

# RANGE EXTENSIONS AND REVIEW OF THE CAPRELLID AMPHIPODS (CRUSTACEA: AMPHIPODA: CAPRELLIDAE) FROM THE SHALLOW, COASTAL WATERS FROM THE SUWANNEE RIVER, FLORIDA, TO PORT ARANSAS, TEXAS, WITH AN ILLUSTRATED KEY

**John M. Foster, Brent P. Thoma, and Richard W. Heard**

*The University of Southern Mississippi, Gulf Coast Research Laboratory, P.O. Box 7000, Ocean Springs, Mississippi 39566-7000, E-mail: beachbugs@comcast.net (JMF) brent.thoma@usm.edu (BPT) richard.heard@usm.edu (RWH)*

**ABSTRACT** Eight species of the amphipod family Caprellidae *sensu* Myers and Lowry, 2003 are currently known to occur in the shallow, near shore waters of the northern Gulf of Mexico (GOM), from the Suwannee River, Florida, to Port Aransas, Texas, and to depths of 10 m. They include: *Phtisica marina*, *Hemiaegina minuta*, *Paracaprella pusilla*, *Paracaprella tenuis*, *Deutella incerta*, *Caprella equilibra*, *Caprella penantis*, and *Caprella scaura*. Another species, *Caprella andreae*, is also suspected to occur in this region due to its close association with sea turtles, which nest on the sand beaches of the northern GOM. The occurrence of these 9 species in the northern GOM is discussed; known distributions, new records, synonymies, diagnoses, and remarks on life history and ecology are also presented. In addition, new northern GOM records for 7 of these species are provided along with a simplified identification key.

## INTRODUCTION

There are published records for 8 species of caprellid amphipods from the shallow, coastal waters of the northern Gulf of Mexico (see Pearse 1908, 1912; Hedgpeth 1950, 1953; Menzel 1956; Steinberg and Dougherty 1957; Pequegnat 1966; McCain 1968; Foster et al. 2004). This report presents additional records and an updated key to the shallow water amphipods of the family Caprellidae *sensu* Myers and Lowry, 2003, currently known from the northern Gulf of Mexico (GOM) limited by the Suwannee River (Florida) in the east, by Port Aransas (Texas) in the west, and by a depth of 10 m.

Steinberg and Dougherty (1957) reviewed the early literature for the caprellid amphipods known from the Gulf of Mexico. In 1968, McCain provided a comprehensive taxonomic study of the northwestern Atlantic caprellids. Laubitz (1993) revised the suborder Caprellidea *sensu* Leach, 1814, to accommodate 3 additional families: the Phtisicidae Vassilenko, 1968, Caprellinoididae Laubitz, 1993, and Pariambidae Laubitz, 1993. The higher taxonomy of the Caprellidea was also reviewed, and 8 families within the suborder were recognized: Paracercopidae Vassilenko, 1972, Phtisicidae; Caprellinoididae; Cyamidae White, 1847, Caprogammaridae Kudrjaschov and Vassilenko, 1966, Caprellidae Leach, 1814, Pariambidae; and Protellidae McCain, 1970. Myers and Lowry (2003) reviewed the classification of the Corophiidea Leach, 1814, and placed the infraorder Caprellida within the suborder Corophiidea. In addition, they expanded the superfamily Caprelloidea to include Caprellidae,

Caprogammaridae, Cyamidae, Dulichiidae Dana, 1849, and Podoceridae Leach, 1814. This study focuses on the family Caprellidae *sensu* Myers and Lowry, 2003. Only the subfamilies Caprellinae and Phtisicinae are represented in the shallow, near shore waters of the northern GOM.

An artificial key to the caprellid amphipods known from the northern GOM is provided along with an annotated listing of the species with a brief synopsis of distribution data, diagnoses, synonymies, new records, and ecological information. Synonymies given are since McCain's 1968 monograph. Table 1 presents a systematic list of the 9 species known or suspected to occur in the shallow, near shore waters of the northern GOM. Figure 1 provides a generalized caprellid body plan for use with the key.

## ARTIFICIAL KEY TO THE FAMILY CAPRELLIDAE (CRUSTACEA: AMPHIPODA) KNOWN FROM THE COASTAL WATERS OF THE NORTHERN GULF OF MEXICO

1. Pereopods 3 and 4 well-developed, attenuated, with 6 articles (Figure 2a,e) . . . . . *Phtisica marina*  
 Pereopods 3 and 4 absent, reduced, or vestigial, when present having no more than 2 articles (Figures 3a,c; 4a,e,h; 5a,d; 6a,g; 7a,d; 8a,d; 9a,d; 10a,d) . . . . . 2
2. Pereonites hexagonal in dorsal view; pereopods 3 and 4 minute, composed of 1 article (Figure 3a,c) . . . . .  
 . . . . . *Hemiaegina minuta*  
 Pereonites not hexagonal in dorsal view; pereopods 3 and 4 absent or minute, consisting of 2 articles (Figures 4a,e,h; 5a,d; 6a,g; 7a,d; 8a,d; 9a,d; 10a,d). . . . . 3

3. Antenna 2 with sparse, short, setae ventrally; pereopods 3 and 4 minute, composed of 2 articles (Figures 4a,e,h; 5a,d; 6a,g) . . . . . 4

Antenna 2 with dense row of long setae ventrally; pereopods 3 and 4 absent (Figures 7a,d; 8a,d; 9a,d; 10a,d)(*Caprella*) . . . . . 6

4. Pereopod 5 inserted near middle of pereonite 5 (Figure 4a,e,h); dorsal pair of spines present on cephalon (head) and second thoracic somite (Figure 4a,e) . . . . .

. . . . . *Deutella incerta*

Pereopod 5 inserted in posterior 1/4 of pereonite 5; cephalon and second thoracic somite without dorsal spines (Figures 5a,d; 6a,g) . . . . . 5

5. Basis of male gnathopod 2 with proximal knob on posterior margin (Figure 5a), that of female relatively short (Figure 5d); mandibular palp vestigial, represented by single seta (Figure 5e); anterolateral margin of pereonite 2 with large triangular projection in males, similar in females, projection smaller (Figure 5a,d) . . . . .

. . . . . *Paracaprella pusilla*

Basis of male gnathopod 2 lacking proximal knob on posterior margin (Figure 6a), that of female relatively long (Figure 6g); mandibular palp minute, composed of 2 small segments (Figure 6e,f); anterolateral margin of pereonite 2 with small triangular projection in males (Figure 6a), absent in females (Figure 6g). . . . . *Paracaprella tenuis*

6. Cephalon lacking anterodorsally directed spine or process; ventral spine between insertions of gnathopod 2 in both sexes (Figure 7a,d) . . . . . *Caprella equilibra*

Cephalon with anterodorsally directed process or projection, blunt or sharp; no ventral spine between insertions of gnathopod 2 (Figures 8a,d; 9a,d; 10a,d) . . . . . 7

7. Cephalon with sharp, acutely tipped, anterodorsally directed spine (Figure 8a,d); body of adult male attenuated; male with gnathopod 2 inserted in posterior 1/5 of pereonite 2 (Figure 8a) . . . . . *Caprella scaura*

Cephalon with blunt anterodorsally directed process; body of males, like females, compressed, not attenuated (Figures 9a,d; 10a,d); male with gnathopod 2 inserted in middle of pereonite 2 (Figures 9a; 10a) . . . . . 8

8. Pereopods 5–7 with palm of propodus convex (Figure 9c) *Caprella andreae* Pereopods 5–7 with palm of propodus concave (Figure 10e) . . . . . *Caprella penantis*

Pereopods 5–7 with palm of propodus concave (Figure 10e) . . . . . *Caprella penantis*

TABLE 1

**Taxonomic listing of the amphipods of the family Caprellidae presently known from the shallow coastal waters of the northern Gulf of Mexico.**

---



---

Order Amphipoda
Suborder Corophiidea
Infraorder Caprellida
Family Caprellidae Leach, 1814
Subfamily Caprellinae Leach, 1814
Genus <i>Caprella</i> Lamarck, 1801
<i>Caprella equilibra</i> Say, 1818
<i>Caprella scaura</i> Templeton, 1836
<i>Caprella andreae</i> Mayer, 1890
<i>Caprella penantis</i> Leach, 1814
Genus <i>Deutella</i> Mayer, 1890 [= <i>Luconacia</i> Mayer, 1903]
<i>Deutella</i> (= <i>Luconacia</i> ) <i>incerta</i> (Mayer, 1903)
Genus <i>Hemiaegina</i> Mayer, 1903
<i>Hemiaegina minuta</i> Mayer, 1890
Genus <i>Paracaprella</i> Mayer, 1890
<i>Paracaprella pusilla</i> Mayer, 1890
<i>Paracaprella tenuis</i> Mayer, 1903
Subfamily Phtisicinae Vassilenko, 1968
Genus <i>Phtisica</i> Slabber, 1769
<i>Phtisica marina</i> Slabber, 1769

---

***Phtisica marina* Slabber, 1769  
(Figure 2 a–g)**

**Diagnosis.** Mandible with 3-segmented palp; carpus of gnathopod 2 shorter than merus, with greatest width proximally; abdomen of male with 2 pairs of biarticulate appendages and 1 pair of pyriform appendages, females with 2 pairs of biarticulate appendages and 1 pair of lobes; pereopods 3 and 4, 6-segmented; pereopod 5, 5-segmented; pereopod 6, 6-segmented.

**Synonymies.** McCain 1968: 91–97, Figures 46–47; Pequegnat and Pequegnat 1968: 24, 33; Krapp-Schickel 1969: 279, 346–347, 391, 413; McCain and Steinberg 1970: 65; Gosner 1971: 508–510; Griffiths 1973: 304; Griffiths 1974a: 205; Griffiths 1974b: 258; Griffiths 1974c: 333; Griffiths 1975: 177; Vassilenko 1974: 94–96, Figure 47; Arimoto 1980: 96–101, Figure 2; Vadon 1984: 553; Laubitz 1995: 83; Camp et al. 1998: 132; Serejo 1998: 381; Ortiz et al. 2002: Figure 40; Guerra-García and Takeuchi 2002: 705.

**Known distribution.** Northeastern Atlantic; British Isles; Norway; Mediterranean Sea; Black Sea; West Africa; South Africa; Brazil; Gulf of Mexico; Caribbean.

