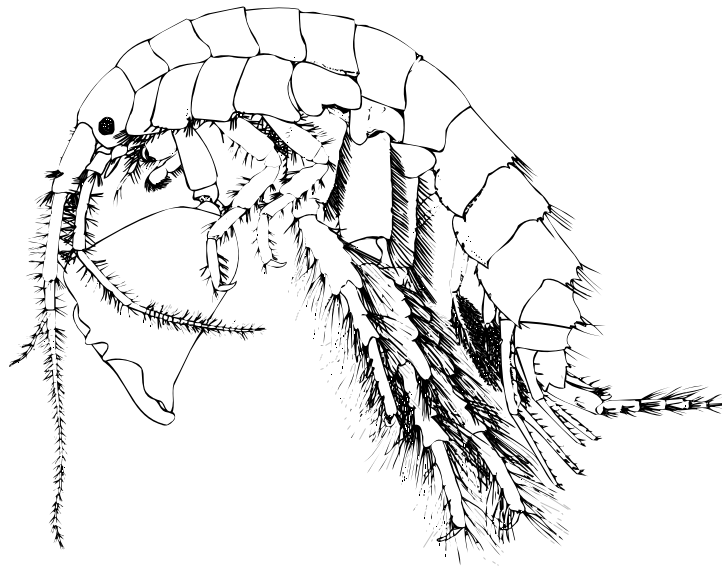


AN ILLUSTRATED IDENTIFICATION GUIDE TO THE NEARSHORE MARINE AND ESTUARINE GAMMARIDEAN AMPHIPODA OF FLORIDA

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**VOLUME 1
FAMILIES GAMMARIDAE, HADZIIDAE,
ISAEIDAE, MELITIDAE AND OEDICEROTIDAE**

Cover illustration: *Dulichiesta appendiculata* (Say, 1818) by Richard W. Heard.

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ERRATA - VOLUME 1

Page 5, paragraph 6, line 4, change “users” to “user’s.”

Page 6, paragraph 1, line 2, change “P1-7 (peraeopods 1-7)” to “P3-7 (peraeopods 3-7)”; paragraph 4, line 7, delete “then” after comma (should read “occurs, the user should then return to the”).

Page 17, couplet 13, part 2, change “coxa 1-2” to “coxae 1-2”.

Page 79, *Dumosus atari*, Synonymy, line 1; Remarks, paragraph 2, line 1; change Barnard & Thomas, 1985c to Thomas and Barnard, 1985c.

Page 105, Florida species, line 1, change “*M. cf planaterga*” to “*M. planaterga*”.

Page 114, Distribution, line 1, change “Cape Romain” to “Cape Romano”.

Page 137, Synonymy, line 1, change “p. 177.” to “p. 177,”; Remarks, line 5, change “Hawaiian or Florida waters” to “Hawaiian or Floridan waters.”

Page 144, Florida species, line 1, delete extra comma after *P. macromana*.

Page 155, Synonymy, line 1, add period after “Fig. 4”; Ecology, line 4, delete comma after “Chesapeake”.

Page 165, line 1, change “Genus *Americhelidium* (Sars, 1892)” to “Genus *Americhelidium* Bousfield and Chevrier, 1996”.

Page 167, line 1, change “Genus *Ameroculodes* Stimpson, 1853” to “Genus *Ameroculodes* Bousfield and Chevrier, 1996”.

Page 168, line 1, change “Genus *Deflexilodes*? Stimpson, 1853” to “Genus *Deflexilodes*? Bousfield and Chevrier, 1996”; Genus *Deflexilodes*?, Remarks, line 1, change “doesn’t” to “does not”; *Deflexilodes*? sp. A, Synonymy, line 3, change “?*Deflexoides*” to “?*Deflexiodes*”.

Page 170, *Perioculodes cerasinus*, Remarks, line 3, change “formalin” to “Formalin”.

Page 182, Shoemaker, 1955, line 2, add a period after “MacGinitie”.

Page 183, Thomas and Barnard, 1984, line 1, change “snad” to “sand”.

Page 184, Wakabara and Serejo, 1998, line 3, delete the period after “*Museu Nacional*”.

Page 185, Fig. 3, line 1, add period after “Figure 5”.

Page 186, Figure 30, line 2, change “Myers, 1983” to “Myers, 1981”.

Page 190, Figure 91, line 2, delete “)” after “1970”.

Page 191, Figure 96, line 4, change “Sheridan, 1979” to “Sheridan, 1980”.

Page 192, Fig. 130, line 4, change “Boudfield” to “Bousfield”.

Page 193, Figure 139, line 1; Figure 140, line 3; Figure 141, line 1; Figure 143, line 1; change “Bynum & Fox, 1973” to “Bynum & Fox, 1977”.

Page 194, Figure 183, line 2; Figure 186, line 1; Figure 187, line 1; change “McKinney, 1980” to “McKinney, 1980a”.

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An Illustrated Identification Guide to the Nearshore Marine and Estuarine
Gammaridean Amphipoda of Florida

Volume 1
Families Gammaridae, Hadziidae, Isaeidae, Melitidae, and Oedicerotidae

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INTRODUCTION

Gammaridean amphipod crustaceans are prominent members of marine and estuarine benthic communities worldwide, occurring in most polar, subpolar, temperate, subtropical and tropical regions. In the southeastern United States, they are especially diverse in Florida waters, reflecting the wide variety of suitable habitats found there. These habitats range from temperate to tropical, low salinity to high salinity, and soft bottom to hard bottom. They include marshes, mangroves, muddy bay bottoms, oyster reefs, sandy open beaches, grassbeds, floating and submerged algal mats, man-made hard substrates such as bridges, piers and sea walls, coral rubble, and coral reefs. Gammaridean amphipods are found in all of these environments, often in large numbers.

Recently, an increased interest in regional biodiversity studies, as well as ongoing work on environmental monitoring, impact assessment, and bioassay programs, have underscored the need for accessible, up-to-date, easy to use, identification manuals for regional faunas. Unfortunately, in spite of the abundance and diversity of gammaridean amphipods along the Florida coast, no such comprehensive regional guide for the group exists in the literature. Many frequently encountered species remain undescribed and much of the literature for the described species is only to be found in older, not readily available journal articles and monographs. This guide seeks to alleviate the problem by consolidating information from the literature into a single source, as well as presenting data on many of the recognized, but as yet undescribed, taxa from Florida waters.

The geographic area encompassed herein includes the marine and estuarine coastal waters of the state of Florida from Perdido Bay to the St. Marys River, including the Florida Keys. All habitats in this region occurring at depths of less than 10 meters are covered. In general, freshwater and terrestrial habitats are not represented; however, there are a few taxa normally found in these environments that occasionally appear in estuarine areas and such taxa are included.

As stated above, the main purpose of this guide is to provide a means of identification of the shallow-water amphipods that are likely to be found in Florida coastal waters. As such, it does not include a great deal of general information on the collection, preservation, biology or ecology of amphipods; much of this information has been previously summarized and is readily available in other publications (eg. Barnard, 1969; Bousfield, 1973; Schram, 1986; Barnard and Karaman, 1991; Thomas, 1993; Watling and Thomas, 1997). Instead, the focus is on providing as much species-specific morphological and habitat information as possible, in a concise illustrated key format, with the intent of producing a manual that will be useful to workers at all levels of taxonomic expertise.

