern Gulf of Mexico; 29°18'01.9"N 84°19'59.0"W; coarse sand; 29 m; August/September 1977; Station 2853G; ♀; 4.5 mm, with oostegite buds; AM P 47313.—1 specimen; 29°05'00.8"N 83°45'00.5"W; medium sand; 20 m; November 1977; Station 2318I; USNM 284106.—1 specimen; same locality; medium sand; 20 m; 9 November 1977; Station 2318J; USNM 284107.—1 specimen; 28°56'00.3"N 84°05'59.9"W; silty, very fine sand; 29 m; August 1977; Station 2317A; USNM 284108.—1 specimen; Florida Middle Grounds; 28°42'00.3"N 84°20'00.7"W; silty, fine sand; 35 m; November 1977; Station 2316C; USNM 284109.—1 specimen; same locality; August 1977; Station 2316H; USNM 284110.—1 specimen; same locality; August 1977; Station 2316I; USNM 284111.—1 specimen; west of Tampa Bay; 27°56'29.5"N 83°52'59.5"W; coarse sand; 43 m; November 1977; Station 2211-04; USNM 284112.—1 specimen; same locality; November 1977; Station 2211-05; USNM 284113.—1 ovigerous ♀; same locality; summer 1977;

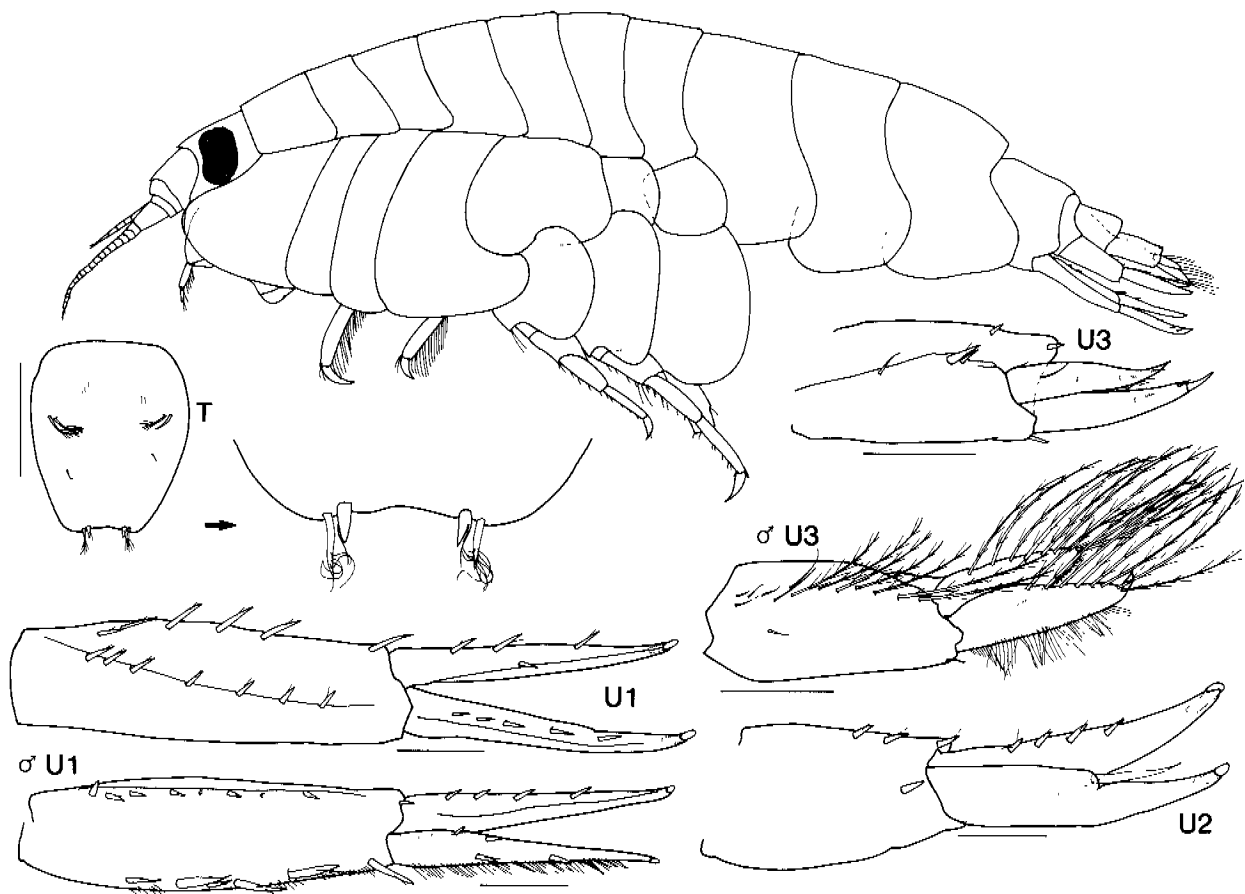


Figure 17. *Aruga holmesi* J. L. Barnard, 1955; whole animal: male, 8.5 mm (USNM 282686), west of Sanibel Island Light, Gulf of Mexico. Female T, U2, U3: female, 8.5 mm (USNM 282685), west of Sanibel Island Light, Gulf of Mexico. Male U1, U3: male, 8.0 mm (USNM 282684), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

Station 2211-09; USNM 284114.—1 ♂, 1 immature; same locality; November 1977; Station 2211-09; USNM 284115.—1 specimen; same locality; November 1977; Station 2211-10; USNM 284116.—1 specimen; west of Tampa Bay; 27°37.2'N 83°53.5'W; coarse sand; 50 m; summer 1977; Station 2748-10; USNM 284117.—1 specimen; 25°40'N 82°20'W; fine sand; 27 m; summer 1977; Station 2960-10; USNM 284118.

Diagnosis: Epimeron 3: without an upturned tooth on posterior margin. Telson: distal margin truncated, slightly emarginate.

Description: Based on female, non-ovigerous, 8.5 mm (USNM 282685); male, 8.0 mm (USNM 282684). Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes reniform, black in alcohol, enlarged in adult male. Antenna 1: medium length, $0.2 \times$ body; peduncular article 1 short, length $1.1 \times$ breadth; peduncular article 2 short, $0.3 \times$ article 1; peduncular article 3 short, $0.14 \times$ article 1; accessory flagellum long, $0.5 \times$ primary flagellum, 8-articulate, article 1 long, $2 \times$ article 2 (male long, $1.8 \times$ article 2); flagellum 14-articulate (male 15), with strong 2-field callynophore in female (strong 2-field callynophore in male), without flagellar robust setae, calceoli absent in female (5 present in adult male). Antenna 2: slightly longer than antenna 1 ($1.2 \times$ body length in male); peduncle without brush setae (strong brush setae in male), weakly geniculate between peduncular articles 3–4, article 3 short, $0.6 \times$ article 4 (male strongly geniculate between peduncular articles 4–5, article 3 short, $0.4 \times$ article 4), peduncular article 4 in male enlarged, slightly longer than broad, article 5 elongate,

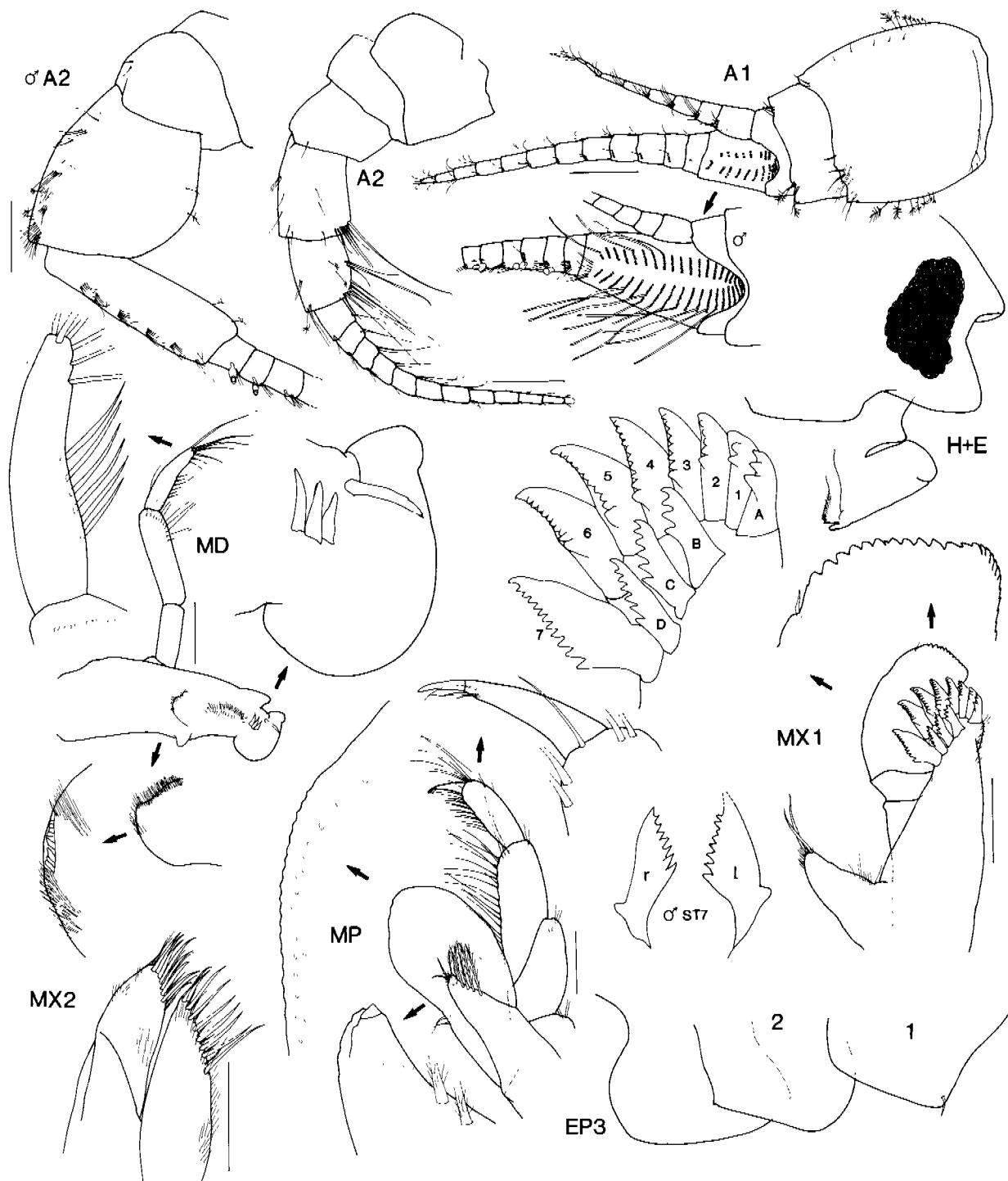


Figure 18. *Aruga holmesi* J. L. Barnard, 1955, female, 8.5 mm (USNM 282685), male, 8.0 mm (USNM 282684), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.2 mm.

slender, length $3 \times$ breadth; flagellum at least 12-articulate (male at least 62, damaged), calceoli absent in female (19 present in adult male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome concave, upper lip

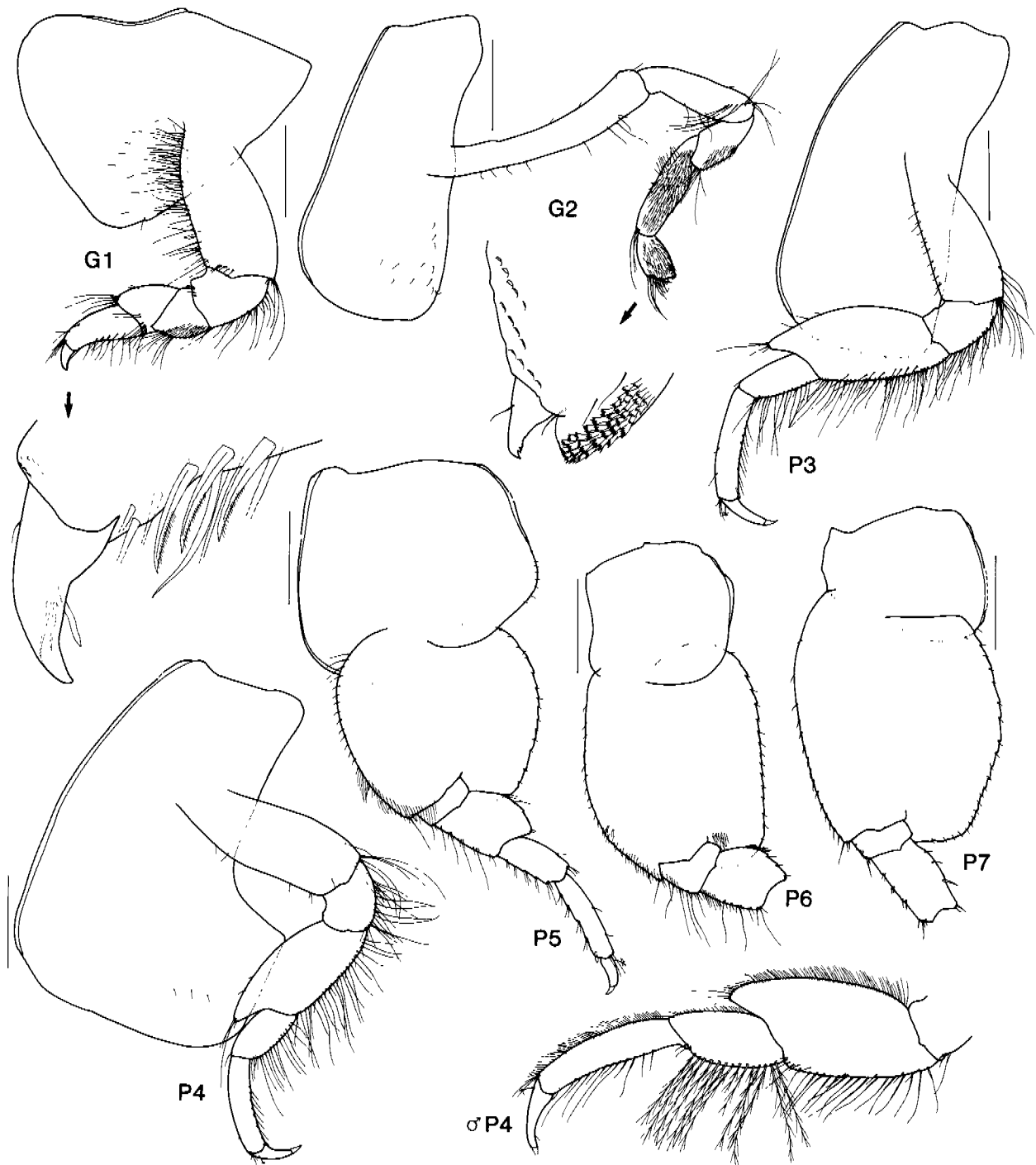


Figure 19. *Aruga holmesi* J. L. Barnard, 1955, female, 8.5 mm (USNM 282685), male, 8.0 mm (USNM 282684), west of Saniel Island Light, Gulf of Mexico. Scales represent 0.5 mm.

produced, apically rounded. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis a long slender peg; accessory setal row, left row with 3, right row with 4 short, slender, multiserrate setae; intermediate setae absent; molar poorly setose, with rudimentary distal triturating surface; mandibular palp attached midway; article 1 long, length $2.7 \times$ breadth; article 2 slender,

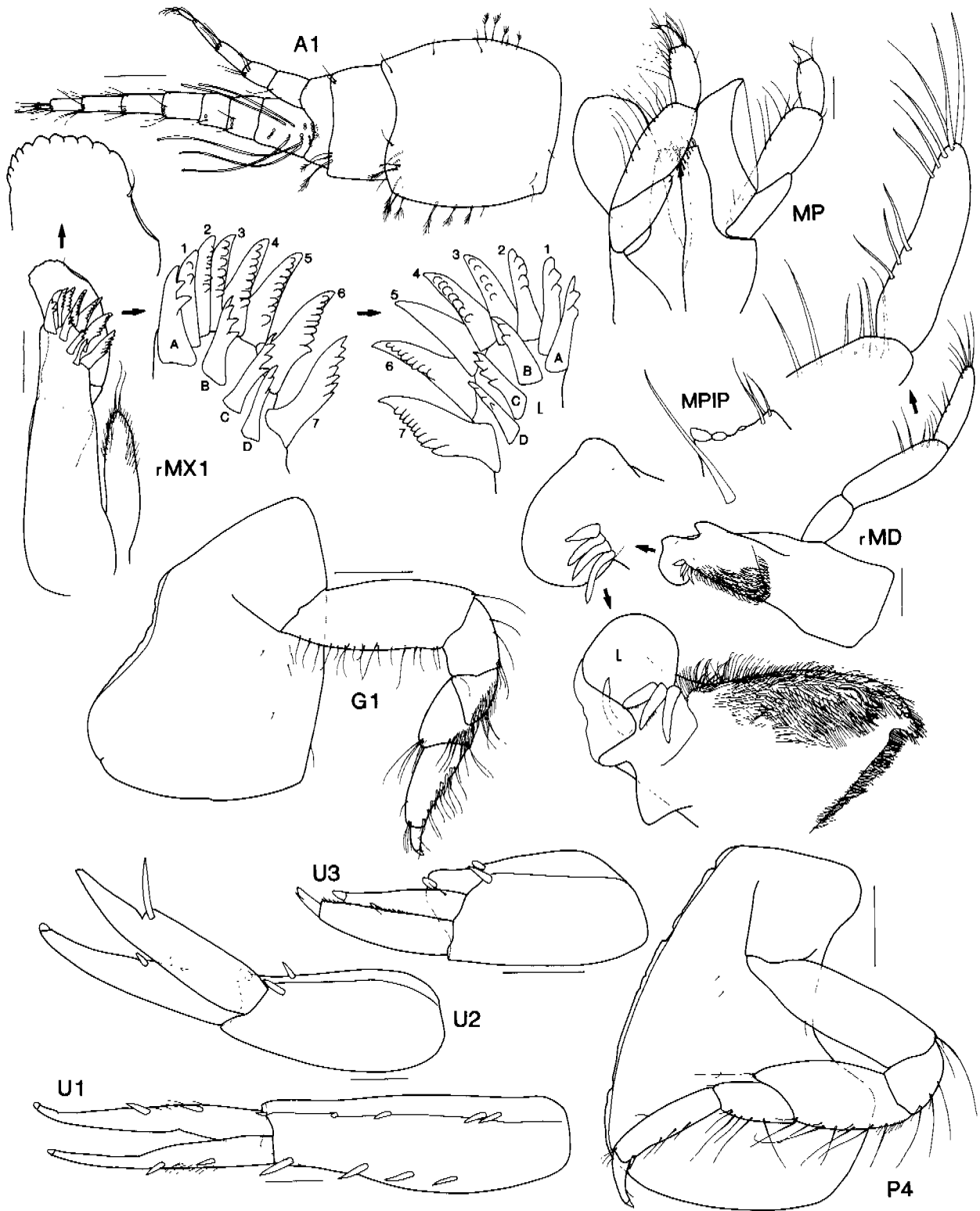


Figure 20. *Aruga holmesi* J. L. Barnard, 1955, immature female, 4.5 mm (AM P47313), northeastern Gulf of Mexico. Scales for G1, P7 represent 0.2 mm, remainder represent 0.1 mm.

length $3.4 \times$ breadth, $1.2 \times$ article 3, with 11 (male 12) submarginal anterodistal A2-setae, without B2- or D2-setae; article 3 slender, blade-like, long, length $4 \times$ breadth, without A3- or B3-setae, with 6 (male 5) proximal D3-setae, with 3 (male 5) distal D3-setae and 3 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose apical setae; outer plate broad with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 10-cuspidate, ST5 large, stout, 10-cuspidate, ST6 large, stout, 10-cuspidate, ST7 slightly asymmetrical, slightly displaced from ST6, large, broad, 11-cuspidate distomedially, STA large, slightly displaced from STB, 2-cuspidate, STB large, broad, 3-cuspidate, STC large, broad, 5-cuspidate, STD large, broad, 6-cuspidate; palp large, 2-articulate, with serrate apical margin, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate. Maxilla 2: inner and outer plates narrow; inner plate length $0.9 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row strong, with 7 pappose setae; outer plate small, subovate, without apical slender setae, without apical robust setae, medial setae absent, submarginal setae absent; palp large, 4-articulate, article 2 slender, length $2.9 \times$ breadth, $1.6 \times$ article 3, article 3 long, slender, length $2.8 \times$ breadth, dactylus well developed, with 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length $2 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.2 \times$ breadth; merus, posterior margin with group of long simple setae and patch of short setae; carpus wedge-shaped, produced anteriorly, short, length $1.3 \times$ breadth, subequal to ($1 \times$) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length $1.8 \times$ breadth, tapering distally, posterior margin smooth, subtly sinusoidal, with 5 simple robust setae and 7 groups of simple, slender setae, palm absent; dactylus simple, with 1 short, simple, robust seta along posterior margin. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length $3.4 \times$ breadth; carpus long, length $3.5 \times$ breadth, posterior margin straight; propodus subrectangular, short, length $1.6 \times$ breadth, palm slightly obtuse, with convex, serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus expanded anterodistally along carpus; merus-carpus with plumose setae in male and female; propodus with 8 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin straight; merus expanded anterodistally along carpus; merus-carpus with plumose setae in male and female; propodus with 7 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa bilobate, anterior lobe slightly produced ventrally; basis expanded, posterior margin minutely crenate; merus expanded with rounded posterior margin; propodus with 4 pairs of robust and slender setae and 1 distal locking seta along anterior margin, with 4 slender setae along posterior margin; dactylus short, stocky. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with minutely crenate posterior margin; merus broadly expanded with rounded posteroproximal shoulder and straight posterior margin. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner narrowly rounded, posteroventral margin straight; merus not expanded posteriorly, with 5 robust setae.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, with strong horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner narrowly rounded. Epimeron 3: posteroventral corner broadly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 7 dorsolateral, 5 dorsomedial, and 1 apicomедial robust

setae; rami subequal in length; outer ramus with 5 dorsal robust setae; inner ramus with 4 dorsal robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral, 1 apicolateral, and 1 apicomедial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 4 dorsal robust setae; inner ramus with 1 dorsal robust seta; inner ramus with weak constriction. Uropod 3: sexually dimorphic; peduncle long, length $2.6\times$ breadth (in male, peduncle long, length $2\times$ breadth), with dorsolateral flange, with 1 dorsolateral (male 0), 1 apicolateral (male 1), and 1 dorsomedial (male 1) robust setae, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae; rami lanceolate, inner ramus slightly shorter than (about $0.8\times$) outer ramus; outer ramus 2-articulate, article 2 short; rami without simple robust setae; slender plumose setae absent in female (present in male). Telson: sexually dimorphic, longer than broad, length $1.2\times$ breadth, entire, without dorsal robust setae, with sparse dorsal setae, distal margins emarginate, with 2 apical penicillate setae, without apical slender setae, with 2 apical robust setae.

Distribution: California to Ecuador, eastern Pacific Ocean, in 4 to 120 m; Gulf of Mexico in 7- to 73-m depths.

Remarks: Until now *Aruga holmesi* has been known only from the Pacific coast of North America. We cannot distinguish specimens we have examined from the Gulf of Mexico from Pacific coast material. This is the first record of *Aruga* from the Atlantic Ocean. The genus was previously known only from the Pacific side of the Isthmus of Panamá.

Bonassa Barnard and Karaman, 1991

Bonassa Barnard and Karaman, 1991, p. 472.

Diagnosis: Antenna 1: callynophore [unknown in female], strong 2-field in male. Antenna 2 in male: [peduncular article 4 probably enlarged, longer than broad], flagellum elongate. Epistome and upper lip: both produced. Mandible: without protuberance on midposterior margin; lacinia mobilis absent; molar a reduced setose flap. Maxilla 1: outer plate, ST7 probably slightly asymmetrical, STA–STD apically bifurcate; palp apically serrate. Gnathopod 1: simple, [sexual dimorphism unknown, probably not dimorphic]. Peraeopods 3–4 in male: merus and carpus with plumose setae along posterior margin. Uropod 3: peduncle elongate, without lateral flange; male peduncle and rami with plumose setae; outer ramus 1-articulate. Telson: entire.

Type species: *Lysianassa bonairensis* Stephensen, 1933a.

Composition: *Bonassa* contains *B. bonairensis* (Stephensen, 1933a).

Remarks: *Bonassa* is most similar to *Macronassa* and *Shoemakerella*. It is possible that *Macronassa* is a junior synonym of *Bonassa*. The males of *B. bonairensis* and *M. macromera* (Shoemaker, 1916) are very similar, especially in the large calceoli on antennae 1 and 2; the reduced mandibular molars; the short, apically bifurcate setal-teeth A to D on outer plate of maxilla 1; and the third uropods with long peduncles and plumose setae on the peduncles and rami. However, in *M. macromera* the third uropods are sexually dimorphic—the female has a short peduncle without plumose setae, and the male has a long peduncle with plumose setae. Unfortunately, *B. bonairensis* is known only from a single adult male. We are reluctant to synonymize the two genera without knowing the condition of female uropod 3 in *B. bonairensis*. Other species, such as *L. cinghalensis* (Stebbing, 1897), *L. ewa* J. L. Barnard, 1970, and an undescribed species from northwestern Australia, also have dimorphic third uropods and may also belong in *Macronassa*. *Shoemakerella* differs from *Bonassa* in having an unproduced epistome, a row of robust setae on the mandibular molar, and non-setose third uropods with short peduncles.

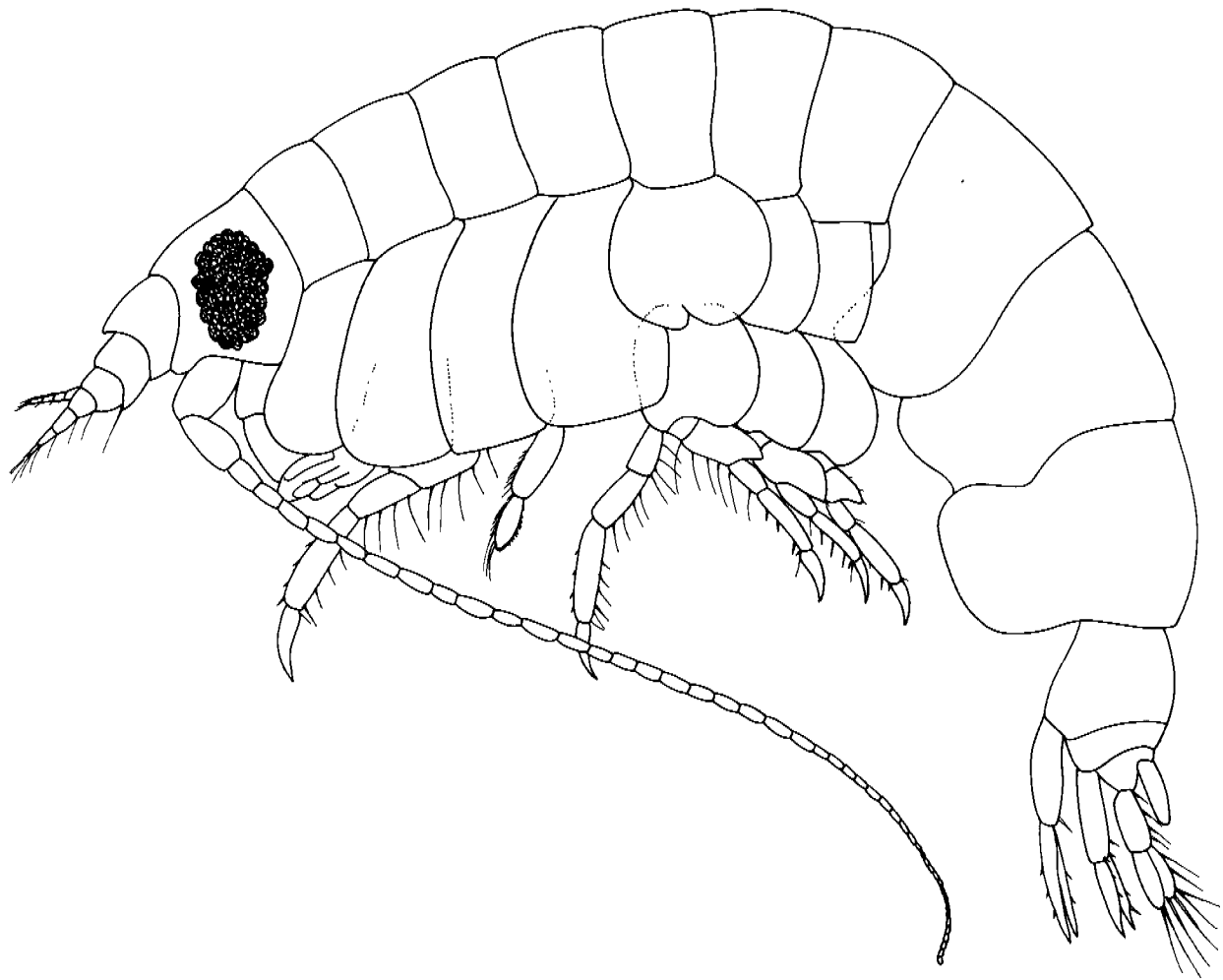


Figure 21. *Bonassa bonairensis* (Stephensen, 1933), holotype male, 3 mm (ZMC), Bonaire, Caribbean Sea; after Stephensen, 1933a.

Bonassa bonairensis (Stephensen, 1933a)

Figures 21–23

Lysianassa (?) *bonairensis* Stephensen, 1933a, pp. 416–420, figs. 1, 2; Stephensen, 1948, pp. 1, 3.

Lysianassa bonairensis: J. L. Barnard, 1958, p. 94; Ortiz, 1979, p. 19.

Bonassa bonairensis: Barnard and Karaman, 1991, p. 472.

Type material examined: **HOLOTYPE**: ♂; 3 mm; Pos Baca near Kralendijk, Bonaire, Caribbean Sea; approximately 12°10'N 68°17'W; in a well with a little stagnant water in coral limestone; 17 May 1930; Station 53b; ZMC.—**HOURLASS MATERIAL**: None.

Description: Based on holotype male, 3 mm (ZMC); female unknown. Head and body: without scattered setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, dark. Antenna 1: short, 0.15 × body; peduncular article 1 short, length 1.1 × breadth, with small midme-

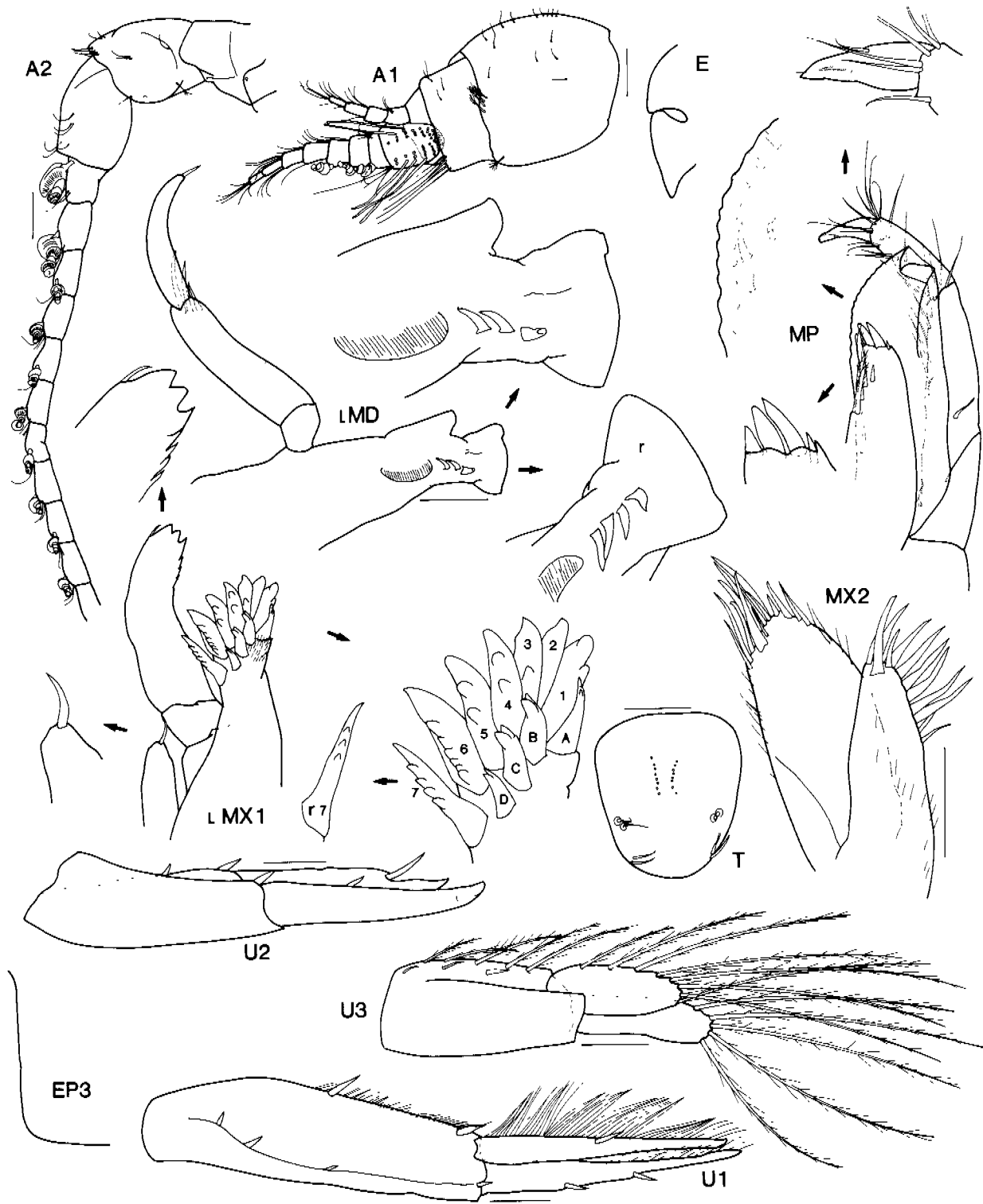


Figure 22. *Bonassa bonairensis* (Stephensen, 1933), holotype male, 3 mm (ZMC), Bonaire, Caribbean Sea; E after Stephensen, 1933a. Scales represent 0.05 mm.

dial spine; peduncular article 2 short, $0.3 \times$ article 1; accessory flagellum long, $0.5 \times$ primary flagellum, 4-articulate, article 1 short, $1.3 \times$ article 2; flagellum 8-articulate in male, with strong 2-field callynophore,

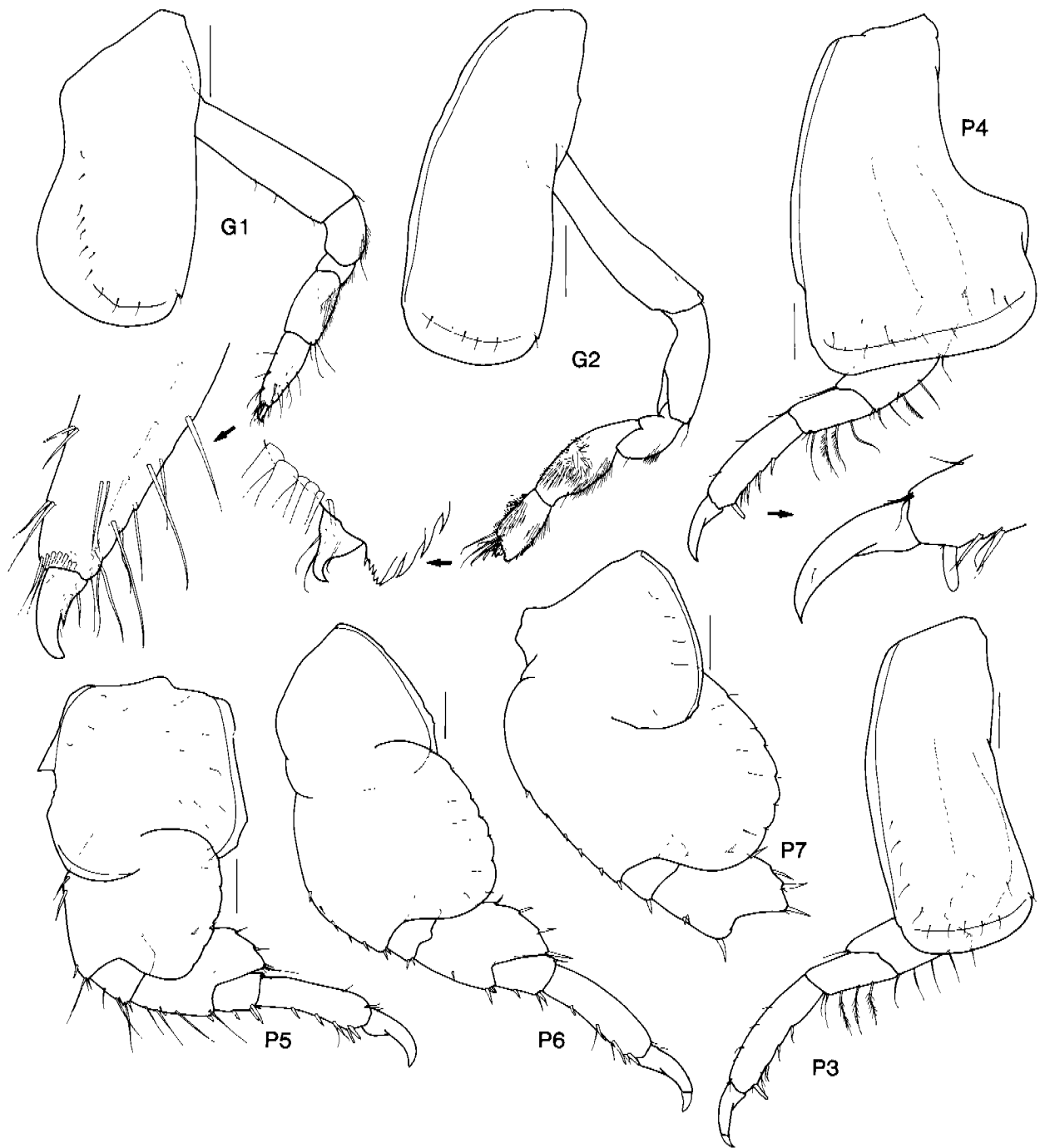


Figure 23. *Bonassa bonairensis* (Stephensen, 1933), holotype male, 3 mm (ZMC), Bonaire, Caribbean Sea. Scales represent 0.1 mm.

calceoli present in male. Antenna 2: $0.65 \times$ body length in male; peduncle without brush setae, strongly geniculate between peduncular articles 3–4, article 3 long, $1 \times$ article 4, peduncular articles 4 and 5 not enlarged in male, flagellum 36-articulate in male, calceoli present in adult male, proximal calceoli much larger than distal.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome slightly produced, rounded, upper lip slightly produced, straight. Mandible: incisors symmetrical, large, with slightly convex

margins; lacinia mobilis absent; accessory setal row, left row with 3, right row with 4 short, robust, simple setae; intermediate setae absent; molar a reduced finely setose flap; mandibular palp attached proximally; article 1 short, length $1 \times$ breadth; article 2 slender, length $3.4 \times$ breadth, $1.1 \times$ article 3, with 3 distal A2-setae, without D2-setae; article 3 slender, falcate, long, length $5.2 \times$ breadth, without A3- or D3-setae, with 1 apical E3-seta. Maxilla 1: inner plate narrow, with 1 simple apical seta; outer plate broad with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, smooth to weakly cuspidate, ST4 large, stout, 2-cuspidate, ST5 large, stout, 2-cuspidate, ST6 large, stout, 6-cuspidate, ST7 probably slightly asymmetrical, slightly displaced from ST6, large, broad, 4-cuspidate medially, STA large, slender, displaced from STB, apically bifurcate, STB short, broad, apically bifurcate, STC short, broad, apically bifurcate, STD short, broad, apically bifurcate; palp large, 2-articulate, with serrate apical margin, robust flag seta present on distolateral corner, distomedial margin serrate. Maxilla 2: inner plate narrow, outer plate broader; inner plate length unknown. Maxilliped: inner plate large, subrectangular, with 3 apical short, robust setae, oblique setal row reduced with 4 pappose setae; outer plate small, subovate, without apical slender setae, without apical robust setae, medial setae absent, submarginal setae short, simple; palp large, 4-articulate, article 2 broad, length $3.6 \times$ breadth, $2 \times$ article 3, article 3 long, slender, length $3 \times$ breadth, dactylus well developed, with 3 subterminal setae, unguis absent.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length $4.1 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.6 \times$ breadth; merus, posterior margin with patch of short setae; carpus subrectangular, short, length $1.9 \times$ breadth, shorter than ($0.9 \times$) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length $2.7 \times$ breadth, tapering distally, posterior margin smooth, convex, with simple, slender setae, palm absent; dactylus simple, with subterminal spine. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $2.8 \times$ breadth; carpus long, length $2.7 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, short, length $1.8 \times$ breadth, palm slightly obtuse, with straight, serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus with few plumose setae in male; propodus with 4 robust setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: coxa with large posteroventral lobe, anterior and posterior margins subparallel; merus weakly expanded anteriorly; merus-carpus with few plumose setae in male; propodus with 3 robust setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin minutely crenate; merus expanded, with rounded posterior margin; propodus with 3 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 6: coxa small, not lobate posteriorly; basis expanded posteriorly, with minutely crenate posterior margin; merus expanded, with rounded posterior margin; propodus with 3 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus distally expanded, margin sloping proximally, straight distally with 5 setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: unknown. Gills: with weak horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner broadly rounded. Urosomites: dorsally smooth. Uropod 1: with long fine setae; peduncle with 3 dorsolateral, 1 apicolateral, 1 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 lateral robust setae; inner ramus with 1 medial robust seta. Uropod 2: without fine setae; peduncle with 1 dorsolateral, 1 apicolateral and 1 apicomедial robust setae; outer ramus slightly

longer than inner ramus; outer ramus with 1 dorsal robust seta; inner ramus with 1 dorsal robust seta, with weak constriction. Uropod 3: peduncle long in male, length $2 \times$ breadth, without dorsolateral flange, with 1 dorsolateral robust seta, without midlateral slender or robust setae, without distoventral robust setae, with plumose setae; rami "paddle-like," subequal in length; outer ramus 1-articulate; rami without simple robust setae, with slender plumose setae in male. Telson: longer than broad, length $1.1 \times$ breadth, entire, without dorsal robust setae, distal margins rounded, each with 1 apical penicillate seta and 1 apical slender seta, without apical robust setae.

Type locality: Pool in coral limestone at Pos Baca, near Kralendijk, Caribbean Sea.

Distribution: Bonaire Island, Lesser Antilles, Caribbean Sea; anchihaline.

Remarks: The only material of the species (Stephensen's slides of the type specimen) has the maxillae 1 mounted in such a way that it is not possible to say with certainty whether setal-teeth 7 are symmetrical or not. However, the apparently unequal lengths of the medial margins suggest that they are slightly asymmetrical.

Concarnes Barnard and Karaman, 1991

Concarnes concavus (Shoemaker, 1933)

Figures 24–26

Socarnes concavus Shoemaker, 1933a, pp. 247, 248, fig. 1; J. L. Barnard, 1958, p. 99; Gurjanova, 1962, p. 304 (key); Ortiz, 1979, p. 19.

Concarnes concavus: Barnard and Karaman, 1991, p. 477.