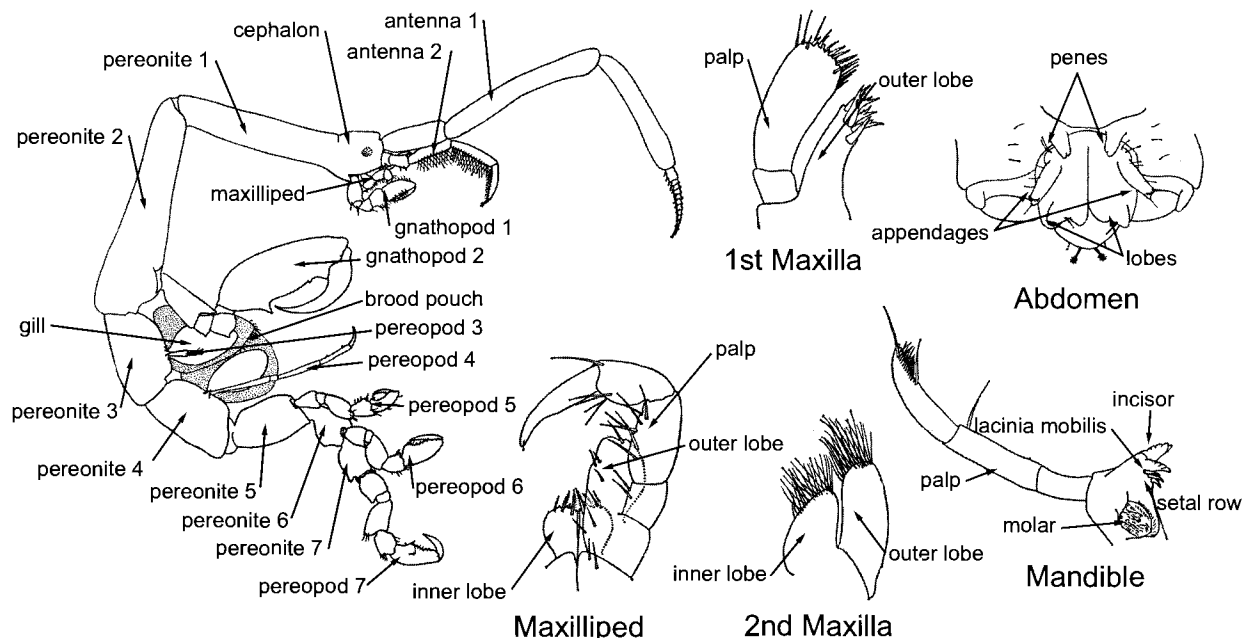


Figure 1. Generalized caprellid body plan. (From McCain 1968: Figure 1).

**Known Gulf of Mexico records.** McCain (1968) reports this species along the east coast of the GOM from Tortugas northward to Panama City, Florida.

**New records.** No new GOM records.

**Remarks.** Habitat consists of various algae, hydroids, seagrasses, sponges, and bryozoans (ectoprocts). Wirtz (1998) also recorded *P. marina* as an associate of the holothurian *Holothuria tubulosa* in the Azores. McCain (1968) reported *P. marina* as a component of the planktonic community in the Western Atlantic Ocean.

Specimens assignable to this species have been collected by Texas A&M University on the continental slope of the GOM at depths of 200–300 m (Foster, pers. obs.).

***Hemiaegina minuta* Mayer, 1890**  
(Figure 3a–f)

**Diagnosis.** Peduncle of antenna 1 not inflated in males, flagellum of antenna 2 biarticulate, swimming setae absent; mandible without palp; outer lobe of maxilliped larger than inner lobe; pereonites with hexagonal shape in dorsal view; propodus of gnathopod 1 with large proximal knob covered with setae; pereopods 3 and 4 1-segmented, pereopod 5 6-segmented; abdomen of male and female with a pair of biarticulate appendages.

**Synonymies.** McCain 1968: 61–64, Figures 29–30; Utinomi 1969: 297–299, Figure 2; Arimoto 1970: 15; McCain and Steinberg 1970: 51; Gosner 1971: 508–510; Laubitz 1972: 59–60, Figure 15; Griffiths 1973: 303; Griffiths 1974c: 332; Griffiths 1975: 175; Arimoto 1976:

58–60, 62, Figures 26–28; Arimoto and Kikuchi 1977: 95–96, Figure 41; Gable and Lazo-Wasem 1987: 637; Aoki and Asakura 1995: 192; Takeuchi 1995: 196–197, Figures 21; Serejo 1997: 630–632; Camp et al. 1998: 132; Ortiz et al. 2002: Figure 32.

**Known distribution.** Cosmopolitan (Japan, Indonesia, Australia, Hawaii, South Africa, Caribbean Sea) (McCain 1968).

**Known Gulf of Mexico records.** Port Aransas, Texas; off Pensacola, Tortugas at Loggerhead Key, Florida (McCain 1968).

**New records.** 2 adult males, 1 adult female, St. Joseph Bay, Florida, 29 May 2000, less than 1.0 m depth, *Sargassum* wash, coll. J.M. Foster, id. by J.M. Foster, GCRL 2065.

**Remarks.** Monotypic genus. Remarkable due to the hexagonal outline of the pereonites. McCain (1968) reports this species taken in plankton samples associated with *Sargassum*.

***Deutella* (= *Luconacia*) *incerta* (Mayer, 1903)**  
(Figure 4a–j)

**Diagnosis.** Cephalon and pereonite 2 having dorsal surface with anteriorly projecting spines; anterolateral margin of pereonite 2 with anterolateral spine or projection; mandibular palp 3-segmented; propodus of gnathopod 1 triangular, grasping margins of dactylus and propodus serrate; gnathopod 2 having propodus with proximal grasping spine and well developed tooth at mid-margin

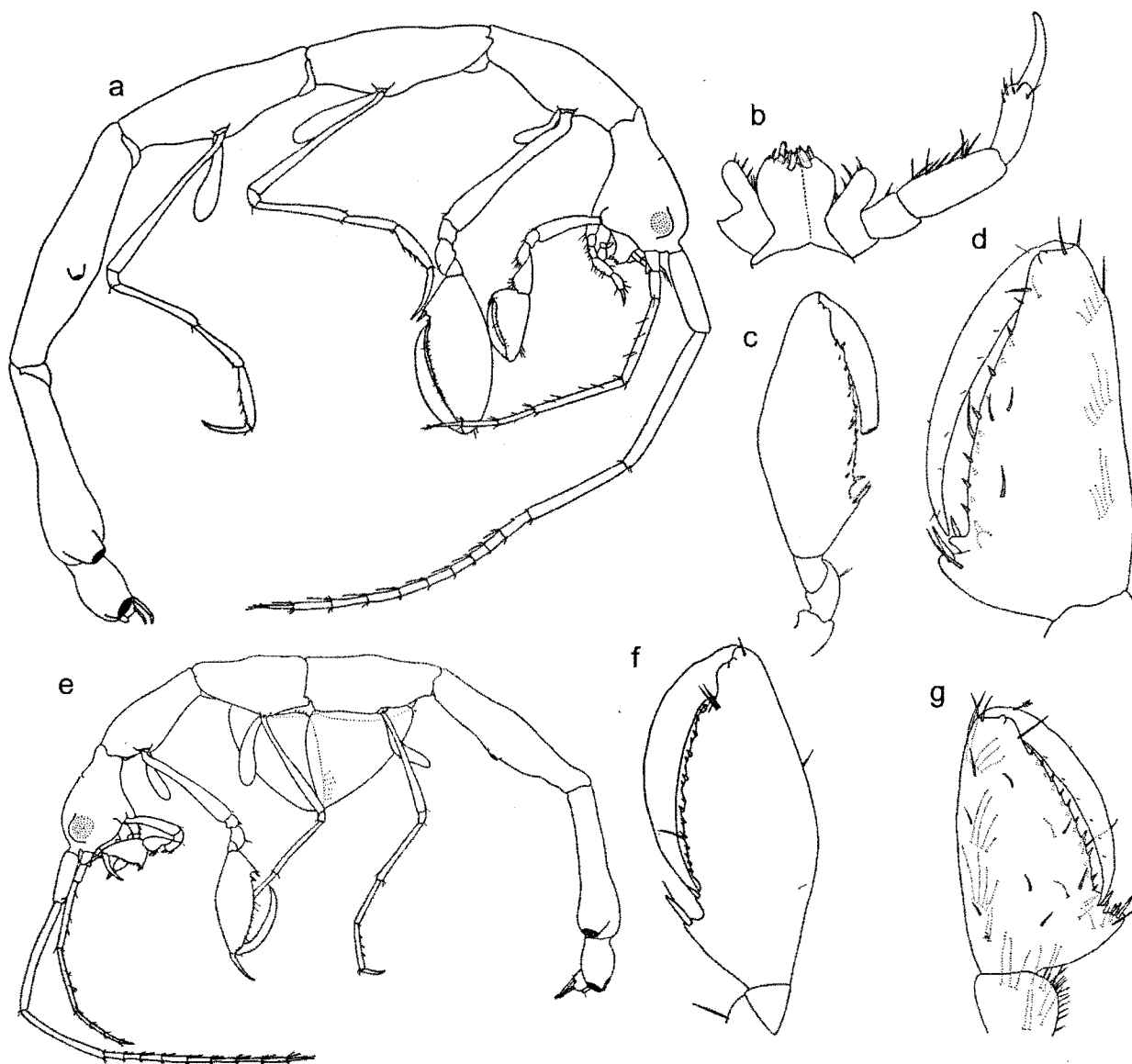


Figure 2. *Phthisica marina* Slabber, 1769, a–d, male, e–g, female; a, lateral view; b, maxilliped; c, gnathopod 2; d, gnathopod 1; e, lateral view; f, gnathopod 2; g, gnathopod 1. (a–d, from McCain 1968: Figure 46; e–g, from McCain 1968: Figure 47).

creating an excavate posterior margin; pereopod 5 inserted near midlength of pereonite 5, pereopod 5 six-segmented.

**Synonymies.** McCain 1968: 68–72, Figures 33–35; Pequegnat and Pequegnat 1968: 24, 33–34, 66; McCain and Steinberg 1970: 53; Gosner 1971: 508–510; Laubitz 1972: 61; Caine 1974: 81–96, Figures 4, 7, 10, 13, 16, 19, 23, 24, 28, 29, 33, 34, 36; Lewis and Stoner, 1983: 298, 301; Johnson 1986: 381, Figure 125; Sterrer 1986: 379, 381; Gable and Lazo-Wasem 1987: 635–636, Figure 4; Camp et al. 1998: 132; Ortiz et al. 2002: Figure 29; Guerra García 2003a: 1062–1065, Figure 3.

**Known distribution.** Atlantic coast of United States; Caribbean Sea; GOM.

**Known Gulf of Mexico records.** Mobile Bay, Alabama; Port Isabel, Texas; Horn Island, Mississippi; and Cedar Key, Florida (McCain 1968).

**New records.** 1 male, 1 female, St. Andrew Bay, Florida, City Marina, 5 February 2000, wash of *Sargassum* and *Ectocarpus*, coll. J.M. Foster, id. by J.M. Foster, GCRL 2070; 1 male, 1 female, St. Joseph Bay, Florida, 6 January 2001, epifaunal on unidentified sponge, intertidal, coll. J.M. Foster, id. by J.M. Foster, GCRL 2071.