The guide consists of four volumes, released over a period of four years, with each volume containing a subset of the amphipod families occurring in Florida. In addition, Volume 1 contains an illustrated key to all of the families and each volume includes a glossary and extensive literature cited section. In general, the arrangement is alphabetical by family, genus and species within each volume, both for ease of use and because the higher taxonomy of the order Amphipoda is still in a state of flux and there is currently much discussion over the proper phylogenetic ordering of the higher taxa within the group. However, the overall order of the four volumes is only semi-alphabetical; several of the more difficult families are presented in the first two volumes to provide that information to users with a minimum of delay.

There is also currently much debate over the family level composition of the suborder Gammaridea, as well as the placement of genera within certain families. For the most part, the higher level classification used herein follows that of Barnard and Barnard (1983) and Barnard and Karaman (1991); however, for certain groups (eg. gammaroids, corophioids) many of the families combined by these authors are still recognized as valid taxonomic units by current experts in those groups and have been retained.

AMPHIPOD MORPHOLOGY

Amphipods are relatively small crustaceans, ranging in size from 1 to 280 mm, although it is rare to find one larger than 20 mm in Florida waters. They are members of the superorder Peracarida, which also includes the Isopoda, Tanaidacea, Cumacea, and Mysidacea, as well as several other less well-known orders. As is the case for other peracarids, amphipods carry their eggs and young within a brood pouch or marsupium. There are no free-swimming larval stages and by the time the young are released, they are essentially miniature adults.

Of the four known amphipod suborders, Gammaridea, Caprellidea, Hyperiidea and Ingolfiellidea, the gammarideans are by far the most abundant and diverse. They exhibit a wide range of morphological modifications and adaptations, but the basic body design for the most part remains the same (Fig. 1). They have no carapace and are generally laterally compressed, although there are many exceptions, especially among the tube-dwellers, which tend to be cylindrical. The body is composed of the head, which bears the antennae and mouthparts, the pereaeon, which bears the gnathopods and pereopods, and the abdomen, which consists of the pleon and urosome and bears the pleopods, uropods and telson. These appendages are briefly described below; however, a much more complete description may be found in Barnard (1969), Bousfield (1973), Barnard and Karaman (1991), or Watling and Thomas (1997).

There are two pairs of antennae in gammaridean amphipods (Fig. 2). The first of these, antenna 1, is usually composed of a proximal, 3-articulate peduncle, followed by a distal, multiarticulate flagellum. In many species, antenna 1 is uniramous; in many others it is biramous, with an accessory flagellum arising from the distal end of the third peduncular article. Antenna 2 is uniramous and is usually composed of a 5-articulate peduncle and a multiarticulate flagellum. In some cases, the flagellae of one or both antennae may be reduced to a few small articles. The antennae function as sensory, locomotory, feeding or grasping appendages.

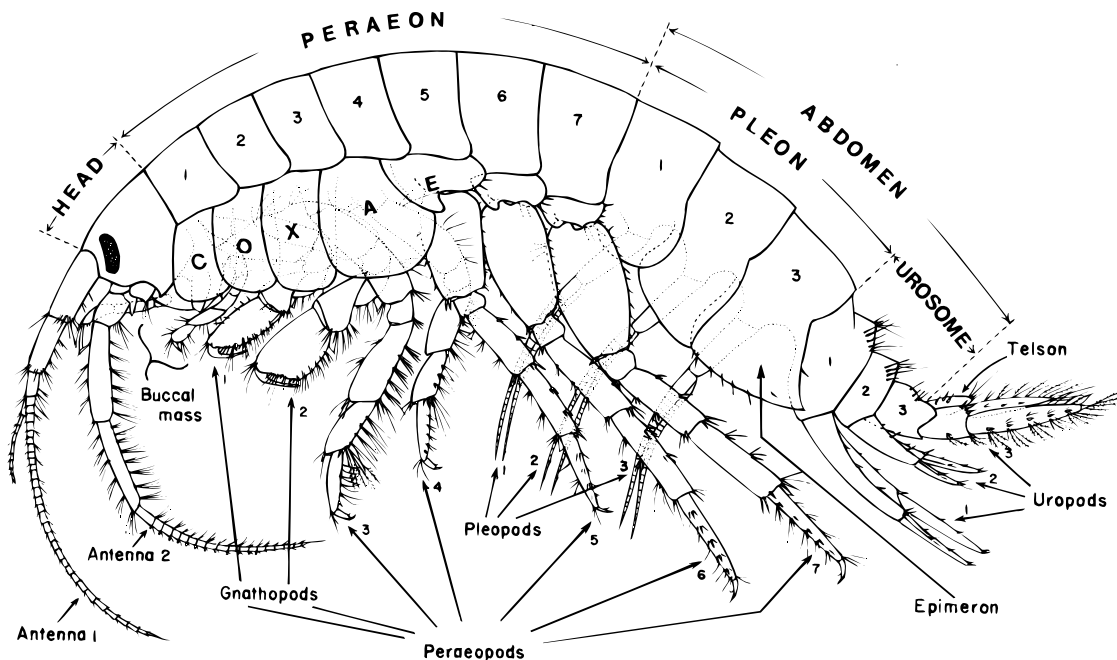


Figure 1. Basic gammaridean amphipod morphology (lateral view). (From *Shallow-Water Gammaridean Amphipoda of New England* by E.L. Bousfield 1973. Reproduced courtesy of the Canadian Museum of Nature, Ottawa, Ontario, Canada.)

