Zootaxa 1269: 1–29 (2006)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)
1269

Revision of *Bowmaniella* sensu Băcescu, 1968 (Crustacea: Mysida: Mysidae: Gastrosaccinae): a taxonomic conundrum

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Accepted by N. Bruce: 19 Jun 2006; published: 24 Jul. 2006

Abstract

There is confusion regarding the taxonomy, systematics, and distribution of species within the burrowing mysid genus *Bowmaniella* Băcescu, 1968. We have critically reviewed and examined the subgenera and the 15 nominal species currently assigned to *Bowmaniella sensu* Băcescu. Type material of eight of the 15 nominal species was examined and *in vivo* observations were made on two nominal species of the '*dissimilis* group'. It was determined that in the ultimate (terminal form) and penultimate (subterminal form) males, the morphology of the third pleopods is distinctly different, a factor which has led to taxonomic confusion and the descriptions of several invalid species. Because Băcescu (1968) did not designate a type species for *Bowmaniella* or for the subgenus *Coifmanniella,* both taxa are *nomina nuda*. Our studies, especially those involving the development of the male third pleopod, also indicate that nine of the nominal species previously assigned to *Bowmaniella* Bacescu, 1968 are junior synonyms. We formally designate two new genera, *Bowmaniella* **n. g.** and *Coifmanniella* **n. g.**, to accommodate the species previously listed under *Bowmaniella* and its subgenera as perceived by Băcescu (1968). We retain the use of Bacescu's original generic and subgeneric names, but with each having distinctly different diagnoses to those originally proposed by Băcescu. *Bowmaniella* **n. g.** is diagnosed to receive *B. dissimilis* (type species) and *B. banneri*. *Coifmanniella* **n. g.** contains four species, *C. johnsoni* (type species), *C. mexicana, C. merjonesi,* and *C. parageia.* Lectotypes are designated for *Bowmaniella dissimilis, B. banneri, Coifmanniella mexicana* and *C. merjonesi* and a neotype is designated for *C. johnsoni*. Illustrated keys are given for the seven "burrowing" genera presently assigned to the Gastrosaccinae and for the species currently assigned to the American genera *Bowmaniella* and *Coifmanniella.*

Key words: Mysida, Mysidae, Gastrosaccinae, *Bowmaniella*, *Coifmanniella*, revision, new genera, taxonomy

Introduction

Over the past 25 years, we have collected and examined numerous specimens of *Bowmaniella* Băcescu, 1968 representing 11 of 15 nominal species. The members of the genus *Bowmaniella* are burrowing species of moderate size (8–12 mm TL) with a distribution limited to the Atlantic and Pacific coasts of the Americas. Our observations are based on material from the Bahamas, Brazil, Caribbean, Gulf of Mexico, US eastern seaboard, and from the eastern Pacific coasts of California and Costa Rica. We also conducted *in vivo* studies on specimens within the '*dissimilis* group' that were designed to determine what effect the development of male third pleopod might have on the taxonomy and systematics of the genus *Bowmaniella sensu* Băcescu (1968). The following taxonomic and systematic revision of the genus *Bowmaniella* is a result of these observations and our critical review of the literature.

Historical review

Norman (1892) erected the subfamily Gastrosaccinae to accommodate the genera *Gastrosaccus* Norman,1868 and *Anchialus* Sars, 1876 (=*Anchialina* Norman & Scott, 1906). Băcescu (1968) split the genus *Gastrosaccus* into three genera: *Gastrosaccus*, known from the warm waters of the western Pacific, Indian Ocean, Mediterranean, and eastern Atlantic (Băcescu 1968); *Iiella* Băcescu, 1968, confined to the tropical and temperate western Pacific (Takahashi & Kawaguchi 1997, Jo *et al*. 1998, Băcescu 1968), and *Bowmaniella* Băcescu, 1968, restricted to the temperate and tropical waters of the Americas. Băcescu (1968) transferred three nominal species of *Gastrosaccus* (*G. dissimilis* Coifmann, 1937; *G. johnsoni* Tattersall, 1937; *G. mexicanus* Tattersall, 1951) previously described from American waters to the new genus *Bowmaniella* and described three additional new western Atlantic species (*B. brasiliensis*, *B. merjonesi* and *B. portoricensis*). He further proposed a new species, *B. banneri*, based on the description and illustrations for *Archaeomysis maculata* of Tattersall (1932, 1951) [not *Archaeomysis (=Callomysis) maculata* (Holmes, 1894)], from the eastern Pacific waters of southern California (La Jolla), but failed to designate a type. Although Băcescu (1968) assigned a type species for *Iiella*, he did not designate one for *Bowmaniella*. He further divided *Bowmaniella* into the subgenera *Bowmaniella* and *Coifmanniella*, but again did not designate a type species for either taxon. When describing *B. bacescui*, *B. parageia* and *B. sewelli* from Bahamian waters, Brattegard (1970a) did not recognize Băcescu's two subgenera because of overlapping characters and other morphological inconsistencies. Brattegard divided *Bowmaniella* into three assemblages, the *dissimilis*, *mexicana*, and *johnsoni* ‘groups’, based primarily on the shape of the posterodorsal margin of the carapace (reflected or non-reflected), the morphology of third male pleopod, and the presence or absence of an articulate process on the posterodorsal margin of the fifth abdominal segment (see Fig. 1). During the 1970s Silva described three species, *B. atlantica* Silva, 1971 (=*Gastrosaccus brasiliensis sensu* Silva 1970), *B. recifensis* Silva, 1971, and *B. inarticulata* Silva, 1972. Holmquist (1975), based on Brattegard's (1970a) supplemental description and illustrations of *C. dissimilis* from southern Florida, designated this North American material as a new species, *B. floridana*. In the same report she redescribed *B. banneri* and, since Băcescu (1968) had failed to do so, designated an adult male from her Baja California material as a neotype for the species. Later, Holmquist (1982) indicated that she had erred in the designation for the neotype of *B. banneri*. She acknowledged that the type should have been chosen from the La Jolla specimens that Tattersall (1932, 1951) originally attributed to *Archaeomysis maculata*, and upon which Băcescu (1968) based his specific designation for *C. banneri*. The last member of the genus to be described, *B. gutzui* Ortiz, 1988, came from Cuban waters, bringing the total number of nominal species for the genus to 15.

Materials and methods

Specimens were collected in the Gulf of Mexico (Marco Island, Florida to Laguna Madre, Texas), the southeastern U.S. Atlantic coast (North Carolina to eastern Florida), Turks and Caicos Islands (Pine Cay), the Caribbean (Cayman Islands, Tobago, Costa Rica) and the Pacific coast of Costa Rica and are in the personal collections of the authors maintained in the Department of Coastal Sciences, University of Southern Mississippi (USM) or the Department of Biology, University of Tampa (UT). Type material and additional western Atlantic material from the collections of the National Museum of Natural History (USNM), American Museum of Natural History (AMNH), Muséum d'Histoire naturelle "Grigore Antipa", The Natural History Museum (NHM), Britain, Museo Zoologico de "La Specola," Italy (MZS) and Museu Nacional (MNB), Brazil were also examined during our investigation. Other abbreviations used include: ICZN for International Code of Zoological Nomenclature, TL for total length (i.e., tip of rostrum to tip of telson)

Living specimens of male *Bowmaniella (Coifmanniella) brasiliensis sensu* Băcescu (1968), a suspected penultimate stage within the '*dissimilis* group', were collected from Tampa Bay, Florida (FL) and Mississippi Sound (Horn Island), Mississippi (MS). Individual specimens were maintained at room temperature in small plastic containers or finger bowls containing seawater (20–32‰). Specimens were observed several times daily, until either moulting or death occurred. Water in the bowls was changed daily and newly hatched (less than six hours post hatching) *Artemia* sp. nauplii were added as a food source. After a successful or partial moult occurred, both the newly moulted specimen and its unattached (or still partially attached exuvia) were examined immediately with a compound microscope and preserved for further examination.

Results

Our studies revealed that species assigned to *Bowmaniella sensu* Băcescu (1968) have two morphologically distinct developmental stages of the male third pleopods. Referred to here as the penultimate (subterminal) and ultimate (terminal) forms, the former is structurally less complex than the latter (see Tables 1, 2; Fig. 2). The previously unreported existence of two distinct male forms has led to the erroneous designation of several invalid species. Respectively, Table 2 and Figure 2 list and illustrate some of the morphological characters that distinguish these two pleopod types. Based on our observations and examination of type material, we now consider that 9 of the 15 nominal species formally attributable to *Bowmaniella sensu* Băcescu (1968) are junior synonyms.

As pointed out by Brattegard (1971), there are inconsistencies with characters used by Băcescu (1968) in establishing the subgeneric designations, which made it impractical to use, especially now in light of the recognition of penultimate and ultimate forms of the males. As originally proposed by Băcescu (1968), the subgenus *Bowmaniella* contained two species, *B. (B.) johnsoni* and *B (B.) portoricensis* Băcescu, 1968, and the subgenus *Coifmanniella* contained *B.* (*C.*) *banneri*; *B.*(*C.)brasiliensis, B. (C.) dissimilis, B.* (*C.) merjonesi* and *B.* (*C.*) *mexicana*. In our revision we use the presence or absence of the articulated dorsal process on the fifth abdominal segment, the setation of the surface of the uropodal endopod, and the morphology of the male ultimate and penultimate third pleopod as the key generic characters to distinguish the two new genera.

TABLE 1. Species of *Bowmaniella* **n. g.** and *Coifmanniella* **n. g.** with synonyms, male stage originally described, and configuration of medial lobes of posterodorsal margin of carapace as indicated or depicted by earlier authors.