Material examined: **HOURLASS MATERIAL:** STATION C: 1 specimen; 19 May 1966; dredge; FSBC I 60046.—1 specimen; 13 December 1966; dredge; FSBC I 60122.—1 specimen; 6 January 1967; trawl; FSBC I 60047.—2 specimens; 6 January 1967; dredge; FSBC I 60048.—1 specimen; 20 May 1967; trawl; FSBC I 60049.—1 specimen; 2 June 1967; dredge; FSBC I 60050.—1 specimen; 5 October 1967; dredge; FSBC I 60051.—STATION D: 1 specimen; 3 May 1966; dredge; FSBC I 60052.—7 specimens; 19 May 1966; trawl; FSBC I 60053.—1 specimen; 11 July 1966; trawl; FSBC I 60054.—1 specimen; 1 September 1966; trawl; FSBC I 60055.—2 specimens; 9 September 1966; trawl; FSBC I 60056.—3 specimens; 19 October 1966; trawl; FSBC I 60057.—3 specimens; 9 November 1966; dredge; FSBC I 60058.—1 specimen; 20 November 1966; trawl; FSBC I 60059.—1 specimen; 2 December 1966; trawl; FSBC I 60060.—4 specimens; 14 December 1966; trawl; AM P47116.—1 specimen; 6 February 1967; trawl; FSBC I 60061.—5 specimens; 6 February 1967; dredge; FSBC I 60062.—1 specimen; 28 February 1967; trawl; FSBC I 60063.—1 specimen; 28 February 1967; dredge; FSBC I 60008.—1 specimen; 3 March 1967; dredge; FSBC I 60009.—1 specimen; 15 March 1967; trawl; FSBC I 60010.—1 specimen; 15 March 1967; dredge; FSBC I 60011.—5 specimens; 4 April 1967; dredge; FSBC I 60012.—1 specimen; 12 May 1967; trawl; FSBC I 60013.—2 specimens; 12 May 1967; dredge; FSBC I 60014.—1 specimen; 21 May 1967; dredge; FSBC I 60015.—1 specimen; 3 June 1967; dredge; FSBC I 60016.—2 specimens; 21 June 1967; dredge; FSBC I 60017.—3 specimens; 12 July 1967; dredge; FSBC I 60018.—4 specimens; 2 August 1967; trawl; FSBC I 60019.—2 specimens; 25 August 1967; trawl; FSBC I 60020.—10 specimens; 1 September 1967; trawl; FSBC I 60021.—1 specimen; 1 September 1967; dredge; FSBC I 60022.—1 specimen; 12 September 1967; trawl; FSBC I 60023.—2 specimens; 12 September 1967; dredge; FSBC I 60024.—7 specimens; 6 October 1967; trawl; FSBC I 60025.—1 specimen; 6 October 1967; dredge; FSBC I 60026.—2 specimens; 27 October 1967; trawl; FSBC I 60027.—1 specimen; 27 October 1967; dredge; FSBC I 60028.—2 specimens; 3 November 1967; trawl; FSBC I 60029.—2

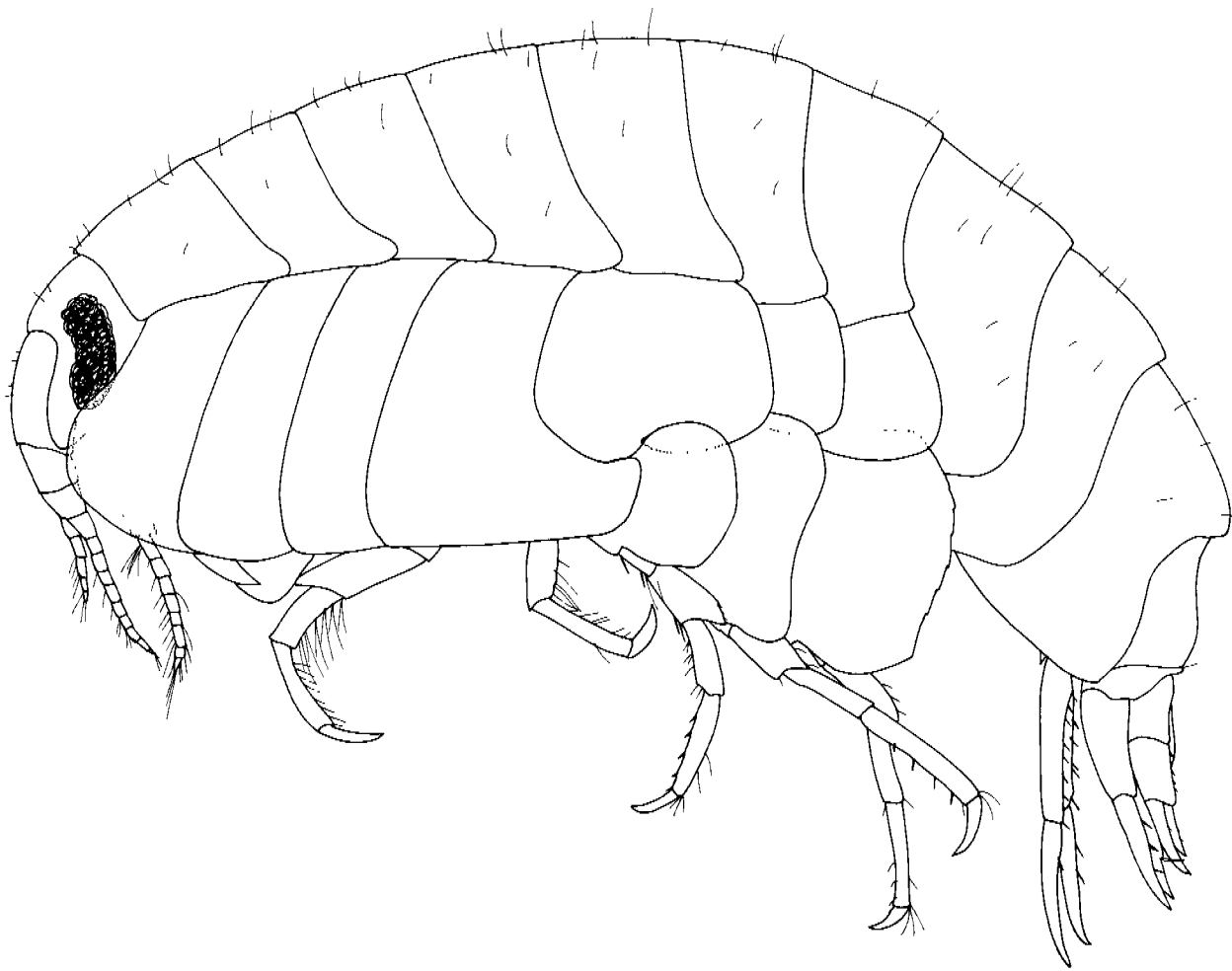


Figure 24. *Concarnes concavus* (Shoemaker, 1933), female, 8.5 mm (USNM 282688), west of Sanibel Island Light, Gulf of Mexico.

specimens; 21 November 1967; trawl; FSBC I 60030.—STATION E: 2 specimens; 7 April 1966; trawl; FSBC I 60031.—1 specimen; 7 June 1966; dredge; FSBC I 60032.—1 specimen; 9 October 1966; dredge; FSBC I 60033.—6 specimens; 9 November 1966; trawl; FSBC I 60034.—3 specimens; 2 December 1966; trawl; FSBC I 60035.—2 specimens; 2 December 1966; dredge; FSBC I 60036.—1 specimen; 26 January 1967; trawl; FSBC I 60125.—1 specimen; 6 February 1967; dredge; FSBC I 60037.—3 specimens; 3 March 1967; trawl; FSBC I 60038.—18 specimens; 12 May 1967; trawl; FSBC I 60039.—6 specimens; 2 August 1967; dredge; FSBC I 60040.—4 specimens (including 9.5-mm female and 4.4-mm male illustrated in Figs. 25 and 26); 1 September 1967; trawl; USNM 282687.—4 specimens; 3 November 1967; trawl; FSBC I 60041.—STATION K: 1 specimen; 7 April 1967; dredge; FSBC I 60042.—2 specimens; 5 July 1967; dredge; FSBC I 60043.—1 specimen; 4 September 1967; trawl; FSBC I 60044.—2 specimens; 14 November 1967; dredge; FSBC I 60045.—STATION L: 1 specimen; 6 July 1966; dredge; FSBC I 60064.—4 specimens; 6 August 1966; dredge; FSBC I 60065.—13 specimens (including 8.5-mm female, whole-animal illustration of Fig. 24); 5 September 1966; dredge; USNM 282688.—1 specimen; 13 November 1966; trawl; FSBC I 60067.—3 specimens; 13 November 1966; dredge; FSBC I 60068.—1 specimen; 16 February 1967; dredge; FSBC I 60069.—1 specimen; 9 March 1967; trawl; FSBC I 60070.—1 specimen; 8 April 1967; dredge; FSBC I 60071.—1 specimen; 7 June 1967; trawl; FSBC I 60072.—4 specimens; 7 June 1967; dredge; FSBC I 60073.—4 specimens; 6 July 1967; trawl; FSBC I

60074.—4 specimens; 8 August 1967; trawl; FSBC I 60075.—19 specimens; 8 August 1967; dredge; FSBC I 60076.—2 specimens; 5 September 1967; trawl; FSBC I 60077.—2 specimens; 5 September 1967; dredge; FSBC I 60078.—3 specimens; 12 October 1967; trawl; FSBC I 60079.—3 specimens; 12 October 1967; dredge; FSBC I 60080.—12 specimens; 15 November 1967; trawl; FSBC I 60081.—10 specimens; 15 November 1967; dredge; FSBC I 60082.—STATION M: 1 specimen; 13 June 1966; dredge; FSBC I 60083.—1 specimen; 6 August 1966; trawl; FSBC I 60084.—11 specimens; 5 September 1966; dredge; AM P47117.—2 specimens; 13 October 1966; dredge; FSBC I 60085.—1 specimen; 13 November 1966; trawl; FSBC I 60086.—4 specimens; 13 November 1966; dredge; FSBC I 60087.—4 specimens; 7 December 1966; dredge; FSBC I 60088.—3 specimens; 13 January 1967; trawl; FSBC I 60089.—4 specimens; 9 March 1967; dredge; AM P47118.—1 specimen; 7 June 1967; dredge; FSBC I 60090.—4 specimens; 6 July 1967; trawl; FSBC I 60091.—3 specimens; 8 August 1967; trawl; FSBC I 60092.—**OTHER MATERIAL:** 4 specimens; course 270° from Egmont Channel Seabuooy, Gulf of Mexico; 27°37.5'N 83°59.3'W; 54.8 m; E. L. Bousfield and D. K. Camp; 15 October 1976; Station D2; CMN C1996-0024.—Bureau of Land Management MAFLA OCS stations; northern Gulf of Mexico: 3 specimens; southwest of Panama City; 29°54'58.6"N 86°04'58.5"W; coarse sand; 37 m; September 1977; Station 2528I; USNM 284120.—1 specimen; same locality; September 1977; Station 2528J; USNM 284121.—1 specimen; northeastern Gulf of Mexico; 29°18'01.9"N 84°19'59.0"W; coarse sand; 29 m; August/September 1977; Station 2853D; USNM 284122.—1 specimen; Looe Key Reef, Florida Keys, Atlantic Ocean; approx. 24°32.5'N 82°24.0'W; J. D. Thomas; October 1983; station LKFR-1B; AM P47093.—1 specimen; Carrie Bow Cay, Belize, Caribbean Sea; 16°48'N 88°05'W; formalin wash of rubble from patch reef just inside foreereef crest; 2 m; J. D. Thomas; 6 July 1987; station Bel 120B; AM P47094.

Description: Based on female, ovigerous (8 eggs), 9.5 mm (USNM 282687), male, 4.4 mm (USNM 282687). Head and body: head and peraeonites 1 to 5 bright orange, white posteriorly (J. D. Thomas, personal communication), with scattered setae. Head: deeper than long, lateral cephalic lobe large, broad, distally truncated; rostrum absent; eyes reniform, dark, enlarged in adult male. Antenna 1: short, 0.2× body; peduncular article 1 medium length, length 1.5× breadth; peduncular article 2 long, 0.5× article 1; peduncular article 3 long, 0.28× article 1; accessory flagellum medium length, 0.5× primary flagellum, 6-articulate, article 1 short, 0.9× article 2 (male long, 1.7× article 2); flagellum 12-articulate (male 8), without callynophore in female (strong 2-field callynophore in male), without flagellar robust setae, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (same in male); peduncle with weak brush setae in female and male, weakly geniculate between peduncular articles 3–4, article 3 short, 0.37× article 4 (male weakly geniculate between peduncular articles 3–4, article 3 short, 0.55× article 4), peduncular articles 4 and 5 not enlarged in female or male; flagellum 9-articulate (male 7), calceoli absent in female and male.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome produced, concave dorsally, rounded ventrally, upper lip produced, rounded proximally, straight distally, angled posteriorly. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis absent; accessory setal row, left row with 3 long, slender, multiserrate setae; intermediate setae absent; molar a small, smooth flap with finely setose margins; mandibular palp attached extremely proximally; article 1 short, length 1.5× breadth; article 2 slender, length 5× breadth, 1.6× article 3, with 10 (male 9) distal A2-setae, without D2-setae; article 3 weakly falcate, long, length 4.8× breadth, without A3-setae, with 2 (male 3) proximal D3-setae, with 2 (male 2) distal D3-setae and 2 apical E3-setae. Maxilla 1: inner plate tapering distally, with 2 apical pappose setae; outer plate broad, with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate, ST4 large, stout, 2-cuspidate, ST5 large, stout, 3-cuspidate, ST6 large, broad, 5-cuspidate, ST7 slightly displaced from ST6, large, broad, 7-cuspidate medially, STA large, slightly displaced from STB, 2-cuspidate, STB large, broad, 2-cuspidate, STC large, broad, 2-cuspidate, STD large, broad, 2-cuspidate; palp large, 2-articulate, with serrate apical margin, without subterminal setae, robust flag seta present on serrate distolateral corner, distomedial margin serrate. Maxilla 2: inner plate

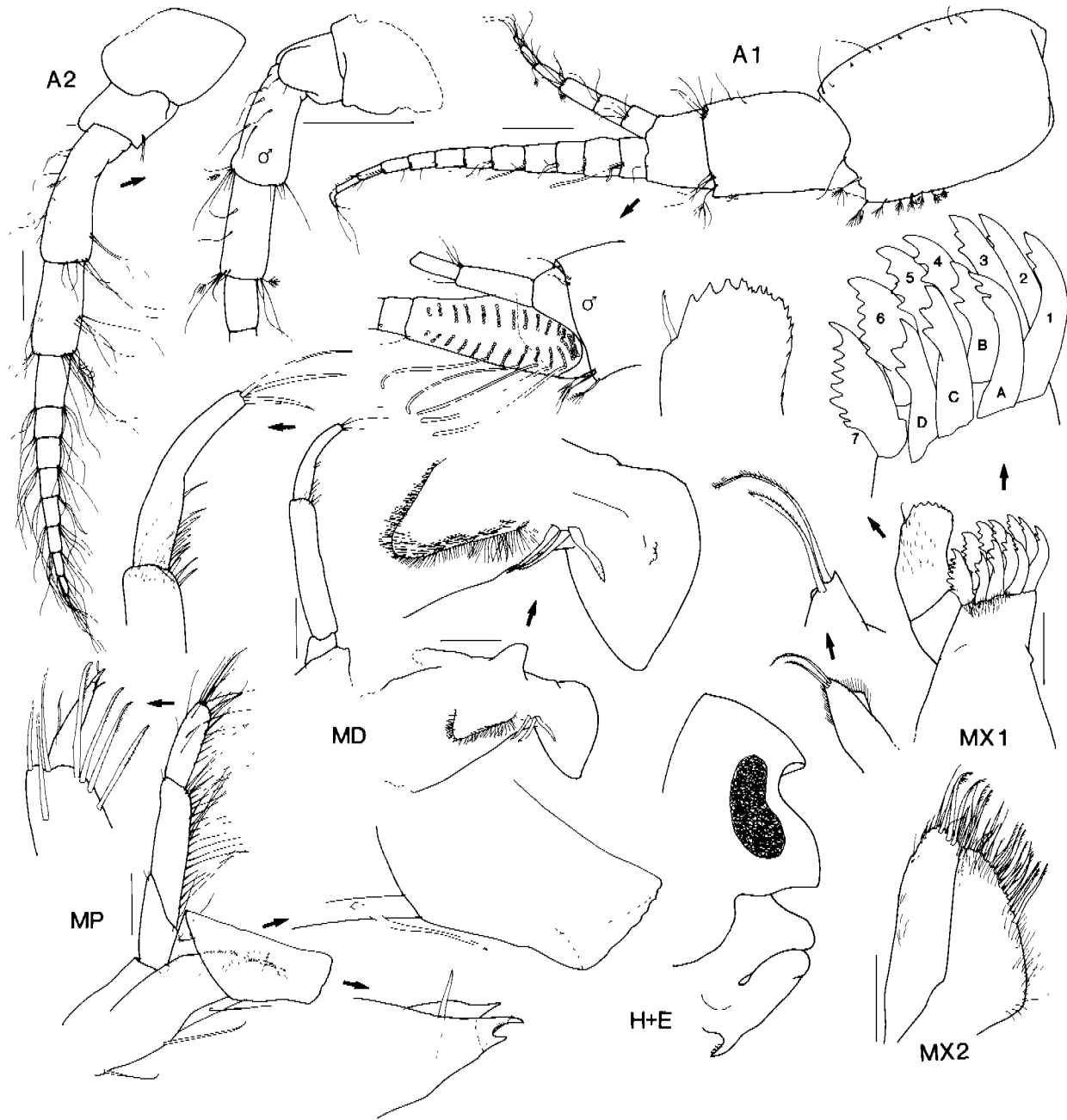


Figure 25. *Concarnes concavus* (Shoemaker, 1933), female, 9.5 mm (USNM 282687), male, 4.4 mm (USNM 282687), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

broad, outer plate narrow; inner plate length $0.9 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row reduced with 1 simple seta; outer plate small, subrectangular, without apical slender setae, without apical robust setae, medial setae absent, submarginal setae absent; palp large, 4-articulate, article 2 slender, length $4.3 \times$ breadth, $1.7 \times$ article 3, article 3 long, slender, length $3 \times$ breadth, dactylus well developed, with 2 subterminal setae, unguis present.

Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner

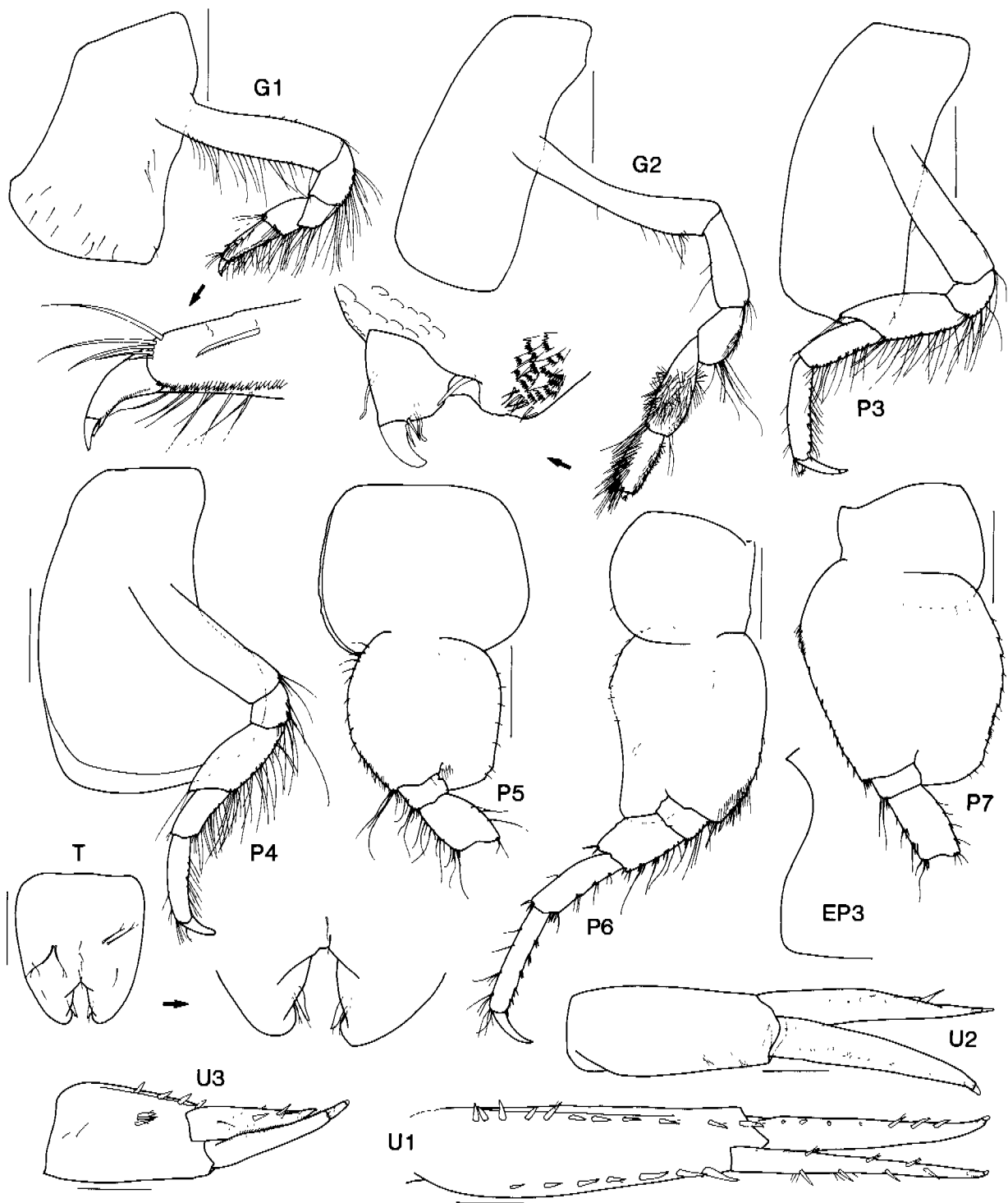


Figure 26. *Concarnes concavus* (Shoemaker, 1933), female, 9.5 mm (USNM 282687), west of Egmont Key, Gulf of Mexico. Scales for U1-3, T represent 0.2 mm, remainder represent 0.5 mm.

produced, rounded, posterior margin straight; basis long, slender, length $4 \times$ breadth, anterior margin smooth, with simple setae; ischium long, length $1.7 \times$ breadth; merus, posterior margin lined with long plumose setae; carpus subtriangular, short, length $1.6 \times$ breadth, shorter than ($0.8 \times$) propodus, with long simple setae along posterior margin; propodus large, subrectangular, length $2.5 \times$ breadth, tapering distal-

ly, posterior margin serrate, straight, with simple, slender setae, palm absent; dactylus simple, with subterminal spine. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $2.7 \times$ breadth; carpus long, length $3 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, long, length $2.5 \times$ breadth, palm slightly acute, with convex, smooth margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 13 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 10 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth; merus slightly expanded posteriorly; carpus, propodus, and dactylus missing from specimen. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with sinusoidal posterior margin; merus expanded, with rounded posterior margin; propodus with 10 robust setae and 2 distal locking setae along anterior margin; dactylus short, stocky. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner rounded, posteroventral margin straight; merus slightly expanded, convex posterior margin with 9 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, with strong horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner narrowly rounded. Epimeron 3: posteroventral corner narrowly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorso-lateral seta. Uropod 1: without fine setae; peduncle with 10 dorsolateral, 1 apicolateral, 6 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 7 lateral robust setae; inner ramus with 4 lateral and 3 medial robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral and 1 apicolateral robust setae; rami subequal in length; outer ramus with 8 dorsal robust setae; inner ramus with 4 dorsal robust setae, with weak constriction. Uropod 3: sexually dimorphic; peduncle short, length $1.7 \times$ breadth, without dorsolateral flange, with 4 dorsolateral and 1 apicolateral robust setae, with 3 midlateral robust setae, without distoventral robust setae, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than (about $0.8 \times$) outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 1 lateral robust seta; inner ramus with 4 lateral robust setae; slender plumose setae absent in female and male. Telson: longer than broad, length $1.4 \times$ breadth, notched (25%), without dorsal robust or slender setae, distal margins rounded, with 1 subapical penicillate seta and 1 subapical robust seta on each lobe, without apical slender setae.

Type locality: Loggerhead Key, Dry Tortugas, Florida, depth not recorded.

Distribution: Eastern Gulf of Mexico and Caribbean Sea, immediate subtidal to 73-m depths.

Remarks: In the original material of *C. concavus*, only a female was described. In the extensive material from the Hourglass collections, a number of mature males are present. We believe these are mature, final-stage males and that males of this species have a very well-developed callynophore but do not develop a long antenna 2 or calceoli. In species that do develop a long second antenna (for example, species of *Parawaldeckia*, see Lowry and Stoddart [1983]), there is a penultimate stage that has a medium-length flagellum but no callynophore. Males of *C. concavus* do not develop plumose setae on the merus and carpus of peraeopods 3 and 4 or plumose setae on the rami of the third uropods. It appears that the only secondary sexual character that develops in this species is a very well-developed callynophore.

Dissiminassa Barnard and Karaman, 1991

Dissiminassa Barnard and Karaman, 1991, p. 482.

Diagnosis: Antenna 1: callynophore weakly developed in female, well developed in male. Antenna 2 in male: peduncular article 4 enlarged, longer than broad, flagellum elongate. Epistome and upper lip: produced. Mandible: without protuberance on midposterior margin; molar a small smooth flap with finely setose margins; lacinia mobilis a long slender peg. Maxilla 1: outer plate, left and right ST7 slightly asymmetrical, STA to STD apically bifurcate; palp apically serrate. Gnathopod 1 simple, not sexually dimorphic. Peraeopods 3–4 in male: merus and carpus with plumose setae along posterior margin. Uropod 3: peduncle elongate, without a lateral flange; male peduncle and rami with plumose setae. Telson: entire.

Type species: *Nannonyx dissimilis* Stout, 1913.

Composition: *Dissiminassa* contains *D. dissimilis* (Stout, 1913) and *D. homosassa* n. sp.

Remarks: *Dissiminassa* is most closely related to *Aruga*. Barnard and Karaman (1991) did not consider this close similarity. *Dissiminassa* differs from *Aruga* in having a less setose molar and apically bicuspidate setal-teeth A to D of maxilla 1.

This is the first record of *Dissiminassa* from the Atlantic Ocean. It was previously known from the Pacific side of the Isthmus of Panamá.

Dissiminassa homosassa, new species

Figures 27–29

Type material examined: **HOLOTYPE:** ♀, 3.5 mm; 38 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°28'W; crushed shell and calcareous silt with limestone outcrops, sponges, algae and *Lithothamnion*; 36.6 m; 20 January 1967; 1410–1440 hours; trawl; HOURGLASS Cruise Post HC 45, Station C; USNM 282689.—**PARATYPE:** 1 ♀, 3.5 mm; same data; USNM 282690.—**PARATYPES:** 1 ♀, 1 ♂; same locality; 21 June 1967; 1000–1015 hours; dredge; HOURGLASS Cruise Post HC 40, Station C; AM P45335.—**PARATYPE:** 1 ♀; 19 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°07'W; sponges, alcyonarians, corals, algae, and seagrasses on bottom of shell and quartz sand between limestone outcrops; 18.3 m; 7 February 1966; 1800–1830 hours; dredge; HOURGLASS Cruise HC 24, Station B; USNM 282691.—**PARATYPE:** 1 ♀; same locality; 3 March 1966; 1855–1910 hours; dredge; HOURGLASS Cruise HC 25, Station B; AM P45333.—**PARATYPES:** 2 ♀; same locality; 19 November 1966; 1140–1210 hours; trawl; HOURGLASS Cruise HC 33, Station B; FSBC I 59996.—**PARATYPE:** 1 ♀; same locality; 5 February 1967; 1850–1920 hours; trawl; HOURGLASS Cruise HC 36, Station B; FSBC I 59997.—**PARATYPE:** 1 ♀; same locality; 2 March 1967; 1840–1855 hours; dredge; HOURGLASS Cruise HC 37, Station B; USNM 282692.—**PARATYPE:** 1 ♂; same locality; 31 August 1967; 1930–1945 hours; dredge; HOURGLASS Cruise HC 43, Station B; AM P45334.—**PARATYPE:** 1 ♀; 65 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°58'W; crushed shell, *Lithothamnion* spp., brown silt with sponges and bryozoans; 54.9 m; 0220–0235 hours; 6 February 1967; dredge; HOURGLASS Cruise HC 36, Station D; USNM 282693.—**PARATYPE:** 1 ♂, 2.8 mm; 51 nautical miles due west of Sanibel Island Light, Gulf of Mexico; 26°24'N 82°58'W; crushed shell and calcareous silt with limestone outcrops, sponges, algae, and *Lithothamnion*; 36.6 m; 6 June 1967; 2330–2345 hours; dredge; HOURGLASS Cruise HC 40, Station K; USNM 282694.—**PARATYPES:** 1 ♀, 1 ♂; course 270° from Egmont Channel Seabuoy, Gulf of Mexico; 27°37.5'N 83°59.3'W; 54.8-m depth; E. L. Bousfield and D.

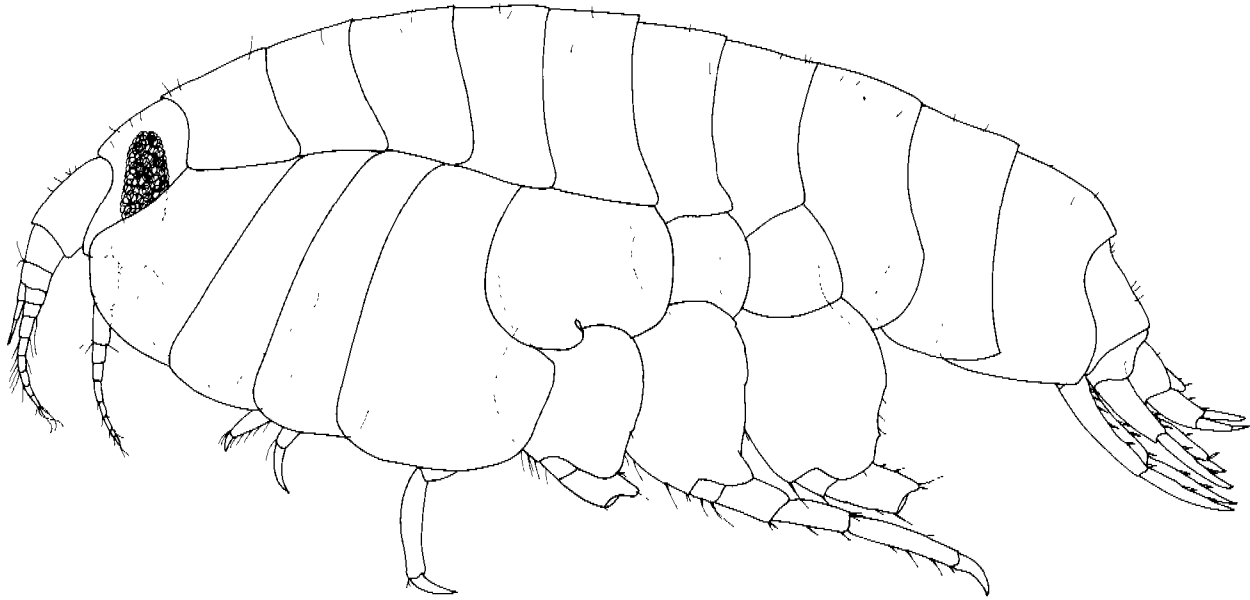


Figure 27. *Dissiminassa homosassa* new species, paratype female, 3.5 mm (USNM 282690), west of Egmont Key, Gulf of Mexico.

K. Camp; 15 October 1976; Station D2; CMN C1996-0023.—*Additional material examined*: **HOUR-GLASS MATERIAL**: STATION B: 1 ♀; 6 January 1967; trawl; FSBC I 60003.—1 ♀; 11 May 1967; trawl; FSBC I 60004.—STATION C: 1 ♂; 3 December 1966; dredge; FSBC I 60005.—STATION D: 1 juvenile; 4 April 1967; dredge; FSBC I 60006.—STATION E: 1 juvenile; 3 March 1967; trawl; FSBC I 60007.

Diagnosis: Antenna 1: male callynophore weakly developed; flagellum without calceoli. Antenna 2: male with only one calceolus; flagellum short. Peraeopods 3–4: male merus and carpus without plumose setae. Epistome: acutely produced. Mandible: molar with weak setose fringe. Uropod 3: male rami without plumose setae. Telson: longer than broad.

Description: Based on holotype female, non-ovigerous, with well-developed oostegites, 3.5 mm (USNM 282689); paratype male (probably immature), 2.8 mm (USNM 282694) (adult male unknown). Head and body: with scattered setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes reniform, dark. Antenna 1: medium length, $0.23 \times$ body; peduncular article 1 short, length $1.3 \times$ breadth; peduncular article 2 long, $0.5 \times$ article 1; peduncular article 3 long, $0.36 \times$ article 1; accessory flagellum long, $0.5 \times$ primary flagellum, 4-articulate, article 1 short, $1 \times$ article 2; flagellum 8-articulate, with weak 2-field callynophore in female, without flagellar robust setae, calceoli absent in female. Antenna 2: subequal in length to antenna 1; peduncle without brush setae in female, weakly geniculate between peduncular articles 3–4, article 3 short; flagellum 6-articulate, without thick setal brush, calceoli absent in female (1 present in immature male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome strongly produced, acute, upper lip produced, dorsally rounded. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis present only on left mandible, a long slender peg; accessory setal row, left row with 2, right row with 3, short, robust, serrate setae; intermediate setae absent; molar a small, smooth flap with finely setose margins; mandibular palp attached proximally; article 1 short, length $1.2 \times$ breadth; article 2 slender, length $4.5 \times$ breadth, $1.7 \times$ article 3, with 4 distal A2-setae, without D2-setae; article 3 fal-

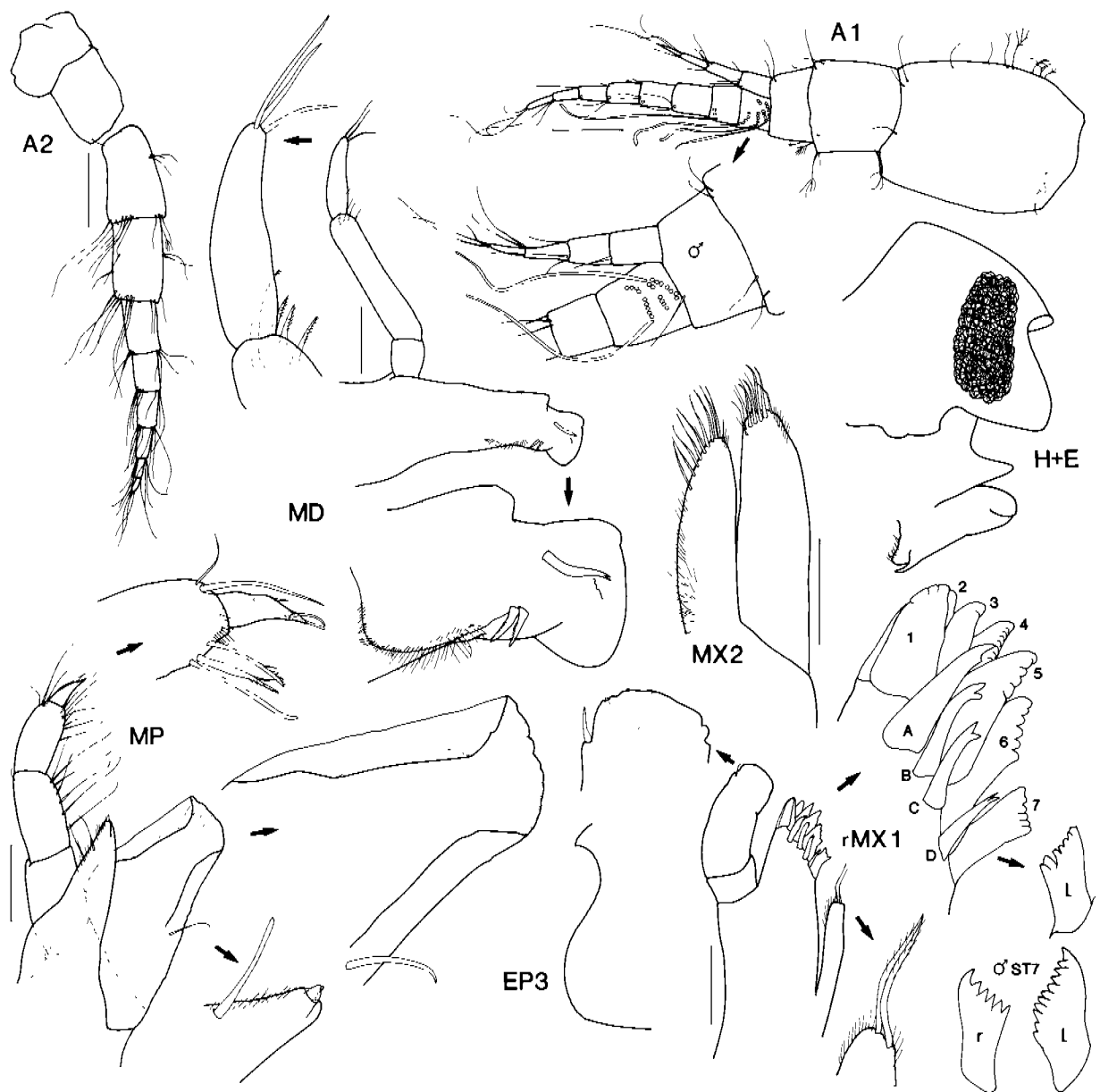


Figure 28. *Dissimnassa homosassa* new species, holotype female, 3.5 mm (USNM 282689), west of Egmont Key, Gulf of Mexico; paratype male, 2.8 mm (USNM 282694), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

cate, long, length $3.7 \times$ breadth, without A3-, B3-, or D3-setae, with 3 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose apical setae; outer plate with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 8-cuspidate, ST5 large, stout, 4-cuspidate, ST6 large, very broad, 5-cuspidate distomedially, left and right ST7 slightly asymmetrical, contiguous with ST6, left very broad, 10-cuspidate, right broad, 5-cuspidate, STA large, slender, not displaced from STB, apically bifurcate, STB–STD long, slender, apically bifurcate; palp large, 2-articulate, with 3 vestigial terminal setae, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate. Maxilla 2: inner and outer plates narrow; inner plate length $0.9 \times$ outer plate. Maxilliped: inner plate large, subrectangular, number of apical nodular setae not clear, probably 3, oblique setal row reduced with 2 pappose setae; outer plate small, subrectangular, without apical slender setae, without

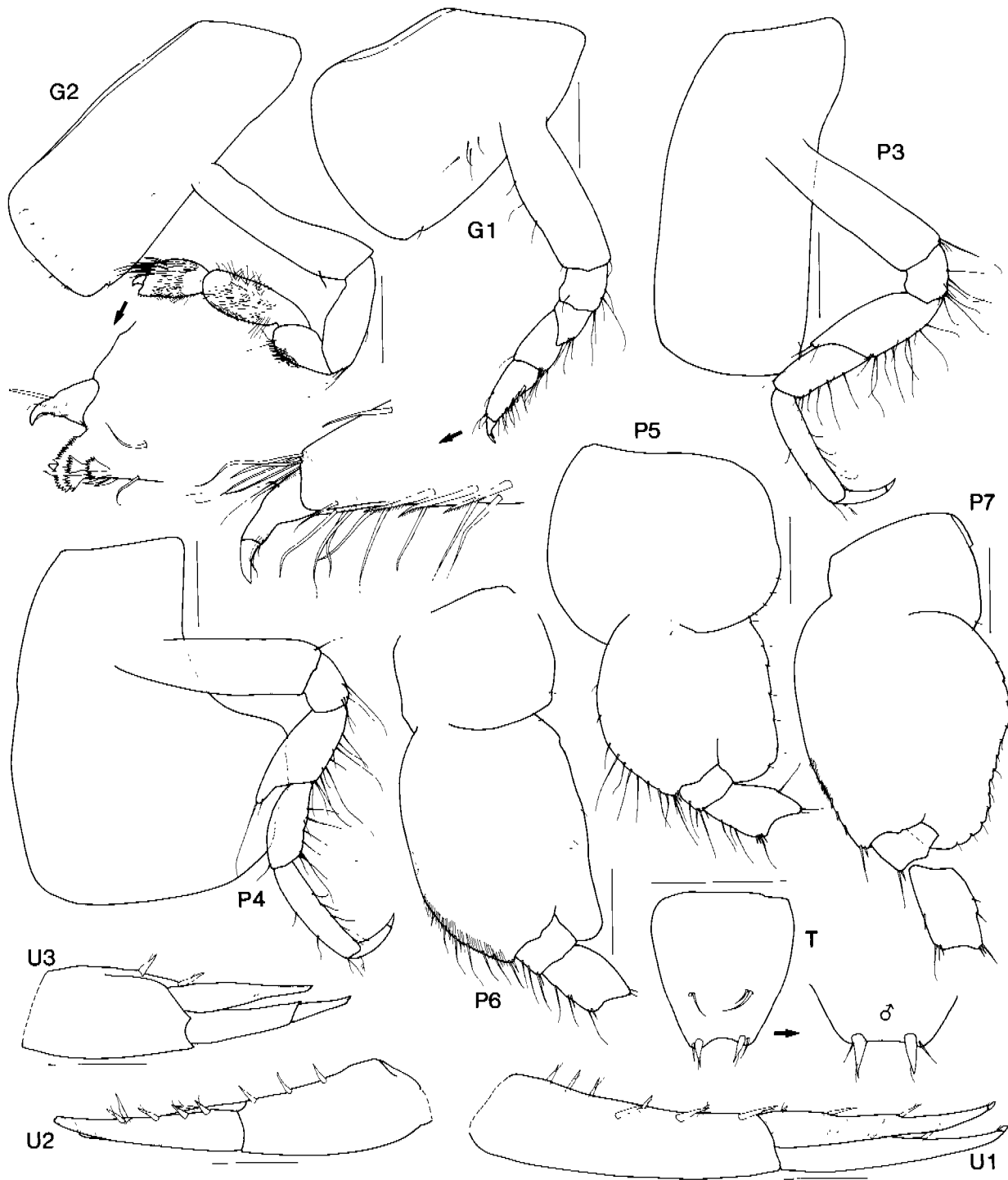


Figure 29. *Dissiminassa homosassa* new species, holotype female, 3.5 mm (USNM 282689), west of Egmont Key, Gulf of Mexico; paratype male, 2.8 mm (USNM 282694), west of Sanibel Island Light, Gulf of Mexico. Scales for U1–3, T represent 0.1 mm, remainder represent 0.2 mm.

apical robust setae, medial setae absent, submarginal setae absent; palp large, 4-articulate, article 2 slender, length $2 \times$ breadth, $1.1 \times$ article 3, article 3 long, slender, length $2 \times$ breadth, dactylus well developed, with 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length $2.8 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.2 \times$ breadth; merus, posterior margin with group of long, simple setae; carpus subrectangular, short, length $1.75 \times$ breadth, subequal to ($1 \times$) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length $1.8 \times$ breadth, tapering distally, posterior margin smooth, straight, with 4 simple robust setae and 5 groups of simple, slender setae, palm absent; dactylus simple, without subterminal spines or simple setae. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $2.8 \times$ breadth; carpus long, length $2.8 \times$ breadth, posterior margin broadly lobate; propodus subquadrate, short, length $1.5 \times$ breadth, palm obtuse, with convex, serrate margin, posterodistal corner without robust setae; dactylus not reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus expanded anterodistally along carpus; merus-carpus without plumose setae in female; propodus with 4 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus expanded anterodistally along carpus; merus-carpus without plumose setae in female; propodus with 4 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth; merus expanded, with rounded posterior margin; carpus, propodus, and dactylus missing from specimen. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with minutely crenate posterior margin; merus broadly expanded with sloping posteroproximal shoulder and straight posterior margin; carpus, propodus, and dactylus missing from specimen. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded proximally, straight distally, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 5 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, with weak horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner broadly rounded. Urosomites: dorsally smooth; urosomite 3 with 1 small dorsolateral seta. Uropod 1: without fine setae; peduncle with 5 dorsolateral, 1 apicolateral, 2 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 dorsal robust setae; inner ramus with 3 dorsal robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral and 1 apicolateral robust setae; outer ramus slightly longer than inner ramus; outer ramus with 4 dorsal robust setae; inner ramus with 2 dorsal robust setae, with weak constriction. Uropod 3: peduncle short, length $1.9 \times$ breadth, without dorsolateral flange, with 1 dorsolateral and 1 apicolateral robust setae, without midlateral slender or robust setae, without distoventral robust setae, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than (about $0.8 \times$) outer ramus; outer ramus 2-articulate, article 2 short, article 1 without robust setae; inner ramus with 1 lateral robust seta; slender plumose setae absent in female and male. Telson: longer than broad, length $1.1 \times$ breadth, entire, without dorsal robust setae, distal margin emarginate, with 2 apical penicillate setae, without apical slender setae, with 2 apical robust setae.

Type locality: Gulf of Mexico, 38 nautical miles due west of Egmont Key, Florida, $27^{\circ}37'N$ $83^{\circ}28'W$, 36.6 m.

Distribution: Eastern Gulf of Mexico, in 18- to 73-m depths.

Etymology: Named for Homosassa Point, Florida.

Remarks: *Dissiminassa homosassa* is distinguished from *D. dissimilis* by having an acutely produced epistome, less developed molar, and longer, more triangular telson.

Compared with *D. dissimilis*, the sexually dimorphic characters of the males in our study material (our study specimen is ready to moult) indicate that they are not fully mature. The callynophore has fewer aesthetascs; there are no calceoli on antenna 1 and only one calceolus on antenna 2; antenna 2 is not elongate; plumose setae are not present on the merus and carpus of peraeopods 3 and 4; and there are no plumose setae on the rami of uropod 3.

Eclecticus, new genus

Diagnosis: Antenna 1: callynophore well developed, 2-field in female and male. Antenna 2: subequal in length to antenna 1 in female and form-A male, nearly as long as body in form-B adult male. Calceoli absent in female and form-A male, present in form-B adult male. Mandible without protuberance on mid-posterior margin; left lacinia mobilis a long, slender peg; molar setose; palp article 3 with gap in D3-setae. Maxilla 1, outer plate: ST6 displaced from ST5 and ST7, ST6 and ST7 displaced down medial face; left and right ST7 symmetrical. Gnathopod 1: simple, may be sexually dimorphic, dactylus extremely reduced, covered in long, slender cuticular teeth. Peraeopods 3 and 4: merus and carpus with plumose setae in form-B male. Uropod 3: peduncle elongate, without flange; male peduncle and rami without plumose setae; outer ramus 2-articulate. Telson: entire, distal margin straight in female and form-A male, emarginate in form-B male.

Type species: *Eclecticus eclecticus* new species.

Composition: *Eclecticus* contains *E. eclecticus* n. sp.

Etymology: The genus name is an allusion to the “free borrowing” of characters from various sources.

Remarks: *Eclecticus* is a shallow-water, scavenging genus most closely related to *Aruga* Holmes, 1908. They differ as follows: *Aruga* has a setose molar with a distal triturating surface, an unmodified 6/5 arrangement of the maxilla 1 setal-teeth, and a simple dactylus on gnathopod 1.

Eclecticus eclecticus, new species

Figures 30–35

Type material examined: **HOLOTYPE:** ♀, with long, non-setose oostegites; 4.4 mm; Sail Rock Reef, San Blas Islands, Panamá, Caribbean Sea; 9°33'14"N 78°55'23"W; baited trap on sand/coral bottom; 4.3 m; J. Morin; 2 December 1985; Station 02125.4; AM P41435.—**PARATYPE:** form-A ♂; 3.0 mm; same data; AM P41436.—**PARATYPE:** form-B adolescent ♂; 3.4 mm; same data; AM P41437.—**PARATYPE:** form-B adult ♂; 3.8 mm; same data; AM P41438.—**PARATYPES:** 200 specimens; same data; AM P40961.—**PARATYPES:** 294 specimens; same data; LACM 85-468.—**PARATYPES:** 200 specimens; same data; USNM 282695.—**HOURGLASS MATERIAL:** None.