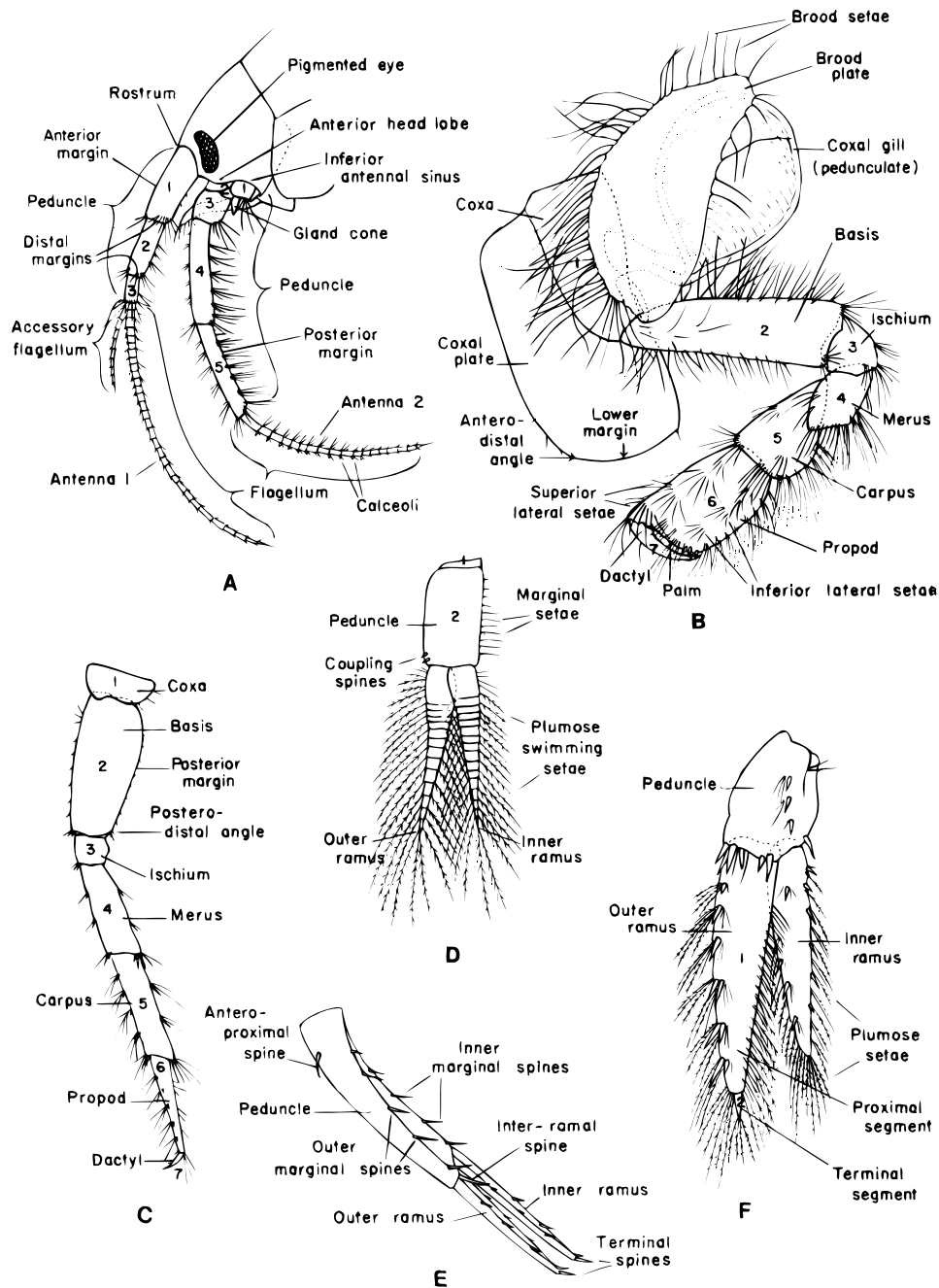


Figure 2. Basic gammaridean amphipod body appendages (not to scale). A - head region; B - gnathopod 2; C - peraeopod 7; D - pleopod; E - uropod 1; F - uropod 3. (From *Shallow-Water Gammaridean Amphipoda of New England* by E.L. Bousfield 1973. Reproduced courtesy of the Canadian Museum of Nature, Ottawa, Ontario, Canada.)

The mouthparts (Fig. 3) consist of an anterior upper lip, or labrum, followed by one pair of mandibles, a lower lip, or labium, two pairs of maxillae, and a pair of basally fused maxillipeds (usually referred to as one appendage, the maxilliped, because of the basal fusion). These appendages together form the mouthpart bundle or buccal mass, located on the ventral surface of the head.

The first two pairs of peraeonal appendages are the gnathopods (Fig. 2), which are often highly modified for grasping, carrying, feeding, or other activities. They are normally composed of seven articles: the coxa (article 1), which is fused to the body; the basis (article 2); the ischium (article 3);

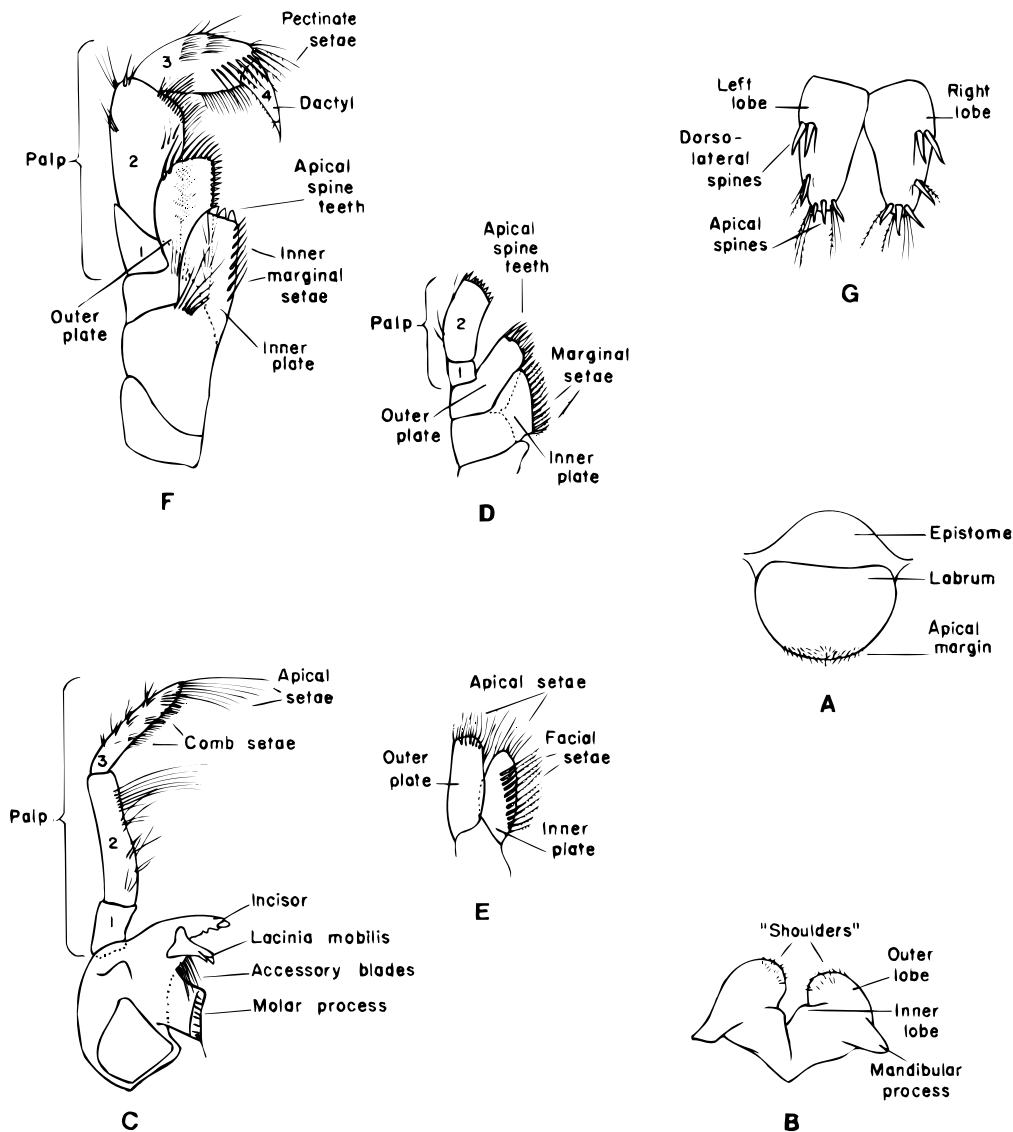


Figure 3. Basic gammaridean amphipod mouthparts and telson (not to scale). A - upper lip; B - lower lip; C - mandible; D - maxilla 1; E - maxilla 2; F - maxilliped; G - telson. (From *Shallow-Water Gammaridean Amphipoda of New England* by E.L. Bousfield 1973. Reproduced courtesy of the Canadian Museum of Nature, Ottawa, Ontario, Canada.)