Species	Original male stage Described	Medial Lobes of Carapace
Bowmaniella Băcescu, 1968, **n.g**		
Bowmaniella dissimilis (Coifmann, 1937), type sp.	Penultimate	non-reflected
Synonyms:		
Bowmaniella floridana (Holmquist, 1975)	Ultimate	non-reflected
*Bowmaniella brasiliensis (*Băcescu, 1968)	Penultimate	non-reflected
Bowmaniella banneri (Băcescu, 1968)	Ultimate	non-reflected
Coifmanniela Băcescu, 1968, **n. g**		
Coifmanniella johnsoni (Tattersall, 1937), type sp.	Ultimate	non-reflected
Synonym:		
Bowmaniella bacescui Brattegard, 1970	Ultimate	non-reflected
Coifmanniella merjonesi (Băcescu, 1968)	Penultimate	reflected
Synonyms:		
Bowmaniella inarticulata Silva, 1971	Penultimate	reflected
Bowmaniella recifensis Silva, 1975	Ultimate	reflected
Coifmanniella mexicana (Tattersall, 1951)	Penultimate	reflected
Synonyms:		
Bowmaniella atlantica Silva, 1971	Ultimate	reflected
Bowmaniella gutzui Ortiz, 1988	Ultimate	reflected
Bowmaniella portoricensis Băcescu, 1968	Ultimate	reflected
Coifmanniella parageia (Brattegard, 1970)	Ultimate	reflected
Synonym:		
Bowmaneilla sewelli Brattegard, 1970	Penultimate	reflected

Based on Articles 66 and 69 of the1999 Fourth Edition of the International Code of Zoological Nomenclature (ICZN), we initially considered the possibility of emending the diagnoses for Bacescu's *Bowmaniella* and *Coifmanniella* with the elevation of the later to full generic rank. Because no type species were designated for *Bowmaniella sensu* Băcescu (1968) and its two subgenera *B.* (*Bowmaniella*) and *B.* (*Coifmanniella*), which were introduced informally in a dichotomous key to the species (Băcescu, 1968), we now choose to follow Article 13 of the ICZN and consider them *nomina nuda* This situation makes it necessary to designate two new genera to accommodate the species previously assigned to *Bowmaniella sensu* Băcescu, 1968. We chose to retain the use of B?cescu's original generic and subgeneric names, *Bowmaniella* and *Coifmanniella*, but with each having distinctly different diagnoses than those originally proposed.

TABLE 2. Terminology of structures for distal complex of male third pleopod for penultimate and ultimate forms of *Bowmaniella* **n. g.** and *Coifmanniella* **n. g.** Terminology follows Brattegard (1970a). (+ = presence, - = absence).

Structure	Penultimate Form	Ultimate Form
Bow	-	+ or -
apophysis	-	+ or -
Inner branch	+	+
inner stylet	+ or -	+
accessory lobe	+	+
distal lobe	+ (not striated)	+ (striated)
apophysis	+	-
Outer Branch	+	+
outer stylet	-	+
blade	+	+
apical spine	+	+
sub-apical spine	+	+
ventral process	+ or -	-

Taxonomy

Order Mysida Haworth, 1825

Family Mysidae Haworth, 1825

Subfamily Gastrosaccinae Norman, 1892

Genus *Bowmaniella,* n.g

Archaeomysis.—Tattersall, 1932, 1951: 86 (in part, not *Archaeomysis* Czerniavsky, 1882).

Gastrosaccus.—Tattersall, 1951: 89 (in part, not *Gastrosaccus* Norman, 1868).
Bowmaniella Băcescu, 1968: 356. (*nomen nudum*).
Bowmaniella (*Coifmanniella*) Băcescu, 1968: 356 (in part) (*nomen nudum*).

Diagnosis. Carapace with posterodorsal margin having mid-dorsal lobe convex and adjacent medial lobes quadrate not attenuated or reflected anteriorly (Fig. 8 F). Abdominal segment 5 with articulated process present on posterodorsal margin. Third male pleopod highly modified; terminal male without bow (Figs. 2D), or if bow present (Fig. 6D, E), lacking apophysis; penultimate male lacking ventral process on outer branch, inner stylet present on inner branch (Figs. 2C, 6C). Uropodal endopod lacking small spiniform-setae immediately distal to statocyst (Fig. 5A, B). Telson cleft shallow, less than 15% of telson length (Fig. 4A, B).

Type species. *Gastrosaccus dissimilis* Coifmann, 1937, here designated.

Other species. *Bowmaniella banneri* (Băcescu, 1968).

Etymology. The genus was named in honour of the late Thomas Bowman, Senior Curator of the Division of Crustacea, National Museum of Natural History, The Smithsonian Institution.

Remarks. As now defined *Bowmaniella* **n. g.** contains two species, the type *B. dissimilis* (Coifmann, 1937) from the western Atlantic, and its eastern Pacific cognate, *B. banneri* (Băcescu, 1968). *Bowmaniella* is characterized by: (1) an articulated, posterodorsal process on the fifth abdominal segment (see Fig. 1); (2) the ultimate or terminal male form with third pleopod lacking a bow, or if bow present, lacking apophysis; (3) the penultimate male form with third pleopod lacking ventral process on outer branch and having an inner stylet present on inner branch; (4) lacking small spiniform-setae posterior to the uropodal statocyst; and (5) the posterodorsal margin of carapace having mid-dorsal lobe convex with adjacent medial lobes quadrate, not attenuated or reflected anteriorly. Based on examination of type material and the literature, two of the four nominal species attributable to *Bowmaniella* **n. g.** are synonyms. The status of these synonymies is discussed in the remarks section for the type species.

***Bowmaniella dissimilis* (Coifmann, 1937)**

(Figs. 1, 2C–D, 4A, 5A, 6A–B, 8F)

Gastrosaccus dissimilis Coifmann, 1937: 5, figs. 2–3; Tattersall, 1951: 97, fig. 29; Costa, 1964: 4, pl. 1, figs. 1–4; Hopkins, 1965: 88; 1966: 29 (table); Odum & Heald, 1972: 682; Christmas & Langley, 1973: 274, 308.
Bowmaniella(*Coifmanniella*) *dissimilis*.—Băcescu, 1968: 357 (key), 363, fig. 4; Brattegard, 1970a:

9,11, fig. 2; Williams, 1972: 255; Dexter, 1974: 57 (table); Livingston *et al.*, 1977: 83; Cooley, 1978: 25.

Bowmaniella cf. *dissimilis*.—Brattegard, 1974a: 51.

Bowmaniella (*Coifmanniella*) *brasiliensis* Băcescu, 1968: 357 (key), 363, figs. 5a–d, 6; Conte & Parker, 1971: 73; Almeida Prado, 1973: 409; Brattegard, 1974b: 91; Price, 1978: 173; Stuck *et al.*, 1979a: 226 (key), 2d, 3d, 4c, 5d, 7; 1979b: 244; Price, 1982: 13, fig. 4; Heard, 1982: 32; Modlin, 1982: 46 (**new synonymy**).

Bowmaniella floridana Holmquist, 1975: 68; Stuck *et al.*, 1979a: 227, fig. 2c, 3c, 4d, 5c, 6; Stuck *et al.*, 1979b: 244; Heard, 1982: 32; Modlin, 1982: 46; Price, 1982: 14, figs. 2, 3; Escobar-Briones & Soto, 1988: 640; Rakocinski *et al*., 1991: 693(table); Rakocinski *et al*., 1993: 88 (figure), 1996: 339 (**new synonymy**).

Material examined

Type material: *Lectotype*, 1 ♂, MZS 2740, off Brazil, 15°S, 38°W, 31 July 1882.—*Paralectotypes*:, 3 ♀, 1 ♂, 2 juveniles, MZS 2741, same data as lectotype.

Other material: **North America.—**3 ♂, UT, Savannah Beach, Georgia, 20 July 1974, coll. J. Ogle, beam trawl.—10 ♂, 10 ♀, UT, Little Tybee, Savannah, Georgia 10 June 1991, coll. R. Heard and D. Roccatagliata, sandy beach, swash zone.—1 ♂, 3 ♀, UT, Cape Coral Bridge, Caloosahatchee River, Florida, 11 July 1982, coll. W. Price, sand, depth 1 m.—6 ♂, 15 ♀, UT, Picnic Island, Tampa Bay, Florida, 26 Sept 1976, coll. W. Price, sand, depth 1 m.—8 ♂, Davis Bayou, Mississippi, mud.—12 ♂, USM, Belle Fontaine Beach, Mississippi, silty sand.—2 ♂, USM, Dauphin Island, Alabama.—1 ♂, USNM 82434, beach near Calcasieu Pass, Louisiana, sta. 18, 18 Nov 1906, coll. W. H. Spaulding.—5 ♂, 19 ♀, UT, BB-3-TL, Baffin Bay, Texas, 2 Dec 1970, otter trawl.—2 ♂, 1 ♀, UT, Six Mile Road, Galveston Island, Dec 1971, coll. W. Price, sand, depth 1 m.—4 ♀, UT, Galveston Island, east end, Dec 1971, coll. W. Price, sand beach depth 1 m.—7 ♂, 10 ♀, UT, Tuxpan, Veracruz, Mexico, 21° 00'N, 97°21'W, 24 May 1973, coll. W. Price, sand beach, depth 1 m. **Central America.—**1 ♂, 10 ♀, UT, Montzanillo, Costa Rica, 17 Nov 1999, coll. R. Heard, sand beach, depth 1 m.—7 ♂, 10 ♀, UT, sta 1, Puerto Vargas, Costa Rica, 18 Nov 1999, coll. R. Heard. **South America** 10 ♂, 17 ♀, UT, sta 4, Bloody Bay, Tobago, 4 Apr 1992, coll. R. Heard.—2 ♂, 3 ♀, MNB 9734, Lage de Santos, Brazil, 18 May 1961, coll. Plinio Soares, MNC.

Diagnosis. Abdominal somite 5 with articulated posterodorsal process (Fig.1). Exopod of male pleopod 3 of ultimate form lacking bow, inner branch with inner stylet short and robust, reaching less than one-half length of distal article (Fig. 2 D; Fig. 6 B). Uropodal endopod lacking small spiniform setae distal to statocyst (Fig. 5A).

Type locality. Coast of Brazil (15°S, 38°W).

Distribution. Western Atlantic: temperate, subtropical and tropical shallow coastal waters along the mainland or near shore islands from Delaware Bay, USA, southward to just south of Rio de Janeiro, Brazil (Brattegard 1970a).