**Remarks.** Widespread in western Atlantic, occurring on seagrass, hydroids, sponges, alcyonarians, and ascidians.

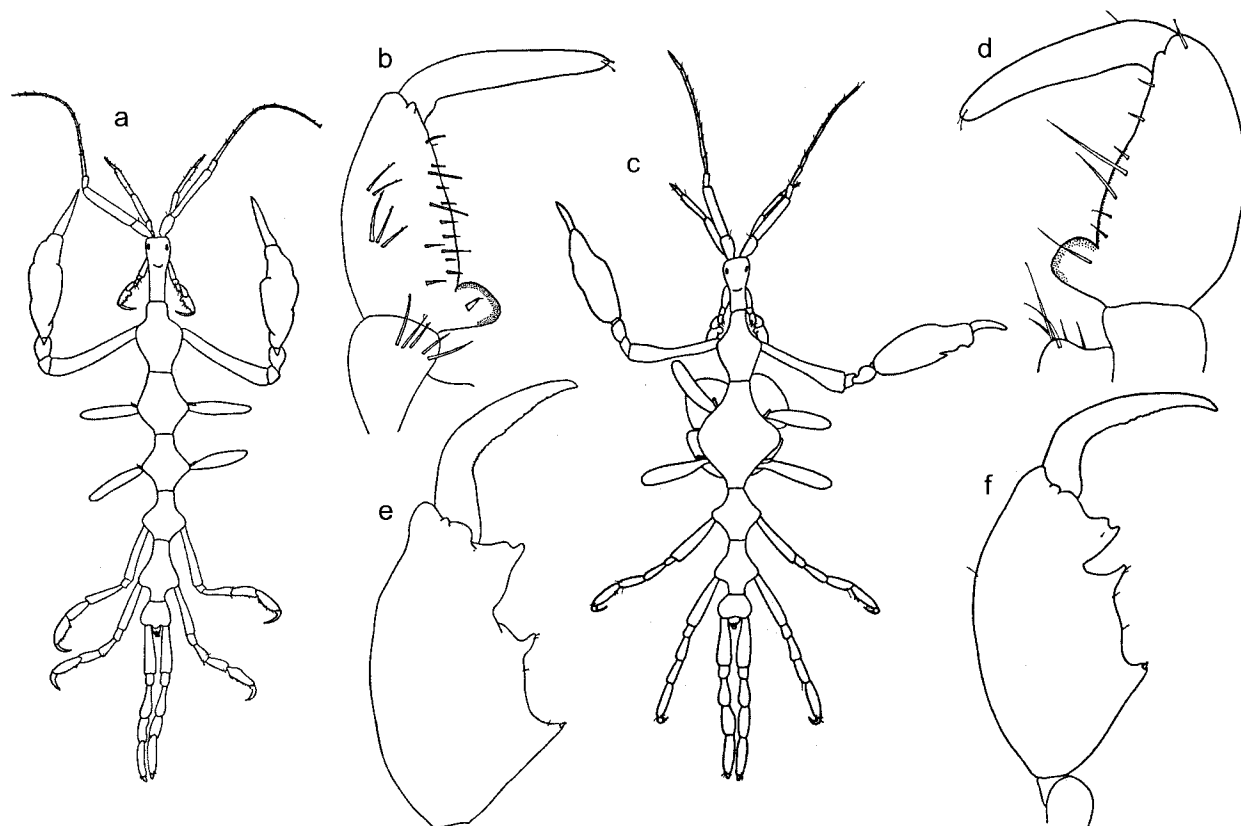


Figure 3. *Hemiaegina minuta* Mayer, 1890, a–b, e, male, c–d, f, female; a, dorsal view; b, gnathopod 1; c, dorsal view; d, gnathopod 1; e, gnathopod 2; f, gnathopod 2. (a–b, e, from McCain 1968: Figure 29; c–d, f, from McCain 1968: Figure 30).

***Paracaprella pusilla* Mayer, 1890  
(Figure 5a–f)**

**Diagnosis.** Males with large triangular projection on anteroventral margin of pereonite 2; mandible without palp except for simple seta; basis of gnathopod 2 short and expanded with proximal knob on posterior margin, propodus with shallow rounded notch at midlength; pereopod 5 inserted near posterior part of pereonite 5.

**Synonymies.** McCain 1968: 82–86, Figures 32a–b, 41–42; Griffiths 1974b: 257; Camp et al. 1998: 132; Serejo 1998: 381; Guerra-García and Thiel 2001: 880, Figure 8; Ortiz et al. 2002: Figure 37; Escobar-Briones and Winfield 2003: 38.

**Known distribution.** Cosmopolitan. (East and South Africa; Hawaii; Japan; China; South America; Western Atlantic; Caribbean Sea) (McCain 1968).

**Known Gulf of Mexico records.** Sarasota Bay, St. Andrew Bay, Florida; Grand Isle, Louisiana; Port Isabel, Texas (McCain 1968).

**New records.** Adult female, Alabama/Mississippi Rapid Assessment Team (AMRAT) Station # M-098, navigational buoy, Horn Island pass, Mississippi Sound,

Mississippi, 30 August 2004, collected at 1.0 m depth, scraping, coll. P. Felts and D. Landi, id. by S.E. LeCroy, GCRL 2255; 2 adult females, 3 adult males, 4 juveniles, AMRAT Station # M-099, navigational buoy, Horn Island pass, Mississippi Sound, Mississippi, 30 August 2004, collected at 6.0 m depth, scraping, coll. P. Felts and D. Landi, id. by S.E. LeCroy, GCRL 2256; 2 adult females, 1 adult male, 1 subadult male, AMRAT Station # M-103, navigational buoy #38, Horn Island pass, Mississippi Sound, Mississippi, 30 August 2004, collected at 10.0 m depth, scraping, coll. D. Hataway and K. Berry, id. by S.E. LeCroy, GCRL 2257; 1 adult male, AMRAT Station # M-196, navigational buoy, Dog Keys pass, Mississippi Sound, Mississippi, 31 August 2004, collected at 9.5 m depth, scraping, coll. P. Felts and D. Landi, id. by S.E. LeCroy, GCRL 2258.

**Remarks.** Found in mangrove habitats, seagrass, on hydroids and ascidians. Martin and Bortone (1997) recovered this species from artificial reefs at the mouth of Choctawhatchee Bay, Florida.

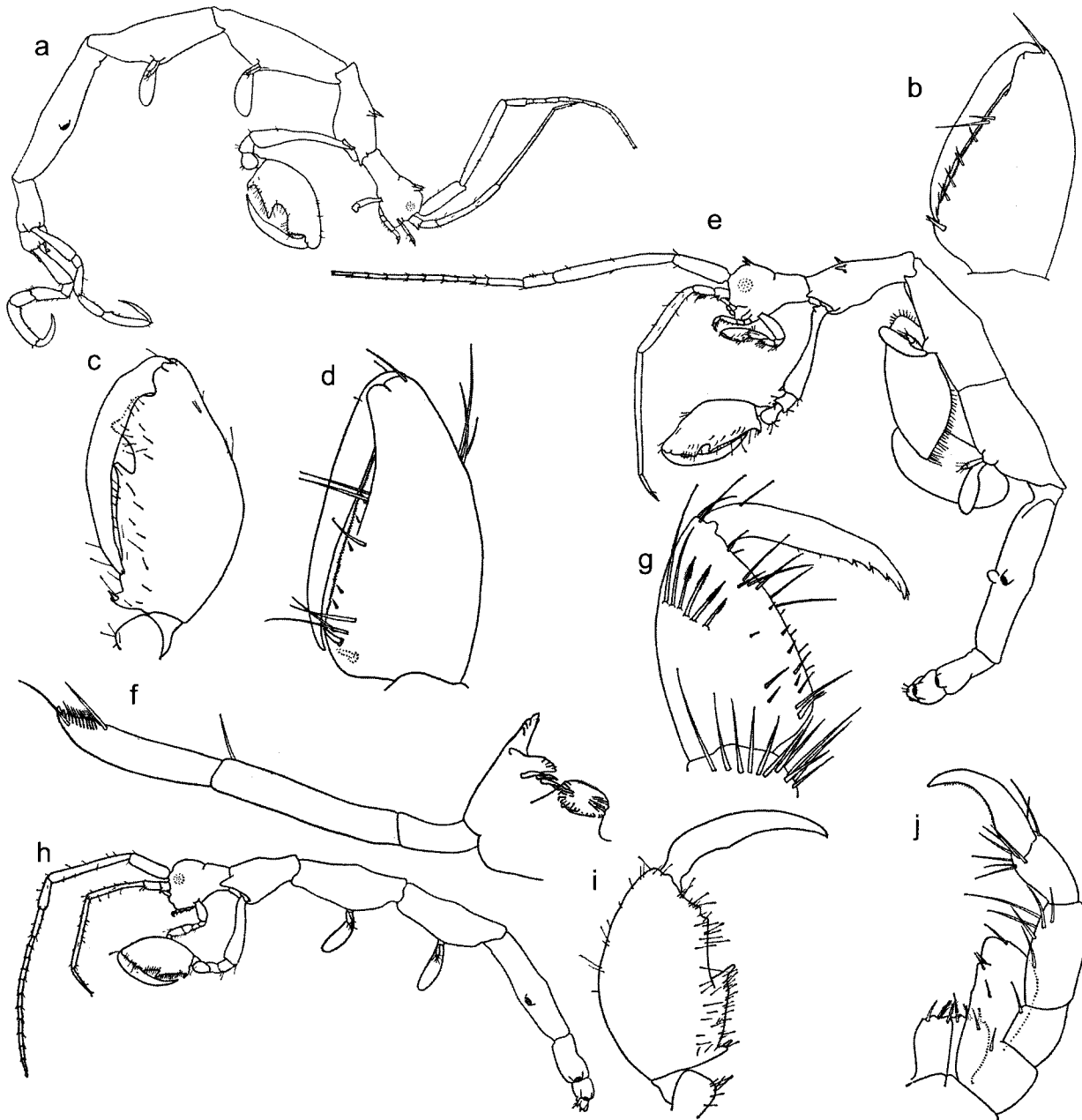


Figure 4. *Deutella* (=Luconacia) *incerta* (Mayer, 1903), a–b, adult male, c–f, female, g–j juvenile male; a, lateral view; b, gnathopod 1; c, gnathopod 2; d, gnathopod 1; e, lateral view; f, left mandible; g, gnathopod 1; h, lateral view; i, gnathopod 2; j, maxilliped. (a–b, from McCain 1968: Figure 33; c–f, from McCain 1968: Figure 34; g–j, from McCain 1968: Figure 35).