the merus (article 4); the carpus (article 5); the propodus (article 6); and the dactyl (article 7). In many species, the gnathopods, especially gnathopod 2, are sexually dimorphic, with the propodus and dactyl being larger and more highly modified in the male than in the female. Attached to the outer surface of the coxa is a flattened structure called the coxal plate, which may vary greatly in size and morphology between species. In addition, the coxa of gnathopod 2 bears a small sac-like, plate-like or occasionally dendritic respiratory appendage called the coxal gill, as well as, in females, a marginally setose, plate-like or strap-like oostegite or brood plate.

The remaining five pairs of peraeonal appendages are the peraeopods, which are numbered 3-7 (peraeonal appendages 3-7) from anterior to posterior. Like the gnathopods, they are comprised of seven articles (coxa, basis, ischium, merus, carpus, propodus, and dactyl) and the coxa bears a coxal plate, coxal gill (on peraeopods 3-6, occasionally on peraeopod 7) and, in females, an oostegite (peraeopods 3-6). The peraeopods may be variously modified for walking, digging, swimming, or, occasionally, grasping.

The first three pairs of abdominal appendages, the pleopods (Fig. 2), are attached to pleon segments 1-3. They are biramous, normally consisting of a relatively stout peduncle and two multiarticulate rami. The synchronous beating of the pleopods serves to move water over the mouthparts and coxal gills for feeding (in some species) and respiration. Additionally, the pleopods may be used for swimming.

The last three pairs of abdominal appendages are the uropods (Fig. 2), which are attached to urosome segments 1-3. They are typically biramous, with a stout peduncle and two slender one- or two-articulate rami, but in many species the second and third uropods in particular may be uniramous, without rami, or totally lacking. The uropods are frequently highly modified and usually function in locomotion or stabilization, but in many cases they are sexually dimorphic and may serve a reproductive function as well.

The telson (Fig. 3) is a small laminar or fleshy flap attached to the distal margin of the third urosome segment. It may be variously cleft or entire, and functions in locomotion or, in the case of some tube-dwelling species, aids in anchoring the animal within the tube.

In addition to the overall morphology of the above appendages, their size or the relative amount of reduction of their component parts may be taxonomically important. This is especially true for the accessory flagellum, the antennal flagellae, the mandibular, maxillary and maxillipedal palps, gnathopod 1, the coxal plates, the pleopods and the uropods. In some cases, entire appendages may be vestigial or absent, although care must be taken to ascertain that the appendage in question is truly absent and not merely missing because of damage to the specimen under examination.

Determining the sex of an amphipod specimen is frequently important when trying to determine its identity because many taxonomically important characters are expressed differently in males and females. This is somewhat more easily accomplished with adult animals than with subadults or juveniles, which may not have fully developed adult characteristics. In many groups of amphipods, the males are more highly modified than the females, although often there is no difference. Males frequently have larger eyes, more well-developed antennae, larger gnathopods, and more powerful pleopods than females, particularly in species in which the males enter the water column in search of potential mates. However, there are other, less species-specific, characters which may be used to sex an amphipod that are useful in the majority of cases, even those where males and females are not obviously different. Males usually possess small rod-like or flap-like structures called penes, which function in sperm transfer, located on the ventral surface of the seventh pereopod segment, adjacent to the coxa of pereopod 7. Females lack these structures, but instead possess oostegites or brood plates attached to the coxae of pereopods 2-5. Even in small subadult specimens, penes and oostegites are often present, although in the case of the latter they are frequently represented by small sac-like oostegite buds. These are adjacent to and may appear similar to the coxal gills, but there is never more than one gill per coxa, so if there are two small sacs present, one of them is an oostegite bud and the specimen is a female.

USE OF KEYS

The keys in this guide, with a few minor exceptions, are in the standard dichotomous format normally used for such documents. Each couplet is accompanied by two figures illustrating the characters referred to in the text of that couplet and the sources for the illustrations used in these figures are given in the Appendix. Arrows are provided to focus the users attention on the specific area of interest within each illustration. In addition, each part of the figure is labeled to indicate the specific amphipod appendage or body part shown and these labels include the following abbreviations: A1-2

(antennae 1-2); CX1-7 (coxae 1-7); GN1-2 (gnathopods 1-2); HD (head); LL (lower lip); MD (mandible); MX1-2 (maxillae 1-2); MXPD (maxilliped); P1-7 (peraeopods 1-7); PLPD1-3 (pleopods 1-3); T (telson); U1-3 (uropods 1-3); UL (upper lip).

The first key presented is one to the families of gammaridean amphipods found in Florida and, unless the user already knows to which family the specimen to be identified belongs, this is the appropriate place to start. Once a family has been determined, the user then proceeds to the key for the genera belonging to that family, and, after identifying the genus, from there to the key for the species of that genus. In cases where there is only one Florida representative of a particular family or genus, there is obviously no need for further keys to the genera or species belonging to that taxon and none are presented (eg. there is only one genus, *Pariphinotus*, of the family Phliantidae found in Florida, so no key to genera is included for that family; however there are two species of that genus, *P. seclusus* and *P. seticoxus*, so a key to the species is presented).

An exception to the above procedure is necessary for the families Gammaridae, Hadziidae and Melitidae, all members of the section Gammarida (*sensu* Barnard and Barnard, 1983). Because of the current confused state of the taxonomy of these three families (see footnote, page 37 and **Remarks** section for marine Gammarida, page 48), they are keyed out as a unit in the family key and a single key to the Florida genera of all three families is presented, with the current family affiliations for each genus indicated in parentheses immediately following the genus name. Therefore, if the specimen being identified keys out to “Marine Gammarida (Gammaridae, Hadziidae, Melitidae)” in the family key, then the next step is to proceed to the key to the Florida genera of marine Gammarida, determine the genus, look to see which family it is in, go to the section for that family and genus, and continue through the key to Florida species of the genus.

To identify a specimen using a dichotomous key, the user starts at the first couplet of the key, determines which half of the couplet most closely represents that specimen, and proceeds to the next numbered couplet indicated. This procedure is continued until a taxonomic determination is arrived at (family, genus or species, depending on the key). If there is any doubt concerning the appropriate half of the couplet to select, the user should choose the one that seems to be the “best fit” and proceed until either an identification is reached or it becomes obvious that a mistake has been made. If the latter occurs, then the user should then return to the questionable couplet and select the other half, again continuing on as far as possible. Although every effort has been made to include all taxa known to occur in the area covered by the guide, there are undoubtedly other as yet unknown or rare taxa that may be encountered and this must be kept in mind when using these keys. After an identification is made with the keys, the specimen should always be carefully compared with all of the available morphological and ecological information to determine if that identification is a correct one.