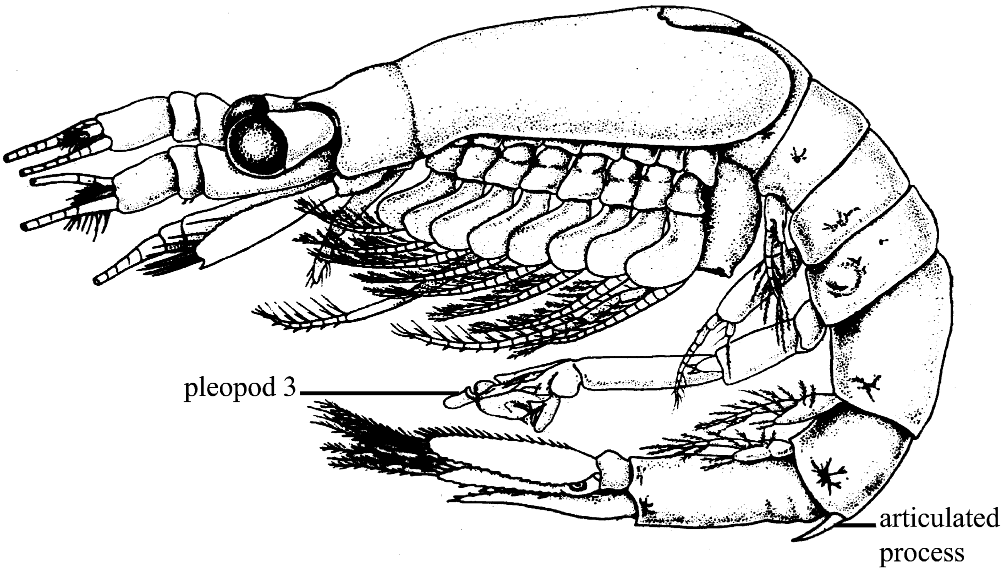

FIGURE 1. *Bowmaniella dissimilis* (Coifmann, 1937), lateral view of the penultimate male (from Băcescu 1968).

Remarks. *Bowmaniella dissimilis* was originally described from Brazilian waters by Coifmann (1937) as *Gastrosaccus dissimilis*. Although not entirely accurate, her drawing of the third male pleopod appears to represent the penultimate male form. Through the kindness of Dr. Gianna Innocenti of the Museo Zoologico de "La Specola", Florence, Italy, we were able to examine Coifmann's type material for which no holotype was designated. The lot that we examined contained seven specimens, one adult male (with one of the third pleopods removed), one subadult male, three females, and two desiccated juveniles. The latter two badly damaged specimens apparently were not included in Coifmann's five syntypes, and they agree in both sex and stage of development with those we examined. Because the adult male appears to be the specimen upon which Coifmann based her description, we have chosen it as the lectotype (MZS Cat. No. 2740) for *B. dissimilis*, and have separated the specimens from Coifmann's four remaining paralectotypes (i.e. MZS Cat. No. MZS 2741).

Tattersall (1951) considered that another Brazilian mysid *Chlamydopleon aculeatum* Ortman, 1893, belonged to the genus *Gastrosaccus* and believed that it was conspecific with *G. dissimilis;* however, because the description and illustration of *C. aculeatum* were so incomplete and its type apparently lost, he did not choose to formally synonymize the two species.

The taxonomic status of *Bowmaniella dissimilis* has been a problem for years, since Coifmann's (1937) original description and illustrations are not clear. Her drawing of the third male pleopod appears to be based on a penultimate male; the illustration is too incomplete for accurate comparison to *Bowmaniella floridana sensu* Holmquist (1975), Stuck *et al.* (1979a), or Price (1982). In his supplemental description of Florida specimens identified as *B. dissimilis,* Brattegard (1970a) stated that the inner stylet on the third pleopod of the terminal male stage was absent. Holmquist (1975), based in part on the apparent absence of a 'bow' (*sensu* Stuck *et al*. 1979a & Price 1982; = inner stylet *sensu* Brattegard 1970a) designated a new species, *B. floridana*. Stuck *et al.* (1979b) and Price (1982) examined specimens of *B. dissimilis* from the southeastern United States, including southern Florida, and all of the terminal males examined had inner stylets on the third pleopods. Brattegard (personal communication**,** 1979) reexamined his Florida specimens of *B. dissimilis* and observed the presence of the inner stylet *sensu* Holmquist (1975) thus confirming the invalidation of *B. floridana*.

Prior to 1975 most records for the genus *Bowmaniella* from estuarine and beach habitats along the southeastern United States were referred to *B. dissimilis*. *Bowmaniella brasiliensis* and *B. floridana* were reported to co-occur in the shallow coastal waters of the Gulf of Mexico by Stuck *et al*. (1979a, b) and Price (1982). These authors illustrated the distinctively modified copulatory structures on the third pleopods of the males of both species (see Fig. 2C, D), but they were unable to reliably differentiate the females and subadult males of these two species. Notwithstanding the differences in the third pleopods, the morphology, pigmentation pattern, and microhabitat for *B. brasiliensis* and *B. floridana* are the same in the populations they examined from the northern Gulf of Mexico.

Based on these factors, we postulated that the third male pleopod of *Bowmaniella. floridana*, the larger and more complex of the two species, represents the ultimate or terminal stage of development and that the male of *B. brasiliensis* is the penultimate or subterminal stage of the same species.

To test this hypothesis, we isolated single living males of *Bowmaniella brasiliensis* collected from shallow-water habitats at Horn Island, MS and Tampa Bay, FL in small bowls containing sea water. When these specimens moulted, the newly moulted specimen and its exuvia were examined. Based on 15 different observations, all of the '*brasiliensis*' male forms moulted into the '*floridana'* male form confirming the synonymy of the two species.

We have examined large numbers *Bowmaniella dissimilis* from North Atlantic waters, including a terminal male form, from near the type locality in the State of Rio de Janeiro, Brazil. We have also studied an excellent series of specimens attributable to *B. dissimilis* from Tobago, off the northeastern coast of South America. As a result of these studies and Brattegard's reexamination of his Florida specimens (Brattegard, personal communication 1979), we now consider that *B. brasiliensis* and *B floridana* are junior synonyms of *B. dissimili*s. Notwithstanding, we currently consider *B. dissimilis* to be the only species of the genus in the northwestern Atlantic. It is known from the shallow waters of the east coasts of the Americas from Delaware, USA to southern Brazil. We did notice that the individuals from some populations (e.g. southeastern Costa Rica) were distinctively larger than those from other regions, but we tentatively consider these differences ecophenotypic or a sampling artifact (e.g. time of year collected). There still remains, however, the possibility of morphologically similar cryptic species occurring within the broad range attributed to *B. dissimilis.* Comparative DNA studies on northern and southern, or isolated populations (e.g. Tobago) of *B. dissimilis* would be needed to refute or support this possibility.

Bowmaniella banneri **(Băcescu, 1968)**

(Figs. 4B, 5B, 6C–E)

Archaeomysis maculata Tattersall, 1932: 304, figs.1–13; 1951: 86, figs. 23–24 [not *Archaeomysis* (=*Callomysis*) *maculata* (Holmes, 1894)].
Archaeomysis sp. Banner, 1948: 370; Ii, 1964: 220.
Bowmaniella (*Coifmanniella*) *banneri* Băcescu, 1968: 356 (key); Holmquist, 1975: 63, figs. 6–8, 1982: 477, fig. 3.
Bowmaniella sp A, B, C, Dexter, 1974: 59 (table).

Material examined. 4 ♂, 5 ♀, USNM 98173, San Felipe, Baja California, Mexico, 24 Feb 1955, coll. R. H. Linsley, low tide.—1 ♂, 4 ♀, UT, Caldera, Bahia de Caldera, Costa Rica, 28 April 1998, coll. R. W. Heard and R. Vargas beach, depth 1–1.5 m.—2 ♀, UT, Islas de Murcielago NE end of San Jose Island (just east of shallow pass between Catalina and San Jose Islands), Costa Rica, 8 May 1999, coll. R. W. Heard, Jorge Cortes and Rita Vargus, sand substratum, depth 6–7 m.—3 ♂, 5 ♀, USNM uncatalogued, acc. no. 295277, Boca de Barranca, Puentarenas, Costa Rica, 9°58'N, 84°45'W, coll. D. Dexter, volcanic sand substratum.—6 ♂, 6 ♀, USNM uncatalogued (acc. no. 295277), Jáco, Playa de Jáco, Costa Rica, 9°37'N, 84°38' W, 27 Mar 1971, coll. D. Dexter, volcanic sand substratum.—8 ♀, USNM uncatalogued (acc. no. 295277), Playa Cocal, Quepos, Costa Rica, 9°26'N, 84°10'W, 27 Feb 1971, volcanic sand substratum.

Diagnosis. Abdominal somite 5 with articulated posterodorsal process (as in Fig. 1). Exopod of male pleopod 3 of ultimate form with bow, inner branch with inner stylet fairly slender, reaching more than one-half length of distal article (Fig. 6D, E) Uropodal endopod lacking small spiniform setae distal to statocyst (Fig. 5B).

Type locality. La Jolla, California.

Distribution. Eastern Pacific Ocean, temperate, subtropical and tropical shallow coastal waters along the mainland from Solana Beach, California (Holmquist 1982), to near Quepos, Costa Rica (9° 26'N, 84° 10'W) (Dexter 1974).