*Paracaprella tenuis* Mayer, 1903  
(Figure 6a–h)

**Diagnosis.** Males with small triangular projection on anterolateral margin of pereonite 2; mandible with minute 0–3 segmented palp, including terminal seta; basis of gnathopod not expanded and without a proximal knob on posterior margin, palm of propodus with a large angular notch at midlength.

**Synonymies.** McCain 1968: 86–89, Figures 43–44; Arimoto 1970: 14; Arimoto 1971c: 61–63, Figures 11–12; Gosner 1971: 508–510; Laubitz 1972: 67–68, Figure 18; Wass 1972: 151; Watling and Maurer 1972: 255–256, 258, 259, 263; Caine 1974: 81–96, Figures 2, 3, 6, 9, 12, 15, 18, 21, 22, 26, 27, 31, 35; Stoner, 1980: 542; Arimoto 1976: 55–58, Figure 24–25; Caine 1986: 20; Rupert and Fox 1988: 239, 403; Camp et al. 1998: 132; Guerra-García 2002: 225–227, Figures 9–12; Ortiz et al. 2002: Figure 38.

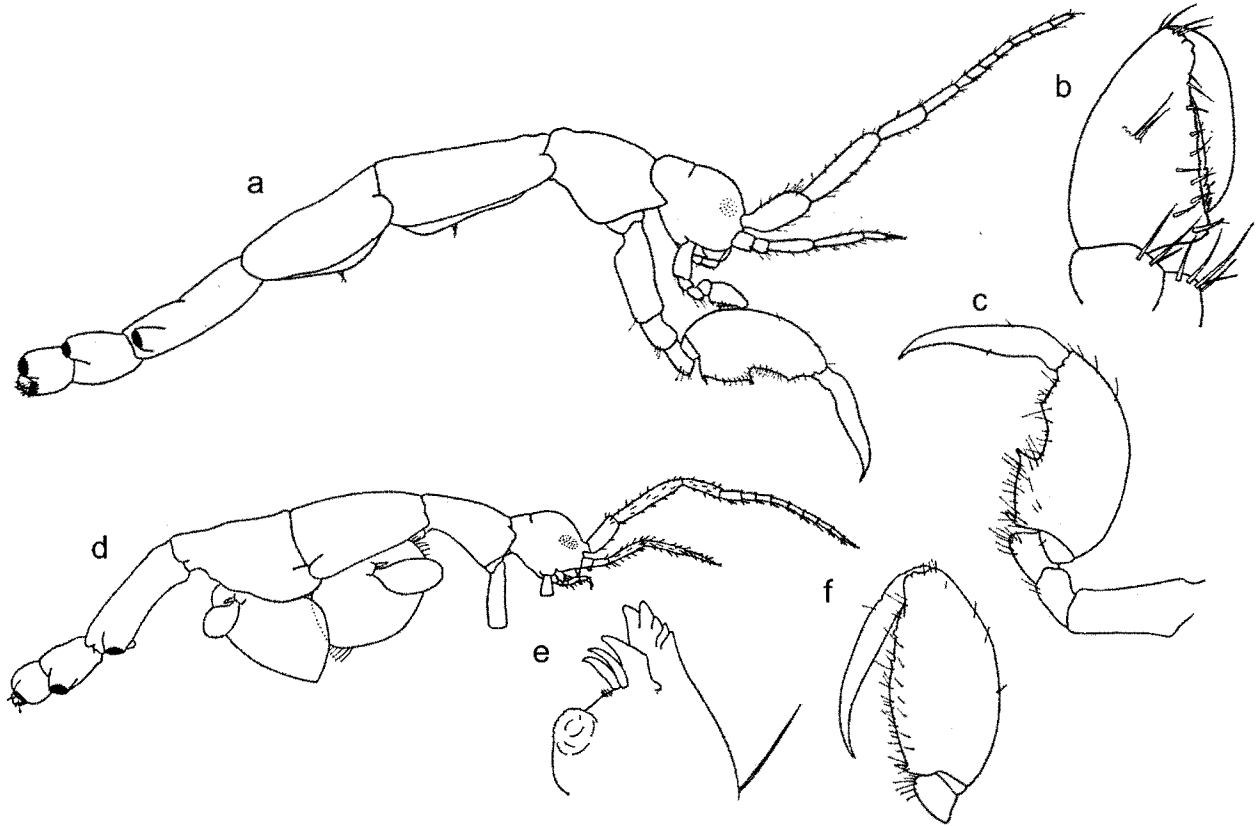


Figure 5. *Paracaprella pusilla* Mayer, 1890, a–c, male d–f, female; a, lateral view; b, gnathopod 1; c, gnathopod 2; d, lateral view; e, right mandible; f, gnathopod 2. (a–c, from McCain 1968: Figure 41; d–f, from McCain 1968: Figure

**Known distribution.** Western Atlantic Ocean (Gulf of St. Lawrence; Maine; Massachusetts; Chesapeake Bay; New Jersey; Sapelo Island, Georgia)(McCain 1968); Japan (Takeuchi 1999).

**Known Gulf of Mexico records.** Alligator Harbor, Tampa Bay, and Pensacola Bay, Florida; Galveston Bay, Port Isabel, and Corpus Christi Bay, Texas (Menzel 1956; Steinberg and Dougherty 1957; McCain 1968).

**New records.** Adult female, St. Joseph Bay, Florida, 5 May 1990, less than 1.0 m depth, algae wash, coll. S.E. LeCroy, id. by S.E. LeCroy, GCRL 2064; 3 males, 6 females, St. Andrew Bay, Florida, Long Point, 2 January 2003, less than 1.0 m depth, kick net over *Thalassia*, coll. J.M. Foster, id. by J.M. Foster, GCRL 2072.

**Remarks.** Found with red and brown algae attached to hard substrates, seagrasses, sponges, hydroids, alcyonarians, and bryozoans (ectoprocts). Caine (1998) observed a mutualistic relationship between *P. tenuis* and the hydrozoan *Bougainvillia rugosa*. *Paracaprella tenuis* was observed defending the hydroid's tentacles from predation by the nudibranch *Tenellia pallida*. *Paracaprella tenuis* apparently uses the hydroid as a substratum to which it clings and grazes on diatoms. Caine's observa-

tions documented for the first time a mutualistic relationship between a caprellid amphipod and a hydrozoan.

***Caprella equilibra* Say, 1818**  
(Figure 7a–g)

**Diagnosis.** Cephalon smooth, without dorsal process; mandible without palp; peduncle of antenna 1 not inflated in males; basis of gnathopod 2 less than one-half the length of pereonite 2; pereopod 2 usually with spine between the insertions of gnathopods 2; pereonites elongated in large males; pereopods 3 and 4 absent, pereopods 5–7 without grasping spines.

**Synonymies.** McCain 1968: 25–30, Figure 12–13; Pequegnat and Pequegnat 1968: 24, 33–34, 53–54, 60–62, 67; Ricketts et al. 1968: 102, 491; McCain 1969: 287–288, Figure 1; Keith 1969: 119–124; Krapp-Schickel 1969: 284, 349; McCain and Steinberg 1970: 19; Laubitz 1970: 55–58, Figure 17; McCain and Gray 1971: 113–114, Figure 3; Arimoto 1971a: 15–16; Arimoto 1971b: 30–35, Figures 1–4; Arimoto 1971d: 1–8, Figures 1–4; Gosner 1971: 508–510; Laubitz 1972: 34; Wass 1972: 151; Watling and Maurer 1972: 255, 256, 263; Griffiths 1973:

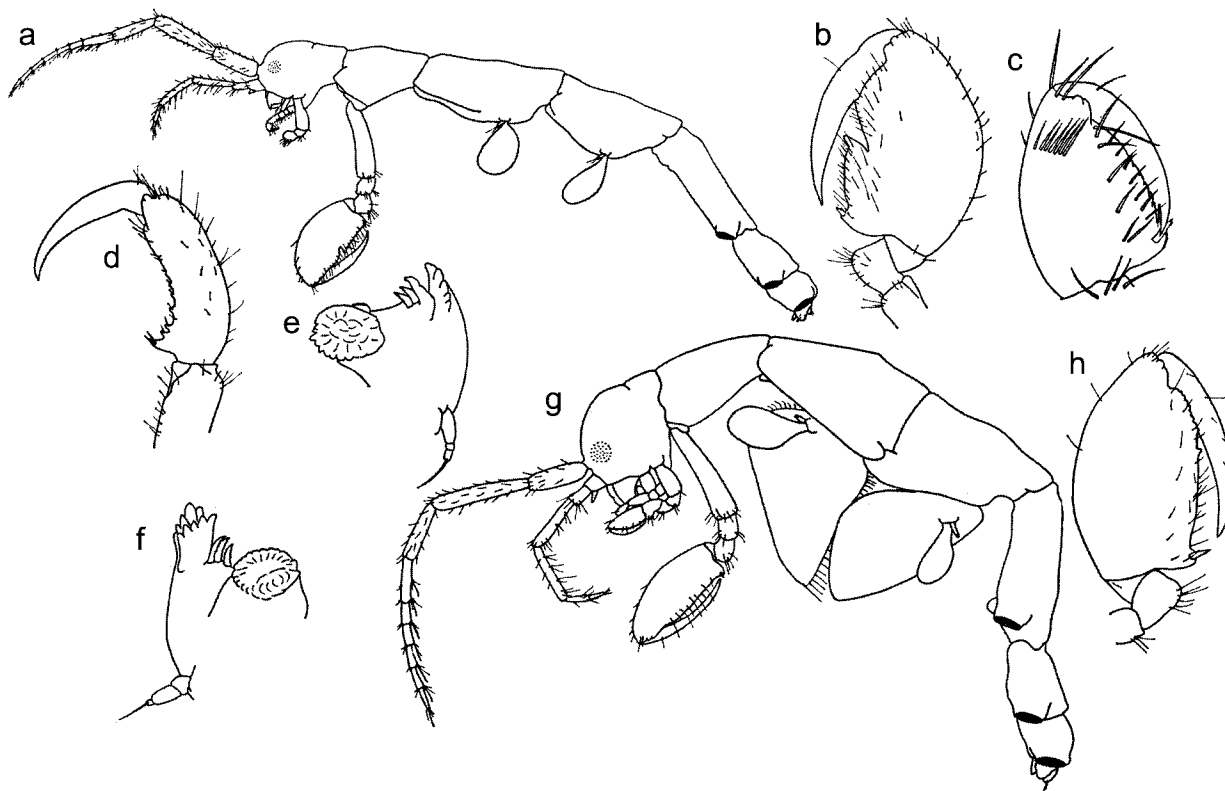


Figure 6. *Paracaprella tenuis* Mayer, 1903, a–f, male, g–h, female; a, lateral view; b, gnathopod 2; c, gnathopod 1; d, pereopod 7; e, right mandible; f, left mandible; g, lateral view; h, gnathopod 2. (a–f, from McCain 1968: Figure 43; g–h, from McCain 1968: Figure 44).