Description: Based on holotype female (AM P41435), form-A paratype male (AM P41436), and adult form-B paratype male (AM P41438). Head and body: with scattered setae; colour unknown. Head: exposed, deeper than long; lateral cephalic lobe large, broadly rounded; rostrum absent; eyes reniform (red in alcohol), enlarged in adult male. Antenna 1: medium length, 0.26 × body, peduncular article 1 short,

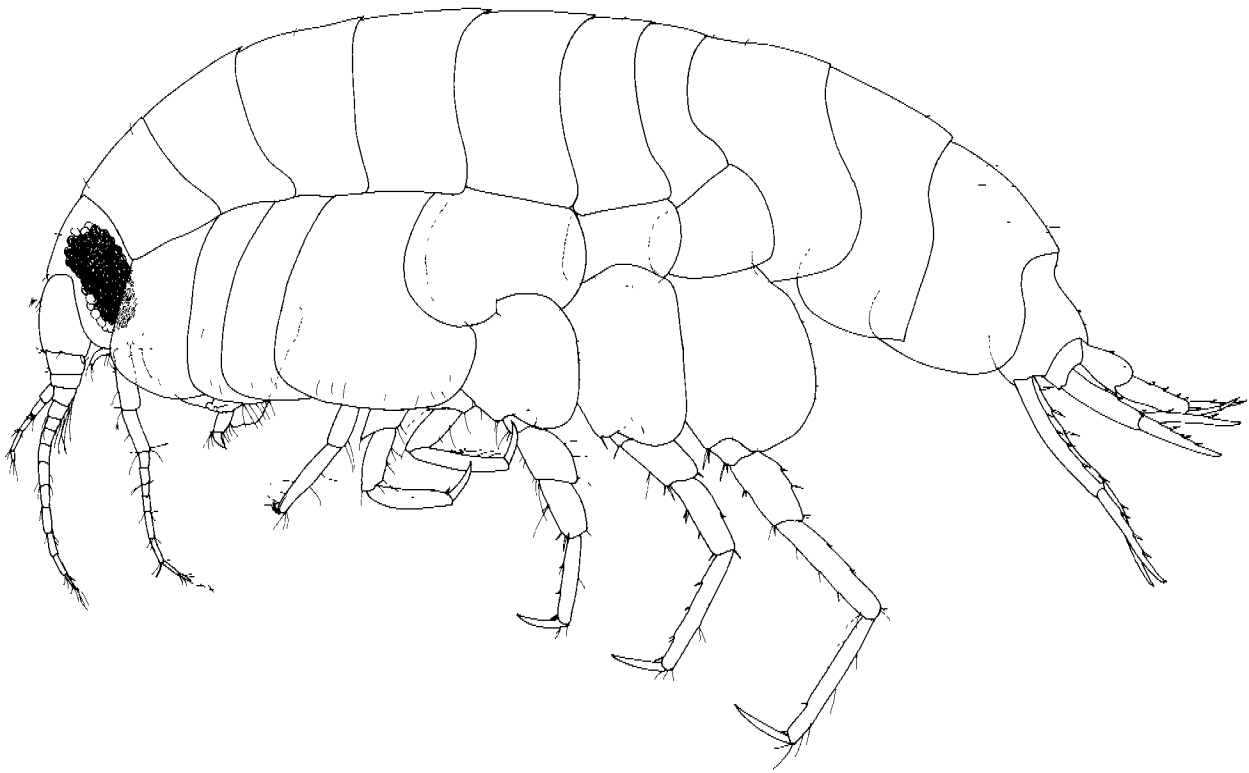


Figure 30. *Eclecticus eclecticus* new species, paratype female, AM P40961, San Blas Islands, Caribbean Sea.

length $1.1 \times$ breadth; without tooth on distomedial margin, without posterodistal tooth, peduncular article 2 short, $0.4 \times$ article 1, peduncular article 3 short, $0.2 \times$ article 1; accessory flagellum medium length, $0.4 \times$ primary flagellum, 4-articulate, article 1 long, $1.5 \times$ article 2 (male, long, $1.5 \times$ article 2), not forming cap; flagellum 10-articulate (male 10); callynophore weak, 2-field in female (strong, 2-field in form-A and form-B males), without posterodistal slender or robust setae, without flagellar robust setae; calceoli absent in female (absent in form-A male, present in form-B adult male). Antenna 2: subequal in length to antenna 1 ($0.87 \times$ body length in form-B male), weakly geniculate between peduncular articles 3–4, article 3 short, $0.38 \times$ article 4 (in male, strongly geniculate between peduncular articles 4–5, article 3 short, $0.46 \times$ article 4); peduncle without brush setae in female (absent in form-A male, weak in form-B male); peduncular article 4 not enlarged (not enlarged in form-A male; enlarged in form-B male, slightly longer than broad, article 5 subequal in length, more slender); flagellum 8-articulate (form-B male 47+); calceoli absent in female (absent in form-A male, present in form-B adult male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome concave, upper lip slightly produced, rounded. Mandible: incisors symmetrical, large, with convex margins; left lacinia mobilis a long, slender peg; accessory setal row, left and right rows each with 3 short, slender, multiserrate setae, without intermediate setae; molar a strongly setose tongue; mandibular palp attached proximally, article 1 long, length $2 \times$ breadth; article 2 elongate, slender, length $4 \times$ breadth, $1.3 \times$ article 3, with 5 (form-B male with 6) posterodistal A2-setae, article 3 slender, falcate, long, length $4.4 \times$ breadth, without A3- or B3-setae, with 1 proximal D3-seta (form-B male with 2), with 3 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose apical setae; outer plate extremely narrow, with 11 setal-teeth in 7/4 crown arrangement, ST1 to ST3 large, multicuspidate, ST4 large, slender, 6-cuspidate, ST5 large, slender, multicuspidate, ST6 displaced from ST5, large, slender, multicuspidate; ST7 symmetrical, displaced down medial face, large, slender, multicuspidate medially, STA large, broad, 3-cuspidate, STB–STD long, broad, 4-cuspidate; palp large, 2-articulate, with serrate apical margin, without subterminal setae, flag seta present

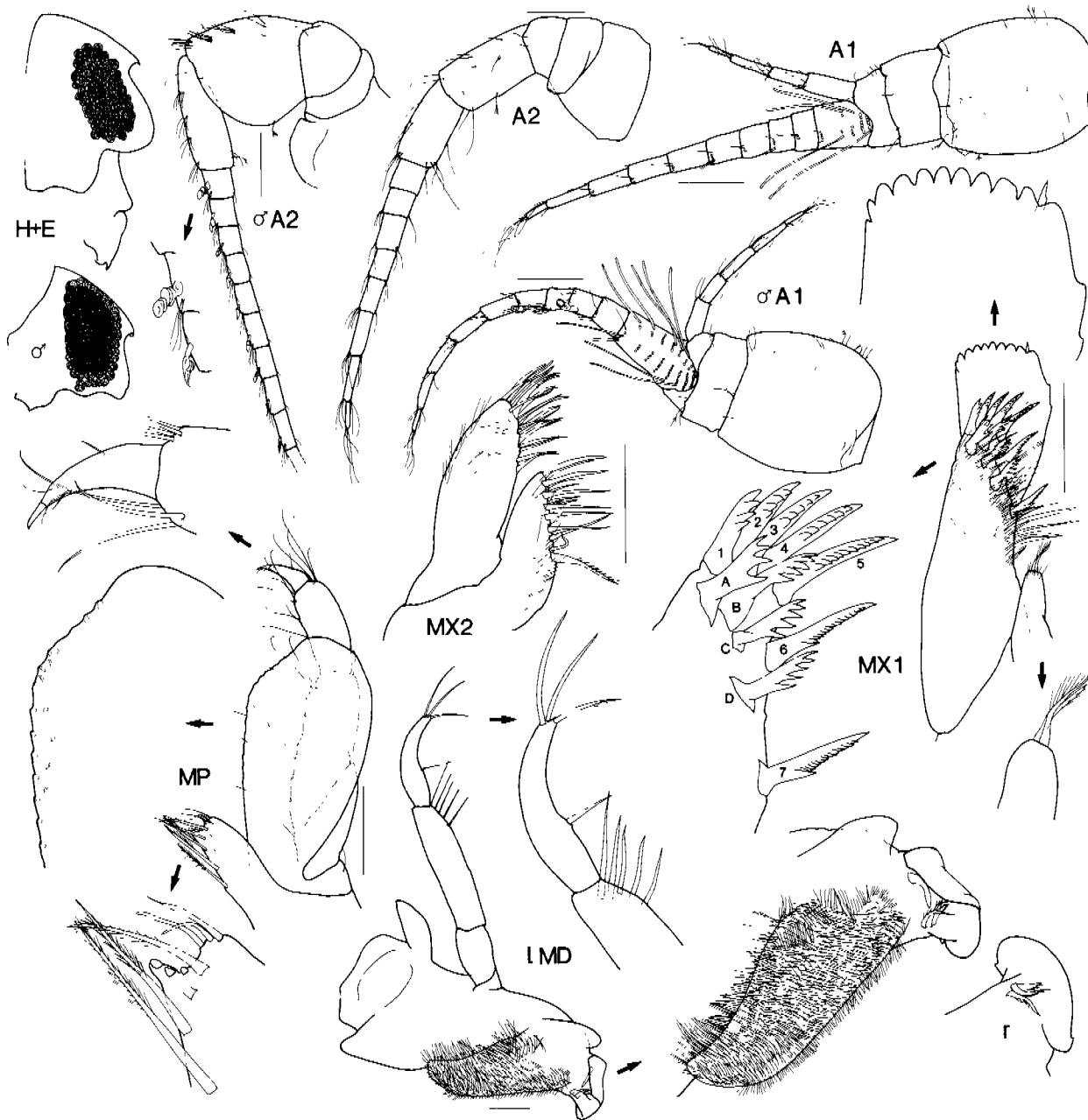


Figure 31. *Ectecticus eclecticus* new species, holotype female, 4.4 mm, AM P41435, paratype form-B adult male, 3.8 mm, AM P41438, San Blas Islands, Caribbean Sea. Scales represent 0.1 mm.

on distolateral corner, distomedial margin smooth. Maxilla 2: inner and outer plates narrow; inner plate $0.6 \times$ length outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae; oblique setal row reduced, with 5 plumose setae, outer plate medium size, subovate, distomedial margin obliquely truncated and slightly concave, without apical slender or robust setae, medial and submarginal setae vestigial; palp large, 4-articulate, article 2 slender, length $3.1 \times$ breadth, $1.6 \times$ article 3; article 3 long, slender, length $2.4 \times$ breadth; dactylus well developed, with 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: simple, coxa large, as long as coxa 2, anterior margin slightly concave, anteroventral corner rounded; posterior margin straight; basis long, slender, length

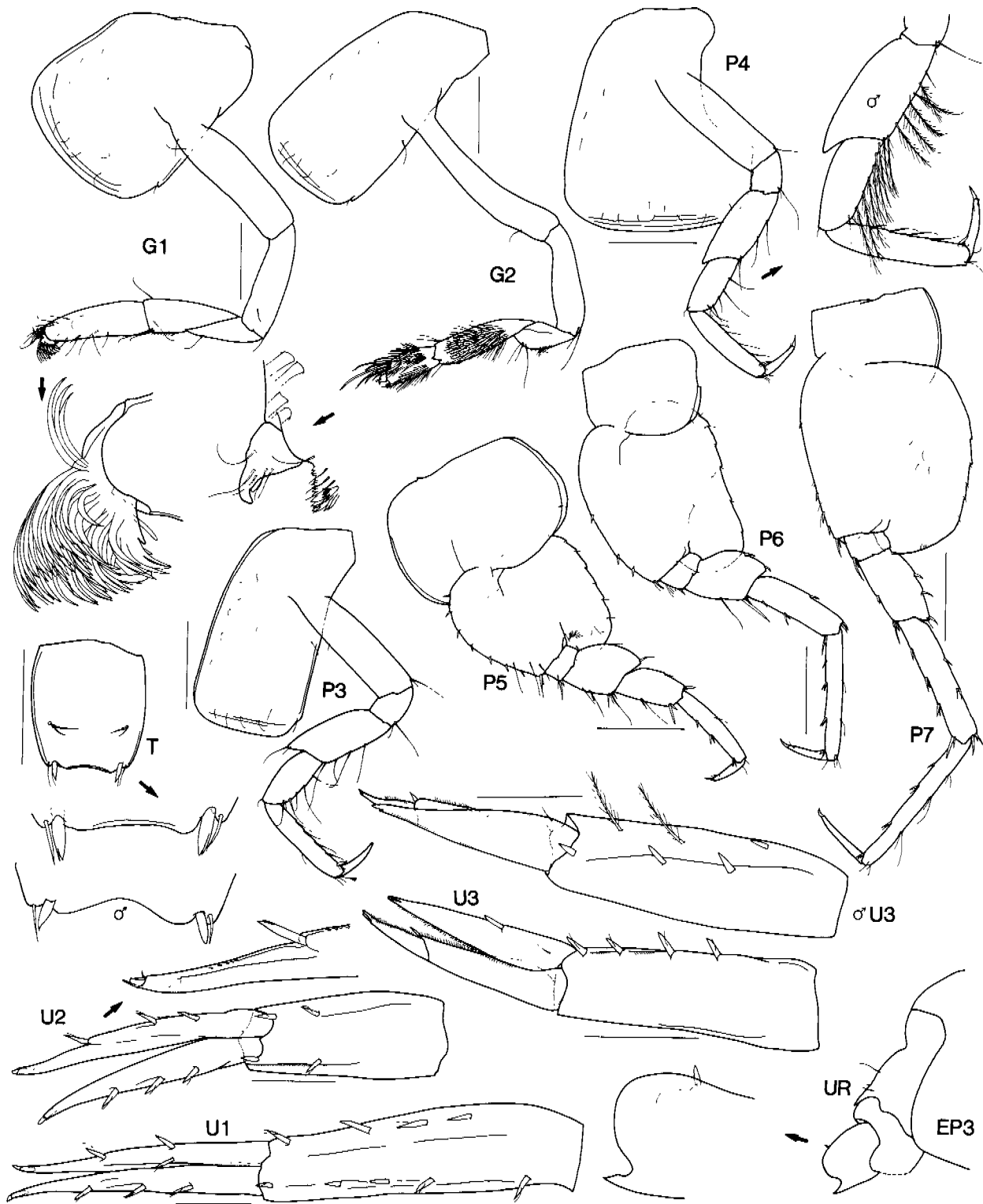


Figure 32. *Eclecticus eclecticus* new species, holotype female, 4.4 mm, AM P41435, paratype form-B adult male, 3.8 mm, AM P41438, San Blas Islands, Caribbean Sea. Scales for U1–3, T represent 0.1 mm, remainder represent 0.2 mm.

4.5 × breadth, anterior margin smooth, without setae; ischium very long, length 3.6 × breadth; carpus sub-triangular, long, length 2.8 × breadth, shorter than (0.9 ×) propodus, with patch of very fine setae near

posterior margin; propodus large, subrectangular, length $3 \times$ breadth, margins slightly converging distally (propodus weakly prehensile in form-A male), posterior margin smooth, straight, without robust setae, without denticulate patch near posterior margin, palm absent; dactylus extremely reduced, covered in long, slender, cuticular teeth. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $3.7 \times$ breadth; carpus long, length $3.6 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2 \times$ breadth, palm slightly obtuse, with straight, minutely serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae (absent in form-A male, form-B male with few plumose setae); propodus with 4 setae and 2 distal locking setae along posterior margin; dactylus long, slender. Peraeopod 4: coxa with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus without plumose setae (absent in form-A male, form-B male with few plumose setae); propodus with 4 setae and 2 distal locking setae along posterior margin; dactylus long, slender. Peraeopod 5: coxa equilobate; basis expanded posteriorly, with posterior margin minutely crenate; merus expanded, with rounded posterior margin; propodus with 3 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 6: coxa small, not lobate posteriorly; basis expanded posteriorly, with minutely crenate posterior margin, without anteroventral lobe; merus expanded, with rounded posterior margin; propodus with 5 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner subquadrate, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 3 robust setae; propodus with 5 robust setae and 2 distal locking setae along anterior margin, 6 setae plus 3 distal robust setae along posterior margin; dactylus long, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, with strong horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner narrowly rounded. Epimeron 3: posteroventral corner broadly rounded. Urosomites: dorsally smooth. Urosomite 3: with 1 small dorsolateral robust seta. Uropod 1: without fine setae; peduncle with 4 dorsolateral, 1 apicolateral, 3 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 3 lateral robust setae; inner ramus with 1 medial and 2 lateral robust setae. Uropod 2: without fine setae; peduncle without dorsolateral flange, with 1 dorsolateral, 1 apicolateral, 1 dorsomedial, and 1 apicomедial robust setae, without plumose setae; rami subequal in length; outer ramus with 3 dorsal robust setae; inner ramus with 2 dorsal robust setae plus long robust seta guarding weak constriction. Uropod 3: peduncle long, length $2.8 \times$ breadth, without dorsolateral flange, with 1 dorsolateral, 2 dorsomedial, and 1 apicomедial robust setae, without distoventral robust setae, without plumose setae (absent in form-A male, present in form-B male); rami lanceolate, subequal in length; outer ramus 2-articulate, article 2 short; with 1 medial robust seta; inner ramus with 1 lateral robust seta; plumose setae absent in male and female. Telson: sexually dimorphic, length $1.1 \times$ breadth, entire (entire in form-A male, emarginate in form-B male), distal margin truncated, without apical penicillate setae, with 2 simple apical setae and 2 robust apical setae.

Type locality: Sail Rock Reef, San Blas Islands, Panamá, Caribbean Sea, $9^{\circ}33'14''\text{N}$ $78^{\circ}55'23''\text{W}$, 4.3 m.

Distribution: San Blas Islands, Caribbean Sea, in 4-m depths.

Etymology: The species name alludes to its eclectic habit of scavenging for food from various sources.

Remarks: This species has been collected only in baited traps. Because of this and its mouthpart

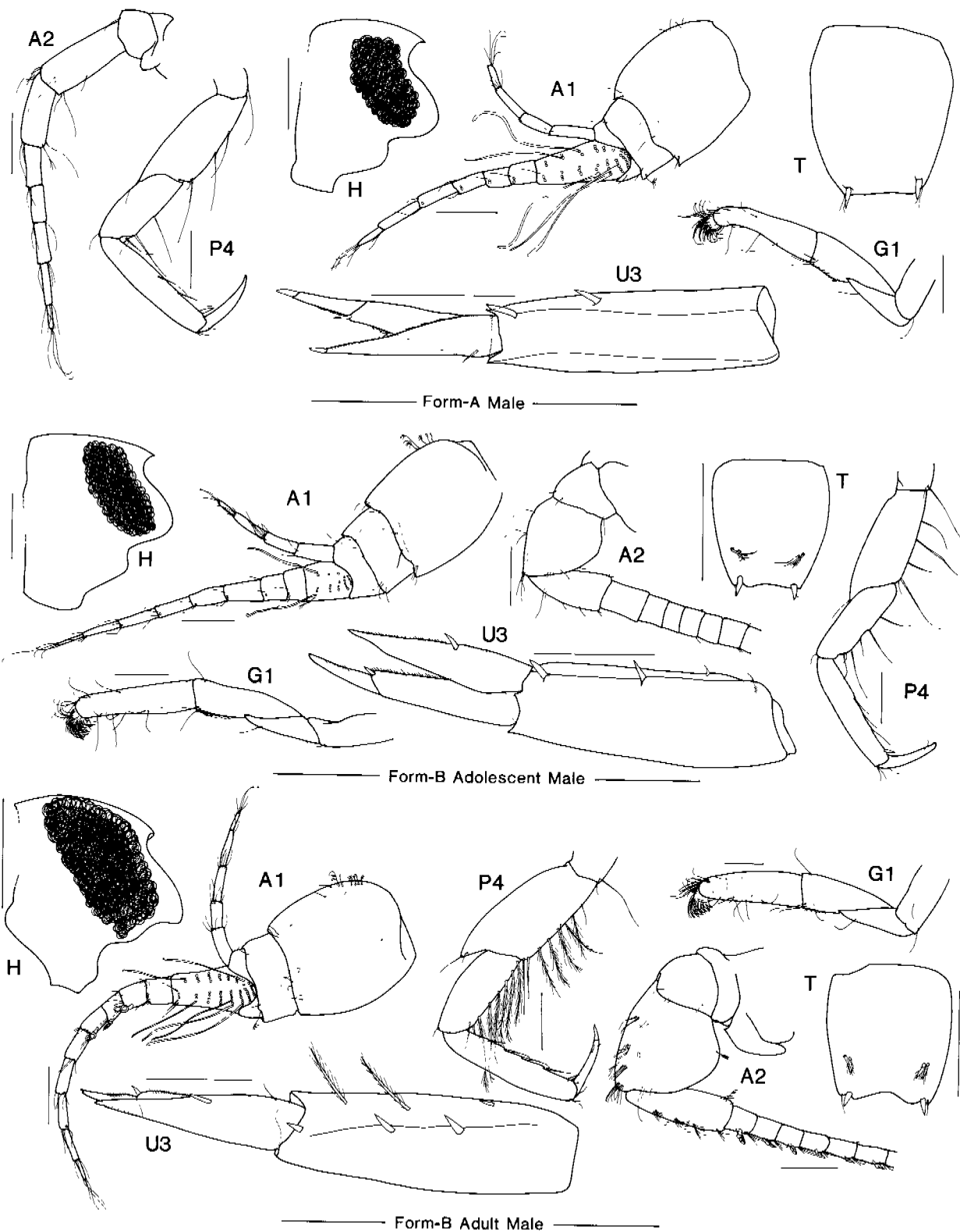


Figure 33. *Eclecticus eclecticus* new species, developmental stages of form-A and form-B males. Form-A male, 3.0 mm, paratype AM P41436; form-B adolescent male, 3.4 mm, paratype AM P41437; form-B adult male, 3.8 mm, paratype AM P41438. Scales for H represent 0.2 mm, remainder represent 0.1 mm.

morphology, particularly the setose molar and the arrangement of the maxilla 1 outer plate setal-teeth, it is considered to be a scavenger.

MALE DEVELOPMENT AND REPRODUCTIVE FORMS IN *ECLECTICUS*

The sample contained specimens in which we could not detect either penes or oostegites (up to about 3 mm); females with oostegite buds (3.2–3.4 mm); females with long, non-setose oostegites (4.0–4.2 mm); and three types of males in which penes were present.

Form-A males (Figure 33): The smallest detectable males (63 specimens, about 3.0 mm long) have a rounded head lobe with the eye as large as that in female; a well-developed, 2-field callynophore on antenna 1; a short antenna 2 (flagellum of 5 articles) with peduncular article 4 not enlarged, no brush setae on peduncular articles 4 or 5; no calceoli on antennae 1 or 2; a distally tapered propodus with a posterodistally concave margin (weakly prehensile) on gnathopod 1; no plumose setae on pereopods 3 or 4; no plumose setae on peduncle of uropod 3; and an entire, non-emarginate telson.

Form-B adolescent males (Figure 33): Intermediate sized males (35 specimens, about 3.4 mm long) have a rounded head lobe with the eye as large as that in female; a weakly developed 2-field callynophore on antenna 1; a medium-length antenna 2 (flagellum of 27 articles) with peduncular article 4 significantly broadened but no brush setae on peduncular articles 4 or 5; no calceoli on antenna 1 or 2; a subrectangular propodus on gnathopod 1; no plumose setae on pereopods 3 or 4; no plumose setae on peduncle of uropod 3; and a slightly emarginate telson.

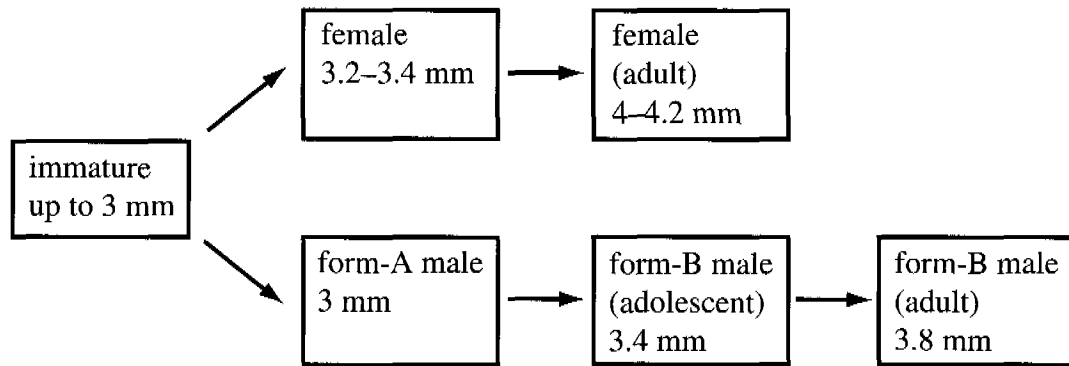
Form-B adult males (Figure 33): The largest males (27 specimens, about 3.8 mm long) have a slightly narrowed, softly triangular head lobe with the eye slightly larger than that in females; a well-developed, 2-field callynophore on antenna 1; a very long antenna 2 (flagellum of 47+ articles) with peduncular article 4 significantly broadened and brush setae on peduncular articles 4 and 5; calceoli on antennae 1 and 2; a subrectangular propodus on gnathopod 1; plumose setae on the merus and carpus of pereopods 3 and 4; a few plumose setae on the peduncle of uropod 3; and an emarginate telson.

A common type of sexual development in lysianassine amphipods that was described by Lowry and Stoddart (1983) for *Parawaldeckia* and occurs in *E. eclecticus* is the transformation through an adolescent form-B male to an adult form-B male (with slight variations). However, it is difficult to accept the idea that there is but a single male transformation series from form-A through adolescent form-B to adult form-B (Figure 34i). Form-A males would have to lose the well-developed, 2-field callynophore and the concave propodus on gnathopod 1 to reach the adolescent form-B male stage and then would need to regain the callynophore but not the concave propodus to reach the adult form-B stage. The well-developed callynophore and prehensile propodus of gnathopod 1 found in the form-A male is a combination commonly found in adult male lysianassids such as *Socarnopsis*.

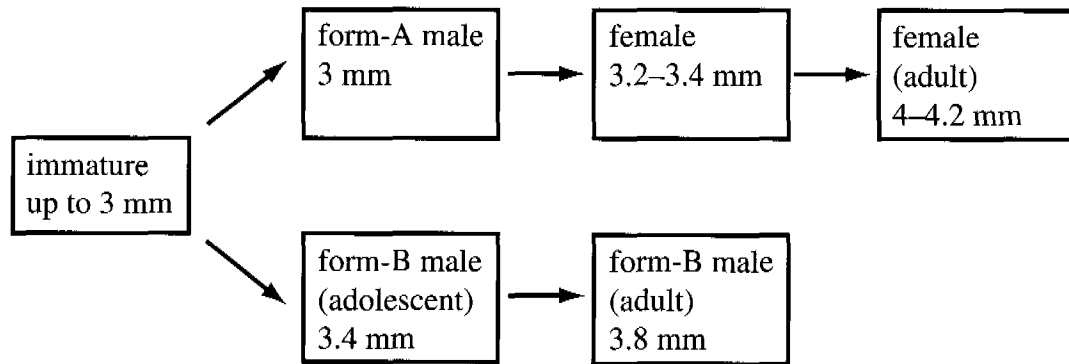
Thus, there appear to be two forms of adult males in the sample. We cannot adequately explain this. Either the form-A male is a cryptic species, or it is an alternative form of reproductive male within *E. eclecticus*. If it is a cryptic species, then we can detect no obvious distinguishing features for the female, and the species is unrecognizable. It would be unusual to have different forms of adult males in closely related species of the same genus. This is the case at the extremes of the closely related genera *Aruga* and *Lysianopsis*.

It is also unusual to have two forms of adult males in one species. Such a case has been described for some conicostomatin lysianassoids (Lowry and Stoddart, 1986), which are sequential hermaphrodites. Figure 34ii illustrates this possibility for *E. eclecticus*, but there is no evidence to suggest sequential hermaphroditism in this species.

(i) **transformation from form-A male to form-B male**



(ii) **sequential hermaphroditism**



(iii) **independent formation**

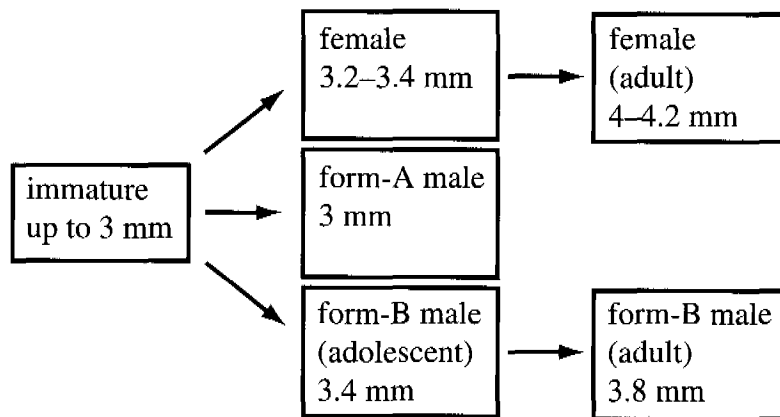


Figure 34. Possible development pathways in *Eclecticus eclecticus*.

A final possibility is that females, form-A males, and form-B males each develop independently from immature specimens (Figure 34iii). This is the most conservative explanation for this unusual situation.

The mystery of the interesting sexual development of *E. eclecticus* will probably be solved only with

extensive sampling, perhaps using several sampling techniques over a period of time, so that animals in all life-history stages are captured.

CONVERGENCE IN ECLECTICUS

There are several outstanding characters in *Eclecticus* that seem to suggest it may be related to genera that are not usually considered to be phylogenetically related. For instance, the dactylus of gnathopod 1 in *Eclecticus* is very similar to that of *Aroui* or *Scopelocheirus*. The arrangement of setal-teeth on the outer plate of maxilla 1 is very similar to that of *Ichnopus*, and the peduncle of antenna 2 in the male is similar to that of *Aruga*. We do not consider these genera to be closely related to each other. A closer examination indicates that there is strong character convergence in *Eclecticus*. Figure 35 shows an array of morphological diversity for characters important to this discussion.

A comparison of the morphology of *Eclecticus* with that of *Scopelocheirus* shows that apart from the remarkable similarity of the gnathopod 1 dactylus, these genera have little in common. In *Scopelocheirus*, peduncular article 4 of the male antenna 2 is not enlarged, the D3-setae of the mandibular palp are continuous, the lacinia mobilis is large and strongly ornamented, the molar is small and distally triturating, terminal robust setae are present on the maxilla 1 palp, the setal-teeth on the outer plate of maxilla 1 are arranged in two subparallel rows, and the telson is deeply cleft. These are manifold and significant differences. Based on this evidence, we interpret the morphological similarity of the dactylus of the first gnathopods as convergence and find little evidence to suggest a close relationship between these taxa.

Comparison of *Eclecticus* with *Ichnopus* shows some obvious differences between the genera: in *Ichnopus*, peduncular article 4 of the male antenna 2 is not enlarged, the lacinia mobilis is a very small robust seta, terminal robust setae are present on the maxilla 1 palp, and the telson is deeply cleft. Morphological similarities occur in the arrangement of D3-setae on the posterior margin of the mandibular palp (there is a gap between the proximal D3-setae and the terminal E3-setae); the molar, which is large and setose; the arrangement of the setal-teeth on the outer plate of maxilla 1; and the ornamentation on the dactylus of gnathopod 1. However, even in these characters there are important differences. The shape of the mandibular palp is very distinctive in *Ichnopus*; setal-tooth 6 on the outer plate of maxilla 1 is immediately adjacent to, and longer than, setal-tooth 5; and the ornamentation of the gnathopod 1 dactylus appears to be formed in an entirely different way: in *Ichnopus*, the cuticular teeth originate from the posterior margin, and the robust setae are in one medial row.

Although the similarities between *Eclecticus* and *Aruga* are in some cases more subtle, they appear to be more significant. Peduncular articles 4 and 5 of the male antenna 2 are very similar in these genera; *Aruga* has a small gap between the proximal and distal D3-setae on the posterior margin of the mandibular palp; the lacinia mobilis is identical, and the molar is large and setose (although in *Aruga* it has a distal, vestigial triturating surface); both genera have terminally serrate margins on the maxilla 1 palp; and both genera have entire telsons that are slightly sexually dimorphic. There are two major differences between these genera. In *Aruga*, the setal-teeth on the outer plate of maxilla 1 are in a 6/5 arrangement, which is the general case in the Lysianassidae, whereas the setal-teeth of *Eclecticus* are in a 7/4 crown arrangement, which is characteristic of the Uristidae. However, the displacement of ST6 from ST5 does not occur in *Ichnopus*, nor have we seen it in other uristid genera. The shape and cuspidation of STA to STD are much more similar to those of *Aruga* than to those of *Ichnopus*. Consequently, we consider that the 7/4 crown arrangement in *Eclecticus* is an independently derived convergence with the 7/4 crown arrangement in the Uristidae. The second difference is in the dactylus of gnathopod 1, which is simple in *Aruga* and highly complex in *Eclecticus*. Because of the weight of other character evidence, we consider

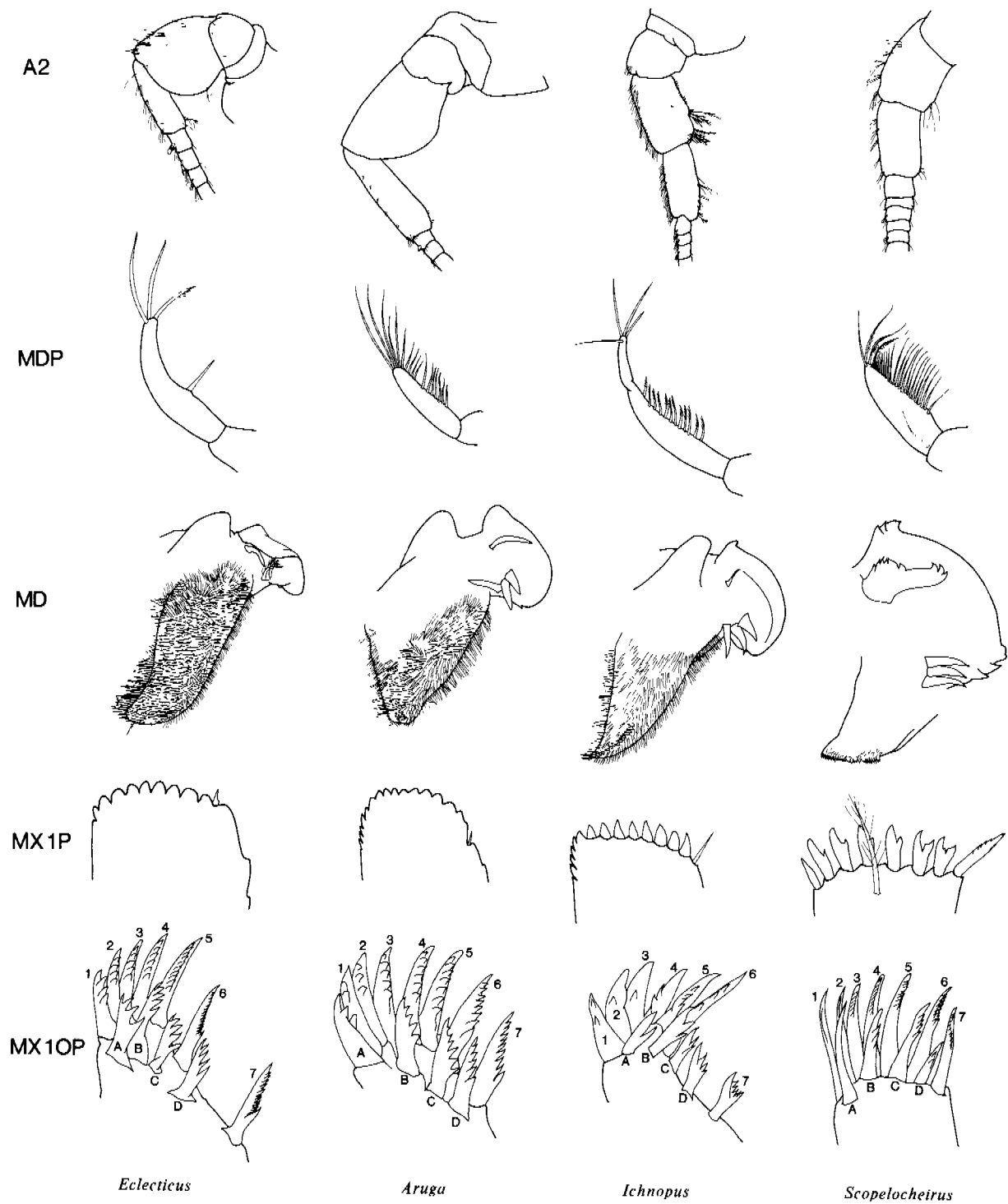


Figure 35a. Comparison of selected characters in *Eclecticus*, *Aruga*, *Ichnopus*, and *Scopelocheirus*.

that the complex dactylus in *Eclecticus* is an independently derived convergence with the complex dactyli in the Scopelocheiridae and in the uristid genus *Ichnopus*.

In our opinion, the setal-tooth arrangement of maxilla 1 and the complex dactylus of gnathopod 1 are extreme examples of convergent evolutionary characters that disguise and confuse what would otherwise

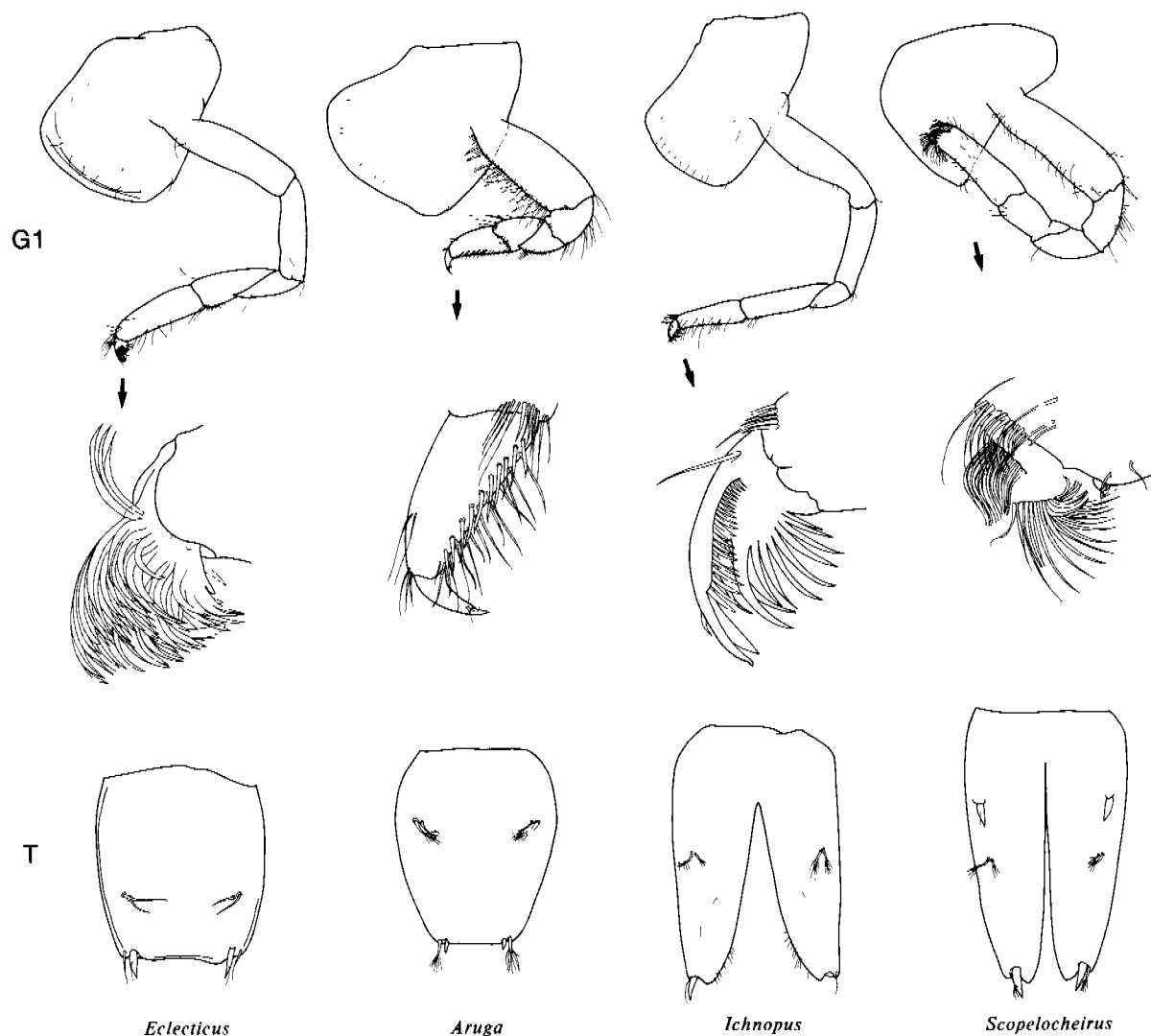


Figure 35b. Comparison of selected characters in *Eclecticus*, *Aruga*, *Ichnopus*, and *Scopelocheirus* (continued).

be an ordinary lysianassid related to genera such as *Aruga*, *Lysianopsis*, *Rhinolabia*, *Socarnopsis*, and *Waldeckia*, a group with known scavengers (Stepien and Brusca, 1985; Clark and Barnard, 1985; Lowry and Stoddart, 1994, 1995b). Both of these convergent characters are commonly found among scavenging lysianassoids, and they probably reflect strong evolutionary pressures in response to radiation into the scavenging habitat. Species of *Scopelocheirus* are voracious scavengers (Lowry and Stoddart, 1989a), and species in the *Ichnopus taurus* species group are well-documented scavengers (Lowry and Stoddart, 1992).

Lysianopsis Holmes, 1903

Lysianopsis Holmes, 1903, p. 276; Holmes, 1905, p. 475; Stebbing, 1906, p. 718; Kunkel, 1918, p. 51; Pirlot, 1936, p. 255; Hurley, 1963, p. 67; Bousfield, 1973, p. 146; Lowry and Stoddart, 1983, p. 317; Barnard and Karaman, 1991, p. 499.

Falcanassa Barnard and Karaman, 1991, p. 486 (type species: *Lysianassa falcata* Stephensen, 1933b = *Lysianassa hummelincki* Stephensen, 1933b).

Diagnosis: Antenna 1: callynophore weak or absent in female, weak 1- or 2-field in male. Antenna 2 in

male: peduncular article 4 not enlarged, flagellum usually not elongate. Epistome not produced; upper lip produced. Mandible: with protuberance on midposterior margin; lacinia mobilis a long, slender peg; molar setose, with vestigial distal triturating surface. Maxilla 1: outer plate, left and right ST7 asymmetrical, STA to STD medially cuspidate or apically bifurcate; palp apically serrate. Gnathopod 1: simple, may be sexually dimorphic. Peraeopods 3 and 4 in male: merus and carpus without plumose setae along posterior margin. Uropod 3: peduncle short or long, with lateral flange; male peduncle and rami without plumose setae; outer ramus 1- or 2-articulate. Telson entire.

Type species: Lysianopsis alba Holmes, 1903.

Composition: Lysianopsis contains *L. alba* Holmes, 1903; *L. hummelincki* (Stephensen, 1933b); *L. ozona* n. sp.; and *L. subantarctica* (Schellenberg, 1931).

Remarks: Lysianopsis tieke Lowry and Stoddart, 1983, should probably be moved to a new genus, as De Broyer (1985) pointed out. It is not a species of *Lysianopsis* because it has a fused epistome and upper lip, a reduced columnar molar with small triturating surface, no flange on the peduncle of uropod 3, and a long article 2 on the outer ramus of uropod 3. It is most like *Kakanui* Lowry and Stoddart, 1983. The main differences between them are that *L. tieke* has a serrated apical margin on the palp of maxilla 1 and species of *Kakanui* have apical robust setae. We are provisionally transferring *L. tieke* to *Kakanui*.

See *Remarks* under Lysianassinae for a discussion of the relationships between *Lysianopsis* and *Aruga*.

KEY TO SPECIES OF *LYSIANOPSIS*

1. Uropod 3, outer ramus 1-articulate or 2-articulate with article 2 poorly defined 2
1. Uropod 3, outer ramus clearly 2-articulate 3
2. Gnathopod 1 male, weakly prehensile (appearing weakly falcate). Uropod 3 outer ramus 2-articulate with article 2 poorly defined *Lysianopsis alba* Holmes, 1903
2. Gnathopod 1 male, prehensile (appearing falcate). Uropod 3 outer ramus 1-articulate
 *Lysianopsis hummelincki* (Stephensen, 1933b)
3. Upper lip projecting only slightly beyond epistome. Maxilla 1 outer plate, ST4–6 with 8–10 cusps. Peraeopod 6, posterodistal margin of basis not incised. Peraeopods 6 and 7, basis broadly lobate posteroventrally. Telson with 2 long apical robust setae *Lysianopsis ozona* n. sp.
3. Upper lip projecting well beyond epistome. Maxilla 1 outer plate, ST4–6 with 4–6 cusps. Peraeopod 6, posterodistal margin of basis broadly incised. Peraeopods 6 and 7, basis narrowly lobate posteroventrally. Telson with 2 short apical robust setae
 *Lysianopsis subantarctica* (Schellenberg, 1931)

Lysianopsis alba Holmes, 1903

Figure 36

Lysianopsis alba Holmes, 1903, p. 276; Holmes, 1905, pp. 475, 476, unnumbered text-fig., pl. 5 fig. 1; Stebbing, 1906, p. 718; Kunkel, 1918, pp. 52–54, fig. 5; Shoemaker, 1933b, pp. 2, 3, fig. 1 (part, type material); J. L. Barnard, 1958, p. 94; Hurley, 1963, pp. 68, 70, 74 (key), fig. 19b; Mills, 1964, p. 114; Watling and Maurer, 1972, pp. 259, 260, 263; Bousfield, 1973, pp. 146, 147, pl. 43.1; Biernbaum, 1979, p. 222; Nelson, 1979, pp. 242, 244; Watling, 1979, p. 266; Dickinson et al., 1980, p. 36; Nelson, 1980, p. 82; Stoner, 1980a, p. 542; Stoner, 1980b, pp. 67–70; Nelson et al., 1982, p. 124; Barnard and Karaman, 1991, p. 499.

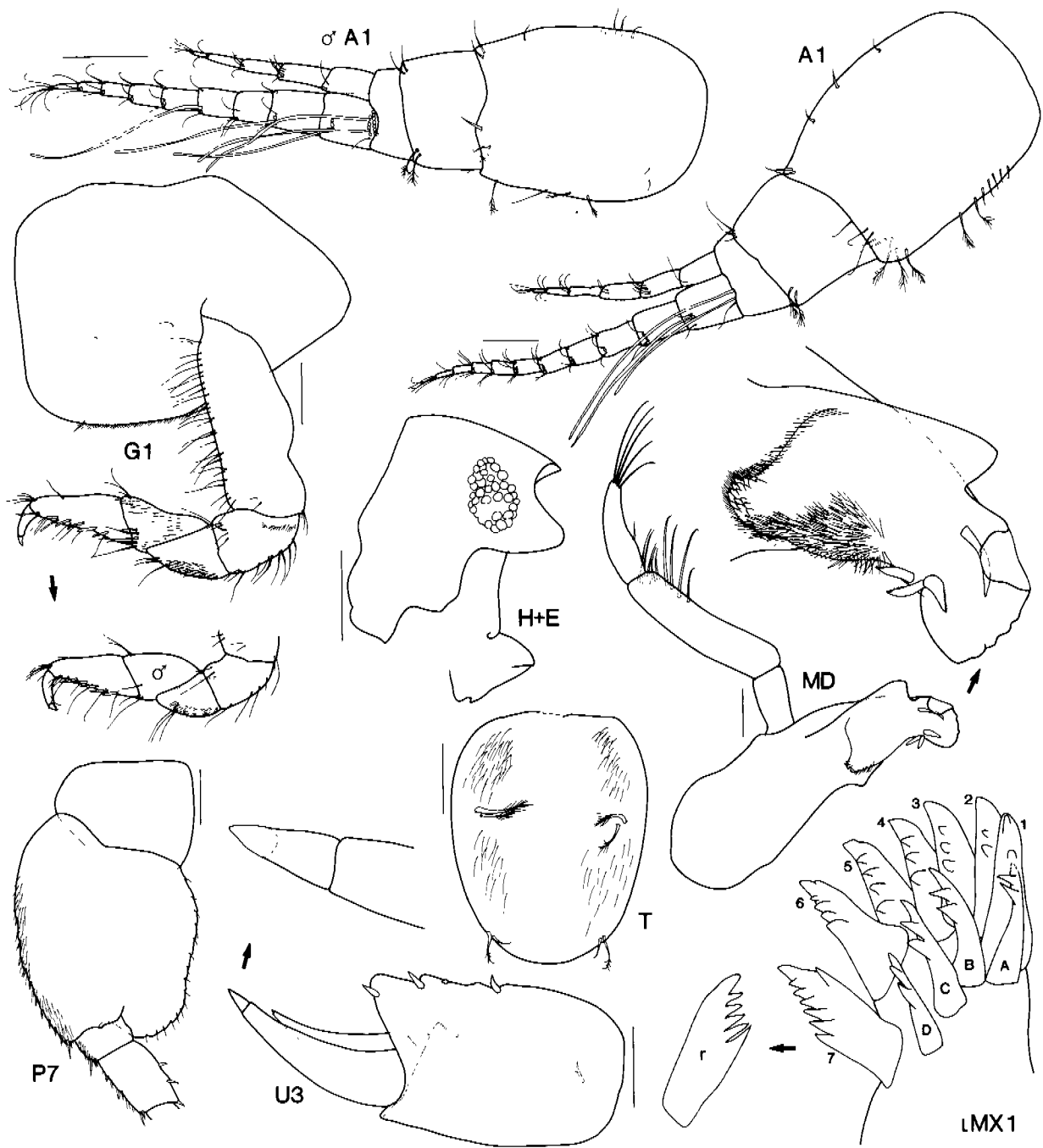


Figure 36. *Lysianopsis alba* (Holmes, 1905), syntype female, 6.8 mm (USNM 29246), Vineyard Sound, New England; male, 5.3 mm (USNM 278142), Amityville, Long Island, New York. Scale for G1 and P4 represents 0.2 mm, remainder represent 0.1 mm.