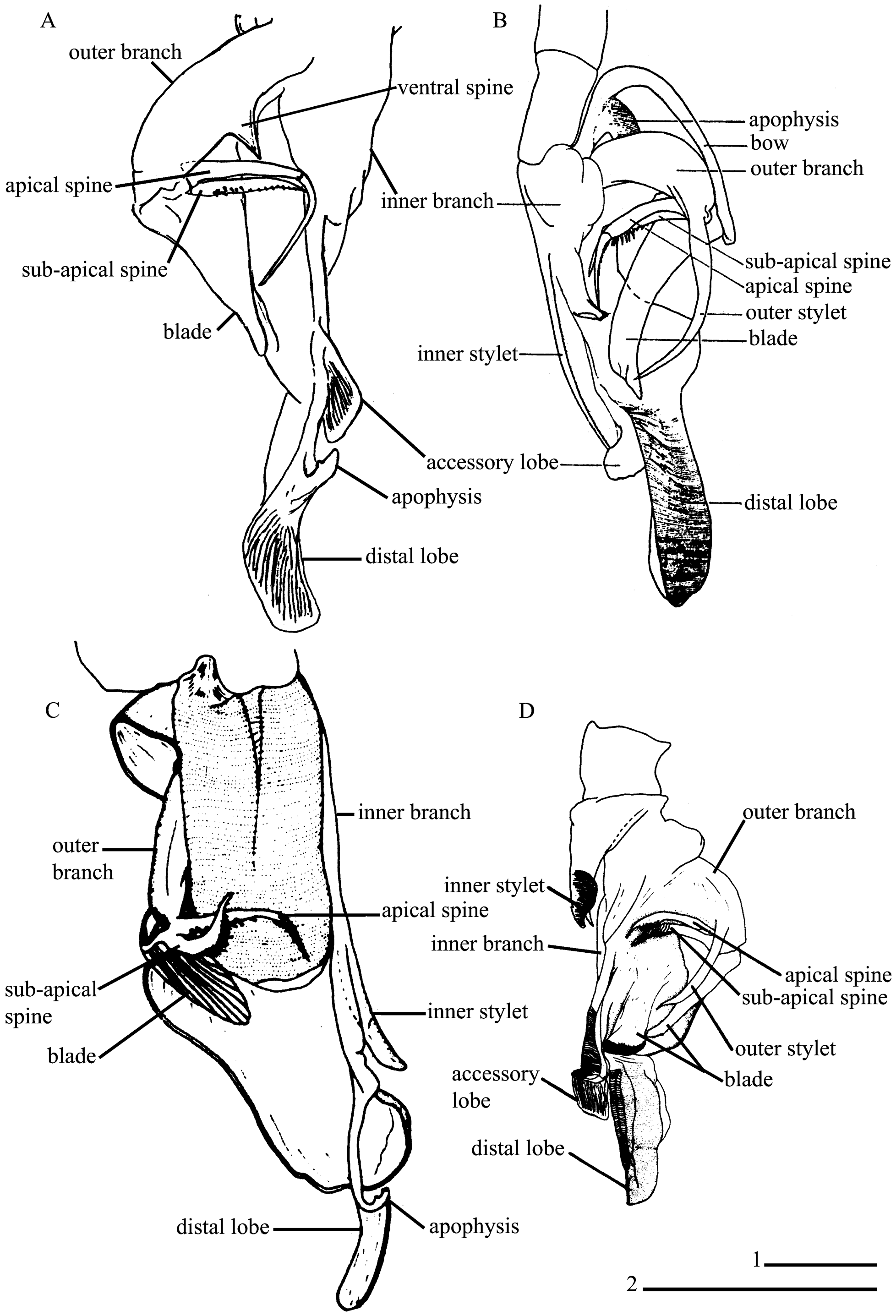

FIGURE 2. Tip of male pleopod 3. *Coifmanniella johnsoni* (Tattersall, 1937): A, penultimate form; B, ultimate form (from Brattegard 1970a). *Bowmaniella dissimilis* (Coifmann, 1937): C, penultimate form (from Stuck *et al.* 1979a); D, ultimate form (from Stuck *et al.* 1979a). Scale 1 = 0.1 mm for A; scale 2 = 0.5 mm for D, 1.0 mm for B,C.

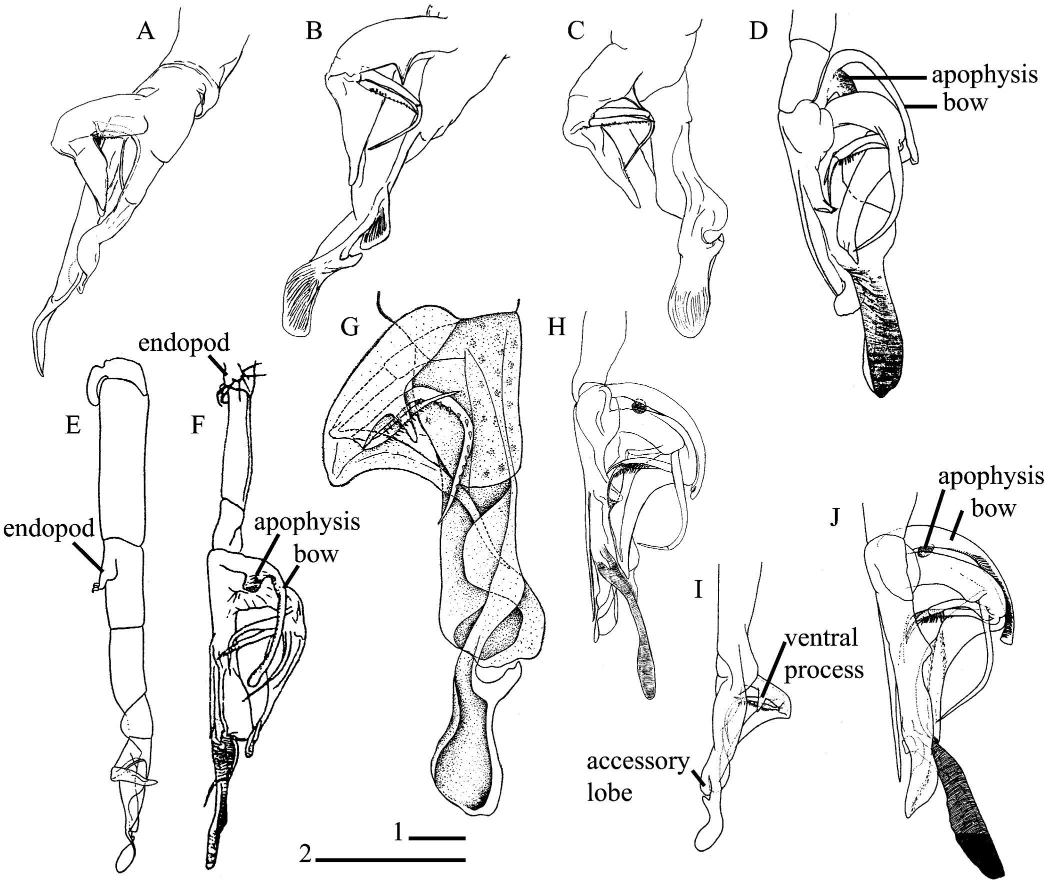

FIGURE 3. Male pleopod 3. *Coifmanniella johnsoni* (Tattersall, 1937): A–C, penultimate form, various aspects; D, ultimate form (after Brattegard 1970a).—*Coifmanniella mexicana* (Tattersall, 1951), entire pleopod: E, penultimate form (after Tattersall 1951); F, ultimate form (after Ortiz 1988).—*Coifmanniella merjonesi* (Băcescu, 1968): G, penultimate form (from Băcescu 1968); H, ultimate form.—*Coifmanniella parageia* (Brattegard, 1970): I, penultimate (after Brattegard 1970a); J, ultimate form (after Brattegard 1970a). Scale 1 = 0.1 mm for A, B, C, G; scale 2 = 0.5 mm for D, H, I, J (Scales for E & F, unavailable).

Remarks. Based on Tattersall's specimens and illustrations, Băcescu (1968) proposed a new name, *Bowmaniella banneri* for '*Archaeomysis maculata*' *sensu* Tattersall [1932, 1951; not *Archaeomysis (=Callomysis) maculata* (Holmes, 1894)] from the eastern Pacific waters of southern California (La Jolla), but failed to designate a type. Holmquist (1975) designated a neotype, based on material from Baja California, apparently unaware that Tattersall's (1932) material was deposited in NHM. Later Holmquist (1982) acknowledged that her neotype designation had no standing and that a lectotype should be selected from Tattersall's syntypic material.

Tattersall's (1932) specimens from La Jolla were deposited in the NHM and are considered the syntypes since they represent the series upon which Băcescu (1968) designated the specific name *Bowmaniella (Coifmanniella) banneri.* Dr. Roger Bamber (NHM) kindly located these specimens from Haul 1789 and facilitated the loan of this material to us for study. We have selected and separated a subadult male, which we now formally designate as a lectotype (NHM.1964:1:21:523) for *B. banneri* (Băcescu, 1968). In addition, the following paralectotypes were chosen: one damaged mature female (NHM.1964:1:21:524) from Haul 1789 and one ovigerous female (NHM.1964:1:21:525) from Haul 432. An illustration of the third pleopod of the penultimate male form (Fig. 6C) is included since it has not been described and is generally similar to that of *B. dissimilis*.

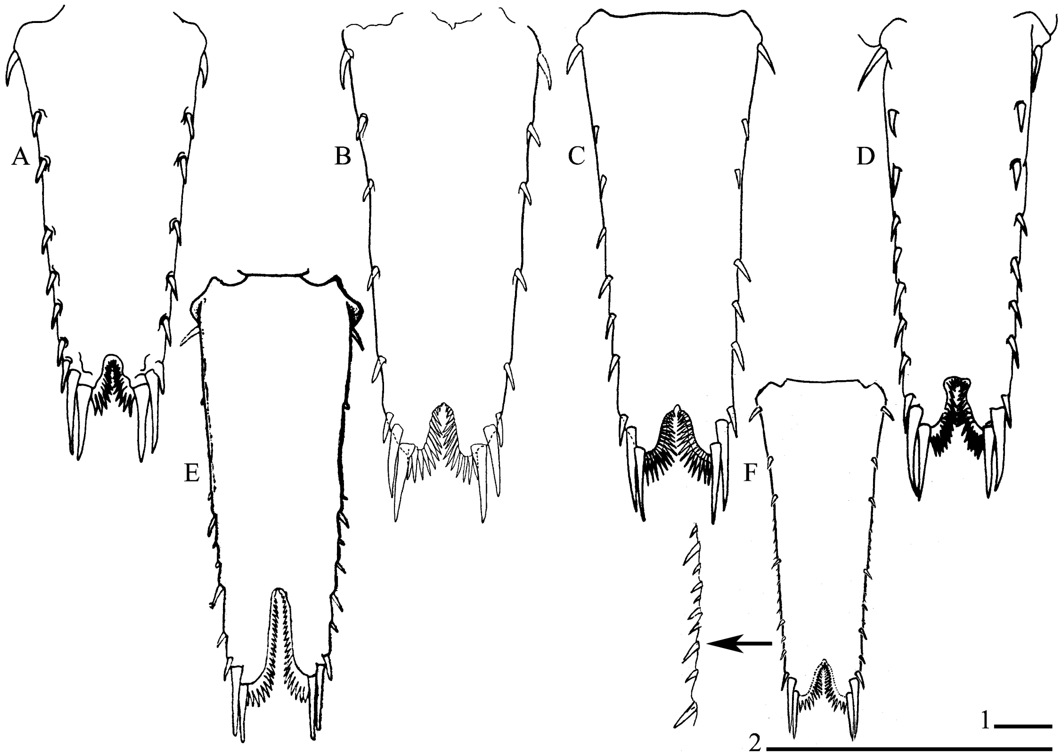

FIGURE 4. Telsons. A, *Bowmaniella dissimilis* (Coifmann, 1937) (after Stuck *et al.* 1979a); B. *Bowmaniella banneri* Băcescu, 1968 (after Holmquist 1975); C, *Coifmanniella johnsoni* (Tattersall, 1937) (after Tattersall 1937); D, *Coifmanniella mexicana* (Tattersall, 1951) (after Stuck *et al.* 1979a); E, *Coifmanniella merjonesi* (Băcescu, 1968) (after Băcescu, 1968); F, *Coifmanniella parageia(* Brattegard, 1970) (after Brattegard 1970a) with enlargement of lateral margin showing setation. Scale 1 = 0.2 mm for B; scale 2 = 0.8 mm for A, C–E; 1.0 mm for F.