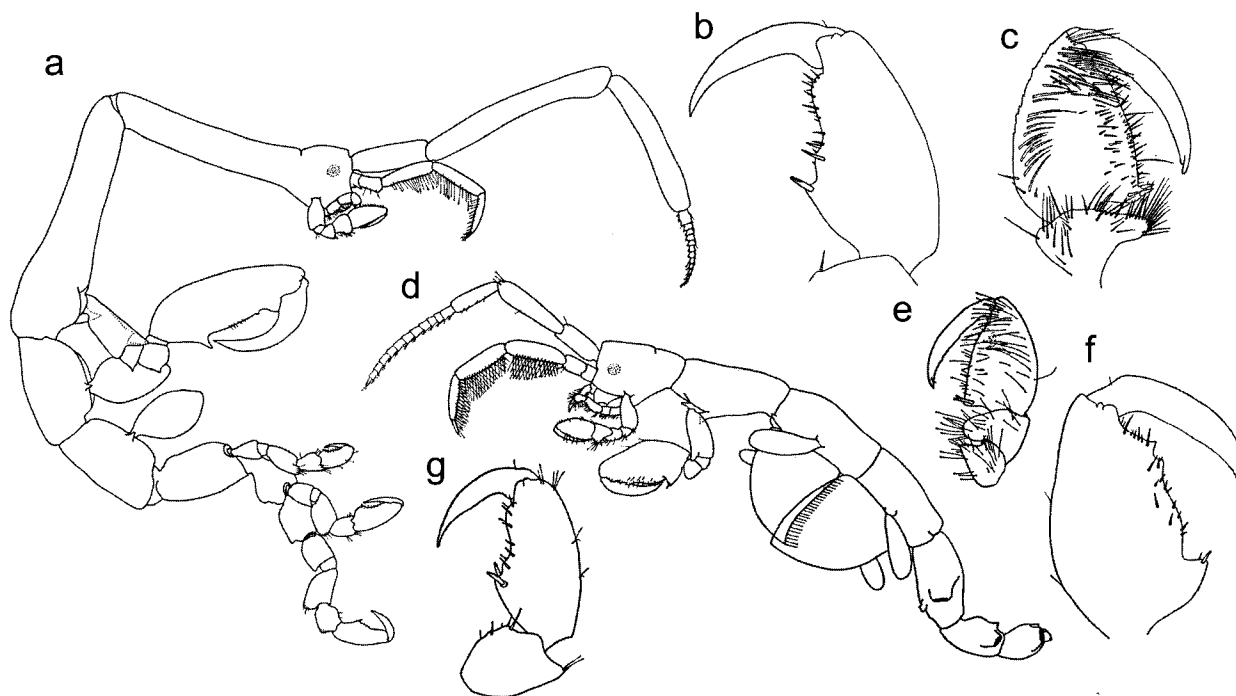


Figure 7. *Caprella equilibra* Say, 1818, a–c, male, d–g, female; a, lateral view; b, pereopod 5; c, gnathopod 1; d, lateral view; e, gnathopod 1; f, gnathopod 2; g, pereopod 6; (a–c, from McCain 1968: Figure 12; d–g, from McCain 1968: Figure 13).



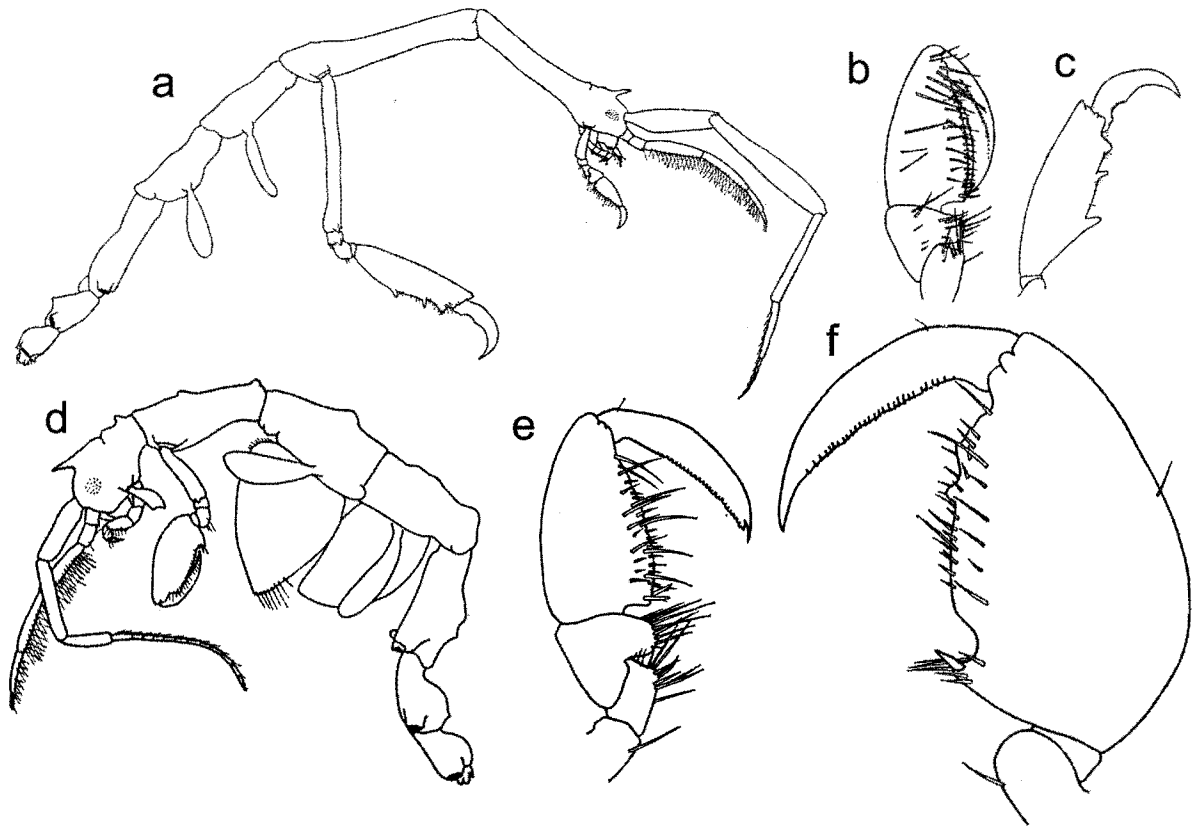


Figure 8. *Caprella scaura* Templeton, 1836, a–c, male, d–f, female; a, lateral view; b, gnathopod 1; c, gnathopod 2; d, lateral view; e, gnathopod 1; f, gnathopod 2. (a–c, from McCain 1968: Figure 17; d–f, from McCain 1968: Figure 18)(Note: In McCain 1968, page 42, Figure 17e represents gnathopod 2, but is incorrectly labeled as gnathopod 1).

303; Utinomi 1973: 33; Griffiths 1974a: 205; Griffiths 1974b: 255; Griffiths 1974c: 331; Griffiths 1975: 175; Cavedini 1982: 500; Arimoto 1976: 195–205, Figures 106–108; Arimoto and Kikuchi 1977: 93, Figure 9D; Caine 1986: 20; Johnson 1986: 381, Figure 125; Sterrer 1986: 379, 381; Cockman and Albone 1987: 163; Lazo-Wasem and Gable 1987: 335–336 (as *Caprella bermudia*); Gable and Lazo-Wasem 1987: 637; Rupert and Fox 1988: 239, 351, 403; Krapp-Schickel 1993: 782–783, Figure 533; Lee and Lee 1993: 358; Aoki and Asakura 1995: 192; Laubitz 1995: 93; Camp et al. 1998: 132; Serejo 1998: 380; Guerra-García and Thiel 2001: 878–879, Figure 6; Ortiz et al. 2002: Figure 21; Escobar-Briones and Winfield 2003: 38; Guerra-García 2003b: 181, Figure 4; Guerra-García and Takeuchi 2004: 1013, Figure 34.

**Known distribution.** Nearly cosmopolitan.

**Known Gulf of Mexico records.** Panama City, Florida; Grand Isle, Louisiana; Galveston, Port Isabel, and Port Aransas, Texas (McCain 1968).

**New Records.** Juvenile female, West Pass jetties, St. Andrew Bay, Florida, 21 June 1984, 1.0 m depth, *Sargassum* wash, coll. J.M. Foster, id. by J.M. Foster, GCRL 2067; 28 males, 13 females, floating fish cage near

Chevron Rig 999, 29°27.9'N, 88°36.3'W, off coast of Mississippi, 1 February 2003, fouling on mesh and riggings of floating cage, coll. C. Bridger, id. by S.E. LeCroy, GCRL 2068.

**Remarks.** *Caprella equilibra* was originally described by Say (1818) from Sullivan's Island near Charleston, South Carolina, in association with salt marshes. Sconfiatti and Luparia (1995) collected this species from wooden pilings near Venice, Italy, in the North Adriatic Sea, where they observed peak breeding activity in April and September with a decrease in the summer and no breeding activity shown in the winter.

Guerra-García and Takeuchi (2002) described the new species, *Caprella ceutae* Guerra-García and Takeuchi, 2002, which is morphologically similar to *C. equilibra* from the Mediterranean Sea on the coast of North Africa. *Caprella ceutae* can be distinguished from *C. equilibra* based primarily upon the prominent ventral spine between the bases of the second gnathopods of *C. equilibra*, which is lacking in *C. ceutae*. In addition, the inferior margin of the third peduncular article of the first antenna is densely setose in *C. ceutae* but is naked or nearly so in *C. equilibra*.