At this point, a few additional words of caution should be inserted concerning the use of the keys contained in this manual. Because they are intended for use in Florida coastal waters only, these keys will not necessarily work well outside of this region, where other taxa not found in Florida may occur. In addition, the keys will work best with adult undamaged material, although in many cases it should be possible to use them to key out subadult or damaged material. Every effort has been made to use characters that are easily observed with a minimum of dissection and also to use several characters per couplet to alleviate problems caused by missing appendages. However, it is not always possible to do this and the use of some difficult characters, such as those involving the dissection and examination of mouthparts, is unavoidable. Excellent detailed instructions for dissecting and mounting amphipod appendages are given by Barnard (1969), Bousfield (1973) and Barnard and Karaman (1991).

The familial, generic and specific diagnoses included herein are also regional in scope and often will not be useful outside of the shallow coastal marine and estuarine waters of Florida. This is especially true for large families or genera, which may contain many taxa worldwide. These diagnoses are not intended to be all inclusive on a global basis, but rather to serve as an aid in identifying the regional amphipod fauna.

ACKNOWLEDGEMENTS

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KEY TO GAMMARIDEAN AMPHIPOD FAMILIES OF FLORIDA

1. < Urosome segments 1-3 fused 2

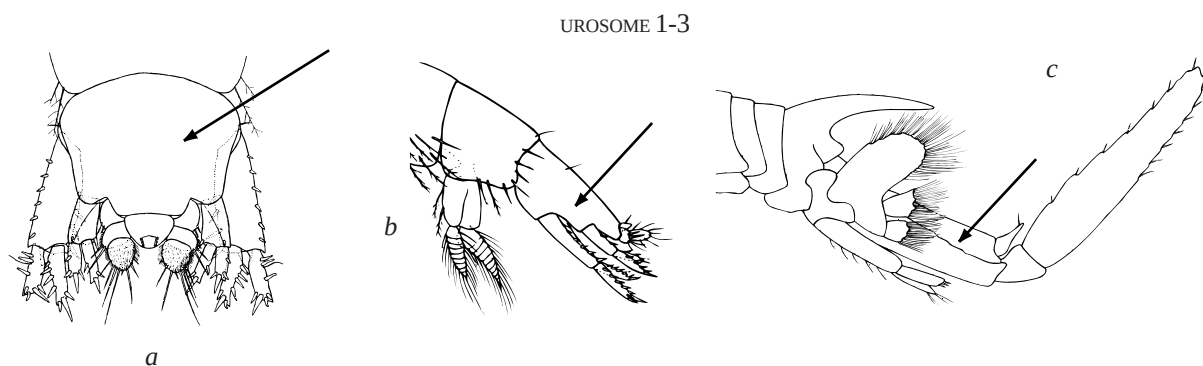


Figure 4.

- < Urosome segments 2 and 3 fused 3

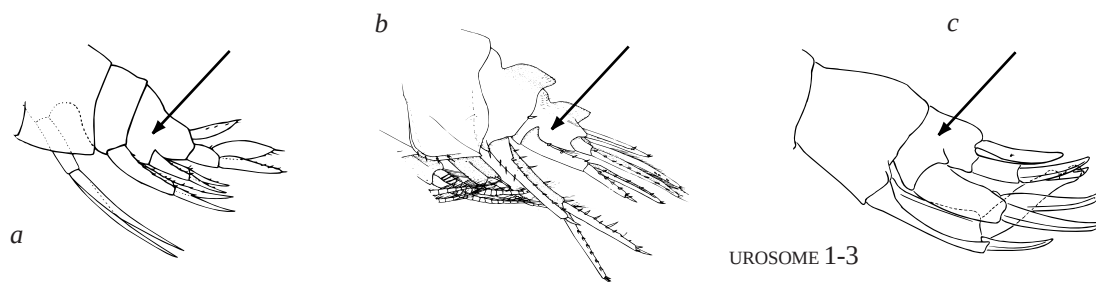


Figure 5.

- < Urosome segments 1-3 separate or, rarely, urosome segments 1-2 fused 6

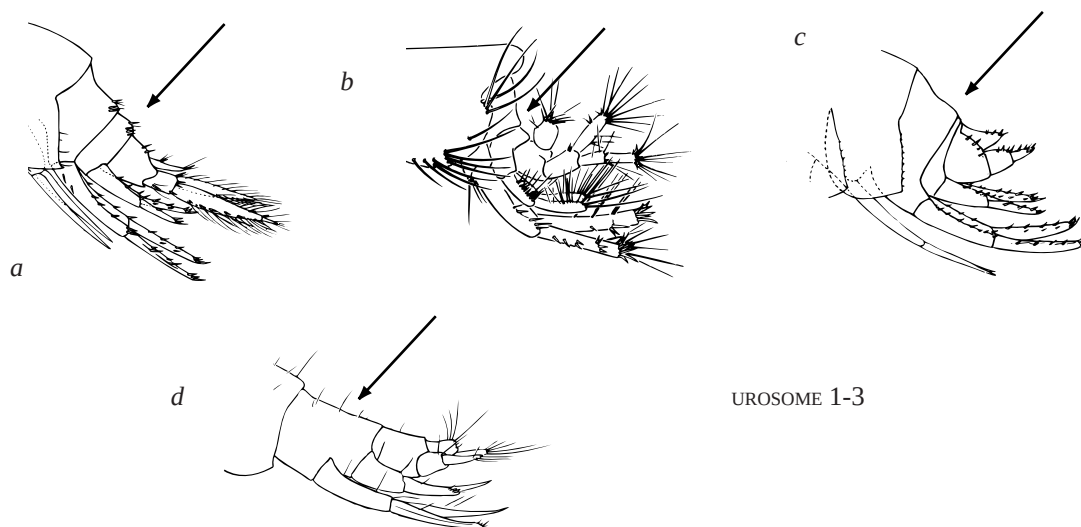


Figure 6.

2. < Antenna 1, accessory flagellum present; head globular; mandible, palp 3-articulate, articles stout; pleon segment 3 with posterodorsal teeth or processes; uropod 2, peduncle broadly expanded, longer than rami; uropod 3 elongate, extending well beyond uropods 1-2 CHELURIDAE