Genus *Coifmanniella,* n. g.

Bowmaniella (*Bowmaniella*) Băcescu, 1968: 356 (in part) (*nomen nudum*).
Bowmaniella (*Coifmaniella*) Băcescu, 1968: 356 (in part) (*nomen nudum*).

Diagnosis. Carapace with posterodorsal margin having mid-dorsal lobe concave posteriorly and adjacent medial lobes attenuated, reflected anterodorsally (Fig. 8G) or non-reflected (Fig. 8F). Male third pleopod complex; terminal male having bow with an associated apophysis, penultimate male having ventral process on outer branch, lacking inner stylet on inner branch (Fig. 2A, B). Abdominal segment 5 with posterodorsal margin lacking articulated process. Uropodal endopod with series of small spiniform setae distal to statocyst. Telson cleft variable, depth from 10 to more than 40% of total telson length.

Type species. *Gastrosaccus johnsoni* Tattersall, 1937, here designated.

Other species. *C. merjonesi* Băcescu, 1968; *C. mexicana* Tattersall, 1951; *C. parageia* Brattegard, 1970.

Etymology. The genus is named in honour of Isabella Coifmann, in recognition of her pioneering contribution to the knowledge of Brazilian Mysida.

Remarks. *Coifmanniella* **n. g.** is immediately distinguished from the genus *Bowmaniella* **n. g.** by lacking an articulated process on the posterodorsal margin of the fifth abdominal segment. *Coifmannella* further differs from *Bowmaniella* by: (1) having a bow with an associated apophysis on the terminal male third pleopod; (2) the penultimate male having a ventral process on outer branch and lacking an inner stylet on inner branch; and (3) the presence of small spiniform-setae distal to the uropodal statocyst.

Inconsistencies and confusion in some the characters used by Băcescu (1968) to distinguish the nominal subgenera of *Bowmaniella* and *Coifmanniella* led Brattegard (1970a) and Holmquist (1982) to not recognize their validity. Based on the recognition of the distinct differences in the penultimate and ultimate male stages (e.g. development and complexity of the third male pleopod), and in the setation patterns of the uropodal endopod, we have a better understanding of the taxonomy and systematics of *Coifmanniella* **n. g.** as diagnosed in this report. This information leads us to synonymise seven of 11 nominal species now attributable to *Coifmanniella*. The following four species are now recognized.

Coifmanniella johnsoni (Tattersall, 1937)
(Figs. 2A, B, 3A–D, 4C, 5C)

Gastrosaccus johnsoni Tattersall, 1937: 9, figs. 5–7, 1951: 93, figs. 26–28.
Bowmaniella (*Bowmaniella*) *johnsoni*.– Băcescu, 1968: 356 (key), figs. 2f, 3c; Brattegard, 1975: 109; Price *et al*., 2002: 41, fig. 4F; Price & Heard, 2004: 150, fig. 3E.
Bowmaniella bacescui Brattegard, 1970a: 9 (Tables 7, 8), 20, fig. 5, 1974b: 91; 1975: 109; Modlin, 1984: 281 (**new synonymy**).

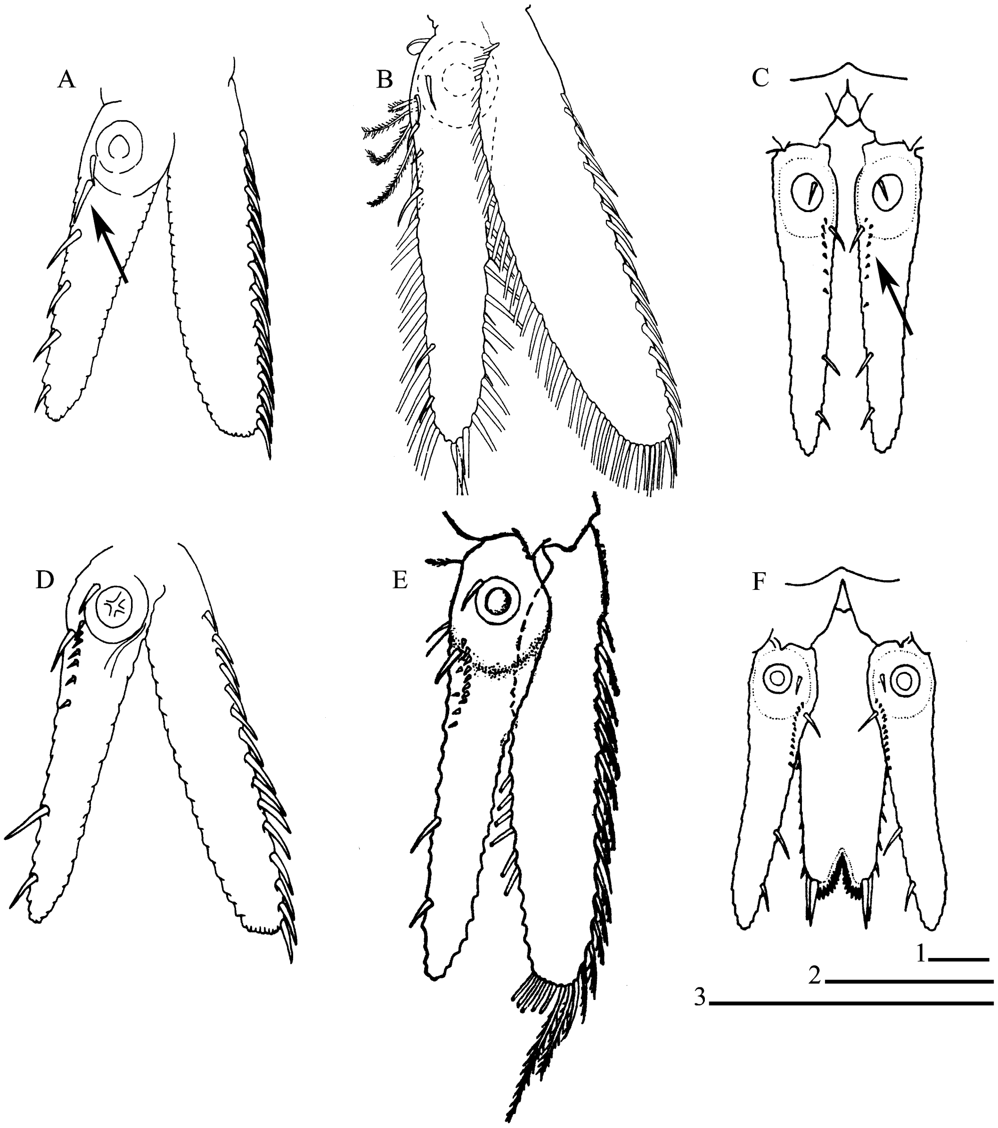

FIGURE 5. Uropods. A, *Bowmaniella dissimilis* (Coifmann, 1937) (after Stuck *et al.* 1979a); B. *Bowmaniella banneri* (Băcescu, 1968) (after Holmquist 1975); C, *Coifmanniella johnsoni* (Tattersall, 1937) (after Brattegard 1970a); D, *Coifmanniella mexicana* (Tattersall, 1951) (after Stuck *et al.* 1979a); E, *Coifmanniella merjonesi* (Băcescu, 1968) (after Băcescu 1968); F, *Coifmanniella parageia* (Brattegard, 1970) (after Brattegard 1970a). Scale 1 = 0.2 mm for B; scale 2 = 0.4 mm for E; 0.7 mm for A, D; scale 3 = 1.0 mm for C, F.

Material examined

***Type material*:** *Neotype*, 1 ♂, (here designated), USNM 1019270, east of Puerto Rico, 18°32'18"N, 65°46'12"W, Johnson-Smithsonian Expedition, serial no. 358A, 23 Feb 1933.

Other material: 6 ♂, 5 ♀, USNM 82847, east of Puerto Rico, 18°32'18"N, 65°46'12"W, Johnson-Smithsonian Expedition, serial no. 358A, 23 Feb 1933.—3 ♂, 14 ♀

USNM 81109, Luis Pena channel, Puerto Rico, Johnson-Smithsonian Expedition serial no. 407B, 25 Feb 1933, surface.—2 ♂, 4 ♀, USNM 8110, Brewers Bay, St. Thomas, Virgin Islands, Johnson-Smithsonian Expedition, 1 Mar 1933, surface.—10 ♂, 5 ♀, USNM 86030, Icocos Bay, Puerto Rico, Johnson-Smithsonian Expedition, sta 387B, 24 Feb 1933, circular net at anchorage.—2 ♂, AMNH 13613 (paratypes of *Bowmaniella bacescui*), off Port Nelson, Rum Cay, Bahamas, 22 Mar 1968, coll. T. Brattegard, sand and *Thalassia* substratum, depth 3–5 m.—75 ♂, 52 ♀, UT, South Hole Sound, Little Cayman Island, 19 May 1995, coll. W.W. Price, R. W. Heard, J.T. Harris and C.M.R. McCoy, night plankton, 1–2 m.—8 ♂, 3 ♀, UT, Rum Point, Grand Cayman Island, 1 Sept 1996, coll. R.W. Heard, sand.—10 ♂, 7 ♀, UT, North beach, Pine Cay, Turks and Caicos Islands, 30 Nov 1988, coll. R. Heard, sand depth 1–1.5 m.