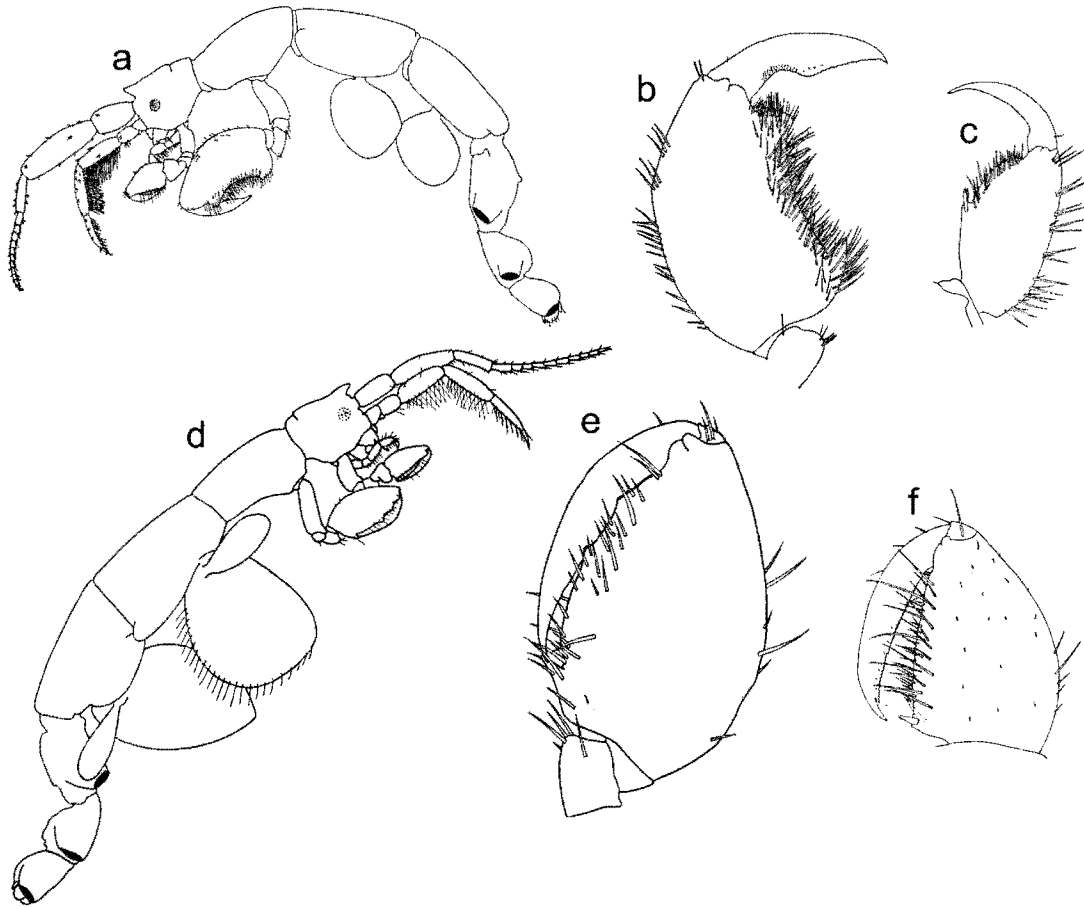


Figure 9. *Caprella andreae* Mayer, 1890, a–c male, d–f, female; a, lateral view; b, gnathopod 2; c, pereopod 6; d, lateral view; e, gnathopod 2; f, gnathopod 1. (a–c, from McCain 1968: Figure 9; d–f, from McCain 1968: Figure 9).

***Caprella scaura* Templeton, 1836**  
(Figure 8 a–f)

**Diagnosis.** Cephalon with anteriorly directed spine, acutely tipped; mandible without palp; peduncle of antenna 1 not inflated in males; pereonites 1–2 elongate in males; basis of gnathopod 2 approximately the length of pereonite 2; propodus of pereopods 5–7 with proximal grasping spines.

**Synonymies.** McCain 1968: 40–44, Figures 17–18; Utinomi 1969: 304; McCain and Steinberg 1970: 37; Arimoto 1971b: 42–48, Figures 10–14; Arimoto 1971c: 44–45; Griffiths 1973: 303; Utinomi 1973: 35; Griffiths 1974a: 205; Griffiths 1974b: 256; Griffiths 1974c: 332; Griffiths 1975: 175; Arimoto 1976: 146–148, Figure 78; Arimoto and Kikuchi 1977: 94–95, Figure 3G; Arimoto and Hirayama 1979: 50; Arimoto 1980: 109–110, Figure 10; Marelli 1981: 660, Figure 2A; Lim and Alexander 1986: 217–230, Figures 1–6; Cockman and Albone 1987: 163; Lee and Lee 1993: 364; Laubitz 1995: 98; Takeuchi 1995: 198, Figures 180; Aoki 1997: 447, 451–456; Camp et al. 1998: 132; Serejo 1998: 380; Guerra-García and

Thiel 2001: 877–878, Figure 5; Ortiz et al. 2002: Figure 24; Guerra-García and Takeuchi 2003: 161–163, Figure 7; Foster et al. 2004: 65–69, Figures 1–2; Guerra-García and Takeuchi 2004: 1016–1017, Figure 36.

**Known distribution.** Nearly cosmopolitan.

**Known Gulf of Mexico records.** St. Andrew Bay, Panama City, Florida. (Foster et al. 2004).

**New records.** Adult female, Panama City Marina, St. Andrew Bay, Florida, 24 December 2003, less than 1.0 m depth, *Padina* wash, coll. J.M. Foster, id. by J.M. Foster, GCRL 2066; gravid female, Long Point, St. Andrew Bay, Florida, 2 January 2003, kick net over *Thalassia* with *Bugula* and oyster shells, coll. J.M. Foster, id. by J.M. Foster, GCRL 2073.

**Remarks.** This is a large species that is widely distributed in temperate and tropical seas of both hemispheres. The collections published by Foster et al. (2004) represent a range extension from the Caribbean Sea (McCain 1968).

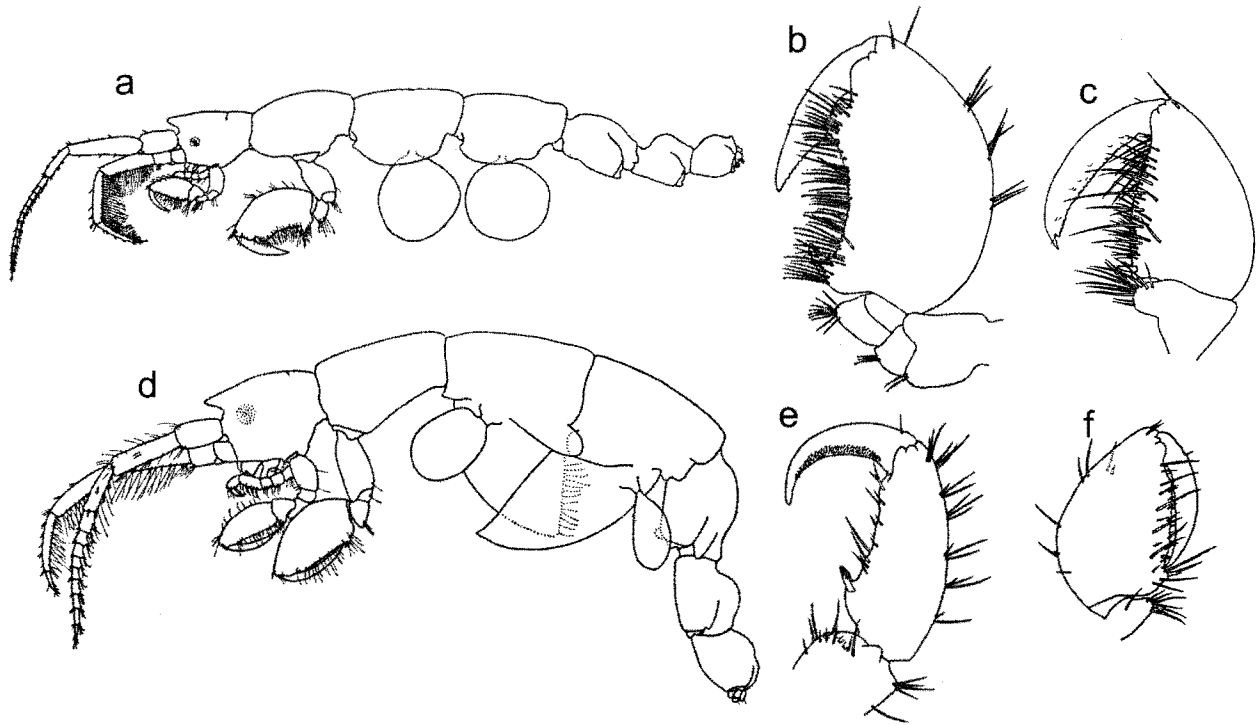


Figure 10. *Caprella penantis* Leach, 1814, a–c, male, d–f, female; a, lateral view; b, gnathopod 2; c, gnathopod 1; d, lateral view; e, pereopod 7; f, gnathopod 2. (a–c, from McCain 1968: Figure 4; d–f, from McCain 1968: Figure 5)

*Caprella andreae* Mayer, 1890  
(Figure 9a–f)

**Diagnosis.** Cephalon with anteriorly directed triangular projection, blunt, not acutely tipped; peduncle of antenna 1 inflated in males; mandible without palp; pereopods 3 and 4 absent; palm of propodus of pereopods 5–7 convex with medial grasping spines.

**Synonymies.** McCain 1968: 19–22, Figures 8–9; Gosner 1971: 508–510; Laubitz 1972: 26; Watling and Maurer 1972: 256, 263; Caine 1986: 20; Minchin and Holmes 1993: 285–286; Krapp-Schickel 1993: 777, Figure 530; Aoki and Kikuchi 1995: 54–58, Figures 1–2; Camp et al. 1998: 132; Ortiz et al. 2002: Figure 18.

**Known distribution.** Northeastern Atlantic; Mediterranean Sea; Hawaii; Sea of Japan; Atlantic coast of United States; Key West, Florida; Cuba (McCain 1968).

**Known Gulf of Mexico records.** Key West, Florida (McCain 1968).

**New records.** No new GOM records.

**Remarks.** McCain (1968) remarks that *C. andreae* appears to be ecologically isolated from other members of the genus by its habit of attaching to floating driftwood, buoys, plants, and the algal incrustations on the backs of sea turtles collected off Cuba and Key West, Florida. Caine (1986) reported *C. andreae* on the carapaces of nesting loggerhead sea turtles on the Florida Atlantic coast.

Watling and Maurer (1972) reported *C. andreae* from incrustations on the back of a loggerhead turtle caught on a fish line south of the Mispillion River in Delaware Bay. Other confirmed co-occurrences of this species with sea turtles were reported by Aoki and Kikuchi (1995).

Although the presence of *C. andreae* has not been confirmed in the northern GOM, its occurrence on carapaces of nesting sea turtles throughout the world indicates a likely presence. Collections of epibionts on the carapaces of sea turtles in the northern GOM should be made to clarify the role of sea turtles in the distribution of this cosmopolitan caprellid species.

*Caprella penantis* Leach, 1814  
(Figure 10a–f)

**Diagnosis.** Cephalon with anteriorly directed triangular projection, blunt, not acutely tipped; mandible without palp; peduncle of antenna 1 not inflated in males; basis of gnathopod 2 shorter than pereonite 2; pereopods 3 and 4 absent, pereopods concave, grasping spines proximal.