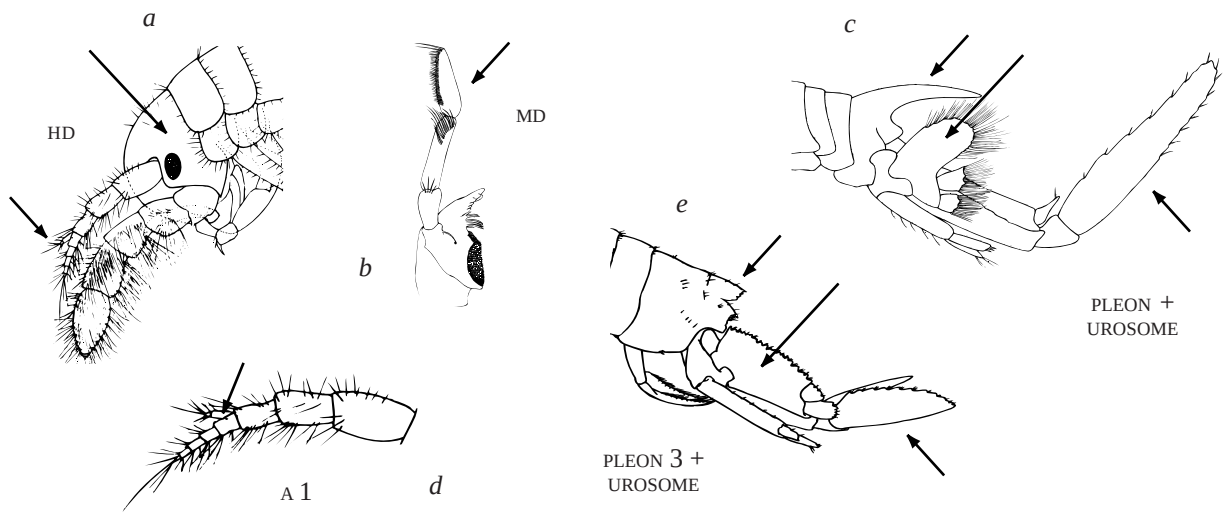


Figure 7.

- < Antenna 1, accessory flagellum absent; head not globular; mandible, palp 2-articulate, articles slender; pleon segment 3 without posterodorsal teeth or processes; uropod 2, peduncle not broadly expanded, subequal to rami in length; uropod 3 very short, not extending beyond uropods 1-2 COROPHIIDAE (in part)

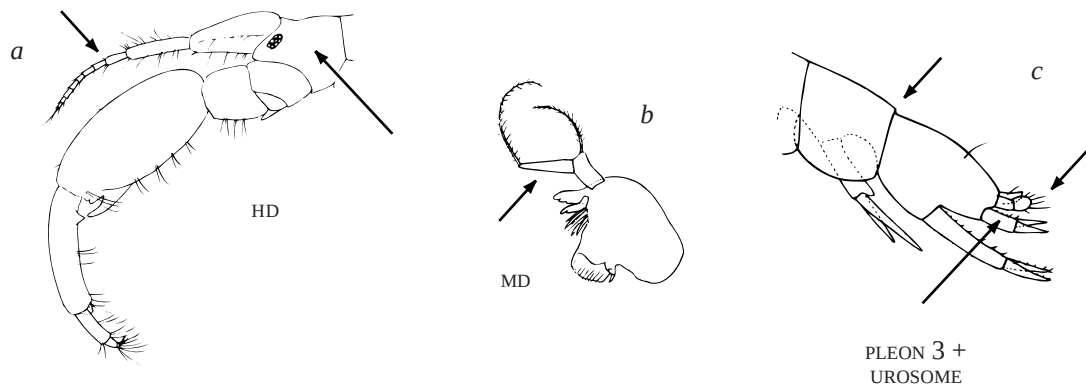


Figure 8.

3. < 2 pairs of eyes present, each eye small, with a single clear lens; gnathopod 2 simple; peraeopods 3-4, dactyl slender, elongate, subequal to or longer than propodus; peraeopod 7, basis subequal in length to remaining articles combined AMPELISCIDAE

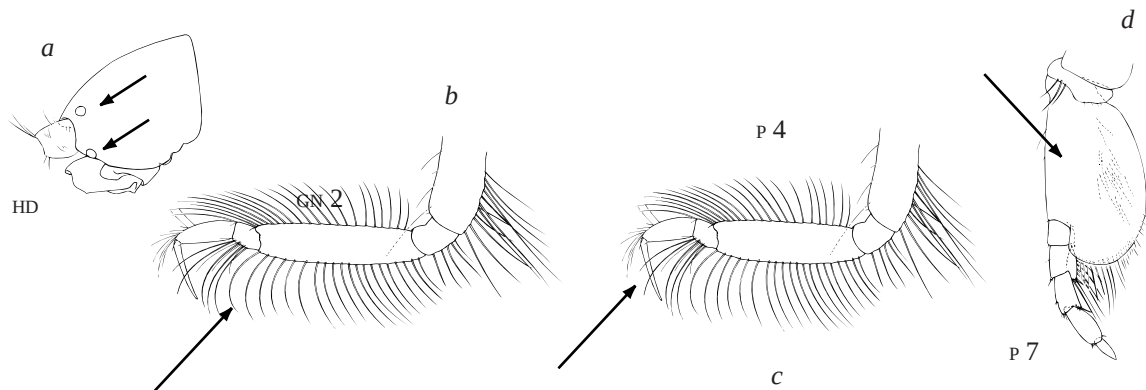


Figure 9.

- < 0-1 pair of eyes present, if present, each eye composed of a few to many ommatidia; gnathopod 2 chelate or subchelate; peraeopods 3-4, dactyl stout, short, much shorter than propodus; peraeopod 7, basis distinctly shorter in length than remaining articles combined .. 4

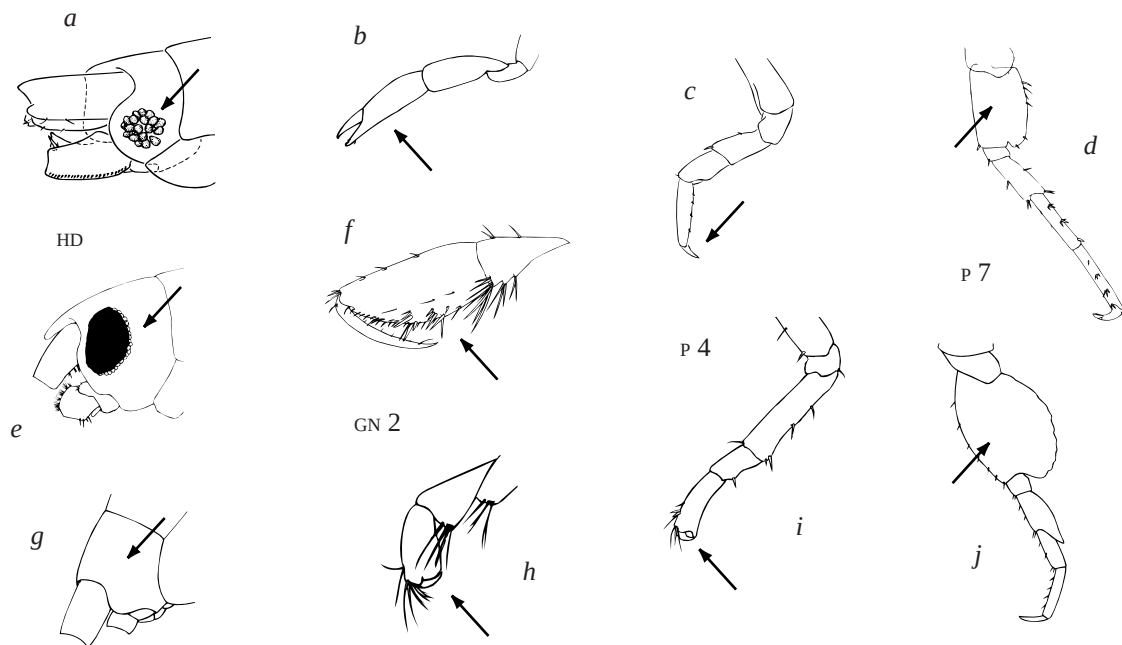


Figure 10.