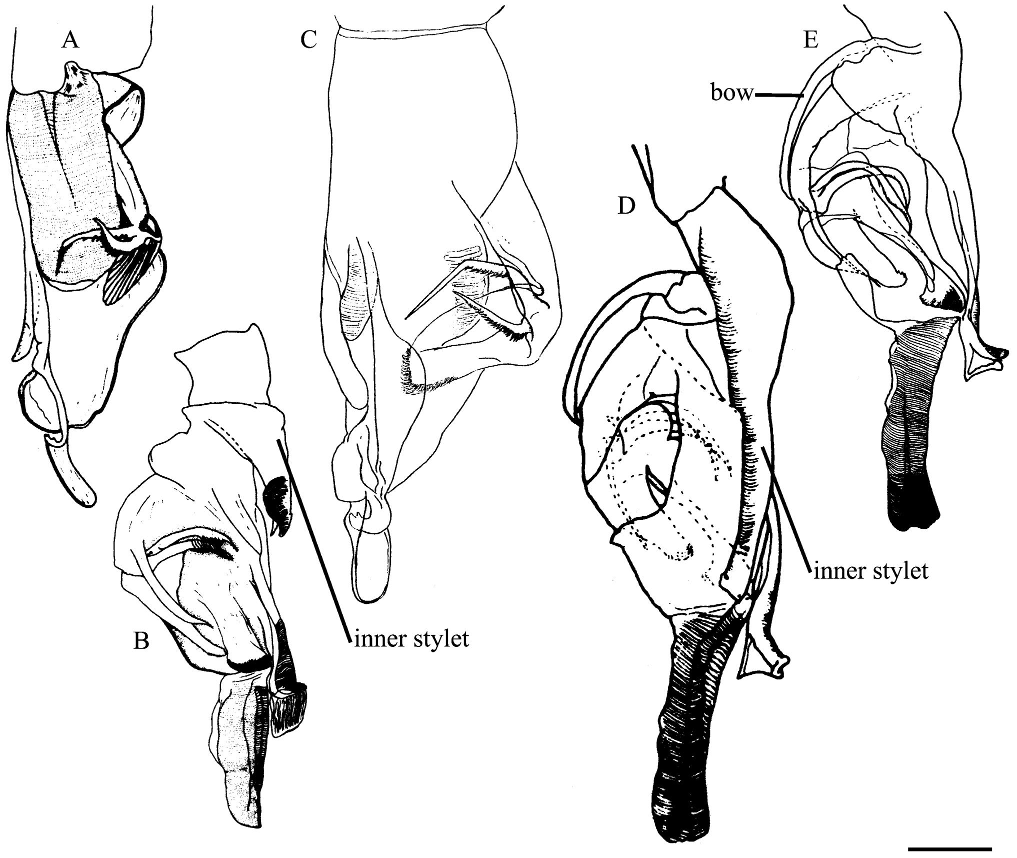

FIGURE 6. Tip of male pleopod 3. *Bowmaniella dissimilis* (Coifmann, 1937): A, penultimate form (from Stuck *et al.* 1979a); B, ultimate form (from Stuck *et al.* 1979a).—*Bowmaniella banneri* (Băcescu, 1968): C, penultimate form; D, E, ultimate form, lateral and medial aspects, respectively (from Holmquist 1975). Scale = 0.2 mm.

Diagnosis. Posterodorsal margin of carapace not reflected anterodorsally (as in Fig. 8 F). Abdominal somite 5 lacking articulated posterodorsal process. Uropodal endopod with 4 large spiniform setae extending from region of statocyst to distal end, row of 5–9 small spiniform setae distal to statocyst. Lateral margins of uropodal exopod armed with rows of 13–15 spiniform setae. Telsonic cleft shallow, less than 1/7 length of telson, armed with 28–32 spinules; lateral margins of telson armed with rows of 6–12 subequal spiniform setae (Fig. 4C).

Type locality. Puerto Rico.

Distribution. Gulf of Mexico (Modlin 1984); Bahamas (Brattegard 1970a); Caribbean Sea (Brattegard 1970a, 1974b, Price & Heard 2004).

Remarks. The type (USNM 72868) and type lot of *Gastrosaccus johnsoni* could not be located and is considered lost (Geoff Keel, personal communication 2004). We examined a large non-type series from the National Museum of Natural History that contained a mixture of *Coifmanniella johnsoni* and *C. merjonesi* including both penultimate and ultimate male forms of both species. This material came from near the type locality for *C. johnsoni* and was collected on the same cruise as the original type series (see Tattersall 1937). Because the type series has been lost and the material we examined was collected on the same expedition near the type locality, we have chosen and separated out an ultimate male specimen as a neotype (USNM 1019270) for *C. johnsoni*. The neotype, which is diagnosed above, came from a non-type lot (USNM 82847), which contained a mixture of *C. johnsoni* and *C. merjonesi*. In our view this further necessitated the selection and separation of a neotype for *C. johnsoni*. .

Examination of male paratypes of *Bowmaniella bacescui* revealed that they represent the ultimate form of *Coifmanniella. johnsoni*. Since the third pleopod of the penultimate male form, which is very similar to that of *C. parageia* (=*C. sewelli*), has not been described, we have included its illustration (Fig. 3 A–C). Of the four species of *Coifmanniella*, *C. johnsoni* is the only one having a non-reflected posterodorsal margin of the carapace.

Coifmanniella mexicana (Tattersall, 1951)

(Figs. 3E, F, 4D, 5D)

Gastrosaccus mexicanus Tattersall, 1951: 98, fig. 30.
Bowmaniella (*Coifmanniella*) *mexicana*.– Băcescu, 1968: 356 (key).
Bowmaniella mexicana.– Brattegard, 1970a: 9, Tables 7, 8.
Bowmaniella (*Bowmaniella*) *atlantica* Silva, 1971: 159 (=*Gastrosaccus brasiliensis sensu* Silva, 1970: 35, fig. 1) (**new synonymy**).
Bowmaniella portoricensis Băcescu, 1968: 357, figs.1, 2a–e, 3a–b; Brattegard, 1970a: 9, Tables 7–8; Wigley & Burns, 1971: 721–722 (map); Stuck *et al*., 1979a: 227, figs. 2b, 3b, 4b, 5b; 1979b: 244 (**new synonymy**).
Bowmaniella gutzui Ortiz, 1988: 4, fig. 1 (**new synonymy**).