**Synonymies.** McCain 1968: 33–40, Figures 15–16; Bieri and Tokioka 1968: 383; Ricketts et al. 1968: 102, 491; Pequegnat and Pequegnat 1968: 24, 33; Utinomi 1968: 287–288; Utinomi 1969: 302; McCain and Steinberg 1970: 33; Arimoto 1971a: 19–20; Arimoto 1971b: 36–41, Figures 5–9; Gosner 1971: 508–510;

Laubitz 1972: 41; Watling and Maurer 1972: 255, 256, 259, 262, 263; Caine 1974: 81–96, Figures 1, 5, 8, 11, 14, 17, 20, 25, 30; Griffiths 1974a: 205; Griffiths 1974b: 256; Griffiths 1974c: 332; Griffiths 1975: 175; Arimoto 1976: 209–220, Figure 113–114; Arimoto and Kikuchi 1977: 93–95, Figure 2E; Arimoto and Hirayama 1979: 51; Cavedini 1982: 508; Wass 1972: 151; Rupert and Fox 1988: 238, 239, Figure 222, 403; Krapp-Schickel 1993: 791–793; Aoki and Asakura 1995: 192; Takeuchi 1995: 202–203, Figure 189; Aoki 1997: 449; Camp et al. 1998: 132; Cházaro-Olvera et al. 2002: 5; Ortiz et al. 2002: Figure 23; Guerra-García and Takeuchi 2002: 692–693, Figure 12; Guerra-García and Takeuchi 2004: 1013, Figure 35.

**Known distribution.** Nearly cosmopolitan. (Northeast Atlantic, Nova Scotia to Georgia; GOM; Caribbean Sea; California; South Africa; Hawaiian Islands; Sea of Japan; New Zealand; New South Wales, Australia) (McCain 1968).

**Known Gulf of Mexico records.** Alligator Harbor, Panama City, St. Andrew Bay, and Destin, Florida (McCain 1968).

**New records.** Ocean Springs, Mississippi (S.E. LeCroy, pers. comm., The University of Southern Mississippi, Gulf Coast Research Laboratory.)

**Remarks.** Habitat preference is nonspecific, occurring on various algae, seagrasses, sponges, hydroids, tunicates, bryozoans (ectoprocts), and echinoids (*Arbacia*) (McCain 1968). Bynum (1978) examined the reproductive biology of this species in North Carolina and noted that it apparently breeds year round with a peak in the spring and a lesser peak in late summer or early fall. In 1980, Bynum explored the morphological variation within *C. penantis* and noted 2 trends, one apparently related to the degree of wave action and the second trend based upon seasonal variation between summer and winter. Caine (1983) reported *C. penantis* on the sea whip *Leptogorgia virgulata* in *Thalassia testudinum* meadows in northwestern Florida. Valério-Berardo and Flynn (2002) noted that *C. penantis* comprised 23.77% of the total amphipod fauna associated with the red algae *Bryocladia trysigera* at a study site in southeastern Brazil. *Caprella penantis* appears to be the most common caprellid found as epibionts on the carapaces of loggerhead sea turtles *Caretta caretta* on the east coast of the United States (Mike Frick, pers. comm., *Caretta* Research Project, Savannah, Georgia.)

## ACKNOWLEDGMENTS

The authors thank J. Shaw, M. Williams, and C. Schloss of the Gunter Library for their assistance in gathering sources. Sara E. LeCroy provided considerable assistance with specimens and tireless counsel, and J.N. Thoma gave assistance and support during the preparation of the manuscript.

## LITERATURE CITED

- Aoki, M. 1997. Comparative study of mother-young association in caprellid amphipods: is material care effective? *Journal of Crustacean Biology* 17:447–458.
- Aoki, M. and A. Asakura. 1995. Caprellids (Crustacea: Amphipoda: Caprellidae) collected from the Ogasawara (Bonin) Islands. *Journal of the Natural History Museum and Institute of Chiba* 3(2):191–194.
- Aoki, M. and T. Kikuchi. 1995. Notes on *Caprella andreae* Mayer, 1890 (Crustacea: Amphipoda) from the carapace of loggerhead sea turtles in the East China Sea and in Kyushu, Japan. *Proceedings of the Japanese Society for Systematic Zoology* 53:54–61.
- Arimoto, I. 1970. List of Caprellid Amphipoda in Japan with record of new localities. *Bulletin of the Biogeographical Society of Japan* 25(3):13–15.
- Arimoto, I. 1971a. List of Caprellidae (Amphipoda) in Japan with record of new localities. *Bulletin of the Biogeographical Society of Japan* 26(3):13–20.
- Arimoto, I. 1971b. The Caprellidae (Crustacea: Amphipoda) of Lake Kamoko and Ryotsu Bay, Sado Island. *Annual Report of the Sado Marine Biological Station Niigata University* 1:29–50.
- Arimoto, I. 1971c. Caprellidae of Japan. *Bulletin of the Biogeographical Society of Japan* 27:59–65.
- Arimoto, I. 1971d. Morphological change due to growth found in *Caprella equilibra* Say. *Research on Crustacea* 4,5:1–8.
- Arimoto, I. 1976. Taxonomic studies of caprellids (Crustacea, Amphipoda, Caprellidae) found in the Japanese and adjacent waters. *Special Publications from the Seto Marine Biological Laboratory, Series 3*, 229 p.
- Arimoto, I. 1980. Supplements to the Japanese caprellid fauna. I. Caprellids from the Korean Straits and adjacent waters. *Publications of the Seto Marine Biology Laboratory* 25:95–113.
- Arimoto, I. and A. Hirayama. 1979. A list of Caprellidea (Amphipoda) in Oshika Peninsula, Tohoku District, with description of a new species and some new record to Japan. *Bulletin of the Biogeographical Society of Japan* 33(5):43–53.
- Arimoto, I. and T. Kikuchi. 1977. Caprellids obtained in the vicinity of the Amakusa Island West Kyushu. *Publications of the Amak USA Marine Biological Laboratory* 4(2):91–98.
- Bieri, R. and T. Tokioka. 1968. Dragonet II, an opening-closing quantitative trawl for the study of microvertical distribution of zooplankton and the meio-epibenthos. *Publications of the Seto Marine Biology Laboratory* 15:373–390.

- Bynum, K.H. 1978. Reproductive biology of *Caprella penantis* Leach, 1814 (Amphipoda: Caprellidae) in North Carolina, U.S.A. *Estuarine and Coastal Marine Science* 7:473–485.
- Bynum, K.H. 1980. Multivariate assessment of morphological variation in *Caprella penantis* Leach, 1814 (Amphipoda: Caprellidae). *Estuarine and Coastal Marine Science* 10:225–237.
- Caine, E.A. 1974. Comparative functional morphology of feeding in three species of caprellids (Crustacea, Amphipoda) from the northwestern Florida gulf coast. *Journal of Experimental Marine Biology and Ecology* 15:81–96.
- Caine, E.A. 1983. Community interactions of *Caprella penantis* Leach (Crustacea: Amphipoda) on sea whips. *Journal of Crustacean Biology* 3:497–504.
- Caine, E.A. 1986. Carapace epibionts of nesting loggerhead sea turtles: Atlantic coast of U.S.A. *Journal of Experimental Marine Biology and Ecology* 95:15–26.
- Caine, E.A. 1998. First case of caprellid amphipod-hydrozoan mutualism. *Journal of Crustacean Biology* 18:317–320.
- Camp, D.K., W.G. Lyons, and T.H. Perkins. 1998. Checklists of selected shallow-water marine invertebrates of Florida. Florida Marine Research Institute Technical Report TR-3:1–238.
- Cavedini, P. 1982. Contributo alla conoscenza dei Caprellidi del Mediterraneo (Crustacea, Amphipoda). *Bollettino del Museo civico di storia naturale di Verona* 8:491–531.
- Cházaro-Olvera, S., I. Winfield, M. Ortiz, and F. Álvarez. 2002. Peracarid crustaceans from three inlets in the southwestern Gulf of Mexico: new records and range extensions. *Zootaxa* 123:1–16.
- Cockman, B. and P. Albone. 1987. Caprellidae of the Swan River Estuary. Curtin University Environmental Studies Group Report No. 1:163–177.
- Escobar-Briones, E. and I. Winfield. 2003. Checklist of the benthic Gammaridea and Caprellidea (Crustacea: Peracarida: Amphipoda) from the Gulf of Mexico continental shelf and slope. *Belgian Journal of Zoology* 133:37–44.
- Foster, J.M., R.W. Heard, and D.M. Knott. 2004. Northern range extensions for *Caprella scaura* Templeton, 1836 (Crustacea: Amphipoda: Caprellidae) on the Florida Gulf coast and in South Carolina. *Gulf and Caribbean Research* 16:65–69.
- Gable, M.F. and E.A. Lazo-Wasem. 1987. The Caprellids (Amphipoda: Caprellidae) of Bermuda: A survey of specimens collected from 1876–1987, including cave inhabitants, and the description of *Deutella aspiducha*, new species. *Proceedings of the Biological Society of Washington* 100:629–639.
- Gosner, K.L. 1971. Guide to the Identification of Marine and Estuarine Invertebrates: Cape Hatteras to the Bay of Fundy. Wiley-Interscience, New York, NY, USA, 693 p.
- Griffiths, C.L. 1973. The Amphipoda of Southern Africa. Part 1. The Gammaridea and Caprellidea of southern Mozambique. *Annals of the South African Museum* 60:265–306.
- Griffiths, C.L. 1974a. The Amphipoda of southern Africa, Part 2. The Gammaridea and Caprellidea of South West Africa south of 20°S. *Annals of the South African Museum* 62:169–208.
- Griffiths, C.L. 1974b. The Amphipoda of southern Africa, Part 3. The Gammaridea and Caprellidea of Natal. *Annals of the South African Museum* 62:209–264.
- Griffiths, C.L. 1974c. The Amphipoda of southern Africa, Part 4. The Gammaridea and Caprellidea of the Cape Province east of Cape Agulhas. *Annals of the South African Museum* 65:251–336.
- 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.
- Guerra-García, J.M. 2002. Redescription of five rare caprellids (Crustacea: Amphipoda: Caprellidea) collected from Tanzanian coasts. *Helgolander Marine Research* 55:221–231.
- Guerra-García, J.M. 2003a. Revision of the genus *Deutella* (Crustacea: Amphipoda: Caprellidea) with description of a new species, redescription of *Deutella venenosa* Mayer, 1890 and a key to the species of *Deutella*. *Journal of Natural History* 37:1059–1084.
- Guerra-García, J.M. 2003b. The caprellidean Amphipoda from the subantarctic islands of New Zealand and Australia with the description of a new genus and two new species. *Scientia Marina* 67:177–194.
- Guerra-García, J.M. and I. Takeuchi. 2002. The Caprellidea (Crustacea: Amphipoda) from Ceuta, North Africa, with the description of three species of *Caprella*, a key to the species of *Caprella*, and biogeographical discussion. *Journal of Natural History* 36:675–713.
- Guerra-García, J.M. and I. Takeuchi. 2003. The Caprellidea (Malacostraca: Amphipoda) from Mirs Bay, Hong Kong, with the description of a new genus and two new species. *Journal of Crustacean Biology* 23:154–168.
- Guerra-García, J.M. and I. Takeuchi. 2004. The Caprellidea (Crustacea: Amphipoda) from Tasmania. *Journal of Natural History* 38:967–1044.
- Guerra-García, J.M. and M. Thiel. 2001. La fauna de caprellidos (Crustacea: Amphipoda: Caprellidea) de la costa de Coquimbo, centro-norte de Chile, con una clave taxonomica para la identificación de las especies. The caprellid fauna (Crustacea: Amphipoda: Caprellidea) from the coast of Coquimbo, Northern-central Chile, with a taxonomic key for species identification. *Revista Chilena de Historia Natural* 74:873–883.
- Hedgpeth, J.W., H.L. Whitten, and H.F. Rosene. 1950. Annotated list of certain marine invertebrates found on Texas jetties. Appendix V. The invertebrate fauna of Texas coast jetties: A preliminary survey. *Publications of the Institute of Marine Science of the University of Texas* 1(2):53–87.
- Hedgpeth, J.W. 1953. An introduction to the zoogeography of the northwestern Gulf of Mexico with reference to the invertebrate fauna. *Publications of the Institute of Marine Science of the University of Texas* 3:107–224.
- Johnson, S.E. 1986. Order Amphipoda. In: W. Sterrer, ed., *Marine Fauna and Flora of Bermuda*. John Wiley & Sons, New York, NY USA, p. 372–381.
- Keith, D.E. 1969. Aspects of feeding in *Caprella californica* Stimpson and *Caprella equilibra* Say (Amphipoda). *Crustaceana* 16:119–124.
- Krapp-Schickel, G. 1969. Zur Ökologie der Amphipoden aus dem Phytal der Nordadria. *Zoologische Jahrbuecher Systematik* 96:264–448.