Lysianassa alba: Feeley and Wass, 1971, pp. 26, 52 (key); Williams and Bynum, 1972, pp. 179–188; Fox and Bynum, 1975, pp. 227, 229 (key).

?*Lysianopsis alba*: Shoemaker, 1933b, p. 2 (part, Key Largo material); Pirlot, 1936, p. 255; Ortiz, 1978, p. 8; Ortiz, 1979, p. 19; Stoner, 1979, p. 203; Stoner, 1980a, p. 542; Stoner, 1980b, pp. 67–70.

not *Lysianopsis alba*: Pearse, 1912, p. 369 (part = *Shoemakerella cubensis*; part unknown); Shoemaker, 1921, p. 99 (= *Shoemakerella cubensis*).

Type material examined: **SYNTYPES:** 9 ♀, 2 ♂ and 1 immature; Woods Hole, Massachusetts; S. J. Holmes; USNM 29246.—*Additional material examined:* 6 ♀; Vineyard Sound, New England; U.S. Fisheries Commission; 11 July 1871; AM P35551.—15 specimens; Amityville, Long Island, New York; 27 July 1938; USNM 278142.—**HOURGLASS MATERIAL:** None.

Diagnosis: Epistome and upper lip: epistome concave; upper lip produced beyond epistome. Maxilla 1: outer plate, setal-teeth 4 to 6 with 3 to 4 cusps. Gnathopod 1: sexually dimorphic, male propodus weakly prehensile. Peraeopod 7: basis with posterior margin slightly concave. Uropod 3: peduncle short, about 1.3 × as long as deep; outer ramus 2-articulate, article 2 poorly defined. Telson: distal margin rounded, without apical robust setae, with 2 short slender setae.

Distribution: East coast of the United States from Cape Cod to south of Cape Hatteras in less than 40-m depths. Possibly extending to southern Florida and the Gulf of Mexico.

Remarks: *Lysianopsis alba* was originally described from the Eel Pond at Woods Hole, Massachusetts, an estuarine environment with very cold winter temperatures, in northeastern United States. We find it difficult to believe that this species is also found in tropical marine environments of the Gulf of Mexico and Caribbean Sea (Shoemaker, 1933b; Pirlot, 1936; Ortiz, 1978, 1979; and Stoner, 1979, 1980a, 1980b). However, we have not examined material of these records and cannot discount them. At the time Shoemaker identified material from the southern Gulf of Mexico, he was not aware of *L. hummelincki*, which was subsequently synonymized with *L. alba* but which we have shown in this paper to be a separate but very closely related species. Pirlot had material from Rio de Janeiro, which he thought was possibly *L. hummelincki*. At Pirlot's request, Stephensen reexamined the mouthparts of *L. hummelincki* and told Pirlot that the species was the same as *L. alba*. Pirlot consequently synonymized the two species and identified his material as *L. alba*. When Ortiz identified his own material, *L. hummelincki* was synonymized with *L. alba* and so was probably not considered as a possibility. Stoner's material came from Apalachec Bay in the northeastern Gulf of Mexico, a subtropical estuarine environment. There needs to be a detailed taxonomic study of material from the eastern American coastline to determine the morphological and geographical range of this species.

Pearse (1912) recorded *Lysianopsis alba* from four localities in the Gulf of Mexico. Shoemaker (1935) examined Pearse's specimens from Pigeon Key Lake, Florida, and from between the Mississippi Delta and Cedar Keys and reidentified them as *Shoemakerella cubensis*. Shoemaker was not able to locate Pearse's material from Grassy Key Lake or Key West.

Lysianopsis hummelincki (Stephensen, 1933)

Figures 37–39

Lysianassa hummelincki Stephensen, 1933b, pp. 438–440, fig. 1; Pirlot, 1936, p. 256; Stephensen, 1948, pp. 1, 3, table 1, J. L. Barnard, 1958, p. 94; Hurley, 1963, p. 72; Ortiz, 1979, p. 19.

Lysianassa falcata Stephensen, 1933b, pp. 440, 441, fig. 2; Stephensen, 1948, pp. 1, 4, table 1; J. L. Barnard, 1958, p. 94; Ortiz, 1979, p. 19.

Lysianopsis alba: Barnard and Karaman, 1991, p. 499 (in part).

Falcanassa falcata: Barnard and Karaman, 1991, p. 486.

Type material examined: **HOLOTYPE:** ♀, ovigerous; 6 mm; near Willemstad, Curaçao, Caribbean Sea; approximately 12°06'N 68°56'W; isolated marine pool in reef; coll. Realino; 1 August 1932; ZMC.—**HOLOTYPE** of *Lysianassa falcata*: ♂; 3.5 mm; near Willemstad, Curaçao, Caribbean Sea; approxi-

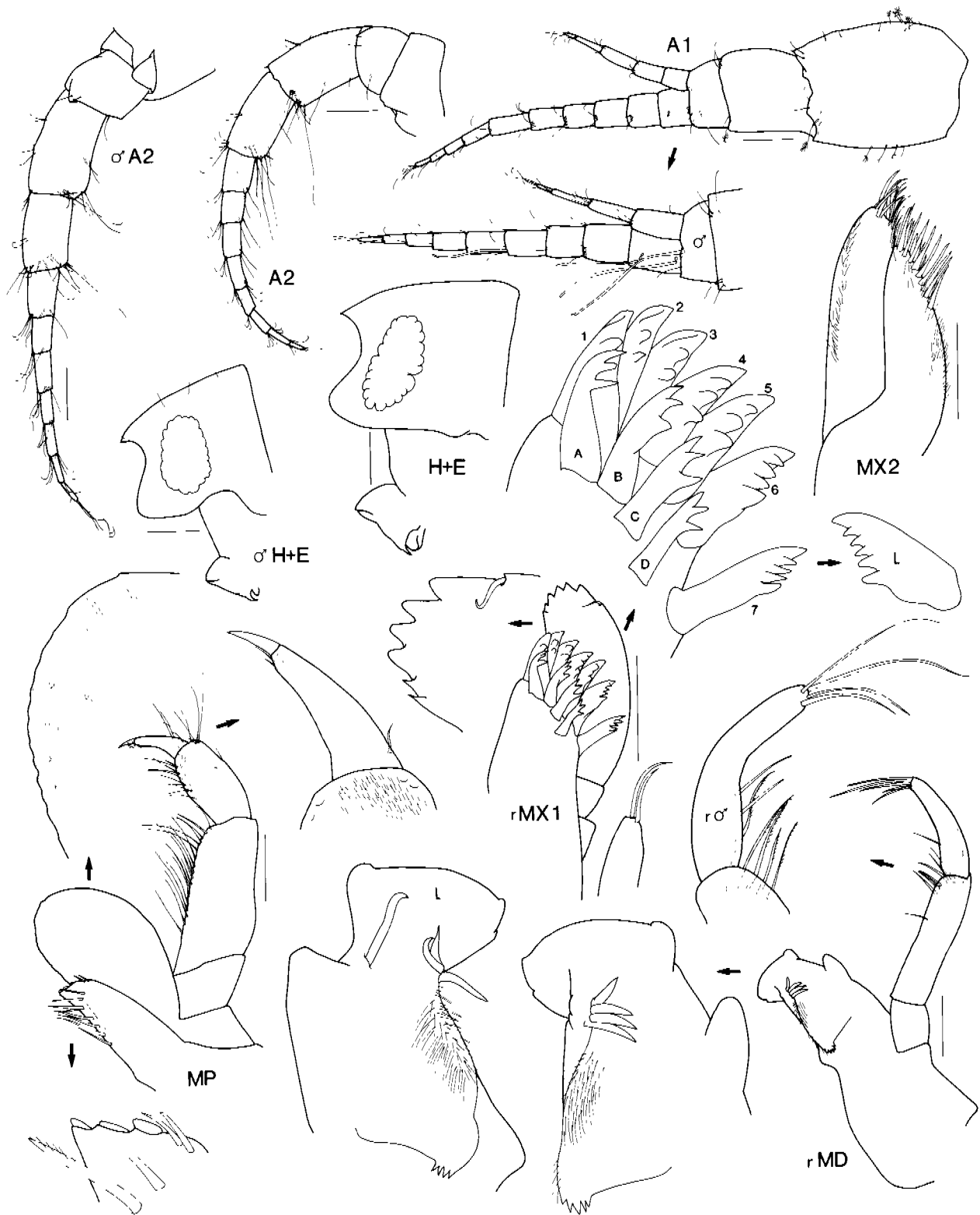


Figure 37. *Lysianopsis hummelincki* (Stephensen, 1933b), holotype female, 6 mm (ZMC), Curaçao, Caribbean Sea; male (holotype of *L. falcata*), 3.5 mm (ZMC), Curaçao, Caribbean Sea. Scale for male H+E represents 0.2 mm, remainder represent 0.1 mm.

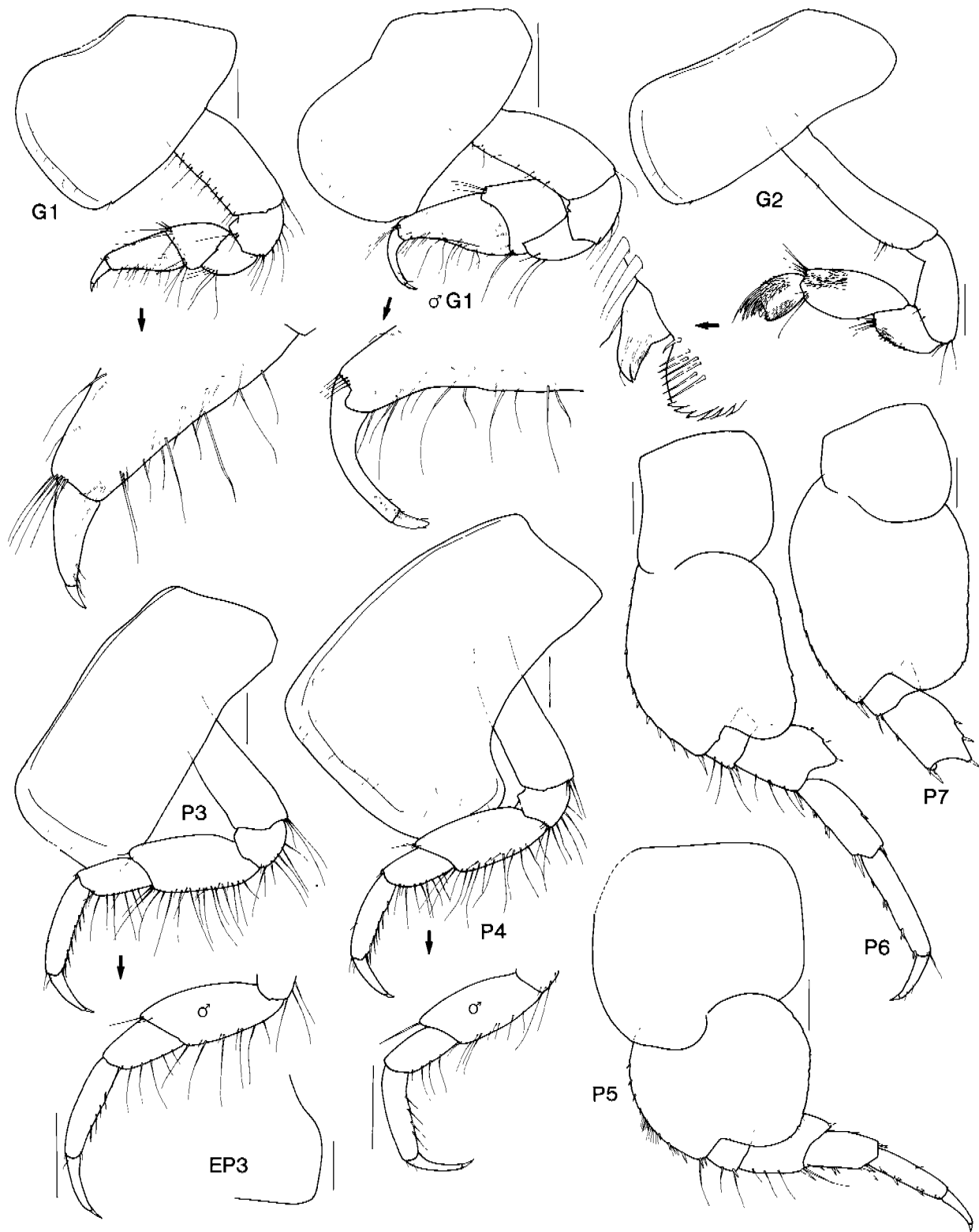


Figure 38. *Lysianopsis hummelincki* (Stephensen, 1933b), holotype female, 6 mm (ZMC), Curaçao, Caribbean Sea; male (holotype of *L. falcata*), 3.5 mm (ZMC), Curaçao, Caribbean Sea. Scales represent 0.2 mm.

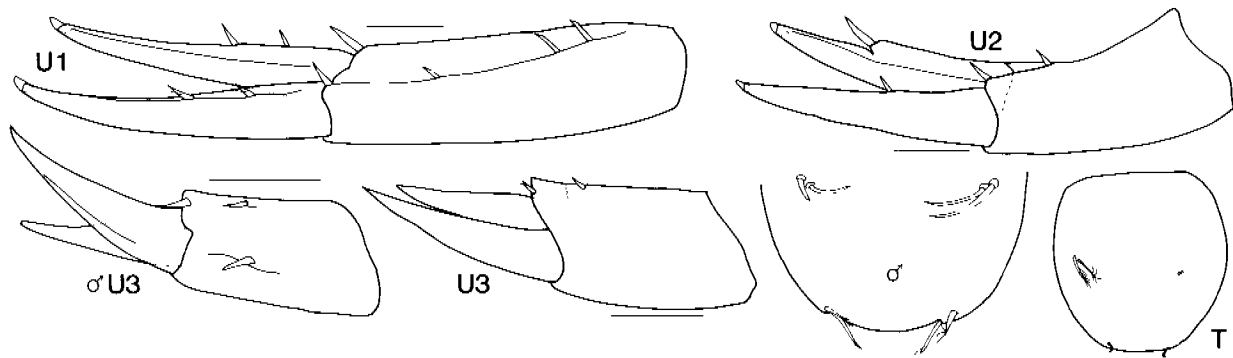


Figure 39. *Lysianopsis hummelincki* (Stephensen, 1933b), holotype female, 6 mm (ZMC), Curaçao, Caribbean Sea; male (holotype of *L. falcata*), 3.5 mm (ZMC), Curaçao, Caribbean Sea. Scales represent 0.1 mm.

mately 12°06'N 68°56'W; isolated marine pool in reef; coll. Realino; 1 August 1932; ZMC.—**HOUR-GLASS MATERIAL:** Nonc.

Diagnosis: Epistome and upper lip: epistome straight; upper lip produced beyond epistome. Maxilla 1: outer plate, setal-teeth 4 to 6 with 3 to 4 cusps. Gnathopod 1: sexually dimorphic, male propodus prehensile. Peracopod 7: basis with posterior margin slightly concave. Uropod 3: peduncle short, $1.6\times$ as long as deep; outer ramus 1-articulate. Telson: distal margin rounded, with 2 short, apical slender setae.

Description: Based on holotype female, 6 mm; male, 3.5 mm (holotype of *Lysianassa falcata*). Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, not enlarged in adult male. Antenna 1: short; peduncular article 1 short, length $1.4\times$ breadth, with small midmedial spine; accessory flagellum long, $0.5\times$ primary flagellum, 5-articulate, article 1 short, $1\times$ article 2; flagellum 10-articulate, without calynophore in female or male, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (same in male); peduncle without brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, peduncular articles 4 and 5 not enlarged in female or male; flagellum 8-articulate (male 7), calceoli absent in female and male.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome straight, upper lip produced, subquadrate. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis a long slender peg; accessory setal row, left row with 3, right row with 4 short, slender, multiserrate setae; intermediate setae absent; with protuberance on midposterior margin; molar setose, with rudimentary distal triturating surface; mandibular palp attached proximally; article 1 short, length $1.6\times$ breadth; article 2 slender, length $3.75\times$ breadth, $1.75\times$ article 3, with 7 (male 6) distal A2-setae, with 1 (male 0) D2-seta on distal third of posterior margin; article 3 falcate, long, length $3.8\times$ breadth, without A3-setae, with 1 (male 2) proximal D3-seta, with 2 (male 2) distal D3-setae and 3 (male 2) apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose setae; outer plate with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate, ST4 large, stout, ST5 large, stout, ST6 large, broad, 4-cuspidate distomedially, left and right ST7 slightly asymmetrical, slightly displaced from ST6, large, broad, 6-cuspidate distally, STA large, slightly displaced from STB, 2-cuspidate, STB–STC large, broad, 2-cuspidate, STD long, slender, 2-cuspidate; palp large, 2-articulate, with serrate apical margin, robust flag seta present on distolateral corner. Maxilla 2: inner and outer plates narrow; inner plate length $1\times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row strong, with 7 pappose setae; outer plate small, subovate, without apical slender setae, without apical robust setae, medial setae absent, submarginal setae vestigial; palp large, 4-articulate, article 2 slender, length $2\times$ breadth, dactylus well developed, with 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: sexually dimorphic; female: simple, coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin straight; basis long, slender, length $1.9 \times$ breadth, anterior margin smooth; ischium short, length $1.5 \times$ breadth; merus, posterior margin with patch of short setae; carpus subtriangular, short, length $1.4 \times$ breadth, subequal to ($1 \times$) propodus; propodus large, subrectangular, length $1.7 \times$ breadth, tapering distally, posterior margin smooth, subtly sinusoidal, without setae, palm absent; dactylus simple, without subterminal spines or simple setae; male: prehensile; basis long, slender; ischium short; merus, posterior margin with a few simple setae; carpus wedge-shaped, produced anteriorly, short, shorter than propodus; propodus large, subrectangular, tapering distally, posterior margin smooth, strongly sinusoidal, with few simple, slender setae, palm extremely acute, margin concave, smooth, posterodistal corner without robust setae; dactylus simple, without subterminal spines or robust setae. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $2.5 \times$ breadth; carpus long, length $2.2 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, long, length $2.2 \times$ breadth, palm slightly obtuse, with convex, smooth margin, posterodistal corner without robust setae; dactylus not reaching corner of palm.

Peracopod 3: coxa large; merus-carpus without plumose setae in male and female; propodus with 6 robust setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peracopod 4: with large posteroventral lobe, anterior and posterior margins subparallel; merus-carpus without plumose setae; propodus with 6 robust setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peracopod 5: coxa bilobate, anterior lobe slightly produced ventrally; basis expanded, posterior margin minutely crenate; merus expanded, with rounded posterior margin; propodus with 4 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peracopod 6: coxa small, not lobate posteriorly; basis expanded posteriorly, with minutely crenate posterior margin; merus expanded, with rounded posterior margin; propodus with 5 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peracopod 7: basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 3 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peracopod 5. Gills: from gnathopod 2 to peracopod 6, with weak horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner narrowly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 3 dorsolateral, 1 apicolateral, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 lateral robust setae; inner ramus with 2 medial robust setae. Uropod 2: without fine setae; peduncle with 1 dorsolateral and 1 apicolateral robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus with 1 dorsal robust seta, with weak constriction. Uropod 3: peduncle short, length $1.6 \times$ breadth, with dorsolateral flange, with 1 dorsolateral and 1 apicolateral robust setae; rami lanceolate, inner ramus reduced, about $0.9 \times$ outer ramus; outer ramus 1-articulate; rami without robust setae, slender plumose setae absent in female and male. Telson: as long as broad, length $1 \times$ breadth, entire, without dorsal robust setae, distal margin rounded, with 2 apical penicillate and 2 apical slender setae.

Distribution: Curaçao, Caribbean Sea, intertidal reefs.

Remarks: Stephensen (1933b) described two species, *Lysianassa hummelincki* and *Lysianassa falcata*, from the same tide pool in Curaçao. He had one female specimen of *L. hummelincki* and two male specimens of *L. falcata*. *Lysianassa hummelincki* was synonymized with *Lysianopsis alba* by Pirlot (1936), and this arrangement has been followed by all subsequent workers. The male has remained as *Lysianassa falcata* until recently, when Barnard and Karaman (1991) erected a monotypic genus, *Falcanassa*, with *L. falcata* as the type species.

In his original description, Stephensen commented that *L. falcata* was very much like *L. hummelincki*, the main distinguishing feature being the peculiar “falcate” gnathopod 1 of *L. falcata*. He also suggested a difference in the third uropods, but we cannot see this difference in our drawings made from his slides of the type specimen. We believe that the difference in the shape of the first gnathopods is a sexually dimorphic character. Such a dimorphism occurs in *Lysianopsis alba*, although to a lesser extent. Lowry and Stoddart (1983) discussed and illustrated a similar dimorphism in *Pseudambasia rossi* (Stephensen, 1927), a member of a related genus. Ledoyer (1986) illustrated a good example of this sexually dimorphic character in *Socarnopsis obesa* Chevreux, 1927, within another related genus. We have examined the type material of both *L. hummelincki* and *L. falcata*. The facts that Stephensen’s specimens came from the same pool, that one species was a male and the other a female, that the specimens are not separable by other characters, and that closely related species exhibit the same sexual dimorphism lead us to conclude that Stephensen had a male and a female of the same species.

Lysianopsis ozona, new species

Figures 40–42

Type material examined: **HOLOTYPE:** ♀; 8.0 mm; 19 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°07'W; sponges, alcyonarians, corals, algae, and seagrasses on bottom of shell and quartz sand between limestone outcrops; 18.3 m; 20 November 1967; 1435–1505 hours; trawl; HOURGLASS Cruise Post HC 45, Station B; USNM 282696.—**PARATYPE:** 1 ♀; same locality; 3 March 1966; 1855–1910 hours; dredge; HOURGLASS Cruise HC 25, Station B; AM P45336.—**PARATYPE:** 1 ♀, 8.5 mm; same locality; 13 December 1966; 1020–1050 hours; trawl; HOURGLASS Cruise Post HC 34, Station B; AM P45337.—**PARATYPE:** 1 ♂; 9.0 mm; same locality; 3 April 1967; 1830–1900 hours; trawl; HOURGLASS Cruise HC 38, Station B; USNM 282697.—**PARATYPE:** 1 specimen; same locality; 3 April 1967; 1830–1845 hours; dredge; HOURGLASS Cruise HC 38, Station B; USNM 282698.—**PARATYPE:** 1 specimen; same locality; 11 September 1967; 1310–1325 hours; dredge; HOURGLASS Cruise Post HC 43, Station B; USNM 282699.—*Additional material examined:* **HOURGLASS MATERIAL:** STATION J: 1 specimen; 8 March 1967; dredge; FSBC I 59989.—2 specimens; 5 July 1967; dredge; FSBC I 59990.—**OTHER MATERIAL:** 2 specimens; northern Gulf of Mexico; 28°56'00.3"N 84°05'59.9"W; silty very fine sand; 29 m; August 1977; Bureau of Land Management MAFLA OCS Station 2317A; USNM 284123.

Diagnosis: Epistome and upper lip: epistome concave; upper lip slightly produced beyond epistome. Maxilla 1: outer plate, setal-teeth 4 to 6 with 8 to 10 cusps. Gnathopod 1: not sexually dimorphic. Peraeopod 7: basis with posterior margin slightly rounded. Uropod 3: peduncle short, 1.4× as long as deep; outer ramus 2-articulate. Telson: distal margin truncated, with 2 long apical robust setae.

Description: Based on holotype female, 8.0 mm (USNM 282696); paratype male, not fully mature, 9.0 mm (USNM 282697). Head and body: with scattered setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes reniform, colour red, enlarged in immature male. Antenna 1: short, 0.13× body; peduncular article 1 short, length 1× breadth; peduncular article 2 short, 0.34× article 1; peduncular article 3 short, 0.17× article 1; accessory flagellum long, 0.6× primary flagellum, 5-articulate, article 1 short, 1.5× article 2 (immature male long, 2× article 2); flagellum 9-articulate (damaged in male), with weak 1-field calynophore in female (weak 2-field calynophore in immature male), calceoli absent in female and immature male. Antenna 2: slightly longer than antenna 1 (0.5× body length in immature male); peduncle without brush setae in female and male, weakly geniculate between peduncular articles 3–4, article 3 short, 0.6× article 4, peduncular articles 4 and 5 not enlarged in female (article 4 enlarged in immature male); flagellum 9-articulate (immature male 44), calceoli absent in female and immature male.

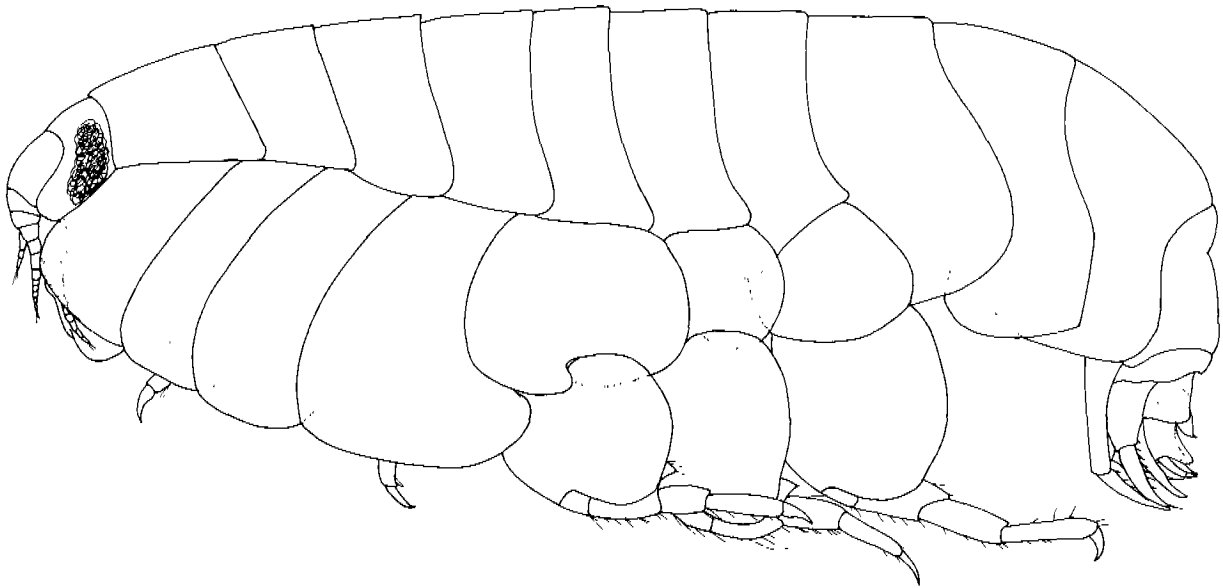


Figure 40. *Lysianopsis ozona* new species, paratype female, 8.5 mm (AM P45337), west of Egmont Key, Gulf of Mexico.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome concave, upper lip slightly produced, rounded. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis a long slender peg; accessory setal row, left with 3, right with 4 short, robust, multiserrate setae; intermediate setae absent; with protuberance on midposterior margin; molar a setose tongue with distal vestigial triturating surface; mandibular palp attached proximally; article 1 short, length $1.5 \times$ breadth; article 2 slender, length $3.4 \times$ breadth, $1.5 \times$ article 3, with 3 distal A2-setae, with 3 D2-setae on distal third of posterior margin; article 3 slender, blade-like, long, length $2.9 \times$ breadth, without A3-setae, with 2 proximal D3-setae, with 2 distal D3-setae and 3 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose setae; outer plate with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 9-cuspidate, ST5 large, stout, 10-cuspidate, ST6 large, broad, 8-cuspidate, left and right ST7 slightly asymmetrical, contiguous with ST6, large, broad, 9-cuspidate distally, STA large, slightly displaced from STB, 2-cuspidate, STB large, broad, 2-cuspidate, STC–STD long, slender, 2-cuspidate; palp large, 2-articulate, with castellate apical margin, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin serrate. Maxilla 2: inner and outer plates narrow; inner plate length $0.9 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row strong, with 7 pappose setae; outer plate small, subovate, with many fine apical setae, without apical robust setae, medial setae absent, submarginal setae absent; palp large, 4-articulate, article 2 slender, length $3.3 \times$ breadth, $1.7 \times$ article 3, article 3 long, slender, length $2.5 \times$ breadth, dactylus well developed, with 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis short, broad, length $1.9 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.3 \times$ breadth; merus, posterior margin with group of long simple setae and patch of short setae; carpus wedge-shaped, produced anteriorly, short, length $1.5 \times$ breadth, subequal to ($1 \times$) propodus, without denticulate patch near posterodistal margin; propodus large, subrectangular, length $1.7 \times$ breadth, tapering distally, posterior margin smooth, straight, with 8 simple robust setae, palm absent; dactylus simple, without subterminal spines or simple setae. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length $2.5 \times$ breadth; carpus long, length $2.7 \times$ breadth, posterior margin broadly lobate; propodus subquadrate, short, length $1.5 \times$ breadth, palm slightly obtuse, with convex, serrate margin, posterodistal

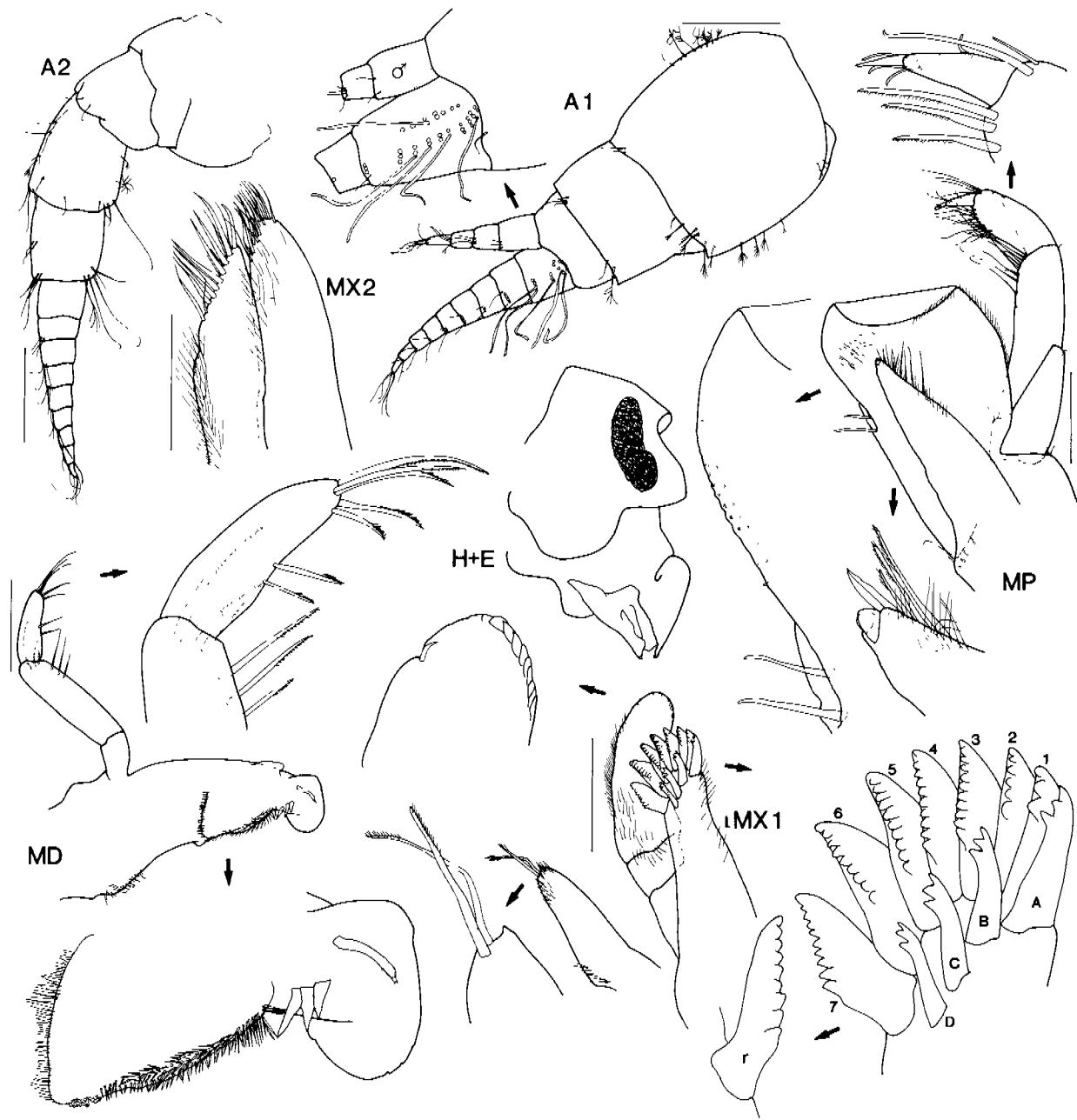


Figure 41. *Lysianopsis ozona* new species, holotype female, 8.0 mm (USNM 282696), west of Egmont Key, Gulf of Mexico; paratype male, 9.0 mm (USNM 282697), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

corner without robust setae; dactylus not reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus expanded anterodistally along carpus; merus-carpus without plumose setae in female and immature male; propodus with 5 slender setae and 1 distal locking seta along posterior margin; dactylus short, stocky. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus expanded anterodistally along carpus; merus-carpus without plumose setae in female and immature male; propodus with 6 slender setae and 1 distal locking seta along posterior margin; dactylus short, stocky. Peraeopod 5: coxa bilobate, anterior lobe slightly produced ventrally; basis expanded, posterior margin minutely crenate; merus

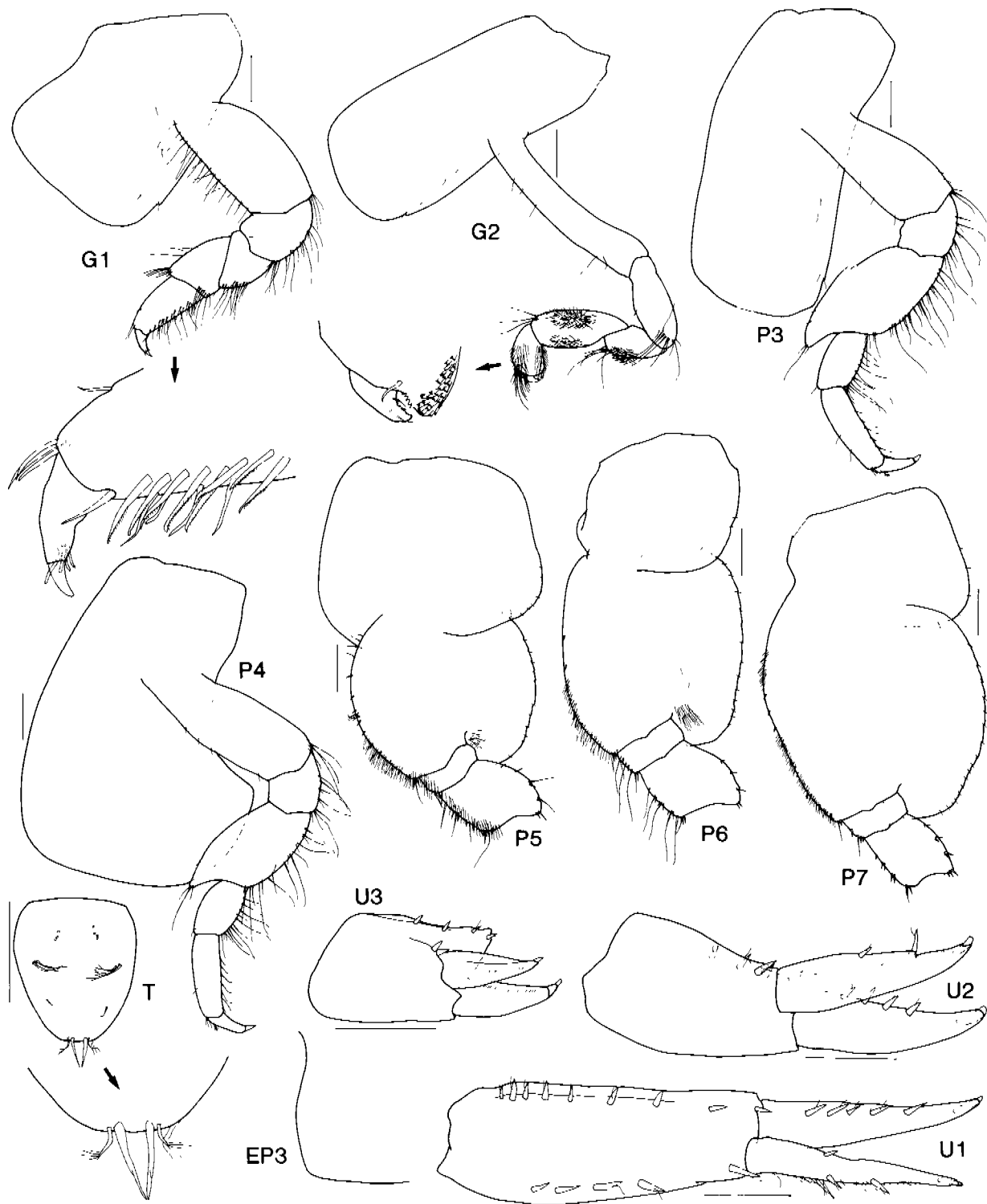


Figure 42. *Lysianopsis ozona* new species, holotype female, 8.0 mm (USNM 282696), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

expanded, with rounded posterior margin; carpus, propodus, and dactylus missing from specimen. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded, slightly exca-

vate along posteroventral margin with posteroventral lobe; merus slightly expanded posteriorly; carpus, propodus, and dactylus missing from specimen. Peraeopod 7: basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 5 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, with strong horizontal pleating.

Pleconites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner subquadrate. Urosomites: dorsally smooth; urosomite 3 without small dorsolateral seta. Uropod 1: with long fine setae at least on rami; peduncle with 8 dorsolateral, 1 apicolateral, 4 dorsomedial, and 1 apicomedial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 5 lateral robust setae; inner ramus with 1 medial and 2 lateral robust setae. Uropod 2: without fine setae; peduncle with 3 dorsolateral, 1 apicolateral, and 1 apicomedial robust setae; rami subequal in length; outer ramus with 4 dorsal robust setae; inner ramus with 2 dorsal robust setae, with weak constriction. Uropod 3: peduncle short, length $1.4 \times$ breadth, with dorsolateral flange, with 3 dorsolateral, 1 apicolateral, and 2 apicomedial robust setae, without midlateral slender or robust setae, without distoventral robust setae, without plumose setae in female or immature male; rami lanceolate, subequal in length; outer ramus 2-articulate, article 2 short, article 1 without robust setae; inner ramus with 2 medial robust setae; slender plumose setae absent in female and male. Telson: longer than broad, length $1.2 \times$ breadth, entire, without dorsal robust setae, distal margin truncated, with 2 apical penicillate and 2 apical robust setae, without apical slender setae.

Type locality: Gulf of Mexico, 19 nautical miles due west of Egmont Key, Florida, 27°37'N 83°07'W, 18.3 m.

Distribution: Eastern Gulf of Mexico in 18- to 29-m depths.

Etymology: Named for Ozona, a coastal town north of Tampa Bay, Florida.

Remarks: *Lysianopsis ozona* has a better-developed molar than does *L. alba*; there are proximal D3-setae on the mandibular palp; the rami of uropods 1 and 2 have more numerous robust setae; and the telson has distal robust setae.

Lysianopsis subantarctica (Schellenberg, 1931)

Aruga subantarctica Schellenberg, 1931, pp. 9, 10, fig. 3; J. L. Barnard, 1958, p. 90.

Lysianopsis subantarctica: Hurley, 1963, pp. 72, 74, 75, fig. 21e; Lowry and Stoddart, 1984, pp. 98–103, figs. 103; Gonzalez, 1991, p. 59; Barnard and Karaman, 1991, p. 499; De Broyer and Jazdzewski, 1993, p. 70.

Lysianassa subantarctica: Lowry and Bullock, 1976, p. 94.

Diagnosis: Epistome concave; upper lip produced beyond epistome. Maxilla 1: outer plate, setal-teeth 4 to 6 with 4 to 6 cusps. [Gnathopod 1: sexual dimorphism unknown]. Peraeopod 7: basis with posterior margin rounded, broadly incised posterodistally. Uropod 3: peduncle short, about $1.3 \times$ as long as deep; outer ramus 2-articulate. Telson: distal margin truncated with 2 short apical robust setae.

Remarks: *Lysianopsis subantarctica* was redescribed by Lowry and Stoddart (1984). There were no males in the material they studied. The only other species with a 2-articulate outer ramus on uropod 3 is *L. ozona*.

The two species are very similar but can be distinguished by the size of the upper lip, the shape of the posterior margin and posteroventral lobe on the basis of peraeopods 6 and 7, and the length of the apical robust setae on the telson.

Shoemakerella Pirlot, 1936

Shoemakerella Pirlot, 1936, p. 264, Barnard and Karaman, 1991, p. 530.

Diagnosis: Antenna 1: callynophore absent in female, weak 1-field in male. Antenna 2 in male: peduncular article 4 not enlarged, flagellum not elongate. Epistome not produced; upper lip produced. Mandible: without protuberance on midposterior margin; lacinia mobilis absent; molar a smooth flap with medial row of robust setae and finely setose margins. Maxilla 1: outer plate, left and right ST7 symmetrical, STA to STD apically bifurcate; palp apically serrate. Gnathopod 1: simple, not sexually dimorphic. Peraeopods 3 and 4 in male: merus and carpus without plumose setae along posterior margin. Uropod 3: peduncle short, with lateral flange; male peduncle and rami without plumose setae; outer ramus 1-articulate. Telson: entire.

Type species: *Lysianax cubensis* Stebbing, 1897.

Composition: *Shoemakerella* contains *S. cubensis* (Stebbing, 1897) and *S. lowryi* Gable and Lazo-Wasem, 1990.

Shoemakerella cubensis (Stebbing, 1897)

Figures 43–45

Lysianax cubensis Stebbing, 1897, pp. 29, 30, plate 7B; Hurley, 1963, p. 71, fig. 20b, c; Lowry and Stoddart, 1989b, pp. 236, 237; ICZN, 1991, p. 169.

Lysianassa cubensis: Stebbing, 1906, p. 38; Shoemaker, 1935, pp. 232–234, fig. 1.

Lysianopsis alba: Pearse, 1912, p. 369, fig. 1 (in part); Shoemaker, 1921, p. 99.

Shoemakerella nasuta: Pirlot, 1936, pp. 265, 266; Pirlot, 1939, pp. 47, 48, Shoemaker, 1948, pp. 1, 2; J. L. Barnard, 1969, p. 180; Ortiz and Lalana Rueda, 1993, p. 26; Ortiz and Lemaitre, 1994, p. 124.

Lysianopsis cubensis: Hurley, 1963, fig. 21a.

Lysianassa nasuta: Ortiz, 1978, p. 8; Ortiz, 1979, p. 19; Lalana Rueda and Pérez Moreno, 1985, p. 51; Lalana Rueda et al., 1989, p. 210; Lalana Rueda and Ortiz, 1990, p. 196; Ortiz and Lalana Rueda, 1992, p. 40.

Shoemakerella cubensis: Barnard and Karaman, 1991, p. 530.

not *Lysianassa cubensis*: Chilton, 1912, p. 464, pl. 1 fig. 5; K. H. Barnard, 1916, p. 120.

? not *Lysianopsis cubensis*: Hurley, 1963, p. 76.

Material examined: **HOURLASS MATERIAL:** STATION B: 1 specimen; 11 May 1967; trawl; FSBC I 60093.—1 specimen; 20 May 1967; dredge; FSBC I 60094.—1 ♂; 2 June 1967; dredge; FSBC I 60095.—1 ♀, 5.0 mm; 20 June 1967; trawl; USNM 282700.—1 specimen; 1 August 1967; dredge; FSBC I 60097.—1 specimen; 11 August 1967; dredge; FSBC I 60098.—1 specimen; 31 August 1967; dredge; FSBC I 60099.—25 specimens; 2 November 1967; dredge; FSBC I 60100.—1 ♀, 1 ♂; 20 November 1967; dredge; FSBC I 60101.—STATION C: 2 specimens; 1 August 1966; trawl; FSBC I 60102.—1 ♀; 1 August 1966; dredge; FSBC I 60103.—1 specimen; 20 January 1967; dredge; FSBC I 60104.—2 specimens; 20 May 1967; trawl; FSBC I 60105.—3 ♀; 20 May 1967; dredge; FSBC I 60106.—1 ♂, 5.1 mm; 2 June 1967; dredge; USNM 282701.—4 ♀, 3 ?; 31 August 1967; trawl; AM P47305.—1 specimen; 11

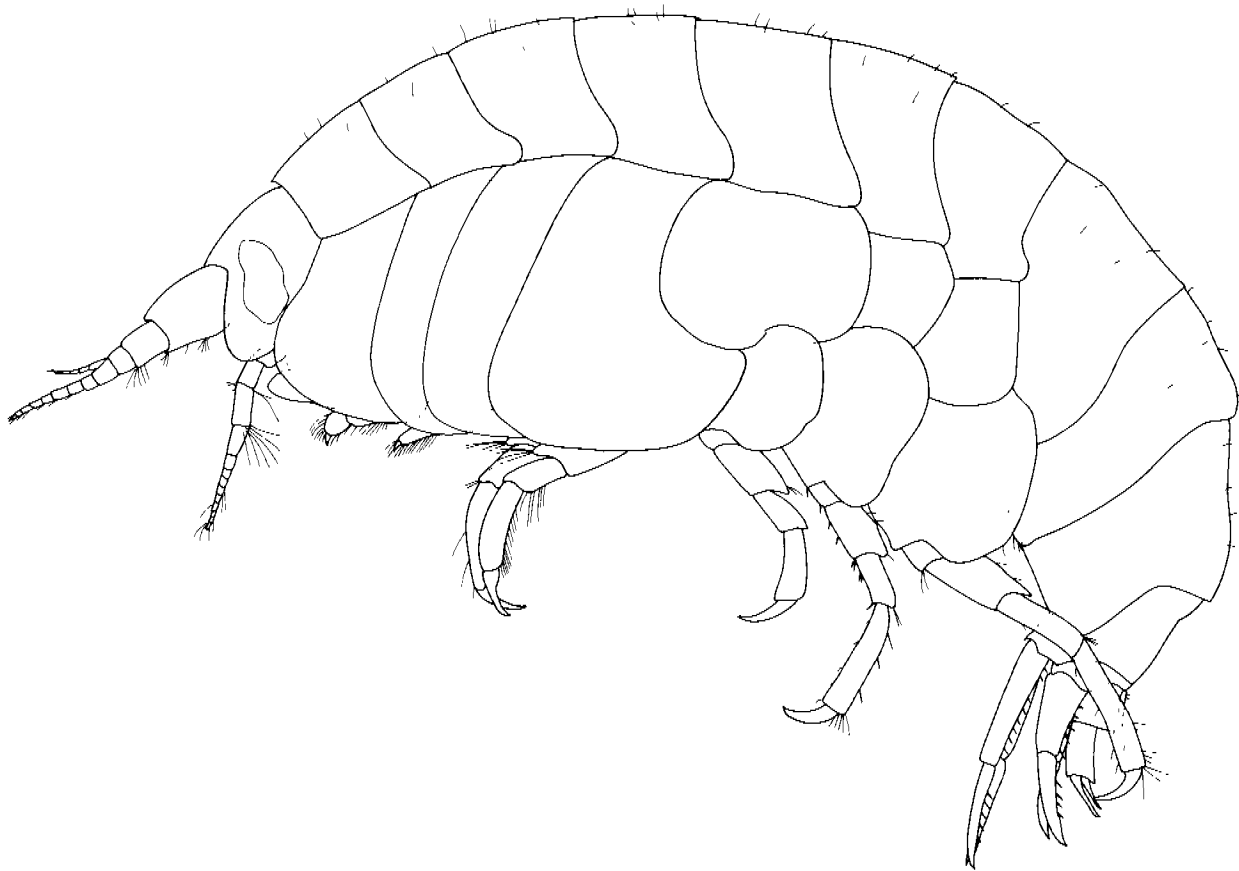


Figure 43. *Shoemakerella cubensis* (Stebbing, 1897), female, 8.6 mm (AM P35550), Loggerhead Key, Dry Tortugas, Florida, Gulf of Mexico.