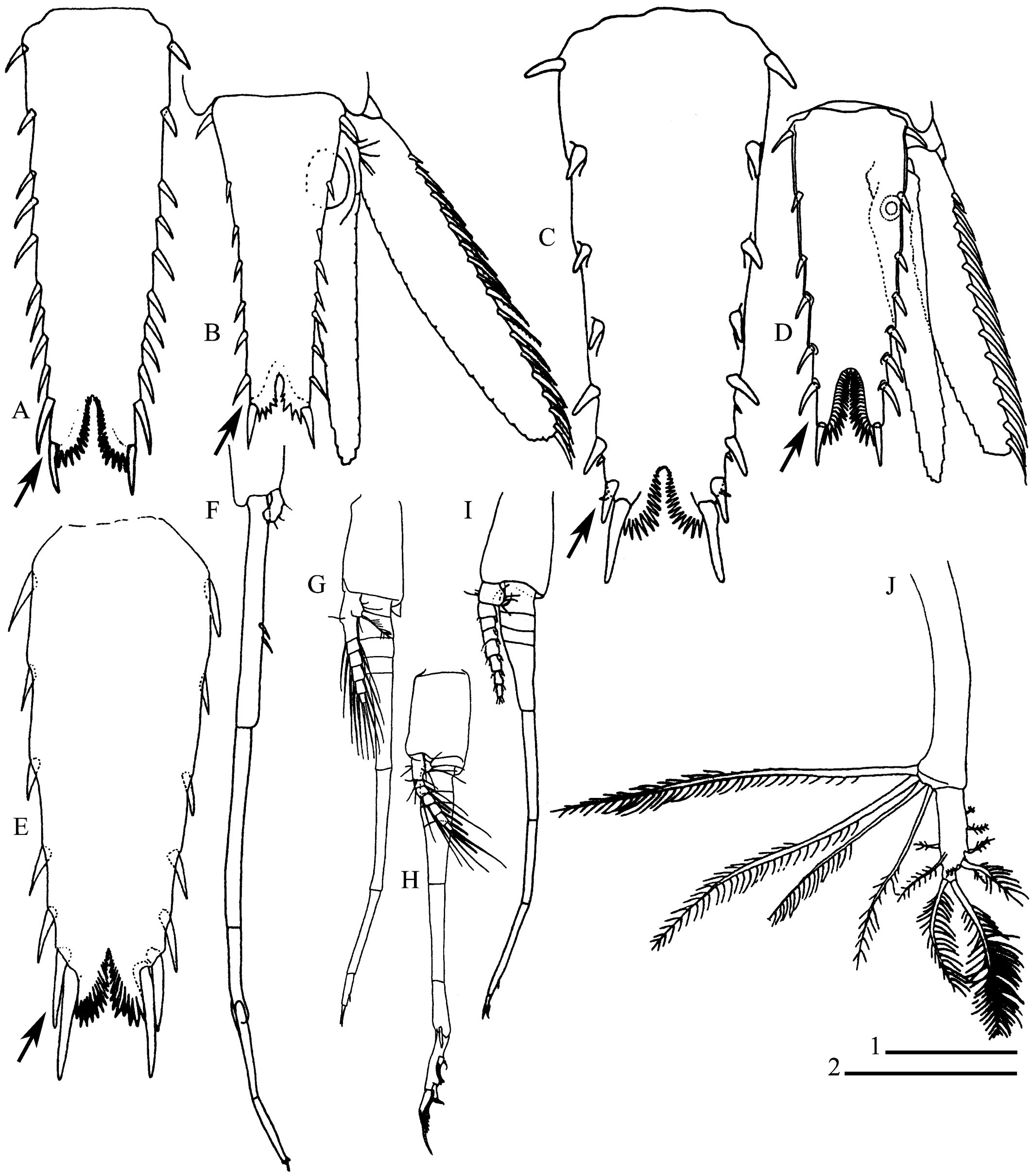

FIGURE 7. *Haplostylus similis* Panampunnayil, 1997: A, telson (from Panampunnayil 1997).—*Iiella iriomotensis* Fukuoka & Murano, 1997: B, telson and uropods (from Fukuoka & Murano 1997).—*Gastrosaccus madagascariensis* Wooldridge, Mees, & Webb, 1997: C, telson (from Wooldridge *et al.* 1997).—*Eurobowmaniella simulans* (Tattersall, 1915) (= *E. phuketensis* Murano, 1995) [see Murano, 1996], D, telson and uropods (from Murano 1995).—*Archaeomysis kokuboi* (Hanamura, 1997): E, telson (from Hanamura 1997).—*Hapostylus uthupus* Panampunnayil, 1997: F, male pleopod 3.—*Gastrosaccus trilobatus* Murano & McLachlan, 1998: G, male pleopod 3.—*Eurobowmaniella simulans* (Tattersall, 1915): H, male pleopod 3 (from Murano 1995).—*Iiella iriomotensis* Fukuoka & Murano, 1997: I, male pleopod 3 (from Fukuoka & Murano 1997).—*Iiella iriomotensis* Fukuoka & Murano, 1997: J, female pleopod 1 (from Fukuoka & Murano 1997). Scale 1 = 0.2 mm for C, J; 0.5 mm for E–I; scale 2 = 0.5 mm for A, B, D.

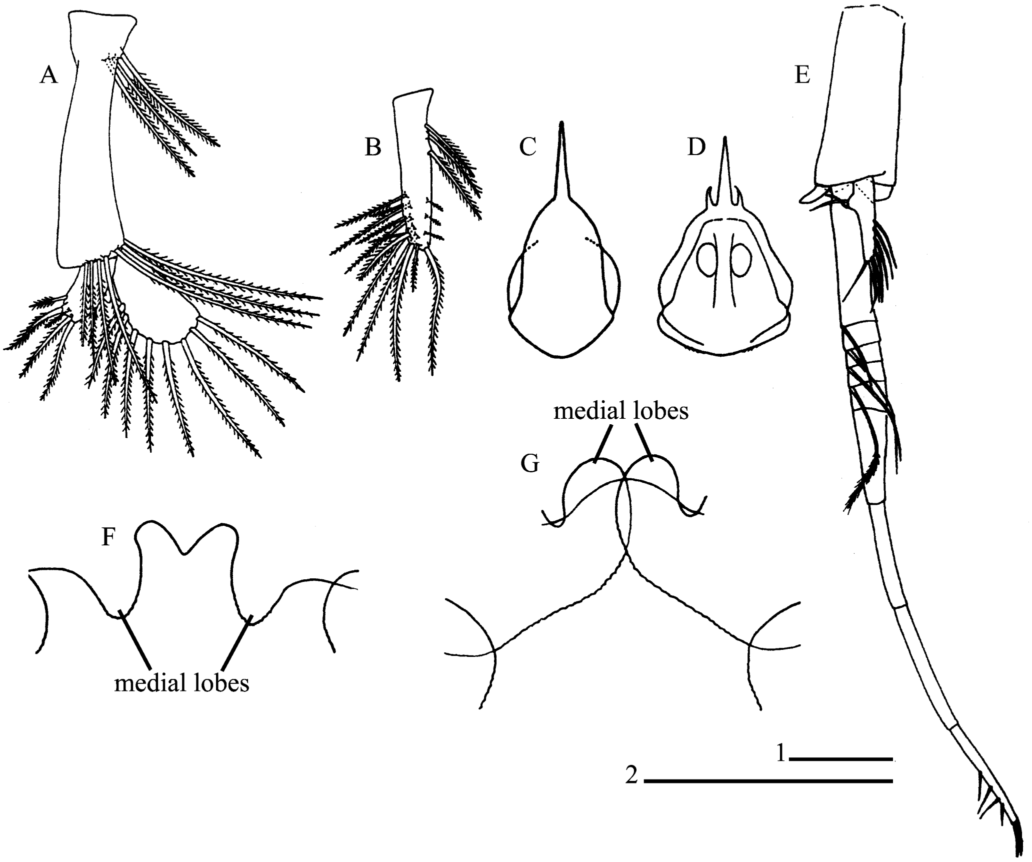

FIGURE 8. *Gastrosaccus madagascariensis* Wooldridge, Mees, & Webb, 1997: A, female pleopod 1; B, female pleopod 2 (from Wooldridge *et al.* 1997).—*Gastrosaccus trilobatus* Murano & McLachlan, 1998: C, labrum (from Murano & McLachlan 1998).—*Eurobowmaniella simulans* (Tattersall, 1915): D, labrum (from Murano 1995).–*Archaeomysis ochotensis* Hanamura, 1997: E, male pleopod 3.—*Bowmaniella dissimilis* (Coifmann, 1937): F, posterior margin of carapace showing non-reflected medial lobes (from Brattegard 1970a).—*Coifmanniella parageia* (Brattegard, 1970): G, posterior margin of carapace showing reflected medial lobes (from Brattegard 1970a) Scale 1 = 0.25 mm for A, B; 0.5 mm for E; scale 2 = 0.25 mm for D; 0.5mm for C, F, G.

Material examined

Type material: *Lectotype*, ♂, (here designated), USNM 81257, off Cape San Blas, Florida, 7 Mar 1885, surface.—*Paralectotypes*, 16 immature males, 16 females, USNM 1078333, same data as lectotype.

Other material: 1 ♂ Museum d'Histoire naturelle "Grigore Antipa", Coll. of Crustacea, No. 96 (holotype of *Bowmaniella portoricensis*), platform off Beaufort, North Carolina, 34°20'5"N, 75°57'5"W, 6 April 1965, depth 80 m.—7 ♂, 10 ♀, UT, PF375a, SE Gulf of Mexico, 26°9'N, 82°12'W, 15 Nov 1968, coll. R.F. Presley, oblique plankton tow, 9.1 m to surface.—6 ♂, 7 ♀, UT, PF 592a, NE Gulf of Mexico, 28°50'N, 84°20'W, 8 July

1969, coll. R.F. Presley, oblique plankton tow, 16.8 m to surface.—1 ♂, USM, BLM 2640E , NE Gulf of Mexico, 29°43.5'N, 87°54.5'W, July 1976, box core.—2 ♂, 2 ♀, USM, BLM 2103C, SE Gulf of Mexico, 26°25'N, 82°58'W, July 1976, box core. **Eastern Pacific:** 2 ♂, 1 ♀, NHM, 1964.1.21.1352, San Jose Island, Gulf of Panama, Panama, 27 Jan 1916, coll. T. Mortensen.

Diagnosis. Posterodorsal margin of carapace reflected anterodorsally (as in Fig. 8 G). Abdominal somite 5 lacking articulated posterodorsal process. Uropodal endopod with 5–8 small spiniform setae distal to statocyst (Fig. 5 D). Telson with lateral margins armed with rows of 4–12 subequal spiniform setae; telsonic cleft shallow, less than 1/5 length of telson (Fig. 4D).

Type locality. Cape San Blas, Gulf of Mexico, Florida.

Distribution. Off southeastern Atlantic coast—90 km north of Cape Hatteras, North Carolina to Fort Pierce, Florida (Wigley & Burns 1971; Băcescu 1968); eastern Gulf of Mexico (Tattersall 1951; Stuck *et al.* 1979 b); Cuba (Ortiz 1988); Baia de Sepetiba, Brazil (Silva 1971a); Pacific coast of Panama (Tattersall 1951).

Remarks. Tattersall reported a type lot (USNM 81257) of *Gastrosaccus mexicanus* composed of 'numerous specimens, mostly immature, but one adult male.' From the syntypes in this type lot, we have separated and here designate the mature male as the lectotype (which retains the original catalogue number, USNM 81257, under which it was published) for *Coifmanniella mexicana*. Tattersall (1951) reported *C. mexicana* from the Pacific coast of Panama. We were able to borrow this material from The Natural History Museum, but like Tattersall, were unable to clearly separate it from that of *C. mexicana* from the Gulf of Mexico and Caribbean. There are no other published records of *Coifmanniella*, as defined here, from the eastern Pacific.

Based on a review of the description and illustrations of *Bowmaniella atlantica* Silva, 1971 and *Bowmaniella gutzui* Ortiz, 1988 and the examination of the holotype of *B. portoricensis* Bacescu, 1968, we consider these three nominal species as junior synonyms of *Coifmanniella mexicana.*

***Coifmanniella merjonesi* (Băcescu, 1968)**
(Figs. 3 G, H, 4E, 5E)

Bowmaniella (*Coifmanniella*) *merjonesi* Băcescu, 1968: 356, figs. 7–9; Brattegard, 1970a: 9, tables 7–8.

Bowmaniella recifensis Silva, 1971: 185, figs. 1, 2 (**new synonymy**).

Bowmaniella inarticulata Silva, 1972: 161, fig. 1 (**new synonymy**).

Material examined

Type material: *Lectotype* ♂ (here designated), USNM 86030, Icocos Bay, Puerto Rico, Johnson-Smithsonian Expedition, Sta 387B, 24 Feb 1933, circular net at anchorage.—*Paralectotypes*, 41 ♂, 65 ♀, USNM 1014086, same data as lectotype.

Other material: 1 ♂, 1 ♀, USNM 81110, Brewers Bay, St. Thomas, Virgin Islands, Johnson-Smithsonian Expedition, 1 Mar 1933, surface.

Diagnosis. Posterodorsal margin of carapace reflected anterodorsally (as in Fig. 8 G). Abdominal somite 5 lacking articulated posterodorsal process. Uropodal endopod with 6–12 small spiniform setae distal to statocyst (Fig. 5E). Telson with lateral margins armed with rows of 9–16 subequal spiniform setae; telsonic cleft deep, approximately 1/3 or more length of telson (Fig. 4E).