- Krapp-Schickel, G. 1993. Suborder Caprellidea. In: S. Ruffo, ed. The Amphipoda of the Mediterranean. Part 3. Gammaridea (Melphidippidae to Talitridae), Ingolfiellidea, Caprellidea. Mémoires de l'Institut océanographique, Monaco 13:773-813.
- Laubitz, D.R. 1970. Studies on the Caprellidae (Crustacea, Amphipoda) of the American North Pacific. National Museum of Natural Sciences (Ottawa), Publications in Biological Oceanography 1:1-89.
- Laubitz, D.R. 1972. The Caprellidae (Crustacea, Amphipoda) of Atlantic and Arctic Canada. National Museum of Natural Sciences (Ottawa), Publications in Biological Oceanography 4:1-82.
- Laubitz, D.R. 1993. Caprellidea (Crustacea: Amphipoda): towards a new synthesis. Journal of Natural History 27(4):965-976.
- Laubitz, D.R. 1995. Caprellidea (Crustacea: Amphipoda) from the southern and western Indian Ocean. Mesogee 54:81-100.
- Lazo-Wasem, E.A. and M.F. Gable. 1987. A review of recently discovered type specimens of Bermuda Amphipoda (Crustacea: Peracarida) described by B.W. Kunkel (1882-1969). Proceedings of the Biological Society of Washington 100:321-336.
- Lee, K.S. and C.M. Lee. 1993. Caprellids (Amphipoda, Caprellidae) from the East Sea in Korea. Korean Journal of Zoology 36:353-366.
- Lewis, F.G. III and A.W. Stoner. 1983. Distribution of macrofauna within seagrass beds: An explanation for patterns of abundance. Bulletin of Marine Science 33:296-304.
- Lim, S.T.A. and C.G. Alexander. 1986. Reproductive behaviour of the caprellid amphipod, *Caprella scaura typica*, Mayer 1980. Marine Behavior and Physiology 12:217-230.
- Marelli, D.C. 1981. New records for Caprellidae in California, and notes on a morphological variant of *Caprella verrucosa* Boeck, 1871. Proceedings of the Biological Society of Washington 94:654-662.
- Martin, T.R. and S.A. Bortone. 1997. Development of an epifaunal assemblage on an estuarine artificial reef. Gulf of Mexico Science 1997(2):55-70.
- McCain, J.C. 1968. The Caprellidae (Crustacea: Amphipoda) of the Western North Atlantic. Bulletin of the United States National Museum No. 278:1-147.
- McCain, J.C. 1969. New Zealand Caprellidae (Crustacea: Amphipoda). New Zealand Journal of Marine and Freshwater Research 3:286-295.
- McCain, J.C. and W.S. Gray Jr. 1971. Antarctic and subantarctic Caprellidae (Crustacea: Amphipoda). Biology of the Antarctic Sea 4:111-139.
- McCain, J.C. and J.E. Steinberg. 1970. Caprellidae I. Family Caprellidae. In: H.-E. Gruner and L.B. Holthius, eds. Crustaceorum Catalogus. Amphipoda I, part 2. Dr. W. Junk Publishers, The Hague, The Netherlands, p. 1-78.
- Menzel, R.W. 1956. Annotated check-list of the marine fauna and flora of the St. George's Sound—Apalachee Bay region, Florida Gulf coast. Florida State University Oceanographic Contribution No. 61:1-78.
- Minchin, D. and J.M.C. Holmes. 1993. A skeleton shrimp *Caprella andreae* Mayer (Crustacea: Amphipoda) new to Ireland, and other strandings in September 1991. Irish Naturalist's Journal 24:285-286.
- Myers, A.A. and J.K. Lowry. 2003. A phylogeny and a new classification of the Corophiidea Leach, 1814 (Amphipoda). Journal of Crustacean Biology 23:443-485.
- Ortiz, M., F. Álvarez, and I. Winfield. 2002. Caprellid amphipods (Amphipoda: Caprellidea): Illustrated key for the genera and species from the Gulf of Mexico and Caribbean Sea. Universidad Nacional Autónoma de México, Facultad de Estudios Superiores Iztacala, Mexico. 83 p.
- Pearse, A.S. 1908. Descriptions of four new species of amphipodous Crustacea from the Gulf of Mexico. Proceedings of the US National Museum 34:27-32.
- Pearse, A.S. 1912. Notes on certain amphipods from the Gulf of Mexico, with descriptions of new genera and new species. Proceedings of the US National Museum 43:369-379.
- Pequegnat, W.E. 1966. Biofouling studies off Panama City, Florida. I. Research Report, Office of Naval Research, Texas A&M University, Department of Oceanography, Reference 66-17T, 33 p.
- Pequegnat, W.E. and L.H. Pequegnat. 1968. Ecological aspects of marine fouling in the northeastern Gulf of Mexico. Texas A&M University, Department of Oceanography, Reference 68-22T, College Station, TX, USA, 80 p.
- Ricketts, E.F., J. Calvin, and J.W. Hedgpeth. 1968. Between Pacific tides. 4th ed. Stanford University Press. Stanford, CA, USA, 614 p.
- Rupert, E.E. and R.S. Fox. 1988. Seashore Animals of the Southeast: A Guide to Common Shallow-Water Invertebrates of the Southeastern Atlantic Coast. University of South Carolina Press, Columbia, SC, USA, 429 p.
- Say, T. 1818. An account of the Crustacea of the United States. Journal of the Academy of Natural Sciences of Philadelphia 1:374-401.
- Sconfietti, R. and P. Luparia. 1995. Population ecology of the amphipod *Caprella equilibra* Say in a lagoon estuary (northern Adriatic Sea, Italy). Marine Ecology 16:1-11.
- Serejo, C.S. 1997. *Hemiaegina costai* Quitete, 1972 a synonym of *Hemiaegina minuta* Mayer, 1890 (Amphipoda, Caprellidae). Crustaceana 70:630-632.
- Serejo, C.S. 1998. Gammaridean and caprellidean fauna (Crustacea) associated with the sponge *Dysidea fragilis* Johnston at Arraial do Cabo, Rio de Janeiro, Brazil. Bulletin of Marine Science 63:363-385.
- Steinberg, J.E. and E.C. Dougherty. 1957. The skeleton shrimps (Crustacea: Caprellidae) of the Gulf of Mexico. Tulane Studies in Zoology 5:267-288.
- Sterrer, W. and C. Schoepfer-Sterrer, eds. 1986. Marine Fauna and Flora of Bermuda: A Systematic Guide to the Identification of Marine Organisms. John Wiley and Sons, New York, NY, USA, 742 p.
- Stoner, A.W. 1980. The role of seagrass biomass in the organization of benthic macrofaunal assemblages. Bulletin of Marine Science 30:537-551.
- Takeuchi, I. 1995. Suborder Caprellidea. In: S. Nishimura ed. Guide to seashore animals of Japan with color pictures and keys. Vol. 2. Hoikusha, Osaka, Japan. p. 193-205 (in Japanese).
- Takeuchi, I. 1999. Checklist and bibliography of the Caprellidea (Crustacea: Amphipoda) from Japanese waters. Otsuchi Marine Science 24:5-17.

## NORTHERN GULF OF MEXICO CAPRELLIDS

- Utinomi, H. 1968. Epibenthic or planktonic caprellids from the environs of Tanabe Bay (Amphipoda: Caprellidae). Publication of the Seto Marine Biological Laboratory 16:281-289.
- Utinomi, H. 1969. Caprellids from Kamaé Bay, northeastern Kyusyu (Amphipoda; Caprellidae). Publications of the Seto Marine Biological Laboratory 16:295-306.
- Utinomi, H. 1973. Additional records of the Caprellidae (Amphipoda) from Japan. Bulletin of the Biogeographical Society of Japan 29:29-38.
- Vadon, C. 1984. La faune carcinologique associée à l'actinie *Anemonia sulcata* (Pennant) sur les côtes françaises de Méditerranée. Océanis 10:551-555.
- Valério-Berardo, M.T. and M.N. Flynn. 2002. Composition and seasonality of an amphipod community associated to the algae *Bryocladia trysigera*. Brazilian Journal of Biology 62:735-742.
- Vassilenko, S.V. 1974. Caprellids (marine shrimps) of the seas of the USSR and neighboring waters. Order Amphipoda (Families Paraceropidae, Phtisicidae, Caprellidae). Opredeliteli po Faune SSSR 107:1-288 [in Russian].
- Wass, M.L. 1972. A check list of the biota of lower Chesapeake Bay: With inclusions from the upper bay and the Virginian Sea. Virginia Institute of Marine Science, Special Scientific Report No. 65:1-290.
- Watling, L. and D. Maurer. 1972. Marine shallow water amphipods of the Delaware Bay area, U.S.A. Crustaceana, Studies on Peracarida (Isopoda, Tanaidacea, Amphipoda, Mysidacea, Cumacea). Supplement 3:251-266.
- Wirtz, P. 1998. Caprellid (Crustacea)—holothurian (Echinodermata) associations in the Azores. Arquipélago Boletim da Universidade dos Acores Ciencias Biologicas e Marinhas 16:53-55 [In English with Portuguese summary].