September 1967; dredge; FSBC I 60109.—6 specimens; 5 October 1967; dredge; FSBC I 60110.—1 specimen; 21 November 1967; trawl; FSBC I 60111.—1 specimen; 21 November 1967; dredge; FSBC I 60112—STATION J: 1 specimen; 15 May 1967; dredge; FSBC I 60113.—1 specimen; 5 July 1967; dredge; FSBC I 60114.—1 ♂; 7 August 1967; dredge; FSBC I 60115.—3 specimens; 14 November 1967; dredge; FSBC I 60116.—STATION K: 5 specimens; 5 July 1967; dredge; FSBC I 60117.—1 ♀; 7 August 1967; trawl; FSBC I 60118.—STATION L: 1 specimen; 13 November 1966; dredge; FSBC I 60119.—1 specimen; 8 August 1967; trawl; FSBC I 60120.—2 specimens; 8 August 1967; dredge; FSBC I 60121.—**OTHER MATERIAL:** 15 specimens; north end of Loggerhead Key, Dry Tortugas, Florida, Gulf of Mexico; shallow water; C. R. Shoemaker; 13 August 1926; Station 20; USNM 277839.—50 specimens; same locality; C. R. Shoemaker; 6 August 1926; AM P35550.—Bureau of Land Management MAFLA OCS stations; northeastern Gulf of Mexico: 2 specimens; west of Tampa; 27°57'00.4"N 83°09'00.3"W; fine to very fine sand; 19 m; August–September 1977; Station 2207-05; USNM 284126.—2 specimens; same locality; summer 1977; Station 2207-05; USNM 284127.—2 specimens; Florida Middle Grounds; 28°42'00.3"N 84°20'00.7"W; silty fine sand; 35 m; 9 November 1977; Station 2316F; USNM 284128.—1 specimen; same locality, 28°56'00.3"N 84°05'59.9"W; silty very fine sand; 29 m; August 1977; Station 2317A; USNM 284129.—1 ♀ with embryos; 29°46'59.8"N 84°05'00.2"W; medium fine sand; 10 m; November 1977; Station 2419-10; USNM 284130.—1 specimen; southwest of Panama City; 29°54'58.6"N 86°04'58.5"; coarse sand; 37 m; September 1977; Station 2528I; USNM 284131.—1 specimen; same locality; September 1977; Station 2528J; USNM 284132.—1 specimen; 25°40'N 82°20'W; fine sand; 27 m; summer 1977; Station 2960-10; USNM 284133.

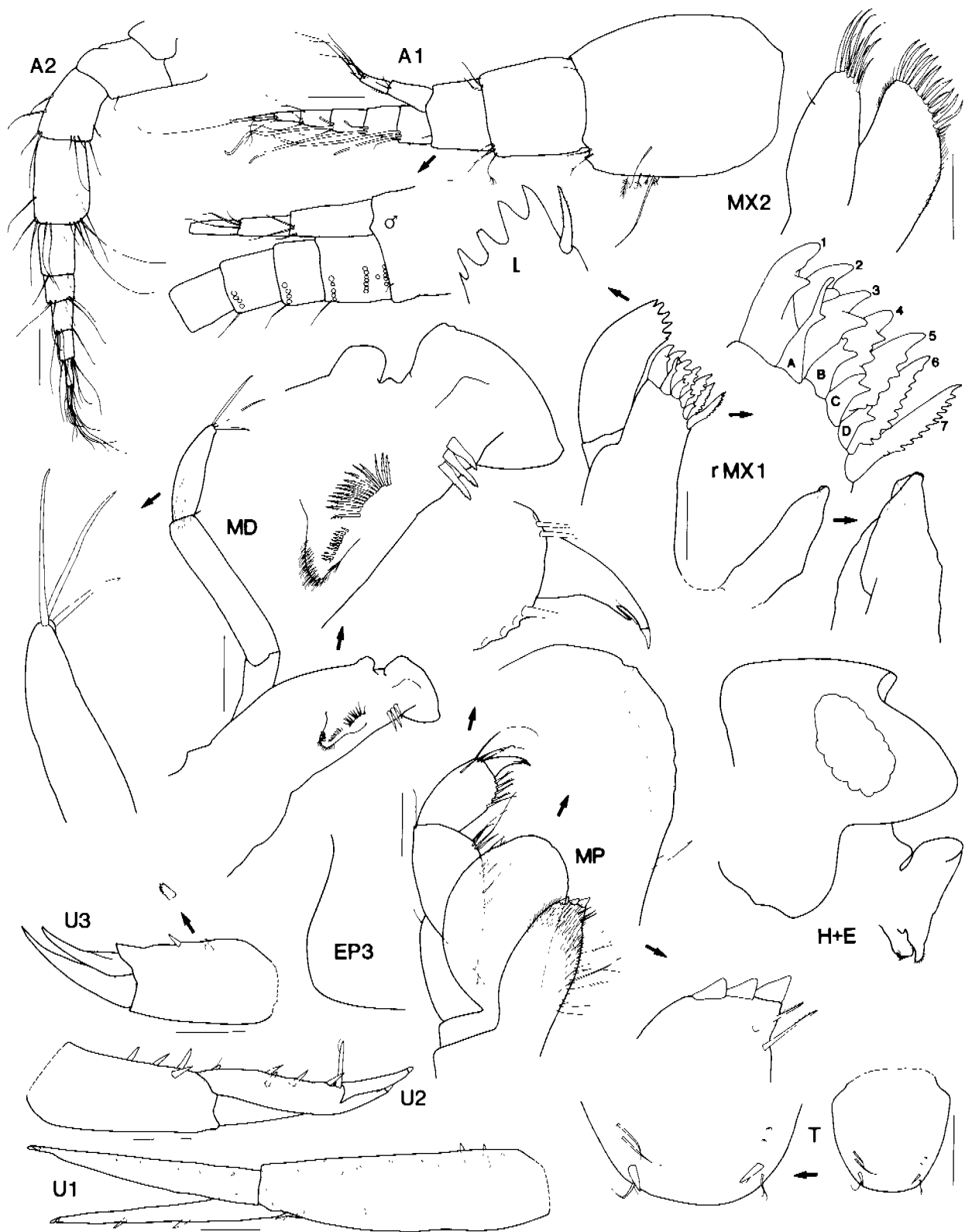


Figure 44. *Shoemakerella cubensis* (Stebbing, 1897), female, 5.0 mm (USNM 282700), male, 5.1 mm (USNM 282701), west of Egmont Key, Gulf of Mexico. Scales represent 0.1 mm.

Diagnosis: Peraeopod 7: long, propodus length $5 \times$ to $6 \times$ breadth.

Description: Based on female, 5.0 mm (USNM 282696); male, 5.1 mm (USNM 282697). Head and body: with scattered setae. Head: deeper than long, lateral cephalic lobe large, broadly rounded; rostrum absent; eyes reniform, dark, enlarged in adult male. Antenna 1: peduncular article 1 short, length $1.3 \times$ breadth, with 1 short posterodistal spine; peduncular article 2 long, $0.5 \times$ article 1; peduncular article 3 long, $0.3 \times$ article 1; accessory flagellum long, $0.5 \times$ primary flagellum, 3-articulate, article 1 short, $1.5 \times$ article 2 (male long, $1.6 \times$ article 2); flagellum 6-articulate (male 9), without callynophore in female (weak 1-field callynophore in male), without flagellar robust setae, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (same in male); peduncle without brush setae in female or male, weakly geniculate between peduncular articles 3–4, article 3 short, $0.8 \times$ article 4, peduncular articles 4 and 5 not enlarged in female or male; flagellum 6-articulate (male 9), calceoli absent in female and male.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome concave, upper lip produced, dorsally rounded. Mandible: incisors symmetrical, large, with slightly convex margins; lacinia mobilis absent; accessory setal row, left row with 3 short, slender, serrate setae; intermediate setae absent; molar a smooth flap with medial row of robust setae and finely setose margins; mandibular palp attached slightly proximally; article 1 long, length $2 \times$ breadth; article 2 slender, length $4.4 \times$ breadth, $1.5 \times$ article 3, with 3 (male 5) distal A2-setae, without D2-setae; article 3 falcate, long, length $3.8 \times$ breadth, without A3-, B3-, or D3-setae, with 3 apical E3-setae. Maxilla 1: inner plate narrow, without apical setae; outer plate broad, with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate, ST4 large, stout, 4-cuspidate, ST5 large, stout, 5-cuspidate, ST6 large, stout, 9-cuspidate, ST7 contiguous with ST6, large, slender, 9-cuspidate medially, STA large, slender, not displaced from STB, 1-cuspidate, STB–STD short, broad, apically bifurcate; palp large, 2-articulate, with serrate apical margin, without subterminal setae, flag seta present (absent on left side), distomedial margin smooth. Maxilla 2: inner plate broad, outer plate narrow; inner plate length $1 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row reduced with 2 simple setae; outer plate small, subovate, without apical slender setae, without apical robust setae, medial setae absent, submarginal setae absent; palp large, 4-articulate, article 2 broad, length $2 \times$ breadth, $1.5 \times$ article 3, article 3 short, broad, length $1.8 \times$ breadth, dactylus well developed, with 1 subterminal seta, unguis present.

Peraeonites 1–7: dorsally smooth. Peraeonite 7 with sternal hook except in ovigerous females. Gnathopod 1: simple; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin slightly convex; basis long, slender, length $2.3 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1 \times$ breadth; merus, posterior margin with group of long simple setae and with patch of short setae; carpus subrectangular, short, length $1.4 \times$ breadth, subequal to ($1 \times$) propodus, with denticulate patch near posterodistal margin; propodus large, subrectangular, length $1.8 \times$ breadth, tapering distally, posterior margin smooth, straight, with 3 simple robust setae and with simple, slender setae, with denticulate patch near posterior margin, palm absent; dactylus simple, with subterminal spine. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $2.5 \times$ breadth; carpus long, length $2.8 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, long, length $2.1 \times$ breadth, palm slightly obtuse, with slightly sinusoidal, smooth margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 4 slender setae and 2 distal locking setae along posterior margin; dactylus long, stocky. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 4 slender setae and 2 distal locking setae along posterior margin; dactylus long, stocky. Peraeopod 5: coxa equilobate; basis greatly

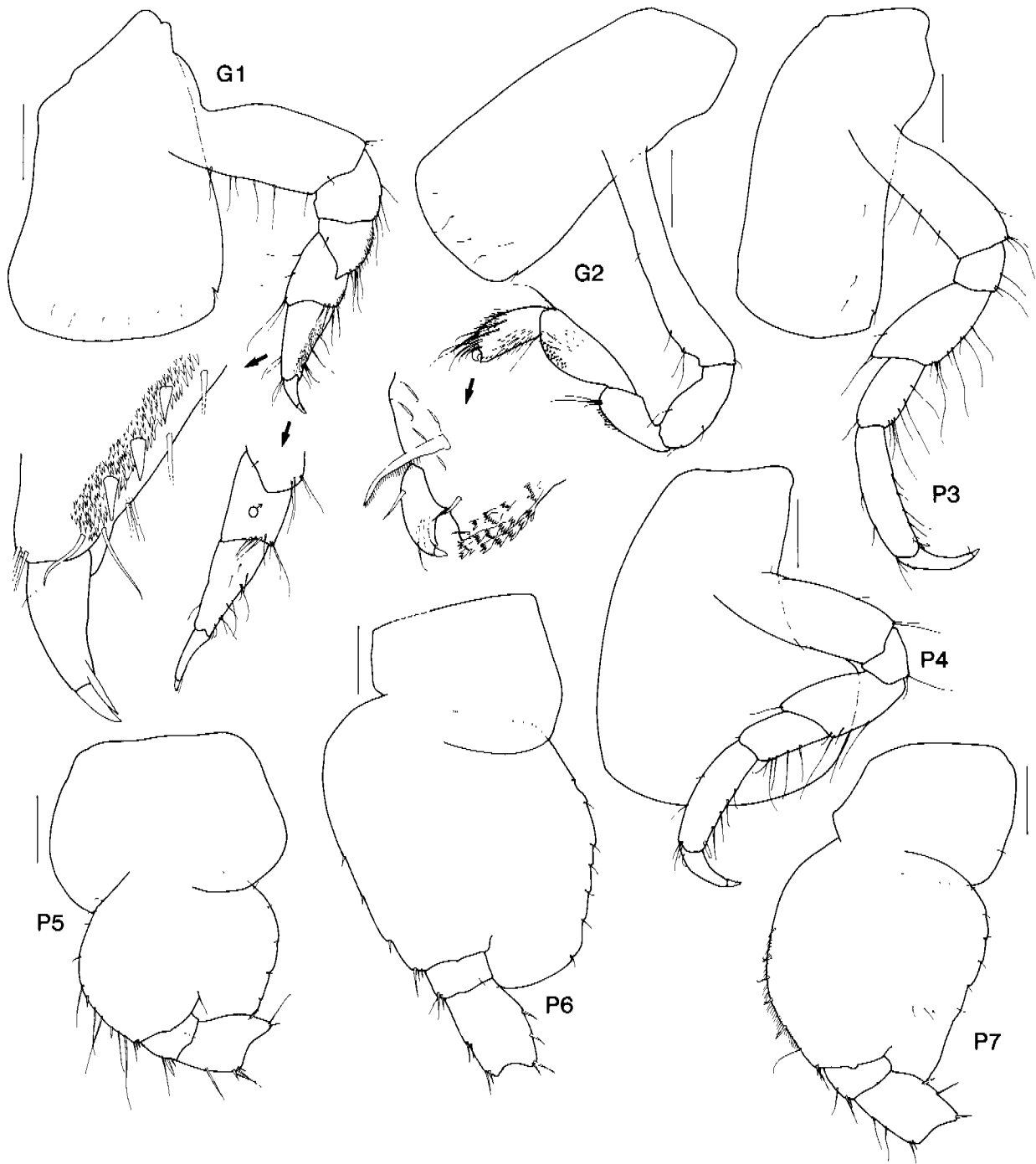


Figure 45. *Shoemakerella cubensis* (Stebbing, 1897), female, 5.0 mm (USNM 282700), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

expanded posteriorly, with smooth posterior margin; merus slightly expanded posteriorly; carpus, propodus, and dactylus missing from specimen. Pereopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded posteriorly; carpus, propodus, and dactylus missing from specimen. Pereopod 7: basis expand-

ed posteriorly, posterior margin slightly rounded, minutely crenate, posteroventral corner subquadrate, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 4 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, with weak horizontal pleating.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner unknown. Epimeron 3: posteroventral corner broadly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 8 dorsolateral, 1 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 4 dorsal robust setae; inner ramus with 2 dorsal robust setae. Uropod 2: without fine setae; peduncle with 3 dorsolateral, 1 apicolateral, and 1 dorsomedial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 3 dorsal robust setae; inner ramus with 3 dorsal robust setae, with strong constriction. Uropod 3: peduncle short, length $1.6 \times$ breadth (in male, peduncle long, length $2.2 \times$ breadth), with dorsolateral flange, with 1 dorsolateral (male 1), 2 dorsomedial (male 0) and 0 apicomедial (male 2) robust setae, without midlateral slender or robust setae, without distoventral robust setae, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than ($0.9 \times$) outer ramus; outer ramus 1-articulate; rami without robust setae, slender plumose setae absent in female and male. Telson: longer than broad, length $1.2 \times$ breadth, entire, without dorsal robust setae, without dorsal slender setae, distal margins truncated, with 2 subapical penicillate setae, without apical slender setae, with 2 apical robust setae.

Type locality: Cuba.

Distribution: Eastern Gulf of Mexico and Caribbean Sea in 2- to 69-m depths; ? Gulf of California in 5- to 18-m depths.

Remarks: Gable and Lazo-Wasem (1990) distinguished *S. lowryi* from *S. cubensis* as follows: 1) article 3 of maxillipedal palp much less setose; 2) no setae on anterior margin of ischium, merus, carpus, or propodus of gnathopod 1; 3) relatively few long setae on anterior margin of ischium, merus, carpus, and propodus of gnathopod 2; 4) peraeopod 7 very long (especially carpus and propodus); 5) dense setae on inner surface of mandibular palp article 3; 6) no spines (robust setae) on inner ramus of uropod 3.

Concerning characters 1 to 3, the Hourglass material (and other material from the northern Gulf of Mexico in our study) falls between *S. lowryi* and *S. cubensis* from the Dry Tortugas.

Character 5 is not valid. The “dense setae” (really cuticular extrusions) on the outer (not inner) surface of mandibular palp article 3 are present in *S. cubensis* but were not illustrated in Lowry and Stoddart’s unpublished figure studied by Gable and Lazo-Wasem. These “setae” are present in most lysianassids.

Concerning character 6, samples of material from Looe Key Reef, from the Dry Tortugas, and from the Hourglass stations all have specimens with and without a robust seta on uropod 3 inner ramus. The number of robust setae on the peduncle of uropod 3 also varies from 0 to 2.

This leaves only character 4 to distinguish the two species. In *S. lowryi*, the propodus of peraeopod 7 is about 9.5 times as long as broad; in a specimen of *S. cubensis* (to be described elsewhere as a neotype), the ratio is 5.4 times as long as broad. The Hourglass material does not contain any specimen with an intact peraeopod 7. In other material from the northern Gulf of Mexico, from the Dry Tortugas, and from Looe Key (the neotype sample), the length of the propodus varies from 5 to 6 times the breadth.

Hurley's (1963) record of *S. cubensis* from the Gulf of California is questioned only because of the geographical location. We have not examined this specimen. Hurley noted that it had a wide inner plate on maxilla 2, so it probably does belong in the genus *Shoemakerella*.

Tryphosinae, new subfamily

Diagnosis: Head: as long as deep or deeper than long. Antennae: calceoli present or absent. Epistome and upper lip separate. Mandible: incisor smooth; lacinia mobilis present on left side only or rarely absent; accessory setal row without distal setal tuft; molar fully to weakly triturating. Maxilla 1: inner plate weakly setose (6 or less) or without setae; outer plate narrow, with 6–11 setal-teeth in modified 6/5 arrangement; palp large, 2-articulate, with terminal robust setae. Maxilliped: with well-developed apical robust setae. Coxae 1 to 4: longer than broad, overlapping; coxa 1 fully developed, reduced, reduced and tapering, or vestigial. Gnathopod 1: strongly to weakly subchelate. Peraeopods: simple. Telson: cleft, occasionally entire, dorsal robust setae present.

Description: Head: exposed; as long as deep or deeper than long; anteroventral margin weakly or moderately recessed, rounded or oblique, shallowly or deeply excavate or not excavate; rostrum present or absent, if present, short; eyes present or absent, if present, ovoid, reniform, lageniform or subrectangular, with ommatidia or a pigment mass, with or without cuticular lenses. Body: laterally compressed, cuticle smooth or indurated, without setae.

Antenna 1: shorter than or subequal to antenna 2; peduncular article 1 longer than article 2; article 2 shorter than, subequal to or longer than article 3; article 3 shorter than article 1; peduncular articles 1–2 geniculate or not; accessory flagellum present or absent, if present, long, short or minute, 2- to 11-articulate; primary flagellum 5- or more articulate; callynophore present or absent; calceoli present or absent. Antenna 2: short to greater than body length; flagellum shorter than or longer than peduncle; 5- or more articulate; calceoli present or absent.

Mouthparts: well developed or reduced, forming subquadrate bundle. Mandible: incisor smooth; lacinia mobilis present on left side only or absent; accessory setal row present or absent, if present, without distal setal tuft; molar small to large, fully to weakly triturating; palp present or absent, if present, 3-articulate. Maxilla 1: inner plate weakly setose (6 or less) or without setae; outer plate with 6–11 setal-teeth; palp large, 2-articulate. Maxilla 2: inner plate without oblique setal row; with strongly to weakly setose medial margin, or without setae on medial margin. Maxilliped: inner plate well developed; outer plate large or small, with apical robust setae; palp 4-articulate.

Coxae 1–4: longer than or as long as broad, overlapping. Gnathopod 1: sexually dimorphic or not; simple, subchelate or parachelate; smaller than or subequal to gnathopod 2; coxa vestigial, hidden or partially hidden by coxa 2, or subequal to or larger than coxa 2; carpus shorter than, subequal to or longer than propodus; propodus, palm acute or transverse; with robust setae around posteroventral corner; dactylus large. Gnathopod 2: not sexually dimorphic; subchelate or chelate; coxa subequal to but not hidden by coxa 3; ischium elongate; carpus elongate, subequal to or longer than propodus; dactylus minute.

Peraeopods: none prehensile. Peraeopod 3: coxa longer than broad; merus and carpus, posterodistal margin without setal brush; merus shorter than, subequal to or longer than propodus; carpus shorter than propodus, not produced; dactylus well developed. Peraeopod 4: coxa subequal to or larger than coxa 3, with posteroventral lobe; merus and carpus, posterodistal margin with or without setal brush; merus shorter than, subequal to or longer than propodus; carpus shorter than propodus, not produced; dactylus well developed. Peraeopod 5: shorter than or subequal in length to peraeopod 6; coxa smaller than, subequal to

or larger than coxa 4, with or without ventrally produced posterior lobe; basis expanded, subovate or subquadrate, with or without posteroventral lobe; merus expanded to linear, posterior margin weakly setose or without setae; carpus linear; dactylus well developed. Peraeopod 6: shorter than or subequal in length to peraeopod 7; basis expanded or slightly expanded; merus expanded or not, posterior margin weakly setose or without setae. Peraeopod 7: subequal to or longer than peraeopod 5, similar in structure to peraeopod 6; basis expanded or slightly expanded, with broad posteroventral lobe, subrectangular or subovate; merus expanded to linear; dactylus short or elongate.

Pleonites 1–3: without dorsal teeth, pleonite 3 with or without dorsal carina. Epimera 2–3: without setae.

Urosome: urosomites 1 to 3 free; urosomite 1 longer than or much longer than urosomite 2; carinate or not. Uropod 1: peduncle without long plumose setae; biramous; rami lanceolate. Uropod 2: peduncle without long plumose setae; biramous; rami lanceolate; inner ramus subequal to outer ramus, not incised. Uropod 3: sexually dimorphic or not; peduncle short or elongate; biramous; rami lanceolate, with or without plumose setae; outer ramus subequal to or longer than peduncle, 2-articulate, article 2 short or long; inner ramus minute, shorter than or subequal to outer ramus. Telson: laminar; deeply to moderately cleft, emarginate or entire; longer than broad, as long as broad or broader than long; dorsal robust and slender setae present or absent; apical robust and slender setae present or absent.

Type genus: Tryphosa Boeck, 1871.

Generic composition: *Allogaussia* Schellenberg, 1926; *Aristiopsis* J. L. Barnard, 1961; *Bruunosa* Barnard and Karaman, 1987; *Cheirimedon* Stebbing, 1888; *Coximedon* Barnard and Karaman, 1991; *Elimedon* J. L. Barnard, 1962; *Gronella* Barnard and Karaman, 1991; *Hippomedon* Boeck, 1871; *Lepidepecreoides* K. H. Barnard, 1931; *Lepidepecreum* Bate and Westwood, 1868; *Lepiduristes* Barnard and Karaman, 1987; *Lysianella* Sars, 1882; *Metambasia* Stephensen, 1923; *Microlysias* Stebbing, 1918; *Onesimoides* Stebbing, 1888; *Orchomene* Boeck, 1871; *Orchomenella* Sars, 1890; *Orchomenyx* De Broyer, 1984; *Paracentromedon* Chevreux and Fage, 1925; *Paralysianopsis* Schellenberg, 1931; *Paratryphosites* Stebbing, 1899; *Paronesimoides* Pirlot, 1933; *Psammonyx* Bousfield, 1973; *Pseudokoroga* Schellenberg, 1931; *Pseudorchomene* Schellenberg, 1926; *Rhinolabia* Ruffo, 1972; *Rifcus* Kudrjaschov, 1965; *Rimakoroga* Barnard and Karaman, 1987; *Schisturella* Norman, 1900; *Stephensenia* Schellenberg, 1928; *Thrombasia* J. L. Barnard, 1966; *Tryphosa* Boeck, 1871; *Tryphosella* Bonnier, 1893; *Tryphosites* Sars, 1891; *Tryphosoides* Schellenberg, 1931; *Wecomedon* Jarrett and Bousfield, 1982.

Remarks: The justification for the establishment of the Tryphosinae is discussed in the remarks section for the Lysianassidae. Taxa included in the Tryphosinae are distinguished by the following character states: 6/5 setal-tooth arrangement on outer plate of maxilla 1; triturating molar; subchelate gnathopod 1 (except *Metambasia* and *Stephensenia*, which have a secondarily derived simple gnathopod 1); coxa 1 fully developed, reduced and tapering, or vestigial.

Hippomedon Boeck, 1871

Hippomedon pensacola, new species

Figures 46–48

Type material examined: **HOLOTYPE:** ♂; 5.2 mm; North Beach, Fort Pickens, Santa Rosa Island, Florida, Gulf of Mexico; 30°18.8'49.1"N 87°15'07.9"W; sandy beach, subtidal, 5 m from shore; J. A. McLelland and S. E. LeCroy (Gulf Coast Research Laboratory); 20 October 1993; GINS Inventory Project Sta-

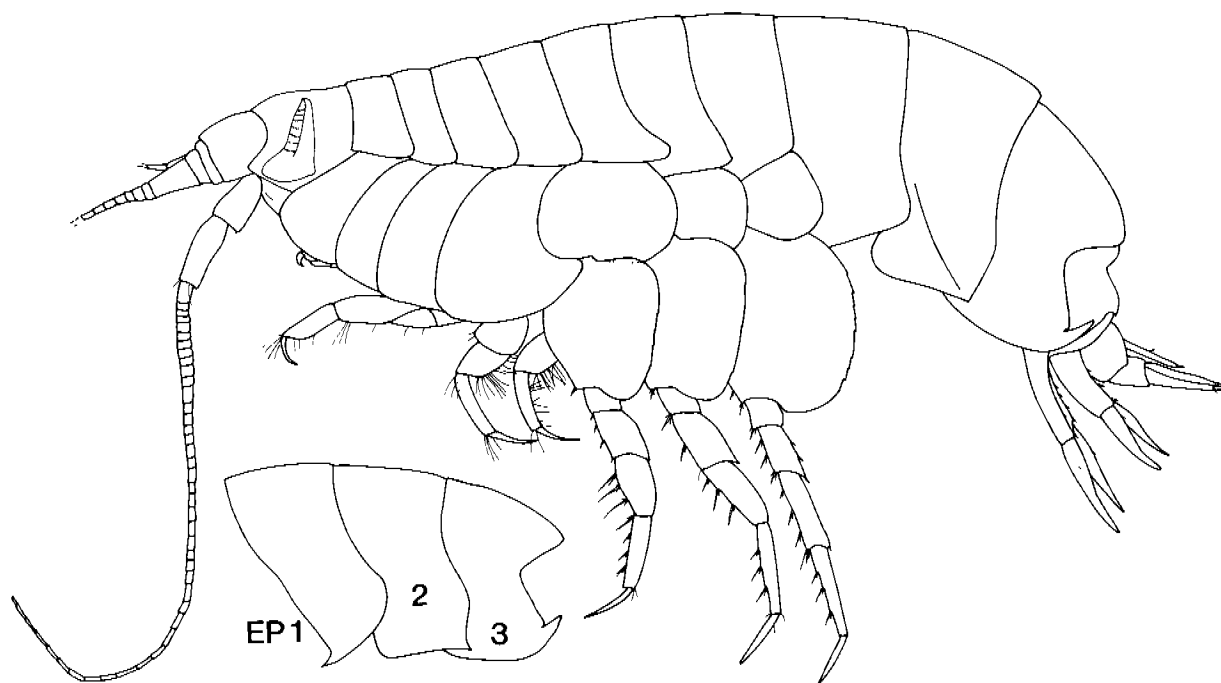


Figure 46. *Hippomedon pensacola* new species, holotype male, 5.2 mm (USNM 282702), Santa Rosa Island, Florida, Gulf of Mexico.

tion SR12; USNM 282702.—**HOURLASS MATERIAL:** None.

Diagnosis: Eyes present. Antenna 1: peduncular article 1 without anterodistal projection. Maxilla 1: inner plate with 2 apical, pappose setae. Gnathopod 1: carpus long, $1.5 \times$ propodus; palm acute, with convex, serrate margin. Epimeron 1: anteroventral corner with strongly projecting spine. Epimeron 3: posteroventral tooth strong, with notch at base. Telson: length $1.4 \times$ breadth, cleft 70%.

Description: Based on holotype male, 5.2 mm (USNM 282702); female unknown. Head and body: without setae. Head: slightly deeper than long, lateral cephalic lobe small, subacute; rostrum absent; eyes narrow, clongate, with two rows of pigment and a ventral concave lens, not enlarged in male. Antenna 1: peduncular article 1 short, length $1 \times$ breadth, without anterodistal projection; peduncular article 2 short, $0.24 \times$ article 1; peduncular article 3 short, $0.18 \times$ article 1; accessory flagellum 3-articulate, article 1 long, $1.6 \times$ article 2; flagellum with strong 2-field calynophore in male, with 1 robust seta on flagellar article 2, calceoli present in male. Antenna 2: $0.7 \times$ body length in male, with strong brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, $0.5 \times$ article 4, peduncular articles 4 and 5 probably enlarged in male, flagellum 41-articulate in male, calceoli present in male, at least 25.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate; epistome straight; upper lip slightly produced, rounded. Mandible: incisors small; with slightly convex margins; lacinia mobilis a stemmed, distally serrate blade; accessory setae absent; intermediate setae absent; molar columnar with fully triturating surface, large pappose seta absent; mandibular palp attached distally; article 1 short, length $1 \times$ breadth; article 2 slender, length $3.7 \times$ breadth, $1 \times$ article 3, with 7 submarginal posterodistal A2-setae, without B2- or D2-setae; article 3 falcate, long, length $4.6 \times$ breadth, without A3- or B3-setae, male with 16 D3-setae along most of posterior margin, and 2 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose apical setae, outer seta without denticulate row; outer plate with 11 setal-teeth, ST1 to ST3 large, stout, weakly cuspidate, ST4–ST6 large, stout, 2-cuspidate, ST7, contiguous with ST6, large, broad, 2-

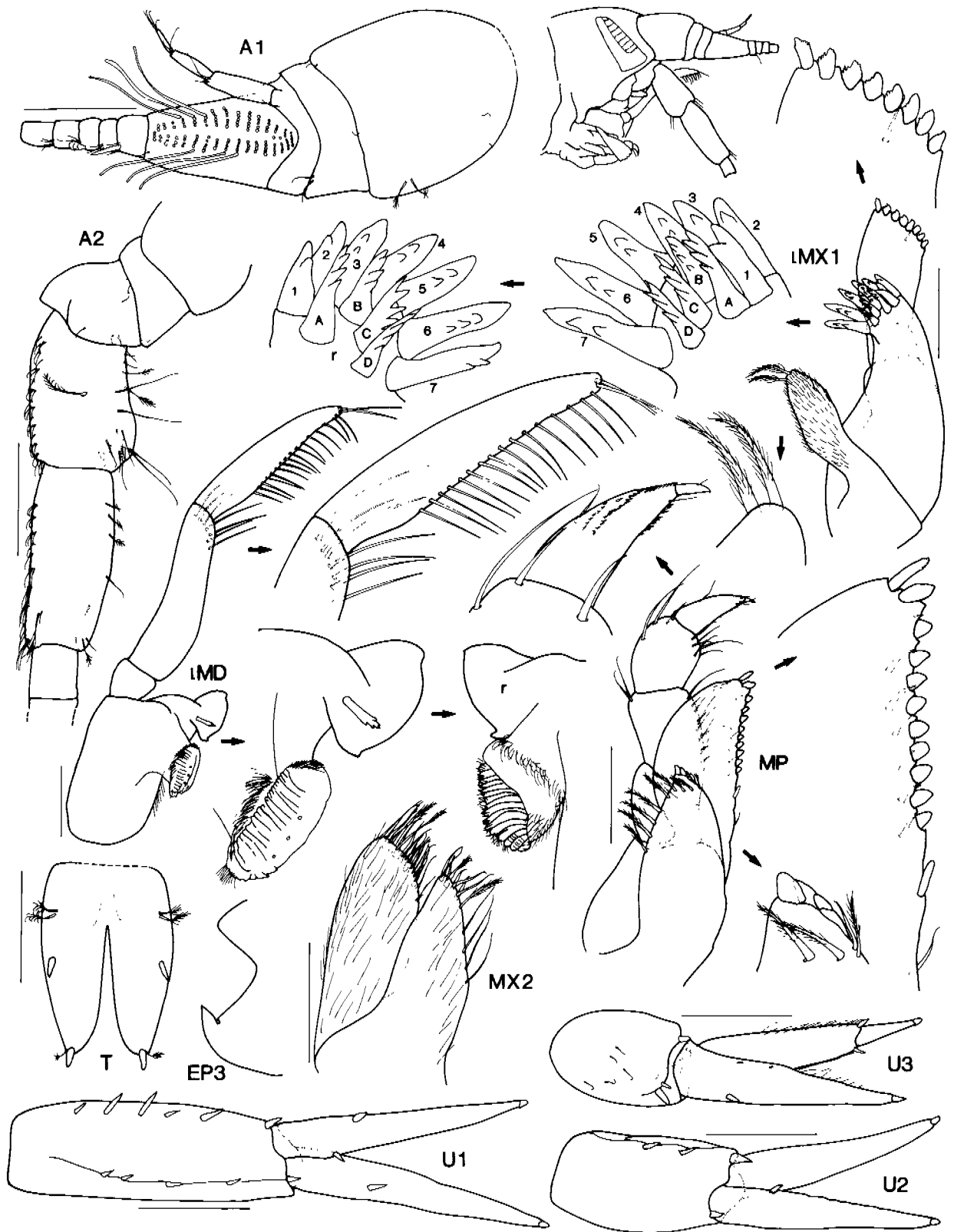


Figure 47. *Hippomedon pensacola* new species, holotype male, 5.2 mm (USNM 282702), Santa Rosa Island, Florida, Gulf of Mexico. Scales for A1, A2, U1-3, T represent 0.2 mm, remainder represent 0.1 mm.

cuspidate medially, STA large, slightly displaced from STB, 3-cuspidate, STB–STD large, broad, 3-cuspidate; palp large, 2-articulate, with 7 short terminal robust setae, with 1 subterminal seta, robust flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner and outer plates broad; inner plate length $1 \times$ outer plate. Maxilliped: base with long, straight, posteriorly projecting spine; inner plate large, subovate, with 3 apical nodular setae, with 2 robust setae on lateral face near inner margin, oblique setal row strong with 9 pappose setae; outer plate medium size, subovate, without apical slender setae, with 1 apical robust seta, medial setae large, robust, submarginal setae short, simple; palp large, 4-articulate, article 2 broad, length $1.7 \times$ breadth, $1.3 \times$ article 3, article 3 short, broad, length $1.4 \times$ breadth, dactylus well developed, with row of minute denticles and 3 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: subchelate; coxa large, about as long as coxa 2, anterior margin slightly concave, anteroventral corner rounded, posterior margin slightly concave; basis long, slender, length $3.4 \times$ breadth, anterior margin smooth, with simple setae; ischium long, length $1.8 \times$ breadth; merus, posterior margin with patch of short setae and a few simple setae; carpus subrectangular, long, length $2.5 \times$ breadth, longer than ($1.5 \times$) propodus, with long simple setae along posterior margin; propodus large, subovate, length $2.3 \times$ breadth, margins slightly converging distally, posterior margin smooth, straight, with simple, slender setae, palm acute, margin convex, serrate, posterodistal corner with 1 medial seta; dactylus simple, without subterminal spines or simple setae. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3, with tiny posterodistal hook; ischium long, length $2.6 \times$ breadth; carpus long, length $3.1 \times$ breadth, posterior margin straight; propodus subrectangular, long, length $2 \times$ breadth, palm transverse, with straight, serrate margin, posterodistal corner without robust setae; dactylus not reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in male; propodus with 11 slender setae and 1 distal locking seta along posterior margin; dactylus long, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin rounded, posterior margin sloping anteriorly; merus not expanded anteriorly; merus-carpus without plumose setae in male; propodus with 12 slender setae and 1 distal locking seta along posterior margin; dactylus long, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth; merus slightly expanded, margins subparallel; propodus with 6 long and short robust setae and 2 distal locking setae (long and short) along anterior margin, with 2 distal robust setae along posterior margin; dactylus long, slender. Peraeopod 6: coxa small, slightly lobate posteriorly; basis slightly expanded posteriorly, with weakly crenate posterior margin; merus not expanded posteriorly; propodus with 6 long and short robust setae and 2 short distal locking setae along anterior margin, with 3 distal robust setae along posterior margin; dactylus long, slender. Peraeopod 7: basis expanded posteriorly, posterior margin almost straight, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus not expanded posteriorly, with 2 robust setae; propodus with 6 long and short robust setae and 2 distal locking setae (long and short) along anterior margin, with 2 distal robust setae along posterior margin; dactylus long, slender.

Oostegites: unknown. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner with strongly projecting spine. Epimeron 3: posteroventral corner produced into strong spine with notch at base. Urosomites: urosomite 1 with anterodorsal notch and rounded boss; urosomite 3 without small dorsolateral seta. Uropod 1: with short fine setae; peduncle with 4 dorsolateral, 1 apicolateral, 5 dorsomedial, and 1 apicomедial setae; outer ramus slightly longer than inner ramus; outer ramus with 1 lateral robust seta; inner ramus with 1 lateral and 1 medial robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral, 1 apicolateral and 1 apicomедial; rami subequal in length; outer ramus without robust setae; inner ramus with 1 medial robust seta, without constriction. Uropod 3: peduncle short, length $1.3 \times$ breadth, without dorsolateral flange, with 2 apicolateral and 1 apicomедial robust setae, without midlateral slender or robust setae, with 2 dis-

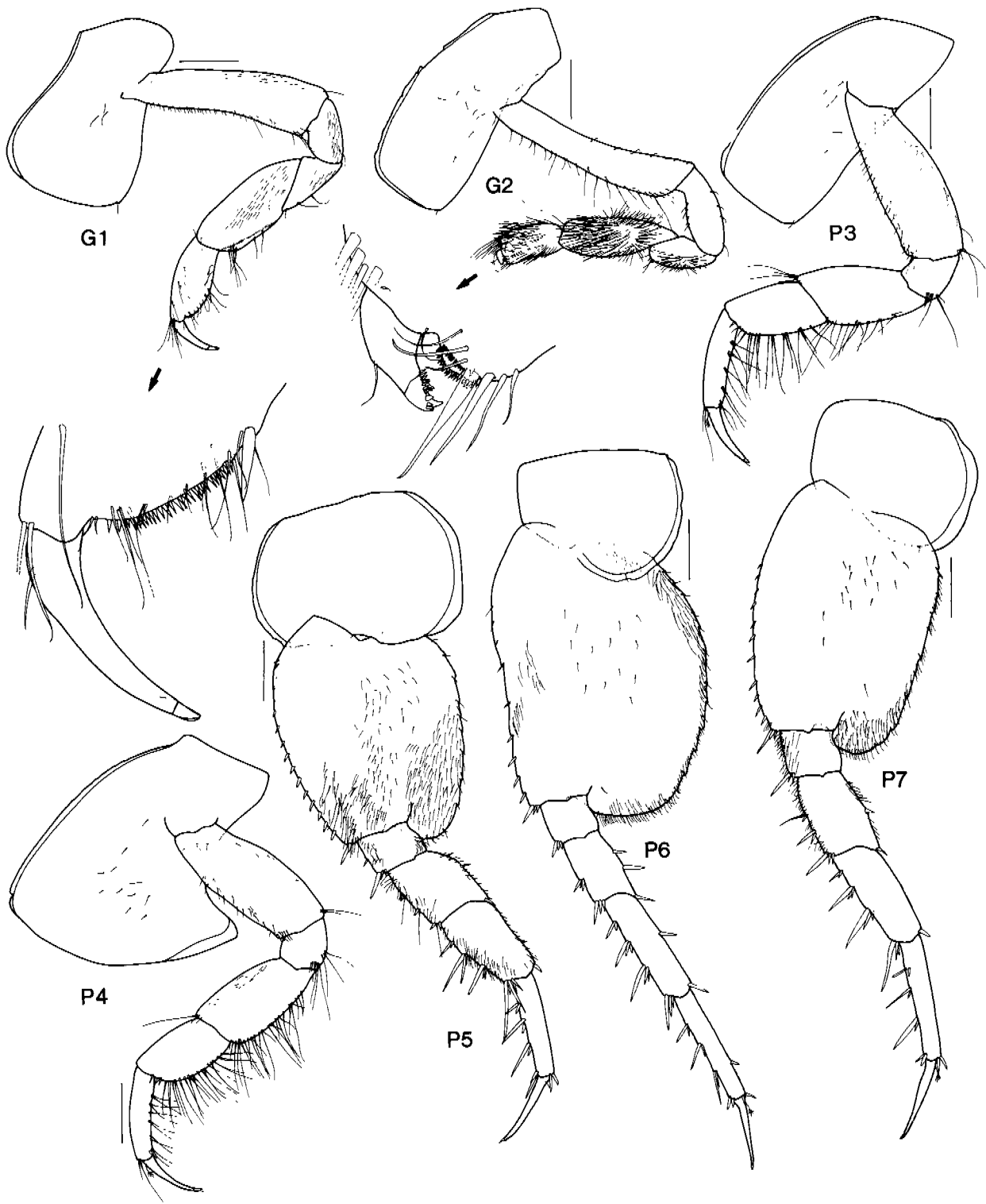


Figure 48. *Hippomedon pensacola* new species, holotype male, 5.2 mm (USNM 282702), Santa Rosa Island, Florida, Gulf of Mexico. Scales represent 0.2 mm.

toventral robust setae, without plumose setae in male; rami lanceolate, subequal in length; outer ramus 2-articulate, article 2 long, article 1 with 1 lateral and 1 medial robust setae; inner ramus with 1 lateral

robust seta; slender plumose setae absent in male. Telson: longer than broad, length $1.4 \times$ breadth, deeply cleft (70%), with 1 dorsal robust seta on each lobe, without dorsal slender setae, distal margins rounded, with 1 apical penicillate seta on each lobe, without apical slender setae, with 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, North Beach, Fort Pickens, Santa Rosa Island, Florida, $30^{\circ}18.8'49.1''\text{N}$ $87^{\circ}15'07.9''\text{W}$, sandy beach, subtidal, 5 m from shore.

Distribution: Santa Rosa Island, Florida, Gulf of Mexico, subtidal.

Etymology: Named for Pensacola Pass, near the type locality.

Remarks: *Hippomedon pensacola* appears to be closely related to the Mediterranean Sea species *H. ambiguus* Ruffo, 1946, and *H. massiliensis* Bellan-Santini, 1965. All of these species have the following: a long, narrow “laddered” eye with a ventral concave lens; a notch at the base of the posteroventral tooth on epimeron 3; and one dorsal robust seta on each lobe of the telson. Because *H. ambiguus* is so poorly described, it is difficult to distinguish from *H. pensacola*. *Hippomedon pensacola* and *H. ambiguus* both have a strongly projecting robust seta on the anteroventral corner of epimeron 1, a character not shared with *H. massiliensis*. Evidently, *H. ambiguus* and *H. massiliensis* both have a small anterodistal projection on peduncular article 1 of antenna 1; have the basis of pereopod 7 more broadly expanded, with a slightly rounded posterior margin; and have the telson more deeply cleft (75%), characters that distinguish them from *H. pensacola*.

Orchomenella Sars, 1890

Orchomenella perdido, new species

Figures 49–51

Type material examined: **HOLOTYPE:** ♀; 4.0 mm; Gulf side of Perdido Key, Florida, Gulf of Mexico; $30^{\circ}17.8'\text{N}$ $87^{\circ}23.49'\text{W}$; sandy beach, 5.5 m from shore; J. Taylor and K. K. (Gulf Coast Research Laboratory), 6 October 1989; Perdido Key Project, Station B8-4; USNM 282703.—**PARATYPE:** juvenile; 2.4 mm; same data; USNM 282704.—**PARATYPE:** 1 ♀; 51 nautical miles due west of Sanibel Island Light, Gulf of Mexico; $26^{\circ}24'\text{N}$ $82^{\circ}58'\text{W}$; crushed shell and calcareous silt with limestone outcrops, sponges, algae and *Lithothamnion*; 36.6 m; 12 November 1966; 2200–2230 hours; trawl; HOURGLASS Cruise HC 33, Station K; USNM 282705.—**PARATYPE:** 1 ♀; Florida Middle Grounds, northeastern Gulf of Mexico; $28^{\circ}42'00.3''\text{N}$ $84^{\circ}20'00.7''\text{W}$; silty fine sand; 35 m; August 1977; Bureau of Land Management MAFLA OCS Station 2316I; USNM 282706.

Diagnosis: Mandibular palp: article 1 about as long as broad. Gnathopod 1: carpus shorter than propodus. Epimeron 3: posteroventral corner narrowly rounded. Urosomite 1: with low rounded dorsal boss. Uropod 3: inner ramus shorter than outer ramus. Telson: notched.