Type locality. Icocos Bay, Puerto Rico.

Distribution. Puerto Rico (Băcescu 1968); Virgin Islands (present study); north Brazil (Silva 1971b, 1972).

Remarks. The deep telsonic cleft, which is a third or more the length of telson, distinguishes this species. Based on the descriptions and illustrations for the Brazilian species, *Bowmaniella inarticulata* Silva, 1972 and *B. recifensis* Silva, 1971b, these two species are consider to represent the penultimate and ultimate forms of *Coifmanniella merjonesi*. Pending study of the types of *B. inarticulata* and *B. recifensis*, which were unavailable for examination, we consider them as junior subjective synonyms of *C. merjonesi*.

When naming *Bowmaniella merjonesi*, Băcescu (1968) failed to designate a holotype; however, his description and illustration are for a penultimate male. From the 42 subadult, penultimate, and ultimate males available in the type series, we selected a penultimate male as the lectotype (USNM 86030) for *Coifmanniella merjonesi* because it represents the form described and illustrated in Băcescu's (1968) original description. For comparison the third pleopod for the ultimate male form is illustrated (Fig. 3H) since it was not figured or described by Băcescu (1968).

Coifmanniella parageia **(Brattegard, 1970)**

(Figs. 3I–J, 4F, 5F, 8G)

Bowmaniella parageia Brattegard, 1970a: 17, fig. 4, tables 7–8.
Bowmaniella sewelli Brattegard, 1970a: 14, fig. 3, tables 7–8, 1970b: 122, 1974a: 51, 1974b: 92, 1975: 110; Modlin, 1984: 280 (**new synonymy**).

Material examined. 40 ♂, AMNH 13609 (paratypes—*Bowmaniella sewelli*), Turtle Rocks, Bahamas, 9 May 1967, coll. T. Brattegard, night plankton.—8 ♂, AMNH 13611 (paratypes—*Bowmaniella parageia*), Turtle Rocks, Bahamas, 9 May 1967, coll. T. Brattegard, night plankton.

Diagnosis. Posterodorsal margin of carapace reflected anterodorsally (Fig. 8 G). Abdominal somite 5 lacking articulated posterodorsal process. Uropodal endopod with 7–16 small spiniform setae distal to statocyst (Fig. 5F). Telson with lateral margins armed with rows of 12–25 spiniform setae, 6–8 larger interrupted by smaller ones; telsonic cleft shallow, less than 1/5 length of telson (Fig. 4F).

Type locality. Near Long Island, Bahamas (22°55'10"N, 74°54'35"W).

Distribution. Gulf of Mexico (Modlin 1984), Bahamas, Florida Keys, southern and western Caribbean (Brattegard 1970 a, b; 1974 a, b).

Remarks. *Coifmanniella parageia* (Brattegard, 1970), which is the terminal form of *C. sewelli* Brattegard, 1970, is designated as the senior synonym since it represents the ultimate male stage for the species. It is interesting to note that most of the paratypes chosen by Brattegard (Brattegard, 1970) for both male forms of *C. parageia* and *C. sewelli* were taken from the same sample in the Bahamas.

Discussion

The burrowing genera *Archaeomysis* Czerniavsky, 1882, *Bowmaniella* Băcescu, 1968, *Coifmanniella* Băcescu, 1968, *Gastrosaccus* Norman, 1868, *Haplostylus* Kossman, 1880, *Iiella* Băcescu, 1968, and *Eurobowmaniella* Murano, 1995 are distinguished by having a greatly elongated exopod on the pleopod 3 of the male and the expansion of the pleura of the first abdominal segment on the female (Hanamura 1997), the latter character being an apparent adaptation to support and protect the marsupium during burrowing. The following key can be used to distinguish these seven burrowing genera.

Three genera, *Anchialina* Norman & Scott, 1906, *Pseudanchialina* Hansen, 1910 and *Paraanchialina* Hansen, 1910, which are currently assigned to the subfamily Gastrosaccinae, are primarily planktonic and not specifically adapted for burrowing. The males of these three species have relatively short third pleopods bearing numerous natatory plumose setae and the females lack the expanded pleura on the first abdominal segment. Using morphological evidence, Hanamura (1997) pointed out that the burrowing and non-burrowing genera represent two separate lineages. Remerie *et al.* (2004) corroborated these findings using molecular data and suggested that consideration be given to dividing the Gastrosaccinae into two subfamilies.

Based on recognition of two distinct forms of the male third pleopod for members of both *Bowmaniella* and *Coifmanniella*, developmental studies on the males of the other burrowing members of the Gastrosaccinae would be in order. Such studies would be especially applicable in habitats where males of two nominal congeneric species have been reported to co-occur. It would be useful to determine (based on examination of the third pleopod) whether or not the males of two distinct species are present, or if the two male forms represent developmental stages of the same species.

Key to the burrowing genera of the subfamily Gastrosaccinae and to the currently recognized species of *Bowmaniella,* n. g. and *Coifmanniella,* n. g.

1. Pairs of strong terminal spiniform-setae of telson usually not inserted closely to subterminal setae on either side; if close together, subterminal setae less than 2/3 length of terminal setae (Fig. 7A–E) 2
- Pairs of strong terminal and subterminal spiniform-setae of telson subequal (subterminal setae 2/3 or more length of terminal setae and inserted close together on either side (Fig. 4) 5
2. Endopod of male pleopod 3 small, uniarticulated (Fig. 7 F) .... *Haplostylus* Kossmann, 1880
- Endopod of male pleopod 3 multiarticulated (Fig. 7 G–I) 3
3. All pleopods of female uniramous (Fig. 7 J)................................ *Iiella* Băcescu, 1968
- Pleopod 1 of female biramous (Fig 8 A); pleopods 2–5 uniramous (Fig. 8B) 4
4. Male pleopod 3 with simple styliform exopod (Fig. 7 G); anterior margin of labrum with long median spine (Fig. 8 C).................................... *Gastrosaccus* Norman, 1868
- Male pleopod 3 with complex exopod (Fig. 7 H); anterior margin of labrum with long median spine and pair of shorter lateral spines (Fig. 8 D) ....*Eurobowmaniella* Murano, 1995
5. Male pleopod 3 simple, styliform; endopod uniarticulated or multiarticulated (Fig. 8 E) ....*Archaeomysis* Czerniavsky, 1882
- Male pleopod 3 complex, not styliform, endopod uniarticulated (Figs. 1, 2, 3, 6) 6
6. Abdominal somite 5 with articulated posterodorsal process (Fig. 1); no small-spiniform setae distal to statocyst on uropodal endopod (Fig. 5A, B) ....*Bowmaniella*, **n. g** 7
- Abdominal somite 5 without articulated postero-dorsal process; 2–16 small spiniform-setae distal to statocyst on uropodal endopod (Fig. 5C–F).......... *Coifmanniella*, **n. g.** 8
7. Exopod of male pleopod 3 of ultimate form with bow, inner branch with inner stylet fairly slender, reaching more than one-half length of distal article (Fig. 6D, E)) .... *B. banneri* (Băcescu, 1968)
- Exopod of male pleopod 3 of ultimate form lacking bow, inner branch with inner stylet short and robust, reaching less than one-half length of distal article (Fig. 2 D;

Fig. 6 B) .... *B. dissimilis* (Coifmann, 1937)

8. Telsonic cleft deep, approximately 1/3 or more length of telson (Fig. 4E); [posterodorsal margin of carapace reflected anterodorsally as in Fig. 8G] ....
   .... *C. merjonesi* (Băcescu, 1968)
- Telsonic cleft shallow, less than 1/5 length of telson (Fig. 4C, D, F) 9

9. Posterodorsal margin of carapace not reflected anterodorsally (as in Fig. 8 F) ....
   .... *C. johnsoni* (Tattersall, 1937)
- Posterodorsal margin of carapace reflected anterodorsally (Fig. 8 G) 10

10. Lateral margins of telson armed with rows of 4–12 subequal spiniform setae (Fig. 4 D)
    .... *C. mexicana* (Tattersall, 1951)
- Lateral margins of telson armed with rows of 16–22 spiniform setae, 6–8 larger interrupted by smaller ones (Fig. 4F) .... *C. parageia* (Brattegard, 1970)

Acknowledgments

We wish to thank Jana Thoma, Brent Thoma, and Micah Bakenhaster for their help in preparing the figures and Sara LeCroy, Jerry McLelland, David Knott, and Robin Overstreet for their constructive comments on the manuscript. During the preparation of this paper, several people have assisted with the loan of specimens and selection of type material. They include Jan Clarke-Walker, Geoff Keel, Karen Reed, Chad Walter (National Museum of Natural History); J. Cordeiro (American Museum of Natural History); Iorgu Petrescu (Muséum d'Histoire naturelle "Grigore Antipa"); Roger Bamber (The Natural History Museum, Great Britain); Gianna Innocenti (Museo Zoologico de "La Specola"), and Cristiana Serejo (Museu Nacional, Rio de Janeiro, Brazil). We are indebted to the following journals and publishers for permission to use illustrations for which they hold the copyright: *Gulf and Caribbean Research* (citation: Stuck *et al.* 1979a); Journal of Crustacean Biology (citation: Fukuoka and Murano 1997); *Travaux du Muséum d'Histoire naturelle "Grigore Antipa"* (citation: Băcescu 1968); Oxford University Press, representing *Journal of Plankton Research* (citation: Panampunnayil 1997); *Phuket Marine Biological Centre Research Bulletin* (citation: Murano 1995); Springer Science and Business Media, Kluwer Academic Publishers, representing *Hydrobiologia* (citation: Wooldridge *et al.* 1997); Taylor and Francis AS, representing *Sarsia* (www.tandf.no/sarsia) (citation: Brattegard 1970a); Taylor and Francis Ltd, representing *Journal of Natural History* (http://www.tandf.co.uk/journals) (citation: Hanamura 1997). We also thank the following authors for use of illustrations from their publications: Y. Hanamura, C. Holmquist, M. Ortiz, S. Panampunnayil and T. Wooldridge. We very much appreciate the thoughtful and constructive suggestions of associate editor Niel Bruce, and of the two anonymous reviewers, and take full responsibility for any of the suggested changes that we chose not to address.

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