4. < Body laterally compressed; antennae 1-2, peduncle articles slender, flagellum well-developed; gnathopod 1 subchelate; telson cleft DEXAMINIDAE

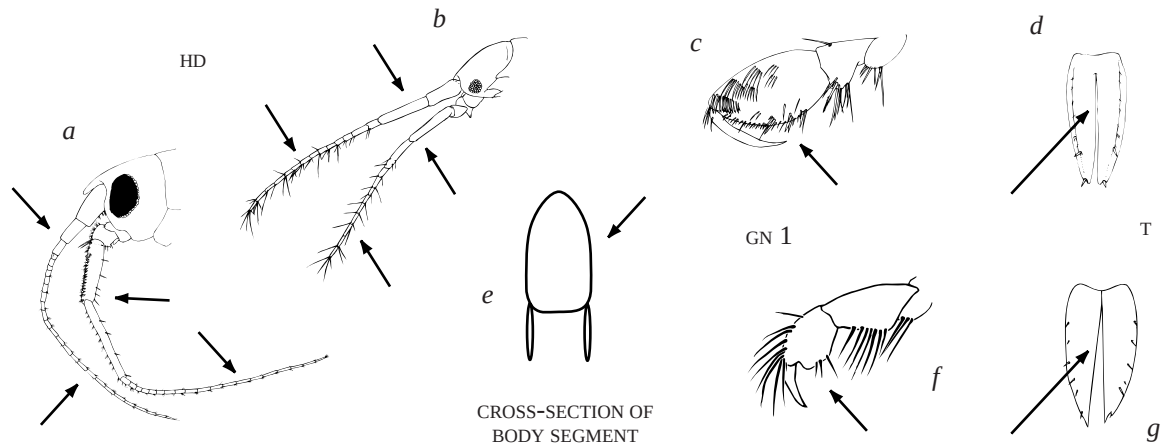


Figure 11.

- < Body subcylindrical; antennae 1-2, peduncle articles stout, flagellum reduced; gnathopod 1 chelate, simple or vestigial; telson entire 5

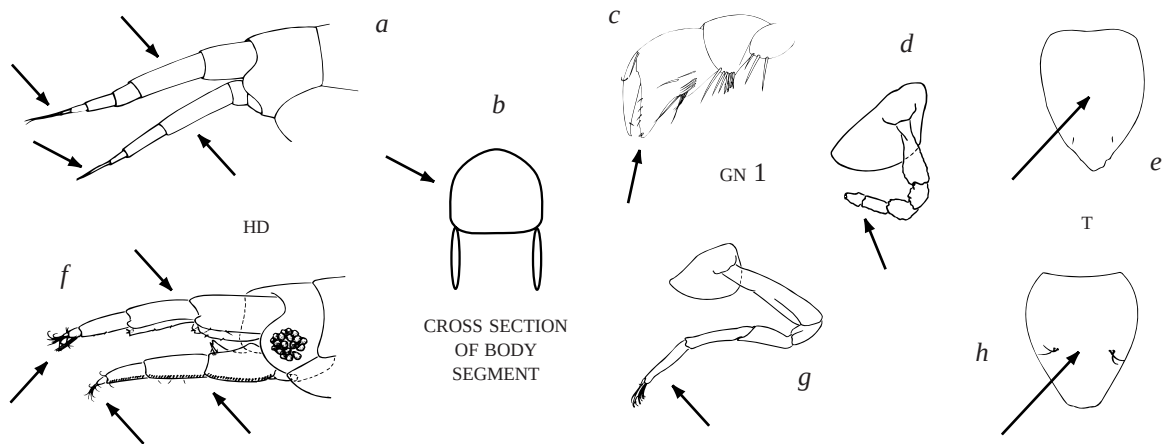


Figure 12.

5. < Eye absent or poorly developed, composed of a few scattered ommatidia; gnathopod 1 chelate, larger than gnathopod 2; gnathopod 2 chelate, article 3 elongate, at least twice as long as wide; coxae 1-4 deeper than wide SEBIDAE

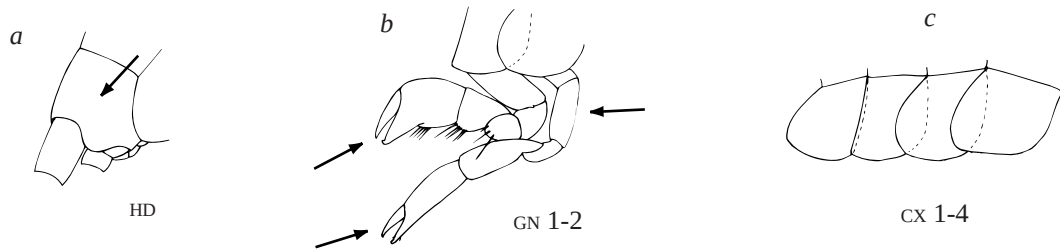


Figure 13.

- < Eye present, well-developed, composed of many ommatidia; gnathopod 1 simple or vestigial, smaller than gnathopod 2; gnathopod 2 subchelate, article 3 not elongate, less than twice as long as wide; coxae 1-4 wider than deep COLOMASTIGIDAE

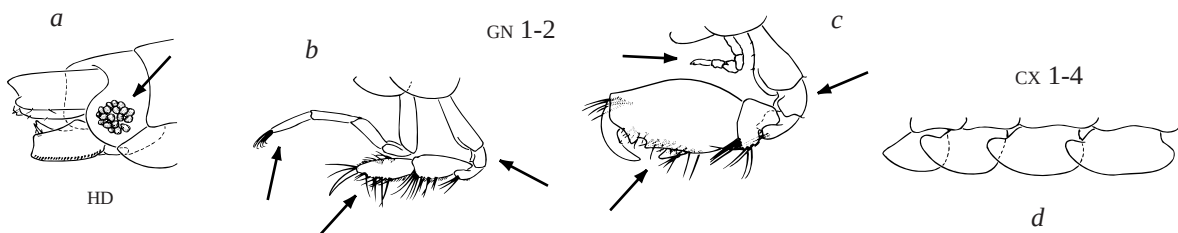


Figure 14.

6. < Gnathopod 2, article 3 elongate, at least twice as long as wide 7

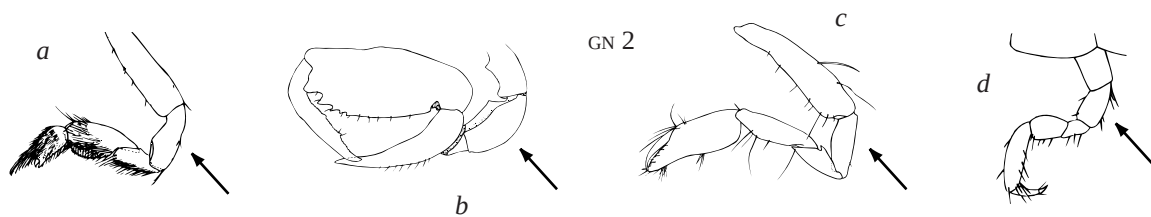


Figure 15.