Description: Based on holotype female, 4.0 mm (USNM 282703); male unknown. Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, broad, subacute; rostrum small; eyes reniform, pale reddish in alcohol. Antenna 1: short, $0.15 \times$ body; peduncular article 1 short, length $1.2 \times$ breadth; peduncular article 2 short, $0.3 \times$ article 1; peduncular article 3 short, $0.2 \times$ article 1; accessory flagellum medium length, $0.49 \times$ primary flagellum, 3-articulate, article 1 long, $2 \times$ article 2; flagellum 6-articulate, with strong 2-field callynophore, calceoli absent. Antenna 2: subequal in length to antenna 1; peduncle without brush setae, weakly geniculate between peduncular articles 3–4, article 3 short, $0.7 \times$

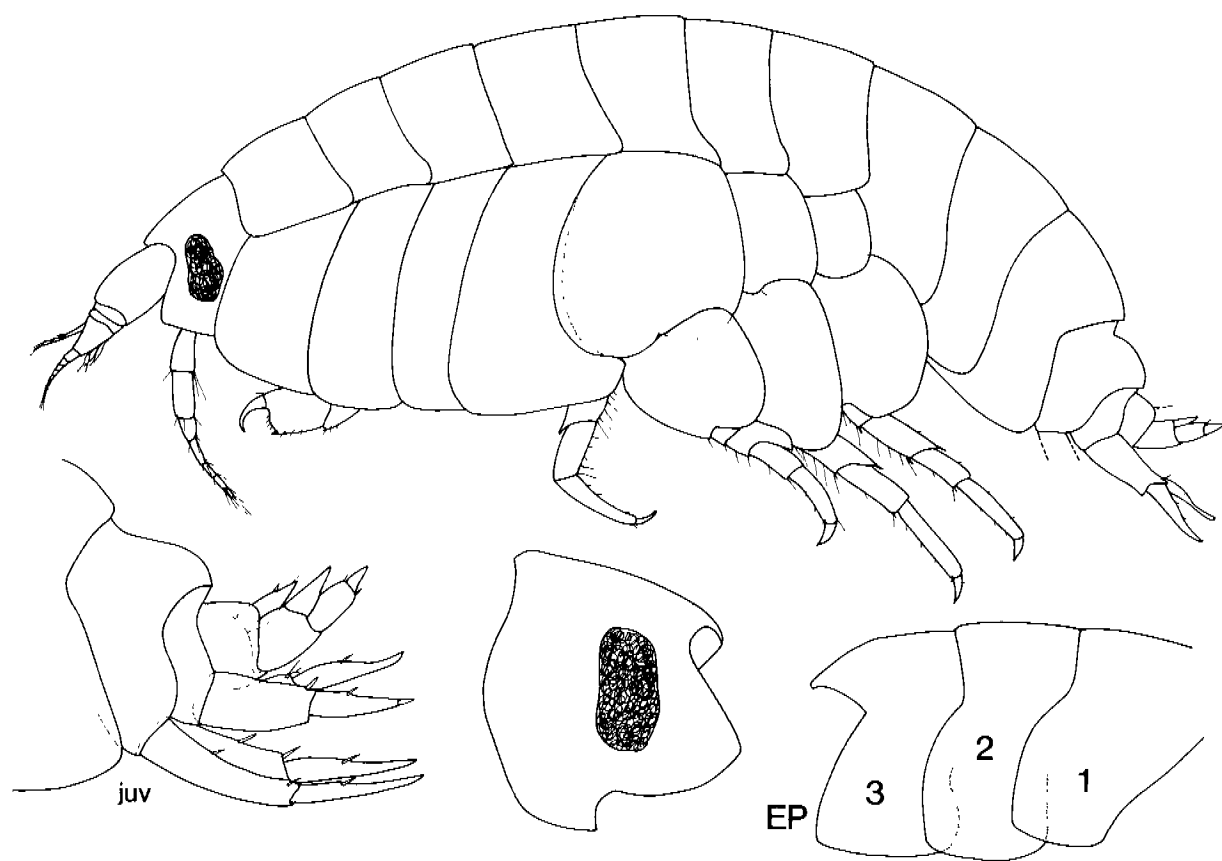


Figure 49. *Orchomenella perdido* new species, holotype female, 4.0 mm (USNM 282703), juvenile, 2.4 mm (USNM 282704), Perdido Key, Florida, Gulf of Mexico.

article 4, peduncular articles 4 and 5 not enlarged in female, unknown for male; flagellum 5-articulate, calceoli absent.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate; epistome concave; upper lip not produced, slightly rounded. Mandible: incisors large; with strongly convex margins; lacinia mobilis a cuspidate peg; accessory setal row, left and right each with 3 short, slender, simple setae; intermediate setae absent; molar with reduced column and convex triturating surface; mandibular palp attached midway; article 1 short, length $0.9 \times$ breadth; article 2 broad, length $3.3 \times$ breadth, $1.7 \times$ article 3, with 8 submarginal posterodistal A2-setae, without D2-setae; article 3 falcate, long, length $2.8 \times$ breadth, with 2 proximal A3-setae, with 7 D3-setae along most of posterior margin and 2 apical E3-setae. Maxilla 1: inner plate unknown; outer plate with 11 setal-teeth, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 3-cuspidate, ST5 large, stout, 3- to 4-cuspidate, ST6 large, very broad, 8- to 6-cuspidate distomedially, left and right ST7 asymmetrical, slightly displaced from ST6, left large, broad, 7-cuspidate distally, right 10-cuspidate distomedially, STA large, slightly displaced from STB, 6-cuspidate distally, STB large, broad, 6-cuspidate, STC large, broad, 8-cuspidate, STD large, broad, 9-cuspidate along medial margin; palp large, 2-articulate, with 6 short, terminal robust setae, without subterminal setae, slender flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner plate narrow, outer plate broader; inner plate length $1 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row strong with 6 pappose setae; outer plate small, subovate, without apical slender setae, with 2 apical robust setae, medial setae small, blunt, submarginal setae short, simple; palp large,



Figure 50. *Orchomenella perdido* new species, holotype female, 4.0 mm (USNM 282703), Perdido Key, Florida, Gulf of Mexico. Scales represent 0.1 mm.

4-articulate, article 2 broad, length $2.1 \times$ breadth, $1.3 \times$ article 3, article 3 long, slender, length $2.4 \times$ breadth, dactylus well developed, with 1 subterminal seta, unguis present.

Gnathopod 1: subchelate; coxa large, about as long as coxa 2, anterior margin concave, anteroventral

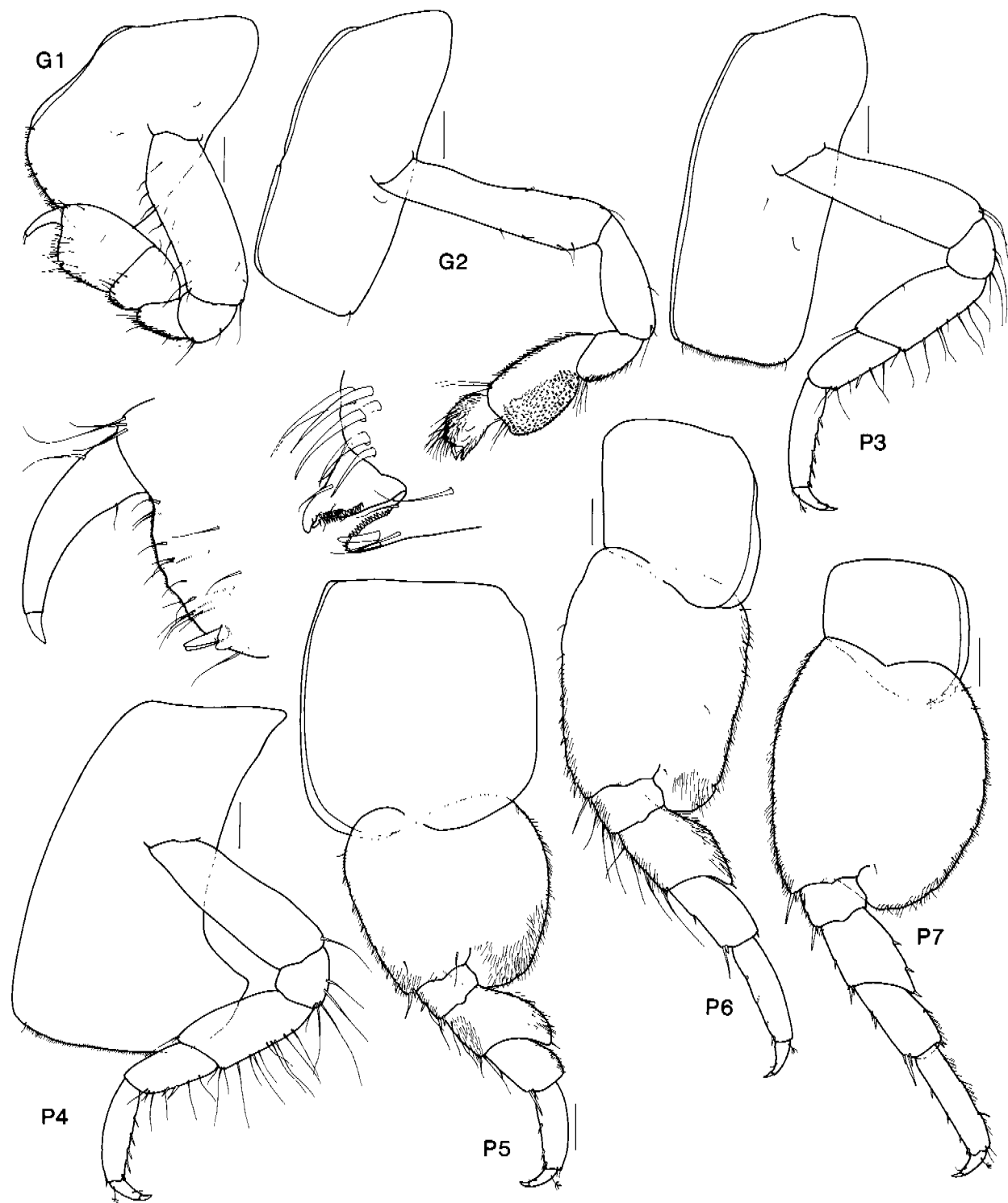


Figure 51. *Orchomenella perdidio* new species, holotype female, 4.0 mm (USNM 282703), Perdido Key, Florida, Gulf of Mexico. Scales represent 0.1 mm.

corner produced, rounded, posterior margin straight; basis long, slender, length $2.3 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.1 \times$ breadth; merus, posterior margin with patch of short setae and with a few simple setae; carpus subtriangular, short, length $0.9 \times$ breadth, shorter than

(0.6×) propodus, with patch of very fine setae near posterior margin; propodus large, subrectangular, length 1.3× breadth, margins subparallel, posterior margin smooth, straight, with very fine setae near posterior margin, palm slightly acute, margin convex, minutely serrate, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus simple, without subterminal spines or simple setae. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length 2.7× breadth; carpus long, length 2× breadth, posterior margin broadly lobate; propodus subquadrate, short, length 1.4× breadth, palm extremely obtuse, with convex, serrate margin, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large, ventral margin lined with short very fine setae; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with 4 robust setae and 2 distal locking setae along posterior margin; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly, ventral margin lined with short very fine setae; merus weakly expanded anteriorly; merus-carpus without plumose setae in female; propodus with 4 robust setae and 2 distal locking setae along posterior margin; dactylus short, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth, rounded, fringed with fine setae; merus expanded, with rounded posterior margin; propodus with 2 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 6: coxa small, slightly lobate posteriorly; basis, anterior margin rounded proximally, straight distally, basis expanded posteriorly, with smooth posterior margin; merus expanded, with rounded posteroproximal shoulder and straight posterior margin; propodus with 3 robust setae and 2 distal locking setae along anterior margin, without setae along posterior margin; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin rounded, with fine setae, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded posterodistally, with 3 robust setae; propodus with 3 robust setae and 2 distal locking setae along anterior margin and 4 slender setae along posterior margin; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1 to 3: dorsally smooth. Epimeron 1: anteroventral corner narrowly rounded. Epimeron 3: posteroventral corner narrowly rounded. Urosomites: urosomite 1 with anterodorsal notch and rounded boss; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 3 dorsolateral, 1 apicolateral, 2 dorsomedial, and 1 apicomедial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 2 dorsal robust setae; inner ramus with 2 dorsal robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral, 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 dorsal robust setae; inner ramus with 2 dorsal robust setae, without constriction. Uropod 3: peduncle short, length 1.4× breadth, without dorsolateral flange, without dorsal robust setae, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae; rami lanceolate, inner ramus shorter than (about 0.6×) outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 1 lateral robust seta; inner ramus with 1 lateral and 1 medial robust setae; slender plumose setae absent. Telson: longer than broad, length 1.3× breadth, notched, with 2 dorsal robust setae, distal margins rounded, without apical penicillate setae, with 2 apical slender and 2 apical robust setae.

Type locality: Gulf of Mexico, Gulf side of Perdido Key, Florida, 30°17.8'N 87°23.49'W, sandy beach, 5.5 m from shore.

Etymology: Named for Perdido Key, the type locality.

Distribution: Eastern Gulf of Mexico, subtidal to 37-m depths.

Remarks: The female of this species is very similar to the female of *Rimakoroga floridiana* n. sp. The main difference between them is that *Orchomenella perdido* has a notched telson and *R. floridiana* has a moderately cleft telson. The male of *O. perdido* is unknown. De Broyer and Vader (1990) have presented strong evidence showing that the telson of *O. recondita* (Stasek, 1958) changes from deeply notched in juveniles to entire in adults, but there is no evidence to suggest that the telson of adult females could vary between notched and moderately cleft. However, until the male of *O. perdido* is described, the possibility remains that *O. perdido* belongs in the genus *Rimakoroga*.

Orchomenella minuta Krøyer, 1846, and *O. pinguis* Boeck, 1861, have both been reported from the western North Atlantic. Both of these species are distinguished from *O. perdido* by their deeply cleft telsons. The Californian species, *O. holmesi* Hurlcy, 1963, differs from *O. perdido* in having a more rectangular propodus on gnathopod 1 and a moderately cleft telson.

Orchomenella thomasi, new species

Figures 52, 53

Type material examined: **HOLOTYPE:** ♀; 3.0 mm, ovigerous (1 egg); 78 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 84°13'W; crushed shell, dead bryozoans, and calcareous algae; 73.2 m; 3 June 1967; 0530–0600 hours; trawl; HOURGLASS Cruise HC 40, Station E; USNM 282707.—**PARATYPE:** ♂; 2.6 mm; 92 nautical miles due west of Sanibel Island Light; Gulf of Mexico; 26°24'N 83°43'W; dead bryozoans and calcareous algae; 73.2 m; 13 November 1966; 0430–0500 hours; trawl; HOURGLASS Cruise HC 33, Station M; USNM 282708.—*Additional material examined:* **HOURGLASS MATERIAL:** None.—**OTHER MATERIAL:** Bureau of Land Management MAFLA OCS stations: 1 juvenile; northeastern Gulf of Mexico; 29°46'59.8"N 84°05'00.2"W; medium-fine sand; 10 m; Summer 1977; Station 2207-03; USNM 284124.—1 juvenile; northwest of Tampa Bay, Gulf of Mexico; 27°57'00.4"N 83°09'00.3"W; fine to very fine sand; 19 m; September 1977; Station 2419-G; USNM 284125.

Diagnosis: Mandibular palp: article 1 about 2 × as long as broad. Gnathopod 1: carpus shorter than propodus. Epimeron 3: posteroventral corner acutely produced. Urosomite 1: with acutely produced dorsodistal boss. Uropod 3: inner ramus shorter than outer ramus. Telson: moderately to deeply cleft.

Description: Based on holotype female, ovigerous (1 egg), 3.0 mm (USNM 282707); paratype male, 2.6 mm (USNM 282708). Head and body: without setae. Head: slightly longer than deep, ventrally truncated, with straight ventral margin, lateral cephalic lobe large, narrowly rounded; rostrum small; eyes oval, not enlarged in adult male. Antenna 1: peduncular article 1 short, length 1.2 × breadth; peduncular article 2 short, 0.25 × article 1; peduncular article 3 short, 0.2 × article 1; accessory flagellum short, 0.35 × primary flagellum, 2-articulate, article 1 long, 2 × article 2 (male long); flagellum 5-articulate (male 6), without callynophore in female (weak 1-field callynophore in male), without flagellar robust setae, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (0.5 × body length in male); peduncle without brush setae in female or male, weakly geniculate between peduncular articles 3–4, article 3 long, 0.9 × article 4 (male strongly geniculate between peduncular articles 3–4, article 3 long, peduncular articles 4 and 5 enlarged in male; flagellum 4-articulate (male at least 16, damaged), calceoli absent in female (at least 14 present in adult male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome produced, rounded, upper lip not produced, straight. Mandible: incisors symmetrical, small, with slightly convex margins; lacinia mobilis a short smooth peg; without accessory setae; intermediate setae absent; molar with reduced column and convex triturating surface; mandibular palp attached proximally; article 1 long, length 2 × breadth; article 2 slender, length 4.2 × breadth, 1.9 × article 3, with 3 (male 5) submarginal posterodistal A2-setae,

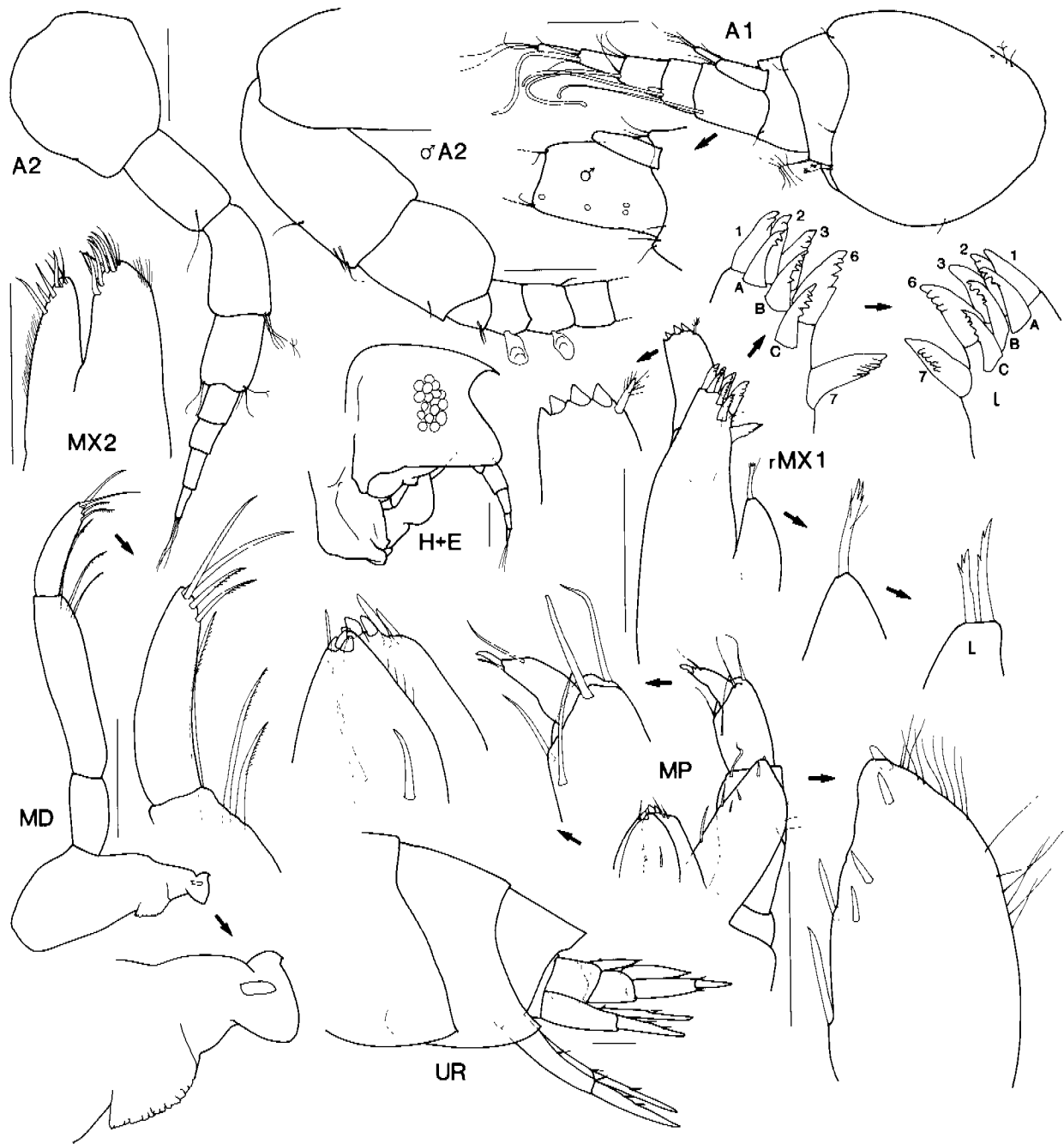


Figure 52. *Orchomenella thomasi* new species, holotype female, 3.0 mm (USNM 282707), west of Egmont Key, Gulf of Mexico; paratype male, 2.6 mm (USNM 282708), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

without D2-setae; article 3 slender, blade-like, long, length $5.6 \times$ breadth, without A3- or B3-setae, with 2 (male 4) distal D3-setae and 2 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose setae; outer plate with 8 setal-teeth in modified 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate, ST4–ST5 absent, ST6 large, broad, 4-cuspidate, ST7 slightly displaced from ST6, large, broad, 7-cuspidate distally, STA large, slender, not displaced from STB, 3-cuspidate, STB long, slender, 4-cuspidate, STC long, slender, 4-cuspidate, STD absent; palp large, 2-articulate, with 3 short terminal robust setae, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner plate

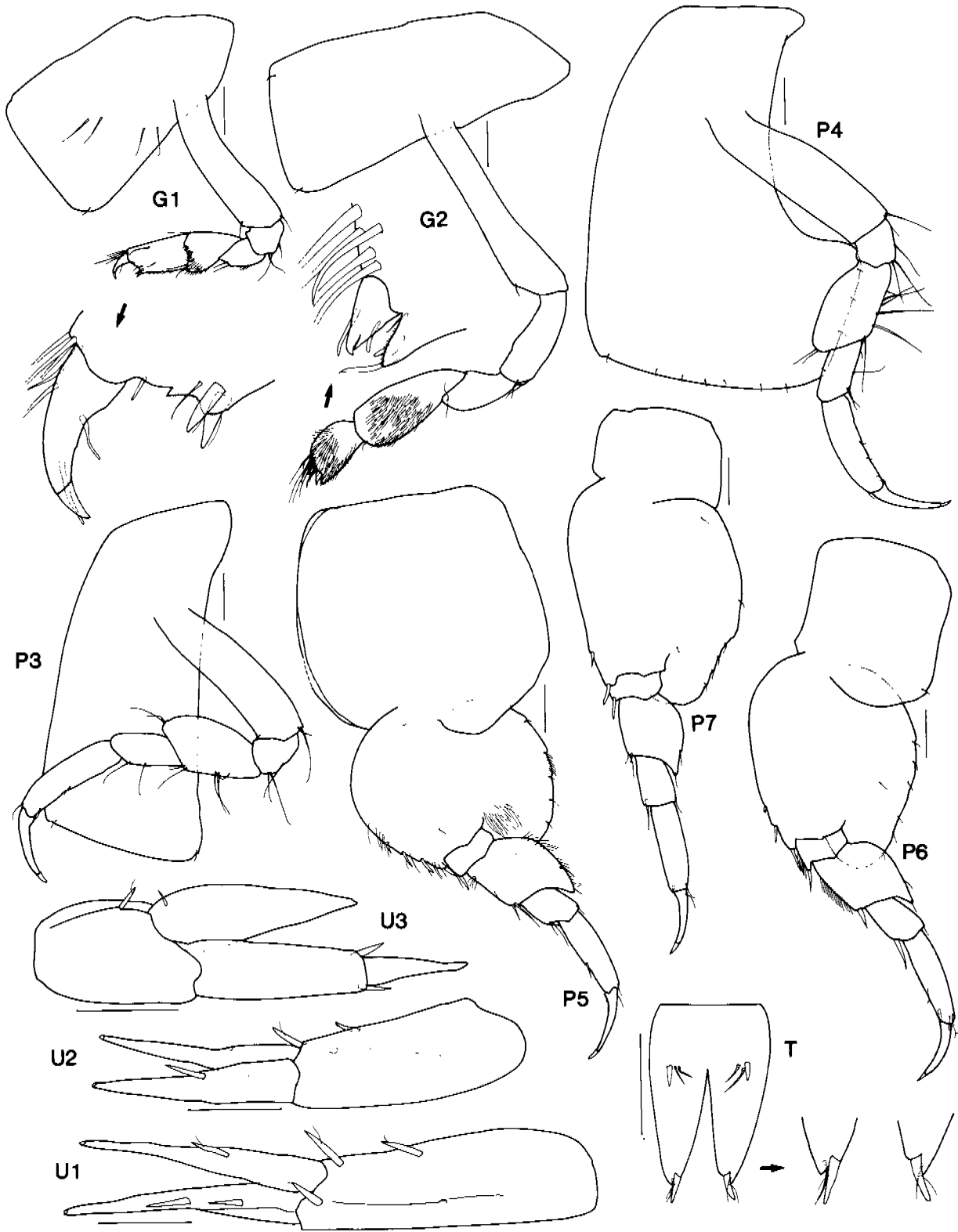


Figure 53. *Orchomenella thomasi* new species, holotype female, 3.0 mm (USNM 282707), west of Egmont Key, Gulf of Mexico. Scales represent 0.1 mm.

narrow, outer plate broader; inner plate length $1 \times$ outer plate. Maxilliped: inner plate small, subquadrate, with 3 apical nodular setae, oblique setal row reduced, with 3 simple setae; outer plate small, subovate, with

many fine apical setae, without apical robust setae, medial setae vestigial, submarginal setae short, simple; palp small, 4-articulate, article 2 broad, length $1.3 \times$ breadth, $0.9 \times$ article 3, article 3 short, broad, length $1.8 \times$ breadth, dactylus well developed, with 2 subterminal setae, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: subchelate; coxa large, as long as coxa 2, anterior margin straight, diverging distally from posterior margin; basis long, slender, length $3.8 \times$ breadth, anterior margin smooth, without setae; ischium short, length $1.3 \times$ breadth; merus, posterior margin with patch of short setae and with a few simple setae; carpus subtriangular, short, length $1.4 \times$ breadth, subequal to ($0.9 \times$) propodus, with patch of very fine setae near posterior margin; propodus large, subrectangular, length $1.9 \times$ breadth, margins subparallel, posterior margin smooth, subtly sinusoidal, with simple, slender setae; palm acute, margin concave, minutely serrate, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus simple, with 1 short, simple, robust seta along posterior margin. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length $2.7 \times$ breadth; carpus long, length $2.4 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, short, length $1.6 \times$ breadth, palm extremely obtuse, with slightly sinusoidal, serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin smooth.

Peraeopod 3: coxa large; merus expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 1 slender seta and 1 distal locking seta along posterior margin; dactylus long, slender. Peraeopod 4: with large posteroventral lobe, anterior margin slightly rounded, posterior margin straight; merus expanded anteriorly; merus-carpus without plumose setae in male or female; propodus with 2 slender setae and 1 distal locking seta along posterior margin; dactylus long, slender. Peraeopod 5: coxa bilobate, posterior lobe slightly produced ventrally; basis expanded, posterior margin minutely crenate; merus expanded, with rounded posteroproximal shoulder and straight posterior margin; propodus with 1 slender seta along anterior margin, without distal locking setae, with 1 slender seta distally; dactylus long, slender. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with smooth posterior margin; merus expanded, with rounded posteroproximal shoulder and straight posterior margin; propodus with 1 robust seta and 1 distal locking seta along anterior margin, with 2 slender setae distally; dactylus long, slender. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded proximally, smooth, excavate distally, posteroventral corner rounded, posteroventral margin rounded; merus distally expanded, margin sloping proximally, straight distally with 2 setae; propodus with 1 slender seta and 1 distal locking seta along anterior margin, with 2 slender setae distally on posterior margin; dactylus long, slender.

Oostegites: on peraeopods 4 and 5. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 3: posteroventral corner acutely produced. Urosomites: urosomite 1 with well-developed, dorsodistally acute carina; urosomite 3 with 1 small dorsolateral seta. Uropod 1: without fine setae; peduncle with 1 dorsolateral, 1 apicolateral, 1 dorsomedial, and 1 apicomedial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 2 dorsal robust setae; inner ramus with 1 dorsal robust seta. Uropod 2: without fine setae; peduncle with 1 dorsolateral, 1 apicolateral and 1 dorsomedial robust setae; rami subequal in length; outer ramus with 1 dorsal robust seta; inner ramus with 1 dorsal robust seta, without constriction. Uropod 3: peduncle short, length $1.6 \times$ breadth, without dorsolateral flange, with 1 dorsolateral robust seta, without midlateral slender or robust setae, without distoventral robust setae, without plumose setae in female or male; rami lanceolate; inner ramus reduced, about $0.6 \times$ outer ramus; outer ramus 2-articulate, article 2 long, article 1 with 1 lateral and 1 medial robust setae; inner ramus without robust setae; slender plumose setae absent in female and male. Telson: longer than broad, length $1.5 \times$ breadth, deeply or moderately cleft (64%), with 1 dorsal robust seta on each lobe, without dorsal slender setae, distal margins incised, with 1 apical penicillate seta, 1 apical slender seta, and 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, 78 nautical miles due west of Egmont Key, Florida, 27°37'N 84°13'W, 73.2 m.

Distribution: Eastern Gulf of Mexico in 10- to 73-m depths.

Etymology: Named for James D. Thomas in recognition of his important contribution to our understanding of the amphipod fauna of this area.

Remarks: *Orchomenella thomasi* forms a species pair with the eastern Pacific species *O. magdalenensis* Shoemaker, 1942. Both species have the following: head with straight ventral margin; mandibular palp article 1 elongate; urosomite 1 with well-developed, dorsodistally produced acute boss; and telson deeply to moderately cleft.

Orchomenella thomasi differs from *O. magdalenensis* in the shorter article 1 of the mandibular palp; the reduced number of setal-teeth on the outer plate of maxilla 1; the reduced outer plate of the maxilliped; gnathopod 1 carpus short, slightly shorter than propodus; and the slightly less cleft telson.

Ortiz (1978) recorded *O. magdalenensis* from Cuban waters but is currently reassessing this identification (personal communication).

Rimakoroga Barnard and Karaman, 1987

Rimakoroga floridiana, new species

Figures 54–56

Type material examined: **HOLOTYPE:** ♀, 4.0 mm; 78 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 84°13'W; crushed shell, dead bryozoans, and calcareous algae; 73.2 m; 6 December 1966; dredge; HOURGLASS Cruise HC 34, Station E; USNM 282709.—**PARATYPE:** ♂; 4.2 mm; same data; USNM 282710.—**PARATYPES:** 2 ♀, 1 ♂; same locality; 9 November 1966; 0500–0530 hours; trawl; HOURGLASS Cruise HC 33, Station E; AM P45338.—**PARATYPES:** 2 ♀; same data; FSBC I 60124.—**PARATYPES:** 2 juveniles; same data; USNM 282711.—**PARATYPE:** 1 ♀; 65 nautical miles due west of Egmont Key, Gulf of Mexico; 27°37'N 83°58'W; crushed shell, *Lithothamnion* spp., brown silt with sponges and bryozoans; 54.9 m; 1055–1110 hours; 21 May 1967; dredge; HOURGLASS Cruise Post HC 39, Station D; USNM 282712.—**PARATYPE:** 1 ♀; same locality; 1 September 1967; 0310–0325 hours; dredge; HOURGLASS Cruise HC 43, Station D; USNM 282713.

Diagnosis: Gnathopod 1: male with transverse palm, dactylus large, bent at right angle proximally. Epimeron 3: posteroventral corner narrowly rounded. Uropod 3: inner ramus slightly shorter than outer ramus. Telson: moderately cleft.

Description: Based on holotype female, 4.0 mm, ovigerous (4 eggs) (USNM 282709); paratype male, 4.2 mm (USNM 282710). Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, colour unknown, enlarged in adult male. Antenna 1: short, $0.17 \times$ body; peduncular article 1 short, length $1.2 \times$ breadth; peduncular article 2 short, $0.3 \times$ article 1; peduncular article 3 short, $0.2 \times$ article 1; accessory flagellum medium length, $0.46 \times$ primary flagellum, 3-articulate (male 4), article 1 long, $1.6 \times$ article 2; flagellum 7-articulate (male 6), with strong 2-field calynophore in female and male, without flagellar robust setae, calceoli absent in female and male. Antenna 2: subequal in length to antenna 1 (same in male); peduncle without brush setae in female or male, weakly geniculate between peduncular articles 3–4, article 3 short, $0.7 \times$ article 4 (male weakly geniculate between peduncular articles 3–4, article 3 short), peduncular articles 4 and 5 not enlarged in female or

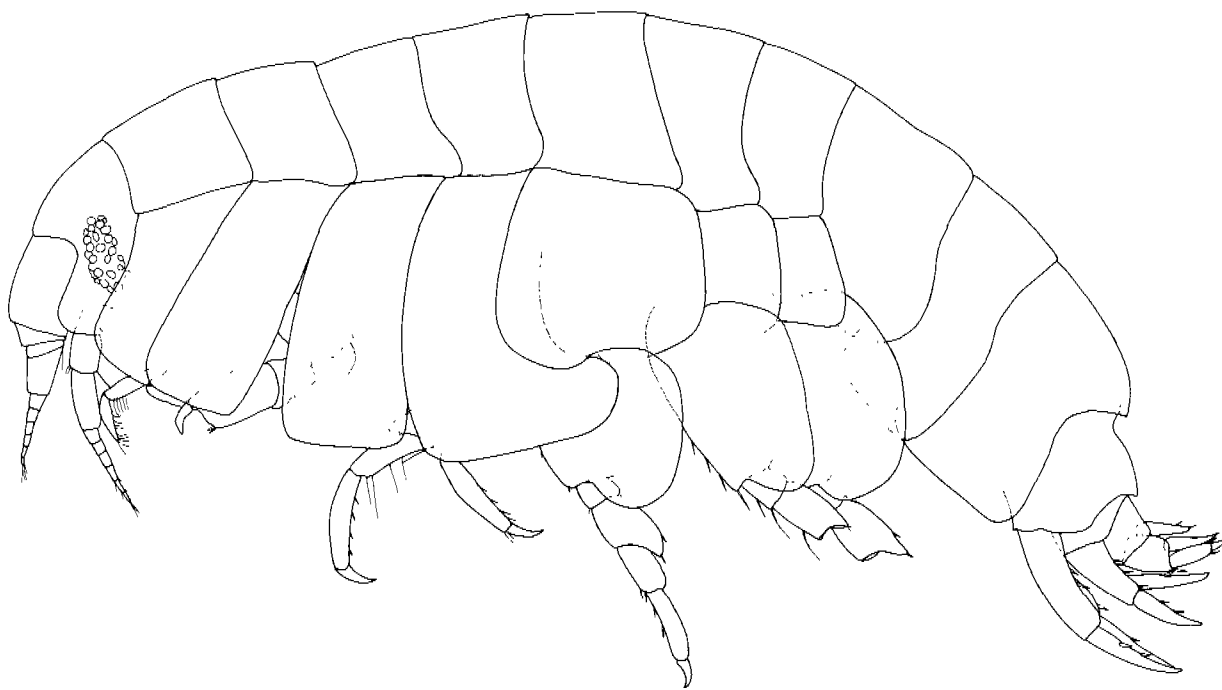


Figure 54. *Rimakoroga floridiana* new species, holotype female, 4.0 mm (USNM 282709), west of Egmont Key, Gulf of Mexico.

male; flagellum 6-articulate (male 8), calceoli absent in female and male.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome straight, upper lip not produced, straight. Mandible: incisors symmetrical, large, with strongly convex margins; lacinia mobilis a cuspidate peg; accessory setal row, left and right rows each with 3 short, slender, simple setae; intermediate setae absent; molar with reduced column and convex triturating surface; mandibular palp attached midway; article 1 short, length $1.2 \times$ breadth; article 2 slightly broadened distally, length $4 \times$ breadth, $1.5 \times$ article 3, with 8 submarginal posterodistal A2-setae (male 9), without D2-setae; article 3 falcate, long, length $4.4 \times$ breadth, with 1 proximal A3-seta (male 1), with 8 D3-setae along most of posterior margin (male 10) and 2 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose setae; outer plate with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 3-cuspidate, ST5 large, stout, 3-cuspidate, ST6 large, very broad, 6-cuspidate distomedially, ST7 displaced from ST6, large, broad, 5-cuspidate distally, STA large, very broad, slightly displaced from STB, 7-cuspidate along entire medial margin, STB large, broad, 6-cuspidate along entire medial margin, STC large, broad, 9-cuspidate, STD large, broad, 7-cuspidate along medial margin; palp large, 2-articulate, with 5 short terminal robust setae, without subterminal setae, robust flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner plate narrow, outer plate broader; inner plate length $1 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row strong, with 6 pappose setae; outer plate small, subovate, without apical slender setae, with 2 apical robust setae, medial setae small, blunt, submarginal setae short, simple; palp large, 4-articulate, article 2 broad, length $2.3 \times$ breadth, $1.4 \times$ article 3, article 3 long, broad, length $2 \times$ breadth, dactylus well developed, with 1 subterminal seta, unguis present.

Gnathopod 1: sexually dimorphic; female, subchelate; coxa large, as long as coxa 2, anterior margin concave, anteroventral corner produced, rounded, posterior margin straight; basis long, slender, length $2.4 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.2 \times$ breadth; merus, pos-



Figure 55. *Rimakoroga floridiana* new species, holotype female, 4.0 mm (USNM 282709), west of Egmont Key, Gulf of Mexico. Scales represent 0.1 mm.

terior margin with patch of short setae and a few simple setae; carpus subtriangular, short, length $0.9 \times$ breadth, shorter than ($0.6 \times$) propodus, without denticulate patch near posterodistal margin; propodus massive, subrectangular, length $1.4 \times$ breadth, margins subparallel, posterior margin smooth, straight, without setae, with very fine setae near posterior margin, palm slightly acute, margin convex, scalloped,

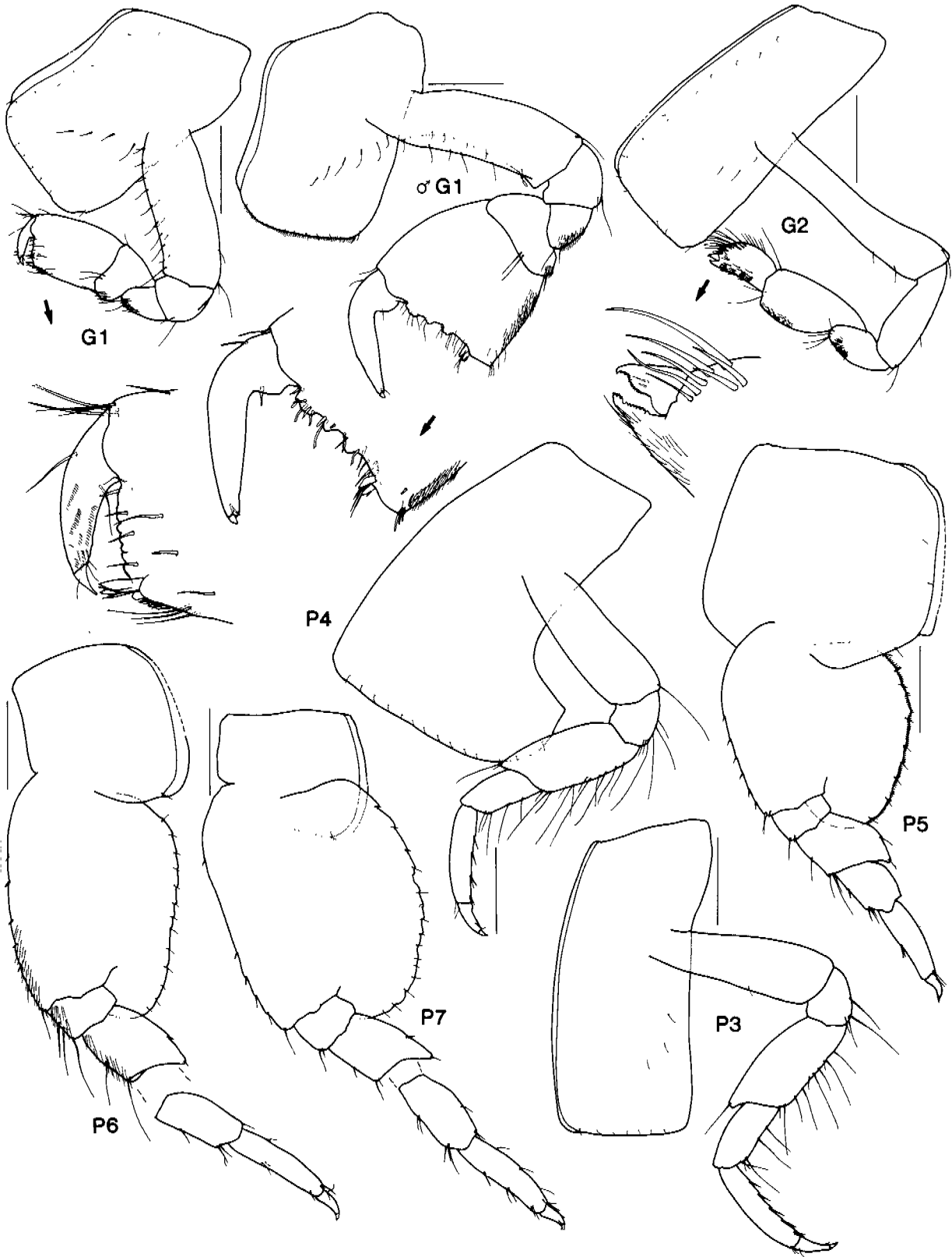


Figure 56. *Rimakoroga floridiana* new species, holotype female, 4.0 mm (USNM 282709), paratype male, 4.2 mm (USNM 282710), west of Egmont Key, Gulf of Mexico. Scales represent 0.2 mm.

minutely serrate, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus large, slightly curved, simple, without subterminal spines or simple setae; male, subchelate; basis long, slender, length $2.8 \times$ breadth; ischium short, length $1.1 \times$ breadth; merus, posterior margin with patch of short setae; carpus subtriangular, compressed, length $0.7 \times$ breadth, shorter than ($0.5 \times$) propodus; propodus massive, subquadrate, length $0.9 \times$ breadth, anterior margin convex, posterior margin straight, posterior margin smooth, straight, with very fine setae near posterior margin, palm transverse, margin concave, minutely serrate, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus large, bent at right angle proximally, simple, without subterminal spines or robust setae. Gnathopod 2: minutely subchelate; coxa large, subequal in size to coxa 3; ischium long, length $3.2 \times$ breadth; carpus long, length $2 \times$ breadth, posterior margin broadly lobate; propodus subquadrate, short, length $1.7 \times$ breadth, palm extremely obtuse, with straight, serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 5 robust setae and 2 distal locking setae along posterior margin; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 4 robust setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth, rounded, fringed with fine setae; merus expanded, with rounded posteroproximal shoulder and straight posterior margin; propodus with 2 robust setae, along anterior margin, without distal locking setae; dactylus short, slender. Peraeopod 6: coxa small, slightly lobate posteriorly; basis, anterior margin rounded proximally, straight distally, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded posteriorly; propodus with 2 robust setae and 2 distal locking setae along anterior margin; dactylus short, slender. Peraeopod 7: basis expanded posteriorly, posterior margin rounded, minutely crenate, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded posterodistally, with 3 robust setae; propodus with 3 robust setae and 2 distal locking seta along anterior margin, with 5 slender setae along posterior margin; dactylus short, slender.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner narrowly rounded. Urosomites: dorsally smooth; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 4 dorsolateral, 1 apicolateral, and 1 apicomедial robust setae; outer ramus slightly longer than inner ramus; outer ramus with 2 dorsal robust setae; inner ramus with 2 dorsal robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral, 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 dorsal robust setae; inner ramus with 1 dorsal robust seta, without constriction. Uropod 3: peduncle short, length $1.6 \times$ breadth, with slight dorsolateral flange, with 1 apicomедial robust seta, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than (about $0.75 \times$) outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 1 lateral and 1 medial robust setae; inner ramus without robust setae; slender plumose setae absent in female and male. Telson: longer than broad, length $1.2 \times$ breadth, moderately cleft (43%), with 2 dorsal robust setae on each lobe, distal margins truncated, with 1 apical penicillate seta and 1 apical robust seta on each lobe, without apical slender setae.

Type locality: Gulf of Mexico, 78 nautical miles due west of Egmont Key, Florida, $27^{\circ}37'N$ $84^{\circ}13'W$, 73.2 m.

Distribution: Eastern Gulf of Mexico in 55- to 73-m depths.

Etymology: Named for Florida, the geographic area where the species occurs.

Remarks: This is the second species of *Rimakoroga*. *Rimakoroga rima* J. L. Barnard, 1964b, is known from southern California and northwestern Mexico. The species are closely related but differ significantly in the shape of male gnathopod 1.

Tryphosella Bonnier, 1893

Tryphosella apalachicola, new species

Figures 57–59

Type material examined: **HOLOTYPE:** ♀; 3.6 mm; ovigerous (1 egg); 73 nautical miles due west of Sanibel Island Light, Gulf of Mexico; 26°24'N 82°22'W; crushed shell, *Lithothamnion* spp., brown silt with sponges and bryozoans; 54.9 m; dredge; 16 February 1967; 0300–0315 hours; HOURGLASS Cruise HC 36, Station L; USNM 282714.—**PARATYPE:** 1 ♂; 3.2 mm; same locality; 5 September 1966; 0150–0205 hours; dredge; HOURGLASS Cruise HC 31, Station L; USNM 282715.

Diagnosis: Lateral cephalic lobe large, narrowly rounded. Eyes well developed, oval. Epistome: produced, rounded. Maxilliped: outer plate with 1 apical robust seta. Gnathopod 1: ischium short; carpus long, length $2.3 \times$ breadth, subequal to propodus; palm acute. Epimeron 3: posteroventral corner subquadrate. Urosomite 1 with rounded boss. Uropod 2: inner ramus not constricted.

Description: Based on holotype female, 3.6 mm (USNM 282714); paratype male, 3.2 mm (USNM 282715). Head and body: without setae. Head: deeper than long, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, enlarged in adult male. Antenna 1: medium length, $0.2 \times$ body; peduncular article 1 short, length $1.2 \times$ breadth, with small midmedial spine; peduncular article 2 short, $0.3 \times$ article 1; peduncular article 3 short, $0.3 \times$ article 1; accessory flagellum medium length, $0.5 \times$ primary flagellum, 4-articulate, article 1 long, $1.7 \times$ article 2 (male long); flagellum 6-articulate (male 8), with weak 2-field callynophore in female (strong 2-field callynophore in male), without flagellar robust setae, calceoli absent in female (5 present in adult male). Antenna 2: slightly longer than antenna 1 ($0.6 \times$ body length in male); peduncle with weak brush setae (strong brush setae in male), strongly geniculate between peduncular articles 3–4, article 3 short, $0.5 \times$ article 4 (male strongly geniculate between peduncular articles 3–4, article 3 short, $0.6 \times$ article 4), peduncular article 4 enlarged in male; 6-articulate (male 15), calceoli absent in female (14 present in adult male).

Mouthpart bundle: subquadrate. Epistome and upper lip: separate, epistome produced, rounded, upper lip not produced, straight. Mandible: incisors symmetrical, small, with slightly convex margins; lacinia mobilis a cuspidate peg; accessory setal row, left row with 4 short, slender, multiserrate setae; intermediate setae absent; molar with reduced column, proximally setose, distally triturating; mandibular palp attached midway; article 1 short, length $0.9 \times$ breadth; article 2 slender, length $4.6 \times$ breadth, $1.6 \times$ article 3, with 4 (male 7) submarginal posterodistal A2-setae, without D2-setae; article 3 slender, blade-like, long, length $4 \times$ breadth, with 1 (male 1) proximal A3-seta, with 6 (male 7) D3-setae along most of posterior margin and 3 apical E3-setae. Maxilla 1: inner plate narrow, with 2 pappose setae, outer seta with denticulate row; outer plate with 11 setal-teeth in 6/5 arrangement, ST1 to ST3 large, stout, weakly cuspidate to multicuspidate, ST4 large, stout, 4-cuspidate, ST5 large, stout, 4-cuspidate, ST6 large, stout, 8-cuspidate, ST7 slightly displaced from ST6, large, broad with convex inner margin, 16-cuspidate medially, STA large, broad, slightly displaced from STB, 13-cuspidate along entire medial margin, STB large, broad, 6-cuspidate, STC large, broad, 11-cuspidate along medial margin, STD large, broad, 13-cuspidate along medial margin; palp large, 2-articulate, with 4 short terminal robust setae, with 1 subterminal seta, robust flag seta present on distolateral corner, distomedial margin smooth. Maxilla 2: inner plate narrow, outer

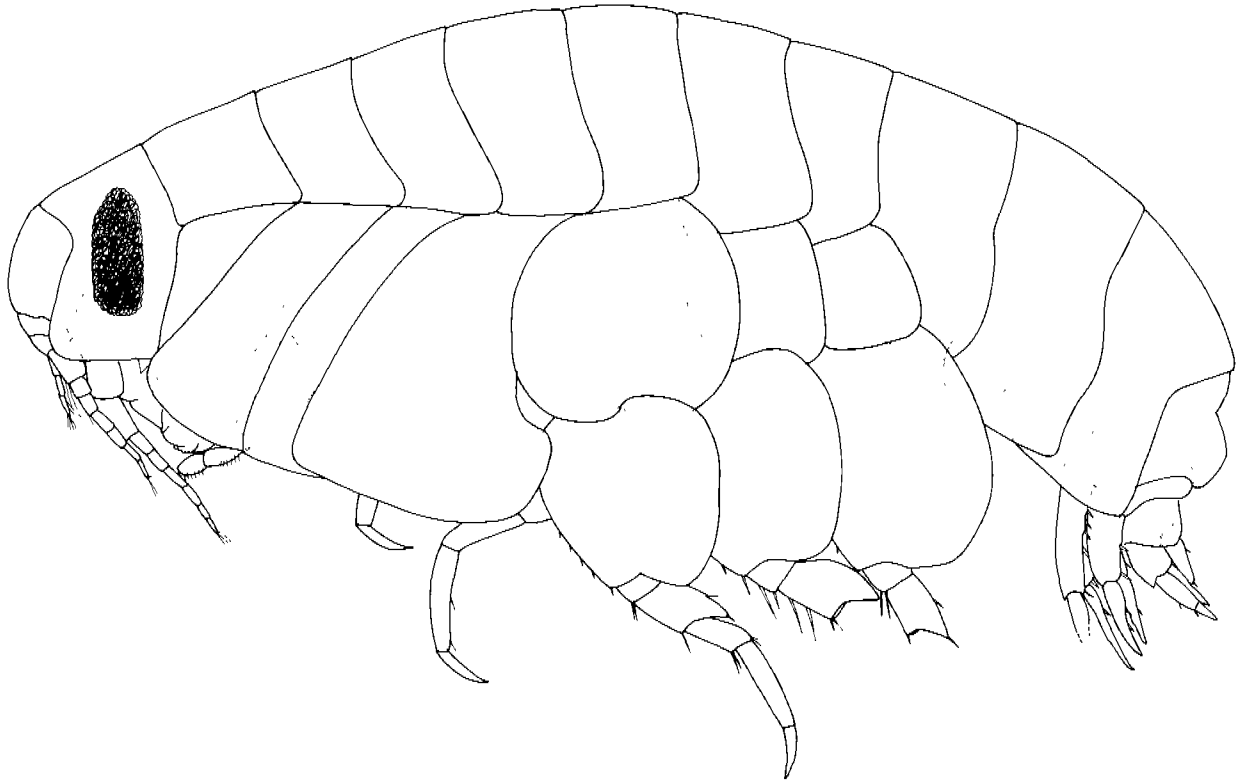


Figure 57. *Tryphosella apalachicola* new species, holotype female, 3.6 mm (USNM 282714), west of Sanibel Island Light, Gulf of Mexico.

plate broader; inner plate length $0.8 \times$ outer plate. Maxilliped: inner plate large, subrectangular, with 3 apical nodular setae, oblique setal row reduced with 5 pappose setae; outer plate small, subovate, without apical slender setae, with 1 apical robust seta, medial setae small, blunt, submarginal setae short, simple; palp large, 4-articulate, article 2 slender, length $2.5 \times$ breadth, $1.5 \times$ article 3, article 3 long, slender, length $2.2 \times$ breadth, dactylus well developed, with 1 subterminal seta, unguis present.

Peraeonites 1–7: dorsally smooth. Gnathopod 1: subchelate; coxa large, slightly shorter than coxa 2, tapering distally, anterior margin concave, anteroventral corner produced, rounded, diverging distally from posterior margin; basis long, slender, length $4 \times$ breadth, anterior margin smooth, with simple setae; ischium short, length $1.3 \times$ breadth; merus, posterior margin with patch of short setae; carpus subrectangular, long, length $2.3 \times$ breadth, subequal to ($1 \times$) propodus, with patch of very fine setae near posterior margin; propodus large, subrectangular, length $2.8 \times$ breadth, margins subparallel, posterior margin smooth, straight, without setae, with very fine setae near posterior margin, palm acute, margin concave, serrate, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus complex, with large subterminal spine and row of 21 medial robust setae near anterior margin. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3; ischium long, length $3 \times$ breadth; carpus long, length $3 \times$ breadth, posterior margin broadly lobate; propodus subovate, short, length $1.8 \times$ breadth, palm slightly obtuse, with straight, serrate margin, posterodistal corner without robust setae; dactylus reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae in male and female; propodus with 2 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slightly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus

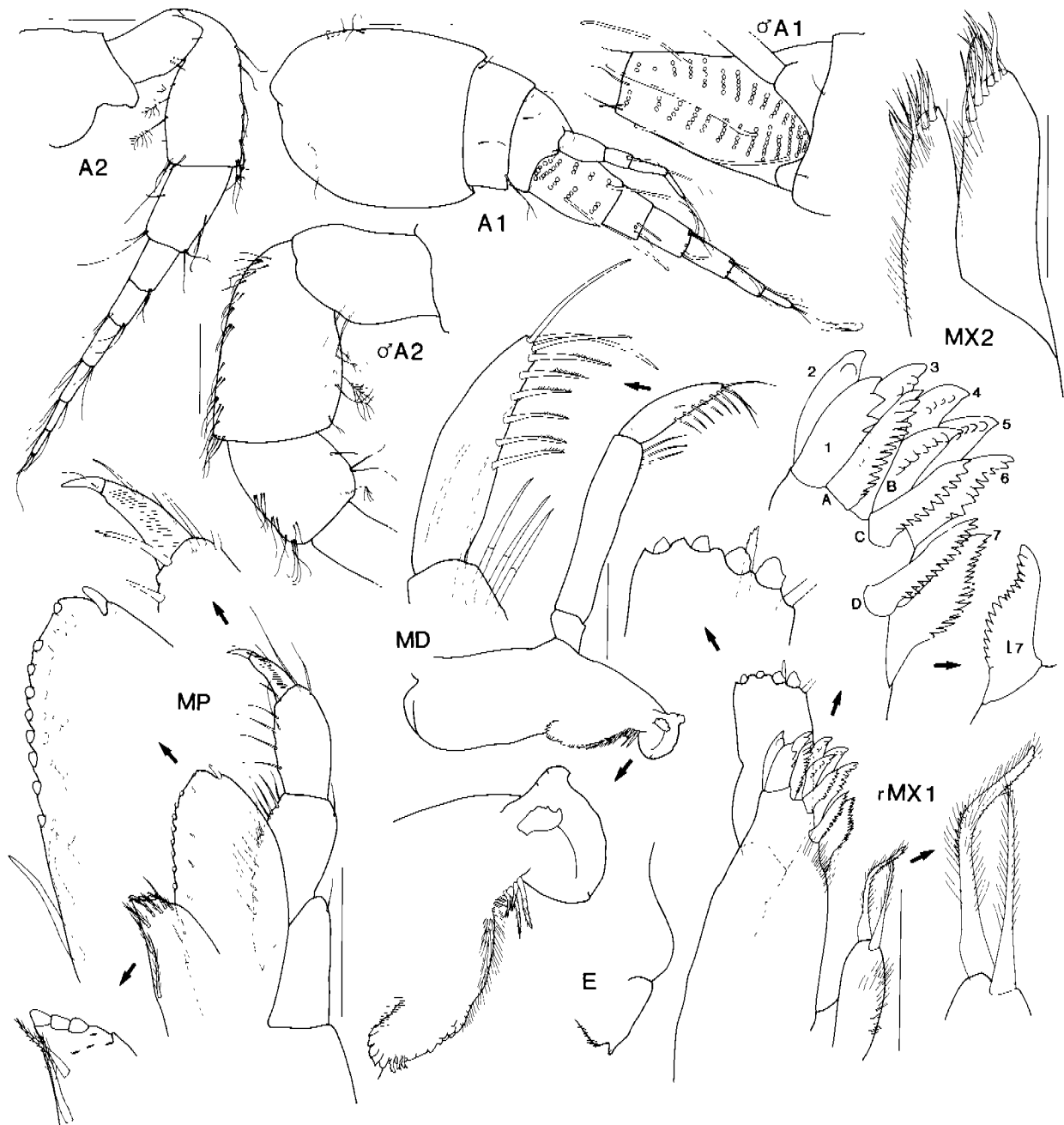


Figure 58. *Tryphosella apalachicola* new species, holotype female, 3.6 mm (USNM 282714), paratype male, 3.2 mm (USNM 282715), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

without plumose setae in male and female; propodus with 2 slender setae and 1 distal locking seta along posterior margin; dactylus short, slender. Peraeopod 5: coxa bilobate, posterior lobe slightly produced ventrally; basis expanded, posterior margin minutely crenate; merus slightly expanded posteriorly; propodus with 2 slender setae along anterior margin, without distal locking setae, with 2 slender setae along posterior margin; dactylus short, slender. Peraeopod 6: coxa small, not lobate posteriorly; basis, anterior margin rounded, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded posteriorly; carpus, propodus, and dactylus missing from specimen. Peraeopod 7: basis expanded posteriorly,

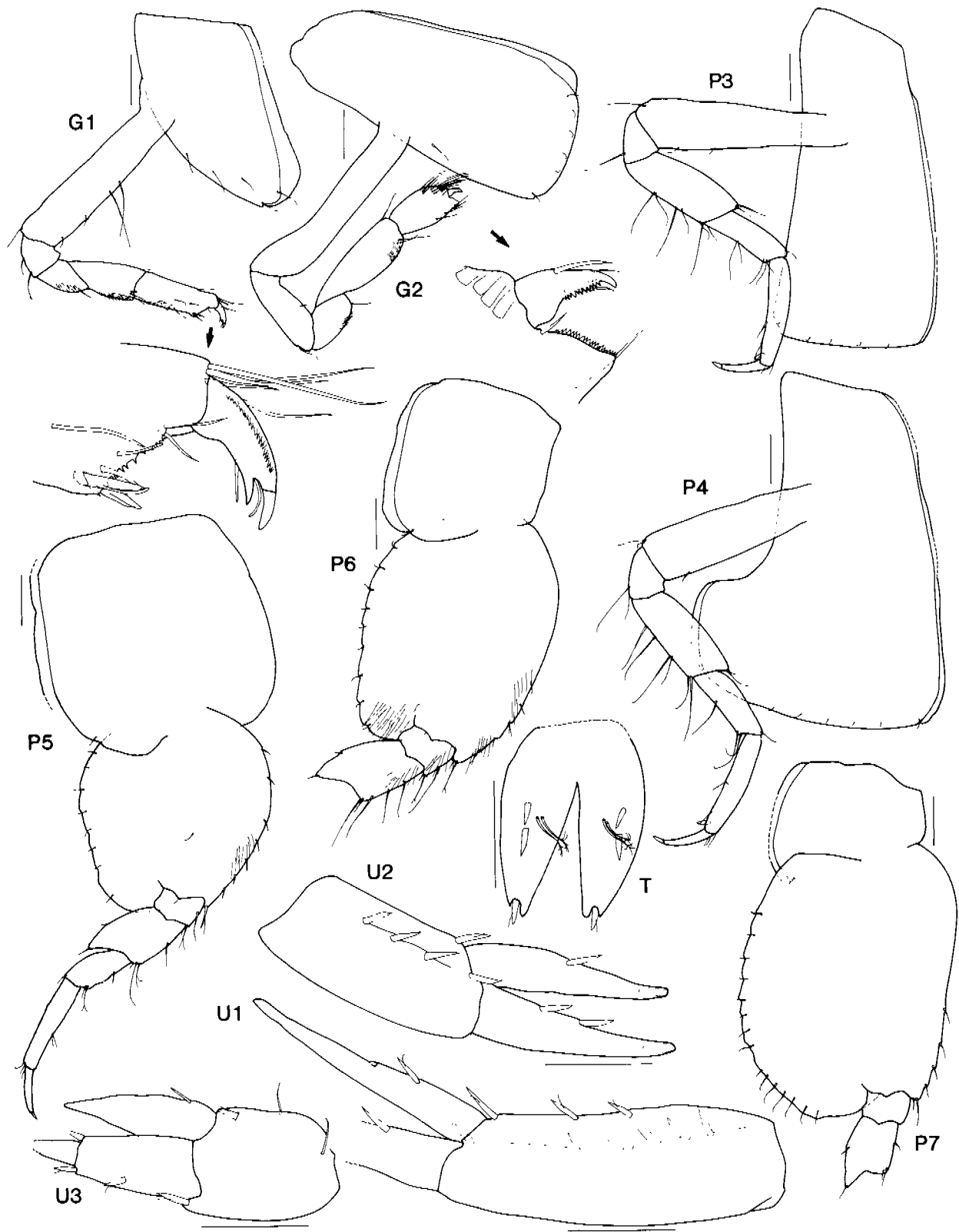


Figure 59. *Tryphosella apalachicola* new species, holotype female, 3.6 mm (USNM 282714), west of Sanibel Island Light, Gulf of Mexico. Scales represent 0.1 mm.

posterior margin almost straight, smooth, posteroventral corner rounded, posteroventral margin rounded; merus slightly expanded, convex posterior margin with 2 robust setae; carpus, propodus, and dactylus missing from specimen.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 6, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 1: anteroventral corner rounded. Epimeron 3: posteroventral corner subquadrate. Urosomites: urosomite 1 with rounded boss; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 5 dorsolateral, 1 apicolateral, 2 dorsomedial, and 1 apicomедial robust setae; inner ramus with 2 dorsal robust setae. Uropod 2: without fine setae; peduncle with 3 dorsolateral, 1 apicolateral and 1 apicomедial robust setae; rami subequal in length; outer ramus with 2 dorsal robust setae; inner ramus with 1 dorsal robust seta, without constriction. Uropod 3: peduncle short, length $1.4 \times$ breadth, without dorsolateral flange, with 1 apicomедial robust seta, with 1 midlateral slender seta, with 1 distoventral robust seta, without plumose setae in female or male; rami lanceolate, inner ramus slightly shorter than (about $0.8 \times$) outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 2 lateral and 1 medial robust setae; inner ramus without robust setae; slender plumose setae absent in female and male. Telson: longer than broad, length $1.4 \times$ breadth, deeply cleft (70%), with 2 dorsal robust setae on each lobe, without dorsal slender setae, distal margins incised, without apical penicillate or slender setae, with 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, 73 nautical miles due west of Sanibel Island Light, Florida, 26°24'N 82°22'W, 54.9 m.

Distribution: Eastern Gulf of Mexico in 55-m depths.

Etymology: Named for Apalachicola Bay, in the geographic area where the species occurs.

Remarks: Of the two ampho-Atlantic species recorded by Watling (1979), *T. apalachicola* differs from *T. compressa* Sars, 1895, in the following ways: the eyes, which are oval, not lageniform; gnathopod 1 is shorter, more robust, and with a short ischium; gnathopod 2 has a more triangular propodus with a smaller, less well-developed palm; urosomite 1 has a rounded, not triangular dorsal boss; and the telson is shorter and less deeply cleft. *Tryphosella apalachicola* differs from the second species, *T. rotundata* (Stephensen, 1925), in the more rounded lateral cephalic lobe, the less rounded posteroventral corner on epimeron 3, and the uropods and telson, which have fewer robust setae.

It appears that the species described as *Uristes californicus* Hurley, 1963, is actually a *Tryphosella*—apparently the only *Tryphosella* known from California and western Mexico. *Tryphosella apalachicola* differs from *T. californica* by having a more rounded lateral cephalic lobe, more rounded epistome, and more rounded posteroventral corner on epimeron 3, and by the uropods and telson, which have fewer robust setae.

Of the four known Mediterranean species, *T. apalachicola* is most closely related to *T. minima* Chevreux, 1911. The two species can be distinguished by the basis of peraeopod 5, which in *T. apalachicola* has a slightly excavate posterior margin and in *T. minima* has a rounded posterior margin, and by the posteroventral corner of epimeron 3, which is narrowly rounded in *T. apalachicola* and with a minute acute tooth in *T. minima*.

Scopelocheiridae, new family

Diagnosis: Head: as long as or longer than deep. Antennae: calceoli present or absent. Epistome and

upper lip: separate. Mandible: incisors usually symmetrical, sometimes asymmetrical, large, with straight or convex margins; left lacinia mobilis a stemmed, distally expanded, smooth or irregularly cusped blade, occasionally a cusped peg; accessory setal row without distal setal tuft; molar present or absent, if present, a narrow column with small triturating surface or a small non-setose triangular flap. Maxilla 1: inner plate usually strongly setose, always more than 2 pappose setae; outer plate broad, with 6–11 setal-teeth in a 7/4 or modified 7/4 arrangement; palp large, 2-articulate. Maxilliped outer plate with or without apical slender simple or pappose setae, with or without apical robust setae. Gnathopod 1: simple, dactylus reduced, complex, setose. Coxae 1 to 4: large, longer than broad, overlapping. Peraeopods 3–7: usually simple, sometimes prehensile, propodus without distal spur. Telson: moderately to deeply cleft.

Description: Head: as long as or longer than deep; rostrum present or absent, if present, short; eyes present or absent, if present, oval, reniform or subrectangular, with ommatidia. Body: laterally compressed.

Antenna 1: shorter than or subequal to antenna 2; peduncular article 1 longer than article 2; article 2 longer than article 3; accessory flagellum long or short, 1- to 3-articulate; primary flagellum multiarticulate, calynophore present or absent, calceoli present or absent. Antenna 2: short or medium length; flagellum shorter than or longer than peduncle, multiarticulate, calceoli present or absent.

Mouthpart bundle subquadrate. Mandible: incisors smooth; left lacinia mobilis present; molar present or absent, if present, a narrow column with small, triturating surface or a small, non-setose triangular flap; palp 3-articulate. Maxilla 1: inner plate usually strongly setose, sometimes weakly setose, always more than 2 setae; outer plate with 6 or 11 setal-teeth; palp large, 2-articulate, with terminal robust setae. Maxilla 2: with strongly or weakly setose medial margin. Maxilliped: inner plate well developed; outer plate small; palp 4-articulate.

Coxae 1–4: longer than broad, overlapping. Gnathopod 1: simple; smaller than or subequal to gnathopod 2; coxa smaller than or subequal to coxa 2; basis may be swollen, glandular; carpus shorter than, subequal to or longer than propodus; dactylus reduced, strongly or weakly covered in setae. Gnathopod 2: subchelate or chelate; coxa subequal to but not hidden by coxa 3; ischium elongate; carpus elongate, subequal to or longer than propodus; dactylus minute.

Peraeopods: 3 and 4 may be weakly prehensile. Peraeopod 3: coxa longer than broad; merus not elongate; carpus shorter than propodus, produced anteriorly. Peraeopod 4: coxa larger than coxa 3, with posteroventral lobe; merus shorter than propodus; carpus shorter than propodus, produced anteriorly. Peraeopod 5: subequal in length to peraeopod 6; coxa smaller than coxa 4, posteroventral lobe weak or absent; basis expanded, weakly expanded or linear, with posteroventral lobe; merus expanded or weakly expanded, posterior margin weakly setose; carpus not expanded. Peraeopod 6: subequal in length to peraeopod 7; basis expanded, slightly expanded or linear; merus expanded or weakly expanded, posterior margin strongly or weakly setose. Peraeopod 7: subequal in length to peraeopod 5; similar in structure to peraeopod 6; basis expanded or weakly expanded; merus weakly expanded or linear.

Pleonites 1–3: without dorsal teeth or carinae. Epimera 2–3: setose or without setae.

Urosome: urosomite 1 much longer than urosomite 2, not carinate; urosomite 3 not carinate. Uropod 1: biramous, rami lanceolate. Uropod 2: biramous, rami lanceolate; inner ramus shorter than or subequal to outer ramus, not incised. Uropod 3: not sexually dimorphic; peduncle short; biramous, rami lanceolate; outer ramus longer than peduncle, 2-articulate; inner ramus subequal to or shorter than outer ramus. Telson: laminar, deeply or moderately cleft, longer than broad, dorsal robust setae present or absent, apical robust setae present, apical slender setae absent.

Type genus: *Scopelocheirus* Bate, 1857.

Generic composition: *Aroui* Chevreux, 1911; *Bathycallisoma* Dahl, 1959; *Eucallisoma* J. L. Barnard, 1961; *Paracallisoma* Chevreux, 1903; *Paracallisomopsis* Gurjanova, 1962; *Scopelocheiropsis* Schellenberg, 1926; *Scopelocheirus* Bate, 1857.

Remarks: Taxa in the Scopelocheiridae have a 7/4 setal-tooth arrangement on the outer plate of maxilla 1 and an extremely reduced dactylus of gnathopod 1, which is covered in varying degrees with sensory setae. Within the scopelocheirids there are two groups: the *Scopelocheirus* group, which has a small columnar triturating molar, and the *Paracallisoma* group, in which the molar is a nonsetose triangular flap or is absent. The *Scopelocheirus* group includes *Scopelocheirus* and *Aroui*, both of which are known scavengers. The remaining genera belong in the *Paracallisoma* group.

Aroui Chevreux, 1911

Aroui americana, new species

Figures 60–62

Type material examined: **HOLOTYPE:** ♀; 5.0 mm, with oostegite buds; Gulf of Mexico, south of Mobile Bay; approximately 29°12'N 88°07'W; from stomach of the fish *Coelorinchus caribbaeus*; 200 m; 1987; Texas A&M MMS Survey Station 1M4; USNM 282716.—**PARATYPE:** 1 ♂; 5.4 mm; Gulf of Mexico, southeast of the Mississippi River Delta; approximately 28°58'N 88°56'W; from stomach of the fish *Pontinus longispinis*; 200 m; February 1987; Texas A&M MMS Survey, Station 4C4; USNM 282717.—**PARATYPE:** 1 ♂; east of Bahía Unión, Argentina; 40°03'00"S 58°56'00"W; trawl; fine dark sand; 95 m; 13 January 1888; *Albatross* Station 2767; AM P45339.—**HOURLASS MATERIAL:** None.

Diagnosis: Maxilla 1: palp with 6 short terminal robust setae and 2 subterminal setae, robust flag seta present on distolateral corner. Maxilliped: outer plate with 1 apical pappose seta, 1 apical robust seta, and many fine apical setae. Gnathopod 1: coxa large, about as long as coxa 2, anterior margin slightly convex, anteroventral corner rounded, posterior margin slightly concave. Gnathopod 2: carpus long, length 2.4 × breadth, propodus subrectangular, short, length 1.9 × breadth. Peraeopod 5: basis with strong row of long slender pappose setae medially. Peraeopod 6: posterior margin with 3 hooked robust setae. Telson: with dorsal robust setae.

Description: Based on holotype female, 5.0 mm (USNM 282716); paratype male, 5.4 mm (USNM 282717). Head and body: without setae. Head: slightly longer than deep, lateral cephalic lobe large, narrowly rounded; rostrum absent; eyes oval, not enlarged in male. Antenna 1: short, 0.16 × body; peduncular article 1 short, length 0.9 × breadth; peduncular article 2 long, 0.5 × article 1; peduncular article 3 long, 0.2 × article 1; accessory flagellum medium length, 0.4 × primary flagellum, 3-articulate, article 1 long, 2 × article 2, forming cap partially covering callynophore; flagellum 9-articulate (male 10), with strong 2-field callynophore in female and male, without setae, calceoli present in male. Antenna 2: length 1.9 × antenna 1; peduncle with strong brush setae, peduncular article 1 greatly enlarged, covering article 2, weakly geniculate between peduncular articles 3–4, article 3 short, 0.7 × article 4, peduncular articles 4 and 5 not enlarged in female or male; flagellum 16-articulate (male 24+), calceoli present in male.

Mouthpart bundle: subquadrate. Epistome and upper lip: separate; epistome concave; upper lip slightly produced, rounded. Mandible: incisors large; with slightly convex margins; lacinia mobilis a stemmed, distally expanded, irregularly cusped blade; accessory setal row, left and right each with 3 short,

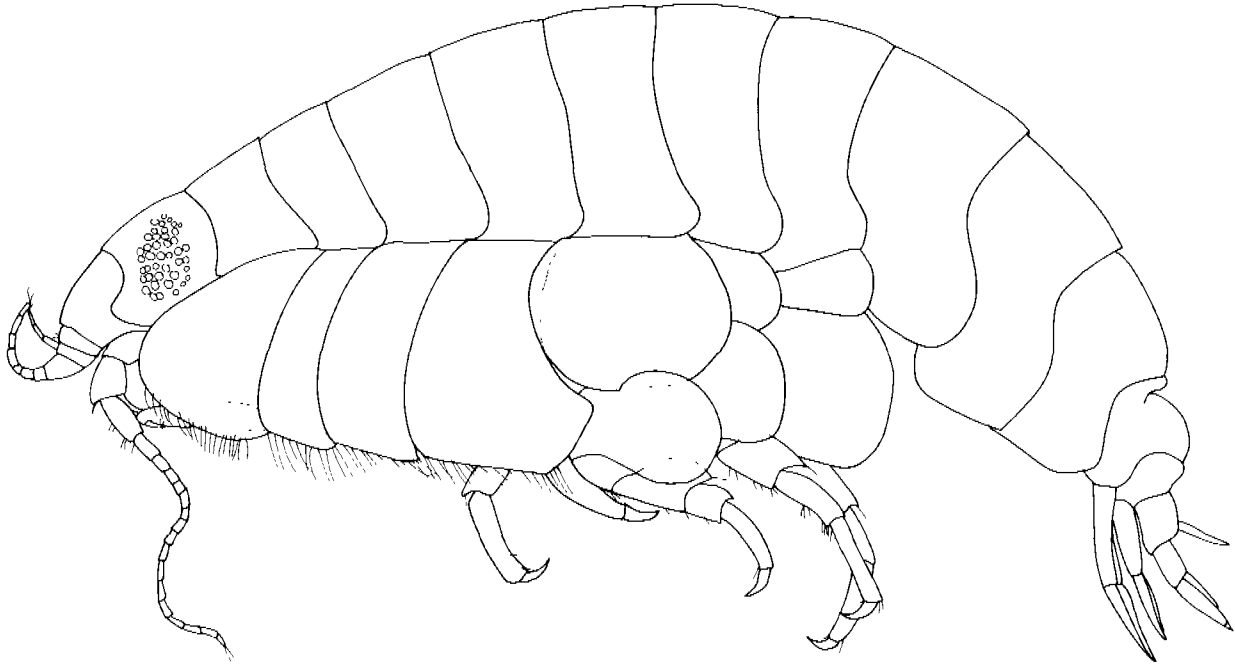


Figure 60. *Aroui americana* new species, holotype female, 5.0 mm (USNM 282716), south of Mobile Bay, Gulf of Mexico.

robust, serrate setae; intermediate setae absent; molar with narrow column, weak triturating surface; mandibular palp attached midway; article 1 short, length $1 \times$ breadth; article 2 broadened proximally, length $2.2 \times$ breadth, $1.2 \times$ article 3, with 10 submarginal posterodistal A2-setae (male 13), without B2 or D2-setae; article 3 slender, blade-like, long, length $2.8 \times$ breadth, without A3 or B3-setae, with 11 (male 13) D3-setae along most of posterior margin, and 2 (male 4) apical E3-setae. Maxilla 1: inner plate tapering distally, inner margin fully setose, with 9 pappose apical setae; outer plate broad, with 11 setal-teeth, with ST1 to ST3 large, slender, multicuspitate, ST4–ST5 large, slender, 8-cuspitate, ST6 large, slender, 12-cuspitate, ST7 contiguous with ST6, large, broad, 19-cuspitate medially, STA large, slender, not displaced from STB, multicuspitate, STB long, slender, 7-cuspitate, STC long, slender, 7-cuspitate, STD short, slender, 3-cuspitate; palp large, 2-articulate, with 6 short terminal robust setae and 2 subterminal setae, robust flag seta on distolateral corner, distomedial margin smooth. Maxilla 2: inner and outer plates broad; inner plate length $1.3 \times$ outer plate; outer plate with extremely long distally barbed slender setae. Maxilliped: inner plate large, subovate, with 3 apical nodular setae, oblique setal row strong with 12 pappose setae; outer plate small, subovate, with 1 apical pappose seta, many fine apical setae, and 1 apical robust seta, medial setae large, robust, submarginal setae long, pappose; palp large, 4-articulate, article 2 broad, length $1.9 \times$ breadth, $1.1 \times$ article 3, article 3 long, broad, length $2.1 \times$ breadth, dactylus well developed, with 2 subterminal setae, unguis present.

Coxae 1–4: with fringe of short slender setae along ventral margin. Gnathopod 1: simple; coxa large, about as long as coxa 2, anterior margin slightly convex, anteroventral corner rounded, posterior margin slightly concave; basis long, slender, length $2.9 \times$ breadth, anterior margin smooth, with simple setae; ischium long, length $2.1 \times$ breadth; merus, posterior margin without setae; carpus subrectangular, long, length $2.3 \times$ breadth, shorter than ($0.8 \times$) propodus; propodus large, subrectangular, length $2.7 \times$ breadth, margins subparallel, posterior margin smooth, slightly concave, with a few simple, slender setae, palm absent; dactylus complex, extremely reduced, covered in sensory setae. Gnathopod 2: minutely chelate; coxa large, subequal in size to coxa 3, ventral margin lined with slender setae; ischium long, length $2.6 \times$

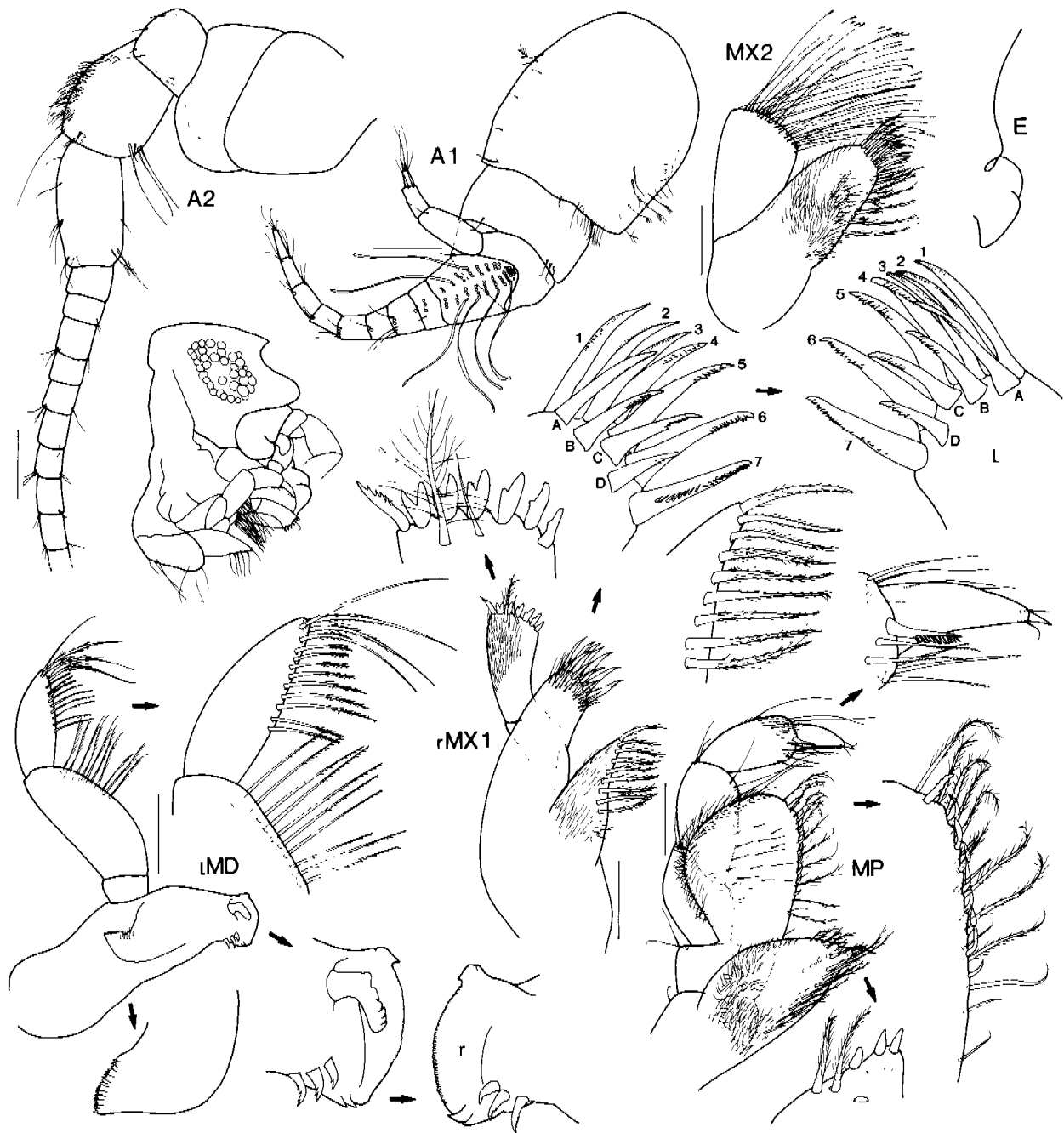


Figure 61. *Aroui americana* new species, holotype female, 5.0 mm (USNM 282716), south of Mobile Bay, Gulf of Mexico. Scales represent 0.1 mm.

breadth; carpus long, length $2.4 \times$ breadth, posterior margin broadly lobate; propodus subrectangular, short, length $1.9 \times$ breadth, palm obtuse, with convex, serrate margin, posterodistal corner with 1 medial and 1 lateral robust setae; dactylus over-reaching corner of palm, posterior margin serrate.

Peraeopod 3: coxa large; merus weakly expanded anteriorly; merus-carpus without plumose setae; propodus with 3 robust setae, 2 slender setae, and 2 distal locking setae along posterior margin; dactylus short, stocky. Peraeopod 4: coxa deeper than wide, with large posteroventral lobe, anterior margin slight-

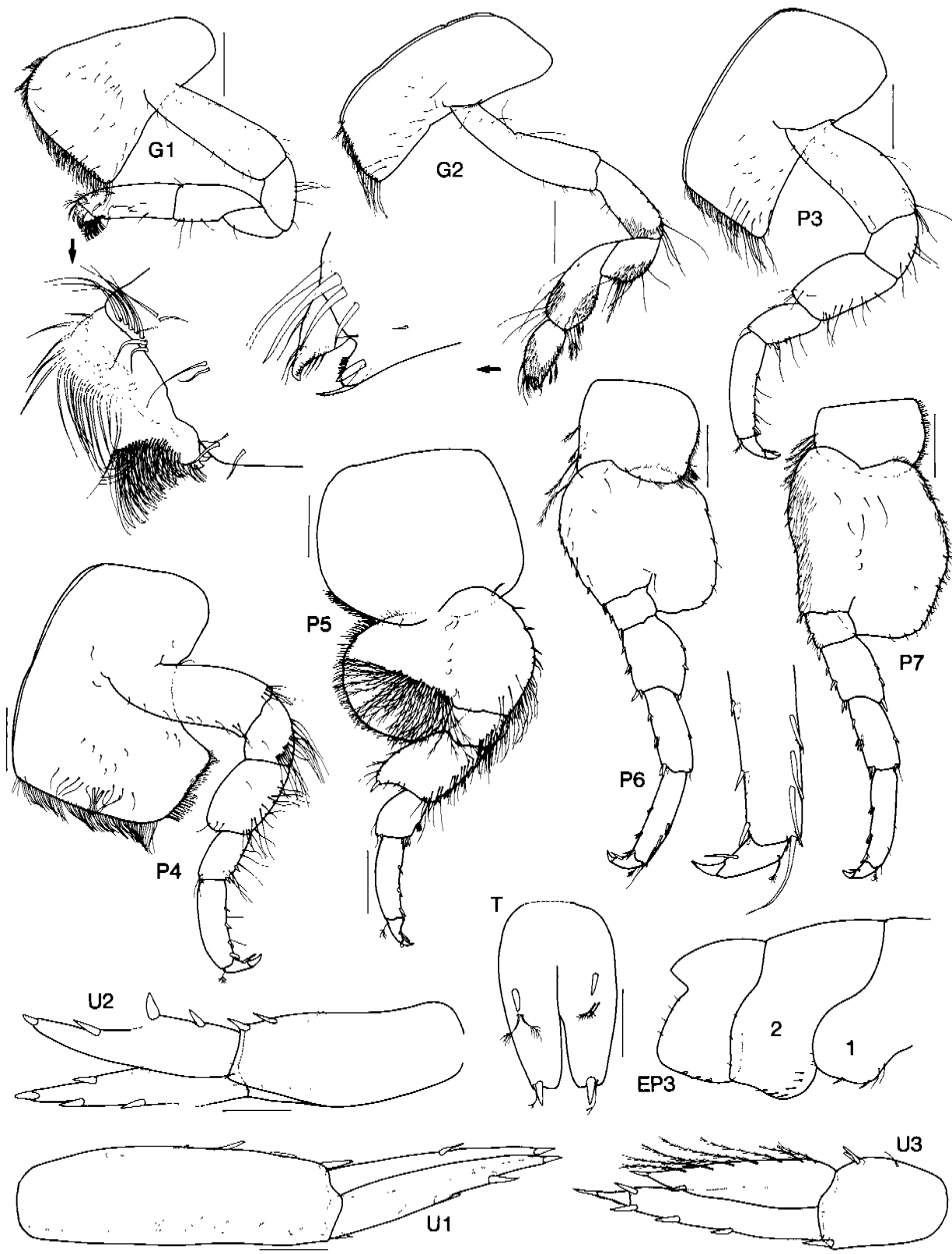


Figure 62. *Aroui americana* new species, holotype female, 5.0 mm (USNM 282716), south of Mobile Bay, Gulf of Mexico. Scales represent 0.1 mm.

ly rounded, posterior margin slightly sloping anteriorly; merus weakly expanded anteriorly; merus-carpus without plumose setae; propodus with 3 robust setae, 2 slender setae, and 2 distal locking setae along posterior margin; dactylus short, stocky, with robust seta on posterior margin. Peraeopod 5: coxa equilobate; basis expanded, posterior margin smooth, with strong row of long slender pappose setae medially; merus broadly expanded, with sloping posterior shoulder and rounded posterior margin; propodus with 3 robust setae and 2 distal locking setae along anterior margin, without setae along posterior margin; dactylus short, stocky, with robust seta on posterior margin. Peraeopod 6: coxa small, slightly lobate posteriorly; basis, anterior margin rounded proximally, straight distally, basis expanded posteriorly, with minutely crenate posterior margin; merus slightly expanded and rounded posteroproximally, straight posterodistally, with 3 setae; propodus posterior margin with 3 hooked robust setae, with 4 robust setae and 2 distal locking setae along anterior margin, with 1 long, slender seta along posterior margin; dactylus short, stocky, with robust seta on posterior margin. Peraeopod 7: basis expanded posteriorly, posterior margin slightly rounded, smooth, posteroventral corner rounded; merus slightly expanded, convex posterior margin with 3 robust setae; propodus with 4 robust setae and 2 distal locking setae along anterior margin, without setae along posterior margin; dactylus short, stocky, with robust seta on posterior margin.

Oostegites: from gnathopod 2 to peraeopod 5. Gills: from gnathopod 2 to peraeopod 7, not pleated.

Pleonites 1–3: dorsally smooth. Epimeron 3: posteroventral corner broadly rounded, ventral margin with 3 small robust setae. Urosomites: urosomite 1 with anterodorsal notch and rounded boss; urosomite 3 without small dorsolateral seta. Uropod 1: without fine setae; peduncle with 5 dorsolateral, 1 apicolateral, 4 dorsomedial, and 1 apicomедial robust setae, without plumose setae; rami subequal in length; outer ramus with 3 lateral robust setae; inner ramus with 1 lateral and 1 medial robust setae. Uropod 2: without fine setae; peduncle with 2 dorsolateral, 1 apicolateral, 4 dorsomedial, and 1 apicomедial robust setae; rami subequal in length; outer ramus with 3 lateral robust setae; inner ramus with 3 lateral and 2 medial robust setae, without constriction. Uropod 3: peduncle short, length $1.5 \times$ breadth, without dorsolateral flange, with 1 apicolateral and 1 apicomедial robust setae, without midlateral slender or robust setae, with 1 distoventral robust seta, without plumose setae; rami lanceolate, inner ramus shorter than (about $0.8 \times$) outer ramus; outer ramus 2-articulate, article 2 short, article 1 with 3 lateral and 1 medial robust setae; inner ramus with 1 medial robust seta; slender plumose setae present in female and male. Telson: longer than broad, length $1.4 \times$ breadth, deeply cleft (74%), with 1 dorsal robust seta on each lobe, without dorsal slender setae, distal margins incised, with 1 apical penicillate seta on each lobe, without apical slender setae, with 1 apical robust seta on each lobe.

Type locality: Gulf of Mexico, south of Mobile Bay, Alabama.

Distribution: Western Atlantic from the Gulf of Mexico and Argentina in 95- to 200-m depths.

Etymology: Named for its general area of discovery to signal the presence of *Aroui* in the Americas.

Remarks: *Aroui americana* is closely related to *A. hamatopodus* Lowry and Stoddart, 1989a, and *A. setosus* Chevreux, 1911, the other two species in the genus. It is distinguished from both by the well-developed row of long slender pappose setae on the medial face of the basis of peraeopod 5 and by the presence of dorsal robust setae on the telson. *Aroui americana* is further distinguished from *A. setosus* by the presence of hooked setae on the posterior margin of the propodus of peraeopod 6, a synapomorphy shared by *A. americana* and *A. hamatopodus*.

This species is known from sand bottoms and from fish stomachs, but it is almost certainly a scavenger. *Aroui setosus* is a well-documented scavenger of the echinoid *Spatangus* in the Mediterranean Sea (Chevreux, 1911; Stroobants, 1976). *Aroui hamatopodus* is also a widespread scavenger on the Australian

continental shelf, where it feeds on spatangoid cchinoderms (Lowry and Stoddart, 1989a) and goes into traps baited with fish (personal observation).

Until now, *Aroui* has been known from the Mediterranean Sea and Australian seas. This first record from the western Atlantic Ocean indicates that members of *Aroui* may be widespread, warm-water scavengers.

Uristidae Hurley, 1963

Stephonyx Lowry and Stoddart, 1989c

Stephonyx biscayensis (Chevreux, 1908)

Figure 63

Euonyx biscayensis Chevreux, 1908, pp. 1–3, fig. 1; ? K. H. Barnard, 1916, pp. 110–112; Stephensen, 1923, p. 42; ? Schellenberg, 1926, pp. 200–202; Chevreux, 1927, p. 47; Chevreux, 1935, pp. 7, 8, pl. 5, fig. 2; ? J. L. Barnard, 1961, p. 34, fig. 4; ? Griffiths, 1975, p. 144; ? Ledoyer, 1986, pp. 748–751, fig. 289.

Stephonyx biscayensis: Lowry and Stoddart, 1989c, pp. 522–524, figs. 2, 3; Pallerud and Vader, 1991, p. 43; Poupin, 1994, p. 16.

Stephonyx sp. Paulmier, 1993, p. 29, pl. 34, fig. 1.

Material examined: **HOURLASS MATERIAL:** None.—**OTHER MATERIAL:** 1 specimen; north-eastern Gulf of Mexico; 27°00.82'N 84°56.22'W; crab trap baited with dead fish; 494 m; 6 May 1987; R/V *Suncoaster*; MARFIN Geryon cruise, area 5; GCRL 1344.—3 specimens; off Puerto Rico, Caribbean Sea; lobster trap baited with dead fish; 549 m; September 1982; S. Candaleri; GCRL 1345.—10 specimens; west of Basse Terre, Guadeloupe, French Antilles, Caribbean Sea; 16°22.04'N 61°50.59'W; fish traps; 900 m; April 1993; G. Leblond and J. Poupin; Mission ORSTOM-IRPM-SMCB, Station GC11; AM P47306.

Diagnosis: Head: lateral cephalic lobe broad, round, curling in toward the body at the lower margin. Mandible: palp article 1 short. Gnathopod 1: carpus subequal in length to propodus. Gnathopod 2: palm acute, not excavate. Peraeopod 7: merus strongly expanded posteriorly with strong posteroproximal shoulder. Pleonites 1–3 without dorsal boss. Epimeron 3: with small posteroventral spine.

Remarks: Paulmier (1993) and Poupin (1994) both have reported *S. biscayensis* from the Caribbean Sea. This is the first record of the species in the Gulf of Mexico.

We can find no significant morphological differences between this material and *S. biscayensis*. In the redescription of *S. biscayensis* by Lowry and Stoddart (1989c), the illustration of the head lobe is incorrect. The lobe is much broader and rounder and tends to curl in toward the body at the lower margin, which makes it easy to mistake the fold line for the edge of the lobe.

According to the literature, *S. biscayensis* is a widespread species. These records place *S. biscayensis* on both sides of the Atlantic but not north of the Bay of Biscay on the eastern side and not north of the Gulf of Mexico on the western side. Lowry and Stoddart (1989c) discussed suspect records of the species from eastern Africa and the Indian Ocean (J. L. Barnard, 1961; Ledoyer, 1986) and concluded that they were probably not *S. biscayensis*. The records from southern Africa (K. H. Barnard, 1916; Schellenberg, 1926; Griffiths, 1975) are inconclusive.

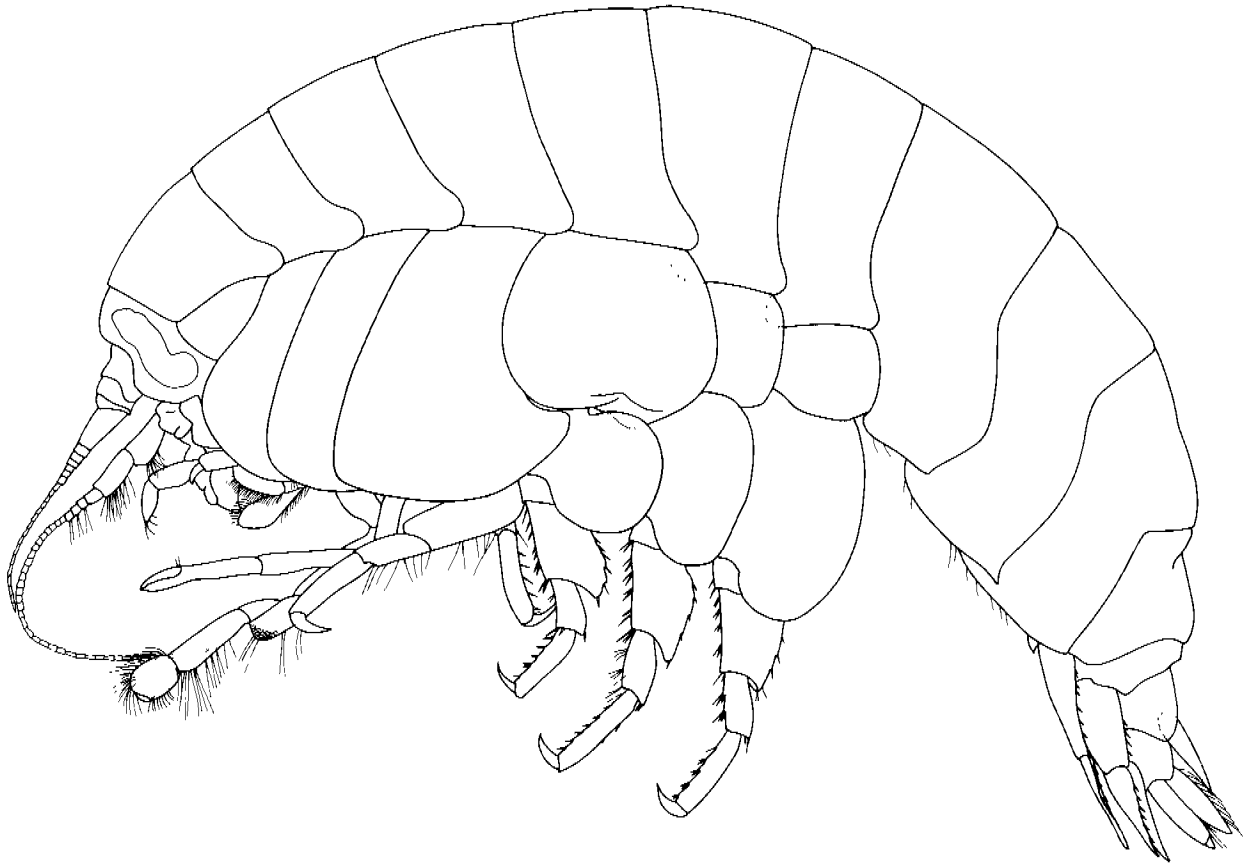


Figure 63. *Stephonyx biscayensis* (Chevreux, 1908), female, 22.5 mm (GCRL 1345), off Puerto Rico, Caribbean Sea.

ECOLOGY

Of the 13 species collected during the Hourglass Cruises, the least species richness (1 species) occurred at 6-m depths, moderate species richness (7 species) occurred between 18- and 37-m depths, and the greatest species richness (11 species) occurred between 55- and 73-m depths (Table 3). *Concarnes concavus* was by far the most abundant and frequently captured species. It was found in deeper water, between 37- and 73-m depths along the eastern shelf. *Aruga holmesi* also occurred along the eastern shelf at all depths sampled and was the only lysianassoid species living in the area off Tampa Bay that is influenced by estuarine conditions (Joyce and Williams, 1969). *Shoemakerella cubensis* was most abundant between 18- and 37-m depths. Other species were infrequently captured and never abundant. It is clear that in this study, abundance and species richness of lysianassoids increased with depth.

It is possible that at least three of the shallow-water species (*A. holmesi*, *C. concarnes*, and *T. apalachicola*) are scavengers. Species of *Aruga*, *Concarnes*, and *Tryphosella* have been taken in traps from other areas (Stepien and Brusca, 1985; Lawson et al., 1993; Lowry and Stoddart, 1995b) and have mouthparts moderately adapted for scavenging. At least three other known scavenging genera, *Aroui*, *Eurythenes*, and *Stephonyx*, are known from deeper water in the Gulf of Mexico. In the Caribbean Sea, *Eclecticus eclecticus* is the only known shallow-water scavenger. *Eurythenes* and *Stephonyx* are reported from deeper water, and because *Aroui americana* is known from north and south of the Caribbean Sea, it probably also occurs there.

Aristiids are often associates with other invertebrates, such as ascidians (Vader, 1984b), brachiopods

TABLE 3. ABUNDANCE AND DEPTH DISTRIBUTIONS OF SPECIES CAPTURED DURING HOURGLASS CRUISES (ONLY NIGHT SAMPLINGS INCLUDED).

Species	Abundance	Frequency of Capture Trawl + Dredge	Number of Specimens Captured at Each Depth				
			6	18	37	55	73
<i>Concarnes concavus</i>	237	69	—	—	11	135	91
<i>Aruga holmesi</i>	73	25	5	26	4	22	16
<i>Shoemakerella cubensis</i>	62	19	—	35	23	4	—
<i>Dissiminassa homosassa</i>	12	12	—	7	2	2	1
<i>Aristias captiva</i>	11	8	—	—	—	2	9
<i>Rimakoroga floridiana</i>	10	3	—	—	—	1	9
<i>Lysianopsis ozona</i>	6	5	—	6	—	—	—
<i>Boca campi</i>	6	5	—	—	—	1	5
<i>Boca megachela</i>	2	2	—	1	—	—	1
<i>Orchomenella thomasi</i>	2	2	—	—	—	—	2
<i>Tryphosella apalachicola</i>	2	2	—	—	—	2	—
<i>Ensayara entrichoma</i>	1	1	—	—	—	—	1
<i>Orchomenella perdido</i>	1	1	—	—	1	—	—
Total abundance at each depth:			5	75	41	169	135
Number of species at each depth:			1	5	5	8	9

(Vader, 1970), and sponges (Vader, 1984a, 1984b). This may account for their presence in the deep-water stations where the substrate has an epifaunal diversity that could provide potential hosts for *Aristias captiva*, *Boca campi*, *B. elvae*, and *B. megachela*.

Lysianassoids are not particularly abundant compared with the aorids from the same area (Myers, 1981). Only *Concarnes concavus* is as abundant as any of the four most abundant aorids, and the most abundant aorid, *Lembos tigrinus*, is seven times more abundant than *C. concavus*.

ZOOGEOGRAPHY

Watling (1979) and Dickinson et al. (1980) reported ten lysianassoid species on the continental shelf between Cape Cod and Cape Hatteras; none of the ten are known from the Gulf of Mexico. Between Cape Hatteras and southern Florida only one species (*Lysianopsis alba*) has been reported from the continental shelf, and its reported occurrence in the Gulf of Mexico needs to be confirmed. It appears that the lysianassoid fauna on the continental shelf off the southeastern United States is seriously underreported. Consequently, it is impossible to make meaningful comparisons of the lysianassoid fauna the Gulf of Mexico with that of the waters off the eastern United States.

The Caribbean Sea is apparently also very poorly sampled for lysianassoid amphipods. Of the eight species known from the shelf, only two, *Concarnes concavus* and *Shoemakerella cubensis*, are known from outside the area and are the only shallow-water species that the Gulf of Mexico and the Caribbean Sea have in common. Deep-water species such as *Eurythenes gryllus* and *Stephonyx biscayensis* occur in both areas.

Of the 16 species known from less than 200-m depths in the Gulf of Mexico, only four occur outside the area (*Aruga holmesi* from California to Ecuador, *Ensayara entrichoma* in Bermuda, and *Concarnes concavus* and *Shoemakerella cubensis* in the Caribbean Sea). Based on current information, the main affini-

ity of the Gulf of Mexico lysianassoid fauna appears to be with that across the Isthmus of Panamá. At least eight genera (*Aristias*, *Aruga*, *Dissiminassa*, *Ensayara*, *Hippomedon*, *Orchomenella*, *Rimakoroga*, and *Tryphosella*) and possibly a ninth (*Shoemakerella*) are found on both sides of the Isthmus of Panamá, and three species pairs occur on opposite sides (*Dissiminassa dissimimalis* (Stout, 1913) and *D. homosassa* n. sp.; *Ensayara ramonella* J. L. Barnard, 1964b, and *E. entrichoma* Gable and Lazo-Wasem, 1990; *Rimakoroga rima* Barnard and Karaman, 1987, and *R. floridiana* n. sp.). The Gulf of Mexico appears to be the source of shallow-water lysianassoid species for Bermuda, which has been sampled recently by Gable and Lazo-Wasem (1990). The occurrence of *Aroui americana* and *Hippomedon perdido*, which are both related to Mediterranean Sea species, may indicate a past connection between these areas.

As Myers (1981) found for the aorid amphipods, sampling is so inadequate in the southeastern coastal and continental shelf areas and in the Caribbean Sea that no conclusion can be drawn about the zoogeography or diversity of the western Atlantic lysianassoid fauna.

LITERATURE CITED

ARNDT, W.

1933. Die biologischen Beziehungen zwischen Schwämmen und Krebsen. Mitteilungen aus dem Zoologischen Museum in Berlin 19: 221–305.

AUSTIN, W. C.

1985. An Annotated Checklist of Marine Invertebrates in the Cold Temperate Northeast Pacific. Volume 3. Khoyatan Marine Laboratory, Cowichan, B.C., 682 pp.

BARNARD, J. L.

1955. Notes on the amphipod genus *Aruga* with the description of a new species. Bulletin of the Southern California Academy of Sciences 54(2): 97–103.
1958. Index to the families, genera, and species of the gammaridean Amphipoda (Crustacea). Allan Hancock Foundation Publications, Occasional Paper 19: 1–145.
1959. Estuarine Amphipoda. Pp. 13–69 in J. L. Barnard and D. J. Reish, eds. Ecology of Amphipoda and Polychaeta of Newport Bay, California. Allan Hancock Foundation Publications, Occasional Paper 21.
1961. Gammaridean Amphipoda from depths of 400 to 6000 meters. Galathea Report 5: 23–128.
1962. South Atlantic abyssal amphipods collected by R.V. Vema. Abyssal Crustacea. Vema Research Series 1: 1–78.
- 1964a. Deep-sea Amphipoda (Crustacea) collected by the R/V “Vema” in the eastern Pacific Ocean and the Caribbean and Mediterranean seas. Bulletin of the American Museum of Natural History 127(1): 1–46.
- 1964b. Marine Amphipoda of Bahia de San Quintin, Baja California. Pacific Naturalist 4(3): 55–139.
1965. Marine Amphipoda of atolls in Micronesia. Proceedings of the United States National Museum 117: 459–551.
- 1966a. Benthic Amphipoda of Monterey Bay, California. Proceedings of the United States National Museum 119: 1–41.
- 1966b. Submarine canyons of southern California. Part V. Systematics: Amphipoda. Allan Hancock Pacific Expeditions 27(5): 1–166.
1967. Bathyal and abyssal gammaridean Amphipoda of Cedros Trench, Baja California. United States National Museum Bulletin 260: 1–205.
1969. Gammaridean Amphipoda of the rocky intertidal of California: Monterey Bay to La Jolla.

- United States National Museum Bulletin 258: 1–230.
1970. Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. *Smithsonian Contributions to Zoology* 34: 1–286.
1979. Littoral gammaridean Amphipoda from the Gulf of California and the Galapagos Islands. *Smithsonian Contributions to Zoology* 271: 1–149.
- BARNARD, J. L., and G. S. KARAMAN
1987. Revisions in classification of gammaridean Amphipoda (Crustacea), Part 3. *Bulletin of the Biological Society of Washington* 100(4): 856–875.
1991. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). *Records of the Australian Museum, Supplement* 13(2): 419–866.
- BARNARD, J. L., and J. D. THOMAS
1990. *Ensayara jumane*, a new species from Belize, Caribbean Sea (Amphipoda, Lysianassidae). *Bulletin of the Biological Society of Washington* 103(1): 120–126.
- BARNARD, K. H.
1916. Contributions to the crustacean fauna of South Africa. 5.—The Amphipoda. *Annals of the South African Museum* 15: 105–302, pls. 26–28.
1925. Contributions to the crustacean fauna of South Africa. No. 8. Further additions to the list of Amphipoda. *Annals of the South African Museum* 20: 319–380, pl. 34.
1931. Diagnosis of new genera and species of amphipod Crustacea collected during the ‘Discovery’ investigations, 1925–1927. *Annals and Magazine of Natural History, Series* 10, 7: 425–430.
1932. Amphipoda. ‘Discovery’ Reports 5: 1–326, pl. 1.
- BATE, C. S.
1857. A synopsis of the British edriophthalmous Crustacea. *Annals and Magazine of Natural History, Series* 2, 19: 135–152.
- BATE, C. S., and J. O. WESTWOOD
1868. A History of the British Sessile-eyed Crustacea. Volume II. John Van Voorst, London. Pp. 401–536.
- BELLAN-SANTINI, D.
1965. Contribution à l’étude du genre *Hippomedon* (Crustacea-Amphipoda) en mer Méditerranée. *Recueil des Travaux de la Station Marine d’Endoume* 52: 161–180.
- BIERNBAUM, C. K.
1979. Influence of sedimentary factors on the distribution of benthic amphipods of Fishers Island Sound, Connecticut. *Journal of Experimental Marine Biology and Ecology* 38: 201–223.
- BIERNBAUM, C. K., and E. L. WENNER
1993. Trapping of necrophagous crustaceans on the upper continental slope off South Carolina, U.S.A. *Journal of Crustacean Biology* 13(3): 601–608.
- BIRSTEIN, J. A., and M. E. VINOGRADOV
1958. Pelagicheskie gammaridy (Amphipoda, Gammaridea) severnoi-zapadnoi chasti Tikhogo Okeana. *Trudy Instituta Okeanologii, Akademiya Nauk SSSR* 27: 219–257.

- BOECK, A.
 1861. Bemaerkninger angaaende de ved de norske kyster forekommende Amphipoder. Forhandlinger ved de Skandinaviske Naturforskeres Møde 8: 631–677.
 1871. Crustacea Amphipoda borealia et arctica. Forhandlinger i Videnskabs-Selskabet i Christiania 1870: 83–280, i–viii [index].
- BONNIER, J.
 1893. Les amphipodes du Boulonnais. Bulletin Scientifique de la France et de la Belgique 24: 161–207, pls. 5–8.
- BOUSFIELD, E. L.
 1973. Shallow-water Gammaridean Amphipoda of New England. Cornell University Press, Ithaca and London. 312 pp.
- BOWMAN, T. E., and R. B. MANNING
 1972. Two arctic bathyal crustaceans: the shrimp *Bythocaris cryonesus* new species, and the amphipod *Eurythenes gryllus*, with in situ photographs from Ice Island T-3. Crustaceana 23(2): 187–201, pl. 1.
- CHEVREUX, E.
 1900. Amphipodes provenant des campagnes de l'*Hirondelle* (1885–1888). Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert I^{er} Prince Souverain de Monaco 16: i–iv, 1–195, pls. I–XVIII.
 1903. Campagnes Scientifique de S.A. le Prince Albert I^{er} de Monaco. Note préliminaire sur les amphipodes de la famille des Lysianassidac recueillis par la *Princesse-Alice* dans les eaux profondes de l'Atlantique et de la Méditerranée. Bulletin de la Société Zoologique de France 28: 81–97.
 1905a. Description d'un amphipode (*Cyphocaris Richardi* nov. sp.) provenant des pêches au filet à grande ouverture de la dernière campagne du yacht *Princesse-Alice* (1904). Bulletin du Musée Océanographique de Monaco 24: 1–5.
 1905b. *Paracyphocaris praedator*. Type d'un nouveau genre de Lysianassidae. Bulletin du Musée Océanographique de Monaco 32: 1–6.
 1905c. Description d'un amphipode (*Katius obesus*, nov. gen. et sp.), suivie d'une liste des amphipodes de la tribu des Gammarina ramenés par le filet à grande ouverture pendant la dernière campagne de la *Princesse-Alice* en 1904. Bulletin du Musée Océanographique de Monaco 35: 1–7.
 1906. Crustacés amphipodes. Expédition Antarctique Française (1903–1905) commandée par le Dr Jean Charcot. Sciences Naturelles: Documents Scientifiques: 1–100.
 1908. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin du Musée Océanographique de Monaco 117: 1–13.
 1911. Campagnes de la *Melita*. Les amphipodes d'Algérie et de Tunisie. Mémoires de la Société Zoologique de France 23: 145–285, pls. 6–20.
 1927. Crustacés Amphipodes. Expéditions Scientifiques du "Travailleur" et du "Talisman" pendant les années 1880, 1881, 1882, 1883. Malacostraces (suite) 9: 41–152, pls. 1–14.
 1935. Amphipodes provenant des campagnes du Prince Albert I^{er} de Monaco. Résultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert I^{er} Prince Souverain de Monaco 90: 1–214, pls. 1–16.
- CHEVREUX, E., and E. L. BOUVIER
 1892. *Perrierella crassipes*, espèce et genre nouveaux d'amphipodes des côtes de France. Bulletin de la Société Zoologique de France 17: 50–54.

- CHEVREUX, E., and L. FAGE
 1925. Amphipodes. Faune de France 9: 1–488.
- CHILTON, C.
 1912. The Amphipoda of the Scottish National Antarctic Expedition. Transactions of the Royal Society of Edinburgh 48: 455–520, pls. 1, 2.
 1921. Report on the Amphipoda obtained by the F.I.S. “Endeavour” in Australian seas. Biological Results of the Fishing Experiments carried on by the F.I.S. “Endeavour,” 1909–14 5(2): 33–92.
- CLARK, J., and J. L. BARNARD
 1985. *Lucayarina catacumba*, new genus, new species, a Bahamian sea-cave amphipod (Crustacea: Amphipoda: Lysianassidae). Proceedings of the Biological Society of Washington 98: 243–254.
- COSTA, A.
 1851. Catalogo dei crostacei Italiani e di moltri altri del Mediterraneo per Fr. Gugl. Hope., Naples, 48 pp. + pl. 1.
 1853. Relazione sulla memoria del Dottor Achille Costa, di ricerche su’ crostacei amfipodi del regno di Napoli. Rendiconti dell’Accademia delle Scienze Fisiche e Matematiche de Napoli 2: 167–178.
 1857. Ricerche sui crostacei Amfipodi del regno di Napoli. Memorie della Reale Accademia de Scienze di Napoli 1: 165–235, pls. I–IV.
 1867. Saggio della collezione de’ Crostacei del Mediterraneo del Museo Zoologico della Università di Napoli spedito alla Esposizione di Parigi del 1867. Annuario del Museo Zoologico della R. Università di Napoli 4(1864): 38–46, pl. III.
- DAHL, E.
 1945. *Menigratopsis svennilssoni* n. gen. et spec., a lysianassid amphipod from the Sound. Kungliga Fysiografiska Sällskapet i Lund Förhandlingar 15(24): 229–235.
 1959. Amphipoda from depths exceeding 6000 meters. Galathea Report 1: 211–241.
- DANA, J. D.
 1849. Synopsis of the genera of Gammaracea. American Journal of Science and Arts, Series 2, 8: 135–140.
 1853. Crustacea. Part II. United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N. 13(2): 689–1618.
- DE BROYER, C.
 1984. Evolution du complexe *Orchomene* Boeck (Amphipoda Lysianassoidea). Annales de la Société royale zoologique de Belgique 114 (Supplement 1): 197–198.
 1985. Description de *Falklandia* gen. n. de l’Ocean Austral et definition des Lysianassoidea uristidiens (Crustacea, Amphipoda). Zoologica Scripta 14(4): 303–312.
- DE BROYER, C., and K. JAZDZEWSKI
 1993. Contribution to the marine biodiversity inventory. A checklist of the Amphipoda (Crustacea) of the Southern Ocean. Documents de Travail de l’Institut Royal des Sciences Naturelles de Belgique 73: 1–154.

- DE BROYER, C., and W. VADER
 1990. Revision and notes on the biology of *Orchomenella recondita* (Stasek, 1958) (Amphipoda, Lysianassoidea) an associate of sea anemones. *Beaufortia* 41(5): 31–38.
- DEMMING, J. W., P. S. TABOR, and R. R. COLWELL
 1981. Barophilic growth of bacteria from intestinal tracts of deep-sea invertebrates. *Microbial Ecology* 7(1): 85–94.
- DICKINSON, J. J., R. W. WIGLEY, R. D. BRODEUR, and S. BROWN-LEGER
 1980. Distribution of gammaridean Amphipoda (Crustacea) in the Middle Atlantic Bight region. National Oceanic and Atmospheric Administration Technical Report NMFS SSRF 741: 1–46.
- FEELEY, J. B., and M. L. WASS
 1971. The distribution and ecology of the Gammaridea (Crustacea: Amphipoda) of the Lower Chesapeake Estuaries. *V.I.M.S. Special Papers in Marine Science* 2: 1–58.
- FOX, R. S., and K. H. BYNUM
 1975. The amphipod crustaceans of North Carolina estuarine waters. *Chesapeake Science* 16(4): 223–237.
- GABLE, M. F., and E. A. LAZO-WASEM
 1990. Lysianassidae (Amphipoda: Lysianassoidea) of Bermuda. *Journal of Crustacean Biology* 10(4): 721–734.
- GONZALEZ, E.
 1991. Actual state of gammaridean amphipoda taxonomy and catalogue of species from Chile. *Hydrobiologia* 223: 47–68.
- GRIFFITHS, C. L.
 1975. The Amphipoda of southern Africa. Part 5. The Gammaridea and Caprellidea of the Cape Province west of Cape Agulhas. *Annals of the South African Museum* 67(5): 91–181.
- GURJANOVA, E. F.
 1962. Amphipoda of the northern part of the Pacific Ocean (Amphipoda-Gammaridea). *Akademiya Nauk SSSR, Opredeliteli po Faune SSSR* 74: 1–440.
- HASWELL, W. A.
 1882. Catalogue of the Australian Stalk- and Sessile-eyed Crustacea. Australian Museum, Sydney, 324 pp. + pls. 1–4.
- HANSEN, H. J.
 1887. Malacostraca marina Groenlandiae occidentalis. Oversight over det vestlige Gronlands Fauna af malakostrake Havkrebsdyr. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjöbenhavn* 1887: 5–226, pls. 2–7.
- HOLMES, S. J.
 1903. Synopses of North-American invertebrates. XVIII. The Amphipoda. *American Naturalist* 37: 267–292.

1905. The Amphipoda of southern New England. *Bulletin of the Bureau of Fisheries* 24: 459–529, pls. 1–13.
1908. The Amphipoda collected by the U.S. Bureau of Fisheries steamer “Albatross” off the west coast of North America, in 1903 and 1904, with descriptions of a new family and several new genera and species. *Proceedings of the United States National Museum* 35: 489–543.
- HURLEY, D. E.
1963. Amphipoda of the family Lysianassidae from the west coast of North and Central America. Allan Hancock Foundation Publications, Occasional Paper 25: 1–160.
- ICZN
1991. Opinion 1639. *Shoemakerella* Pirlot, 1936 (Crustacea, Amphipoda): *Lysianax cubensis* Stebbing, 1897 designated as the type species. *Bulletin of Zoological Nomenclature* 48(2): 169–170.
- JARRETT, N. E., and E. L. BOUSFIELD
1982. Studies on the amphipod family Lysianassidae in the northeastern Pacific region. *Hippomedon* and related genera. Systematics and distributional ecology. National Museum of Natural Sciences (Ottawa). *Publications in Biological Oceanography* 10: 103–128.
- JOHNSON, S. E.
1986. Order Amphipoda. Pp. 372–381 in W. Sterrer, ed. *Marine Fauna and Flora of Bermuda*. John Wiley and Sons, New York.
- JOYCE, E. A., and J. WILLIAMS
1969. Rationale and pertinent data. *Memoirs of the Hourglass Cruises* 1(1). 50 pp.
- KRØYER, H. N.
1846. Crustacés. In *Voyages de la commission scientifique du Nord; en Scandinavie, en Laponie, au Spitzberg et aux Fero, . . . Atlas*. Paris.
- KUDRJASCHOV, V. A.
1965. New amphipod species of the family Lysianassidae (Amphipoda, Gammaridea) from the Okhotsk Sea. *Zoologicheskii Zhurnal* 44(4): 513–520.
- KUNKEL, B. W.
1910. The Amphipoda of Bermuda. *Transactions of the Connecticut Academy of Arts and Sciences* 16: 1–116.
1918. The Arthrostraca of Connecticut. *State of Connecticut, State Geological and Natural History Survey Bulletin* 26: 1–261.
- LALANA RUEDA, R., N. CAPETILLO, R. BRITO, E. DIAZ, and R. CRUZ
1989. Estudio del zoobentos asociado a *Laurencia intricata* en un área de juveniles de langosta, al SE de la Isla de la Juventud, Cuba. *Revista Investigaciones Marinas* 10(3): 207–218.
- LALANA RUEDA, R., and M. PÉREZ MORENO
1985. Estudio cualitativo y cuantitativo de la fauna asociada a las raíces de *Rhizophora mangle* en la cayería este de la Isla de la Juventud. *Revista Investigaciones Marinas* 6(2–3): 45–57.

- LALANA RUEDA, R., and M. ORTIZ
 1990. Zoobentos de Cayo Hicacos, SE de la Isla de la Juventud, Cuba. *Revista de Investigaciones Marinas* 11(3): 191–199.
- LAWSON, G. S., P. A. TYLER, and C. M. YOUNG
 1993. Attraction of deep-sea amphipods to macrophyte food falls. *Journal of Experimental Marine Biology and Ecology* 169: 33–39.
- LECROY, S. E.
 1995. Amphipod Crustacea III. Family Colomastigidae. *Memoirs of the Hourglass Cruises* 9(2). 139 pp.
- LEDOYER, M.
 1972. Amphipodes gammariens vivant dans les alvéoles des constrictions organogènes récifales intertidales de la région de Tuléar (Madagascar). *Etude systématique et écologique. Téthys Supplement* 3: 165–285.
 1986. Crustacés Amphipodes Gammariens. Familles des Haustoriidae à Vitjazianidae. *Faune de Madagascar* 59(2): 599–1112.
- LICHTENSTEIN, H.
 1822. *Dissertatio inauguralis quam consensu et auctoritate gratiosi micorum ordinis in universitate literaria berolinensi ut summi in medicina et chirurgia honores rite sibi concedantur die XXII. M. Julii A MDCCCXXII H.L.Q.S., publice defendet autor martinus Guilelmus Mandt Beyenburgensis*. Pp. 31–37 in M. W. Mandt, 'Observation in historiam naturalem et anatomiam comparatam in itinere Groenlandico factae' (opponentibus : J.th. v. Brandt Med. Cd. J Ollenroth Med. Cd., E. Gabler Med Cd.; Formis Brueschckianis). antecedent pp. + 1–40.
- LOWRY, J. K., and S. BULLOCK
 1976. Catalogue of the marine gammaridean Amphipoda of the Southern Ocean. *Bulletin of the Royal Society of New Zealand* 16: 1–187.
- LOWRY, J. K., and H. E. STODDART
 1983. The shallow-water gammaridean Amphipoda of the subantarctic islands of New Zealand and Australia: Lysianassoidea. *Journal of the Royal Society of New Zealand* 13: 279–394.
 1984. Redescriptions of Schellenberg's types of *Lysianopsis subantarctica* and *Paralysianopsis odhneri* (Amphipoda, Lysianassidae). *Crustaceana* 47(1): 98–108.
 1986. Protandrous hermaphrodites among the lysianassoid Amphipoda. *Journal of Crustacean Biology* 6(4): 742–748.
 1989a. The scopelocheirid genus *Aroui* (Crustacea: Amphipoda: Lysianassoidea) with notes on the association between scopelocheirid amphipods, cassid gastropods and spatangoid echinoids. *Records of the Australian Museum* 41(2): 111–120.
 1989b. *Shoemakerella* Pirlot, 1936 (Crustacea, Amphipoda): proposed designation of *Lysianax cubensis* Stebbing, 1897, as type species. *Bulletin of Zoological Nomenclature* 46(4): 236–238.
 1989c. *Stephonyx*, a new, widespread genus of lysianassoid Amphipoda. *Zoologica Scripta* 18(4): 519–525.
 1992. A revision of the genus *Ichnopus* (Crustacea: Amphipoda: Lysianassoidea: Uristidae). *Records of the Australian Museum* 44(2): 185–244.

1993. Crustacea Amphipoda: Lysianassoids from Philippine and Indonesian waters. Pp. 55–109 in A. Crosnier, ed. 'Résultats des Campagnes MUSORSTOM' Volume 10. Mémoires du Muséum National d'Histoire Naturelle, Paris, Séries A, Zoology 156.
1994. Crustacea Amphipoda: Lysianassoids from the tropical western South Pacific Ocean. Pp. 127–223 in A. Crosnier, ed. 'Résultats des Campagnes MUSORSTOM' Volume 12. Mémoires du Muséum National d'Histoire Naturelle, Paris, Séries A, Zoology 161.
- 1995a. New lysianassoid genera and species from south-eastern Australia (Crustacea: Amphipoda). Records of the Australian Museum 47(1): 7–25.
- 1995b. The Amphipoda (Crustacea) of Madang Lagoon: Lysianassidae, Opisidae, Uristidae, Wandinidae and Stegocephalidae. Pp. 97–174 in J. K. Lowry, ed. Amphipoda (Crustacea) of the Madang Lagoon, Papua New Guinea. Records of the Australian Museum, Supplement 22.
- LUCAS, H.
1846. Histoire naturelle des animaux articulés. Pt. 1. Crustacés, Arachnides, Myriapodes et Hexapodes. Exploration Scientifique de l'Algérie pendant les années 1840, 1841, 1842. Zoologie 2. Pp. 1–403 + pls.
- MILLS, E.
1964. Amphipoda. Pp. 107–116 in R. I. Smith, ed. Keys to Marine Invertebrates of the Woods Hole Region. Marine Biological Laboratory, Woods Hole, Massachusetts.
- MILNE EDWARDS, H.
1830. Extrait de recherches pour servir à l'histoire naturelle des crustacés amphipodes. Annales des Sciences Naturelles 20: 353–399, pls. 10, 11.
- MYERS, A. A.
1981. Amphipod Crustacea I. Family Aoridae. Memoirs of the Hourglass Cruises 5(5). 75 pp. + 1 pl.
- NELSON, W. G.
1979. An analysis of structural patterns in an eelgrass (*Zostera marina* L.) amphipod community. Journal of Experimental Marine Biology and Ecology 39: 231–264.
1980. The biology of eelgrass (*Zostera marina*) amphipods. Crustaceana 39: 59–89.
- NELSON, W. G., K. D. CAIRNS, and R. W. VIRNSTEIN
1982. Seasonality and spatial patterns of seagrass-associated amphipods of the Indian River Lagoon, Florida. Bulletin of Marine Science 32: 121–129.
- NORMAN, A. M.
1900. British Amphipoda: Fam. Lysianassidae (concluded). Annals and Magazine of Natural History, Series 7, 5: 196–214, pl. 6.
- ORTIZ, M.
1978. Invertebrados marinos bentónicos de Cuba. I. Crustacea, Amphipoda, Gammaridea. Ciencias 38: 3–10.
1979. Lista de especies y bibliografía de los anfípodos (Crustacea: Amphipoda) del Mediterraneo Americano. Ciencias 45: 1–40.
1991. Amphipod Crustacea II. Family Batceidae. Memoirs of the Hourglass Cruises 8(1): 31 pp.

- ORTIZ, M. R., and R. LALANA RUEDA
 1989. Nuevas consignaciones de crustáceos marinos cubanos. *Revista Investigaciones Marinas* 10(3): 219–221.
 1992. Parasitos de anfípodos (Gammaridea) de Cuba. *Revista Investigaciones Marinas* 13(1): 39–48.
 1993. Adición a la lista de especies y bibliografía de los anfípodos (Crustacea: Amphipoda) del Mediterraneo Americano. *Revista Investigaciones Marinas* 14(1): 16–37.
- ORTIZ, M. R., and R. LEMAITRE
 1994. Crustáceos anfípodos (Gammaridea) colectados en las costas del Caribe Colombiano, al sur de Cartagena. *Anales del Instituto de Investigaciones Marinas, Punta Betin* 23: 119–127.
- OSHEL, P. E., and D. H. STEELE
 1988. Comparative morphology of amphipod setae, and a proposed classification of setal types. *Crustaceana Supplement* 13: 100–106.
- PALERUD, R., and W. VADER
 1991. Marine Amphipoda Gammaridea in north-east Atlantic and Norwegian Arctic. *Tromura, Naturvitenskap* 68: 1–97.
- PAULMIER, G.
 1993. Crustacés profonds capturés aux casiers aux Antilles Françaises. *Catalogue de l'Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) Février 1993*: 1–34, pls. 1–33.
- PEARSE, A. S.
 1912. Notes on certain amphipods from the Gulf of Mexico, with descriptions of new genera and species. *Proceedings of the United States National Museum* 43(1936): 369–379.
- PIRLOT, J. M.
 1933. Les amphipodes de l'expédition du Siboga. Deuxième partie: Les amphipodes gammarides, II.—Les amphipodes de la mer profonde. 1 (Lysianassidae, Stegocephalidae, Stenothoidae, Pleustidae, Lepechinellidae). *Siboga-Expeditie, Monograph Deuxième Siboga-Expeditie* 33^c: 114–167.
 1936. Les amphipodes de l'expédition du Siboga. Deuxième partie: Les amphipodes gammarides, II.—Les amphipodes de la mer profonde. 3: Addendum et partie générale. III.—Les amphipodes littoraux. 1: Lysianassidae—Gammaridae. *Siboga-Expeditie* 33^e: 237–328.
 1939. Amphipoda. Résultats scientifiques des croisières du navire-école Belge 'Mercator'. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique, série 2*, 15: 47–80.
- POUPIN, J.
 1994. Faune marine profonde des Antilles Françaises récoltes du Naivre *Polka* faites en 1993. *ORSTOM Editions* 1994: 1–79, pls. 1–5.
- RUFFO, S.
 1946. Studi sui Crostacei Anfipodi. XI. Gli Anfipodi bentonici di Rovigno d'Istria (nota prev.). *Bollettino della Società Entomologica Italiana, Genova* 76(7–8): 49–56.
 1972. Studi sui crostacei anfipodi LXIX. Un nuovo genere di Lysianassidae del Golfo di Napoli

- e osservazioni su *Lysianella dellavallei* Stebbing. Memorie del Museo Civico di Storia Naturale di Verona 19: 103–112.
1987. Studi sui crostacei anfipodi. 103. Le specie Mediterranee di *Lysianassa* H. Milne Edwards, 1830 e descrizione del genere *Pardia* (Crustacea Amphipoda Lysianassidae). Monitore Zoologico Italiano N.S. Supplemento 22(5): 31–57.
- SARS, G. O.
1882. Oversigt af Norges Crustaceer med forelobige Bemaerkninger over de nye eller mindre bekjendte Arter, I: (Podophthalmata-Cumacea-Isopoda-Amphipoda). Forhandlinger i Videnskabs-Selskabet i Christiania 18: 1–124, pls. 1–6.
1890. An Account of the Crustacea of Norway, with Short Descriptions and Figures of all the Species. Vol. I. Amphipoda. Parts 1–3. Alb. Cammermeyer, Christiana. Pp. 1–68, pls. 1–24.
1891. An Account of the Crustacea of Norway, with Short Descriptions and Figures of all the Species. Vol. I. Amphipoda. Parts 4–9. Alb. Cammermeyer, Christiana. Pp. 69–212, pls. 25–72.
1895. An Account of the Crustacea of Norway, with Short Descriptions and Figures of all the Species. Vol. I. Amphipoda. Parts 31, 32, Appendix. Alb. Cammermeyer, Christiana. Pp. 673–711, supplementary pls. 1–8.
- SCHELLENBERG, A.
1926. Die Gammariden der deutschen Südpolar-Expedition 1901–1903. Deutsche Südpolar-Expedition, Zoology 10, 18: 235–414.
1928. *Stephensenia haematopus* n. g. n. sp., eine grabende Lysianasside. Zoologischer Anzeiger 79: 285–289.
1931. Gammariden und Caprelliden des Magellangebietes, Suedgeorgiens und der Westantarktis. Further Zoological Results of the Swedish Antarctic Expedition 1901–1903 2(6): 1–290, pl. 1.
1936. Zwei neue Amphipoden des Stillen Ozeans und zwei Berichtigungen. Zoologischer Anzeiger 116(6): 153–156.
1953. Ergänzungen zur Amphipodenfauna Südwest-Afrikas nebst Bemerkungen über Bru-traumbildung. Mitteilungen aus dem Zoologischen Museum in Berlin 29: 107–126.
1955. Amphipoda. Reports of the Swedish Deep-Sea Expedition, II, Zoology, 14: 181–195.
- SHOEMAKER, C. R.
1916. Descriptions of three new species of amphipods from southern California. Proceedings of the Biological Society of Washington 29: 157–160.
1921. Report on the amphipods collected by the Barbados-Antigua Expedition from the University of Iowa in 1918. University of Iowa Studies in Natural History 9(5): 99–102.
- 1933a. Two new genera and six new species of Amphipoda from Tortugas. Papers from Tortugas Laboratory of the Carnegie Institution of Washington 28 (Publ. 435): 245–256.
- 1933b. Amphipoda from Florida and the West Indies. American Museum Novitates 598: 1–24.
1934. Three new amphipods. Reports on the collections obtained by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep. Smithsonian Miscellaneous Collections 91(2): 1–6.
1935. The amphipods of Porto Rico and the Virgin Islands. Scientific Survey of Porto Rico and the Virgin Islands (New York Academy of Sciences) 15: 229–253.
1942. Amphipod crustaceans collected on the Presidential Cruise of 1938. Smithsonian Miscellaneous Collections 101(11): 1–52.

1945. The Amphipoda of the Bermuda Oceanographic Expeditions, 1929–1931. *Zoologica, Scientific Contributions of the New York Zoological Society* 30(4): 185–266.
1948. The Amphipoda of the Smithsonian-Roebling Expedition to Cuba in 1937. *Smithsonian Miscellaneous Collections* 110(3): 1–15.
1956. Notes on the amphipods *Eurythenes gryllus* (Lichtenstein) and *Katius obesus* Chevreux. *Proceedings of the Biological Society of Washington* 69: 177–178.

SPRINGER, S., and H. R. BULLIS.

1956. Collections by the *Oregon* in the Gulf of Mexico. List of crustaceans, mollusks, and fishes identified from collections made by the exploratory fishing vessel *Oregon* in the Gulf of Mexico and adjacent seas 1950 through 1955. United States Department of the Interior, Special Scientific Report: Fisheries 196: 1–134.

STASEK, C. R.

1958. A new species of *Allogaussia* (Amphipoda, Lysianassidae) found living within the gastrovascular cavity of the sea-anemone *Acanthopleura elegantissima*. *Journal of the Washington Academy of Sciences* 48(4): 119–126.

STEBBING, T. R. R.

1888. Report on the Amphipoda collected by H.M.S. Challenger during the years 1873–1876. Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–76, *Zoology*, 29: 1–1737, pls. 1–210.
1897. Amphipoda from the Copenhagen Museum and other sources. *Transactions of the Linnean Society, London, Series 2, Zoology*, 7: 25–45.
1899. Revision of Amphipoda (continued). *Annals and Magazine of Natural History, Series 7*, 4: 205–211.
1906. Amphipoda. I. Gammaridea. *Das Tierreich* 21: 1–806.
1910. Scientific results of the trawling expedition of H.M.C.S. “Thetis.” Crustacea. Part V. Amphipoda. *Memoirs of the Australian Museum* 4: 565–658, pls. 47–60.
1918. Some Crustacea of Natal. *Annals of the Durban Museum* 2: 47–75, pls. 8–12.

STEPHENSEN, K.

1915. Isopoda, Tanaidacea, Cumacea, Amphipoda (excl. Hyperiidia). Report on the Danish Oceanographical Expeditions 1908–10 to the Mediterranean and Adjacent Seas 2, *Biology*, D 1: 1–53.
1923. Crustacea Malacostraca, V: (Amphipoda, I). *Danish Ingolf-Expedition* 3(8): 1–100.
1925. Crustacea Malacostraca, VI: (Amphipoda, II). *Danish Ingolf-Expedition* 3(9): 101–178.
1927. Papers from Dr. Th. Mortensen’s Pacific Expedition 1914–16. XL. Crustacea from the Auckland and Campbell Islands. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjöbenhavn* 83: 289–390.
- 1933a. Zoologische Ergebnisse einer Reise nach Bonaire, Curaçao und Aruba im Jahre 1930. No. 8. Fresh- and brackish-water Amphipoda from Bonaire, Curaçao and Aruba. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie un Geographie der Tiere* 64(3/5): 415–436.
- 1933b. Zoologische Ergebnisse einer Reise nach Bonaire, Curaçao und Aruba im Jahre 1930. No. 9. Amphipoda from the marine salines of Bonaire and Curaçao. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie un Geographie der Tiere* 64(3/5): 437–446.
1948. Amphipods from Curaçao, Bonaire, Aruba and Margarita. *Studies on the Fauna of Curaçao, Aruba, Bonaire and the Venezuelan Islands* 3(11): 1–20.

- STEPIEN, C. A., and R. C. BRUSCA
 1985. Nocturnal attacks on nearshore fishes in southern California by crustacean zooplankton. *Marine Ecology–Progress Series* 25: 91–105.
- STONER, A. W.
 1979. Species-specific predation on amphipod Crustacea by the pinfish *Lagodon rhomboides*: mediation by macrophyte standing crop. *Marine Biology* 55: 201–207.
 1980a. The role of seagrass biomass in the organization of benthic macrofaunal assemblages. *Bulletin of Marine Science* 30(3): 537–551.
 1980b. Abundance, reproductive seasonality and habitat preferences of amphipod crustaceans in seagrass meadows of Apalachee Bay, Florida. *Contributions in Marine Science* 23: 63–77.
- STOUT, V. R.
 1913. Studies in Laguna Amphipoda. II. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie un Geographie der Tiere* 34: 633–659.
- STRETCH, J. J.
 1985. Quantitative sampling of demersal zooplankton: reentry and airlift dredge sample comparisons. *Journal of Experimental Marine Biology and Ecology* 91: 125–136.
- STROOBANTS, G.
 1976. Description nouvelle d'*Aroui setosus* Chevreux 1910 (Crustacea Amphipoda) et comparaison de l'évolution morphologique des *Aroui setosus* et *Scopelocheirus hopei*. *Bollettino del Musco Civico di Storia Naturale, Verona* 3: 239–268.
- TATTERSALL, W. M.
 1906. The marine fauna of the coast of Ireland. Part VIII. Pelagic Amphipoda of the Irish Atlantic slope. *Scientific Investigations of the Fisheries Branch, Department of Agriculture and Technical Instruction for Ireland* 1905(4): 3–39, pls. 1–5.
- VADER, W.
 1970a. The amphipod, *Aristias neglectus* Hansen, found in association with Brachiopoda. *Sarsia* 43: 13–14.
 1970b. Amphipods associated with the sea anemone, *Bolocera tuediae*, in western Norway. *Sarsia* 43: 87–98.
 1978. Associations between amphipods and echinoderms. *Astarte* 11: 123–134.
 1984a. Notes on Norwegian marine Amphipoda. 7. Amphipod associates of *Geodia* sponges in western Norway. *Fauna Norvegica, Series A*, 5: 14–16.
 1984b. Notes on Norwegian marine Amphipoda. 8. Amphipods found in association with sponges and tunicates. *Fauna Norvegica, Series A*, 5: 16–21.
 1984c. Associations between amphipods (Crustacea: Amphipoda) and sea anemones (Anthozoa: Actinaria). *Memoirs of the Australian Museum* 18: 141–153.
- WALKER, A. O.
 1904. Report on the Amphipoda collected by professor Herdman, at Ceylon, in 1902. *Ceylon Pearl Oyster Fisheries–1904–Supplementary Reports* 17: 229–300, pls. 1–8.
- WATLING, L.
 1979. Zoogeographic affinities of northeastern North American gammaridean Amphipoda. *Bulletin of the Biological Society of Washington* 3(1979): 256–282.

1989. A classification system for crustacean setae based on the homology concept. Pp. 15–27 in B. E. Felgenhauer, L. Watling, and A. B. Thistle, eds. *Functional Morphology of Feeding and Grooming in Crustacea*. Crustacean Issues 6, Balkema, Rotterdam.
- WATLING, L., and D. MAURER
 1972. Marine shallow water amphipods of the Delaware Bay area, U.S.A. *Crustaceana*, Supplement 3: 251–266.
- WILLIAMS, A. B., and K. H. BYNUM
 1972. A ten-year study of meroplankton in North Carolina estuaries: amphipods. *Chesapeake Science* 13(3): 175–192.
- WOLFF, T.
 1979. Macrofaunal utilization of plant remains in the deep sea. *Sarsia* 64: 117–136.

NOTE ADDED IN PROOF

Bellan-Santini (1997) described several new species from deep water off Barbados. Included are four new lysianassoid taxa: *Orenoqueia serrata* n. g., n. sp.; *Stephonyx carinatus* n. sp.; *S. incertus* n. sp.; and *Tryphosella uristei* n. sp.

When compiling the lists of species from the Gulf of Mexico and adjacent areas, we overlooked the publication of Bellan-Santini (1990). This paper records *Orchomene stocki* n. sp. from deep water off Barbados.

The addition of these five species brings to 49 the number of lysianassoid amphipod species known from the western North Atlantic Ocean south of Cape Hatteras.

BELLAN-SANTINI, D.

1990. Nouvelle espèce d'*Orchomene* s.l. (Crustacea-Amphipoda) des fonds abyssaux. Affinities avec les autres *Orchomene* profonds. *Beaufortia* 41: 15–23.
1997. Amphipods of the cold seep community on the south Barbados accretionary prism. *Crustaceana* 70(1): 1–30.

APPENDIX I

Monthly catches at each benthic Hourglass station of those species collected on five or more occasions during the Hourglass sampling program. Subscript 1 = regular (night) cruises, subscript 2 = post (day) cruises, and subscript sp. = supplementary (45-ft trawl) cruises.

<i>Concarnes concavus</i>																																				
STA	1965					1966										1967										TOT										
	A	S	O	N	D	J	F	M	A	M	J	J	Jsp	A	S	O	N	D	J	Jsp	F	M	A	M	J		J	A	S	O	N					
A																																				
B ₁																																				
B ₂																																				
C ₁																			3						1											
C ₂										1													1													
D ₁										1											6	1	5	3	1		4	11	8	2						
D ₂										7											2	2	1	2	3	2	3	3	2							
E									2																											
I										1																										
J																																				
K																																				
L																																				
M																																				
TOT									2	9	2	2							5	27	6	19	15	6	1	10	11	7	23	10	13	37	23	18	32	278

<i>Dissiminassa homosassa</i>																																		
STA	1965					1966										1967										TOT								
	A	S	O	N	D	J	F	M	A	M	J	J	Jsp	A	S	O	N	D	J	Jsp	F	M	A	M	J		J	A	S	O	N			
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TOT									1	1									2	1	3	2	2	1	1	3					1			18

<i>Lysianopsis ozona</i>																																			
STA	1965					1966										1967										TOT									
	A	S	O	N	D	J	F	M	A	M	J	J	Jsp	A	S	O	N	D	J	Jsp	F	M	A	M	J		J	A	S	O	N				
A																																			
B ₁																																			
B ₂																																			
C ₁																																			
C ₂																																			
D ₁																																			
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E																																			
I																																			
J																																			
K																																			
L																																			
M																																			
TOT										1									1																9

<i>Shoemakerella cubensis</i>																																
STA	1965					1966										1967								TOT								
	A	S	O	N	D	J	F	M	A	M	J	J	Jsp	A	S	O	N	D	J	Jsp	F	M	A		M	J	J	A	S	O	N	
A																																
B ₁																							1	1		1	1			25	29	
B ₂																							1	1		1			2	5		
C ₁														3										1				7	6	17		
C ₂																			1				5				1		2	9		
D ₁																																
D ₂																																
E																																
I																							1			1	1			3	6	
J																														6		
K																										5	1			6		
L																	1										3			4		
M																																
TOT														3			1		1						8	3	6	7	9	6	32	76



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