- < Gnathopod 2, article 3 not elongate, less than twice as long as wide 11

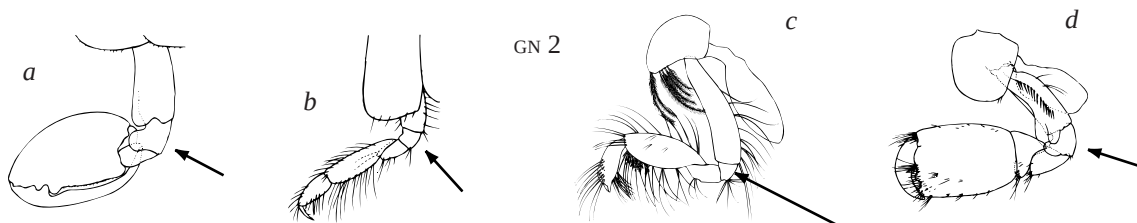


Figure 16.

7. < Body dorsoventrally depressed, segments strongly carinate; anterior coxae splayed
PHLIANTIDAE

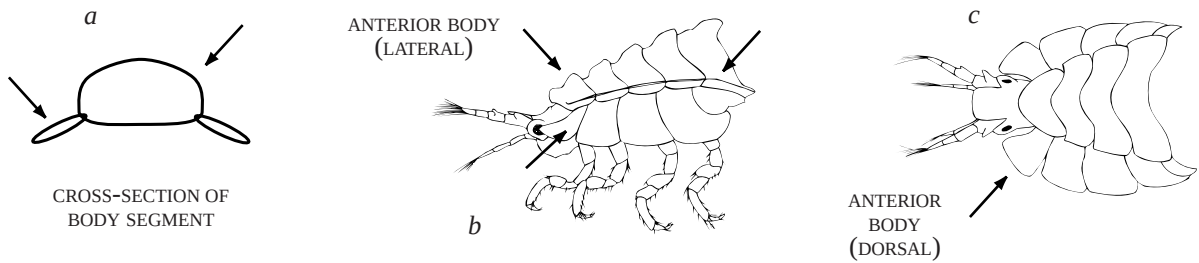


Figure 17.

- < Body laterally compressed, segments not carinate; coxae not splayed 8

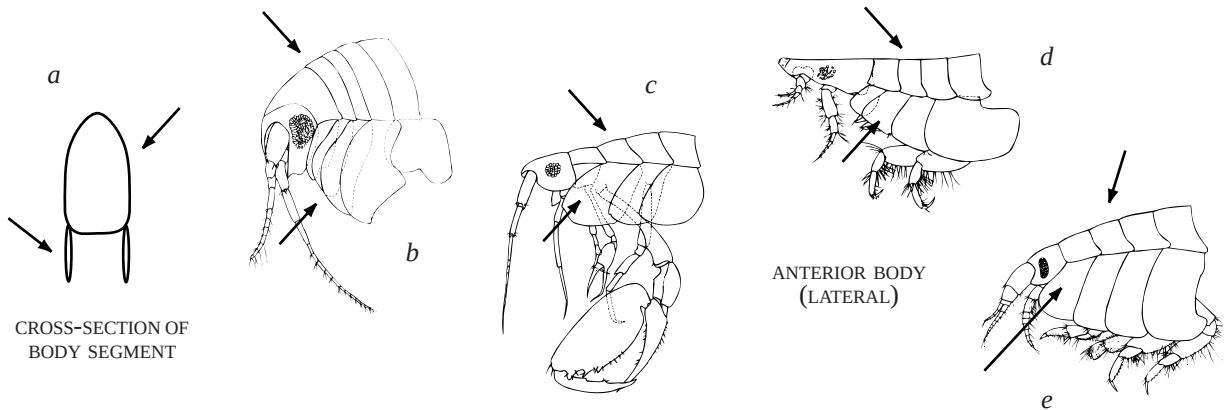


Figure 18.

8. < Peraeon 7 and pleon 1-3 with strong dorsal teeth or processes IPHIMEDIIDAE

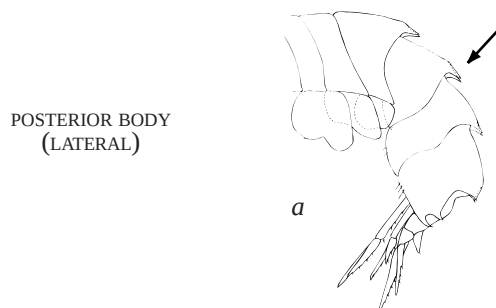


Figure 19.

- < Peraeon 7 and pleon 1-3 dorsally smooth, without strong teeth or processes 9

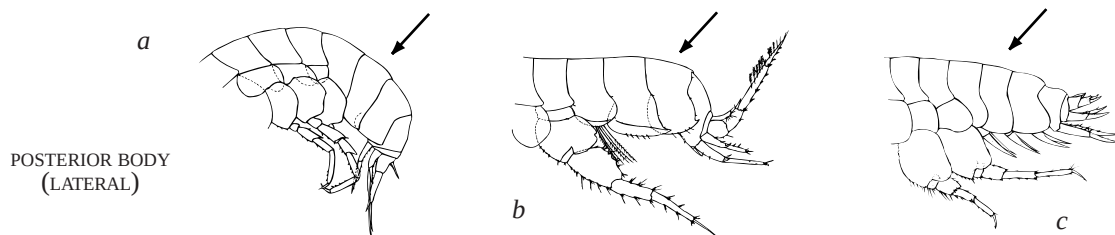


Figure 20.

9. < Head elongate, much longer than deep, forming cylindrical “snout”; gnathopods 1 and 2 with elongate article 3, article 3 subequal to article 4; uropod 3, inner ramus short, scale-like, outer ramus elongate PLATYISCHNOPIDAE

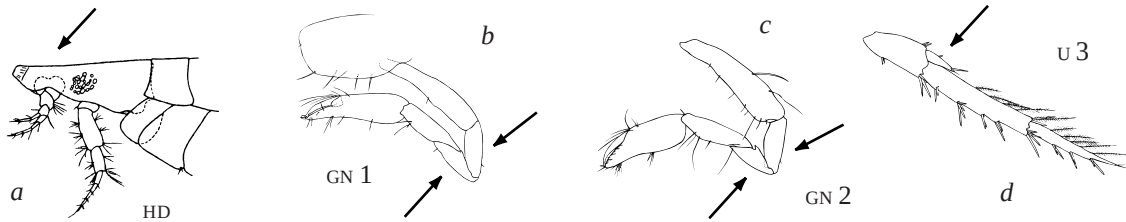


Figure 21.

- < Head not elongate, at most slightly longer than deep, not forming cylindrical “snout”; gnathopod 2 only with elongate article 3, article 3 longer than article 4; uropod 3, inner ramus not scale-like, at least one half outer ramus in length, outer ramus not elongate 10

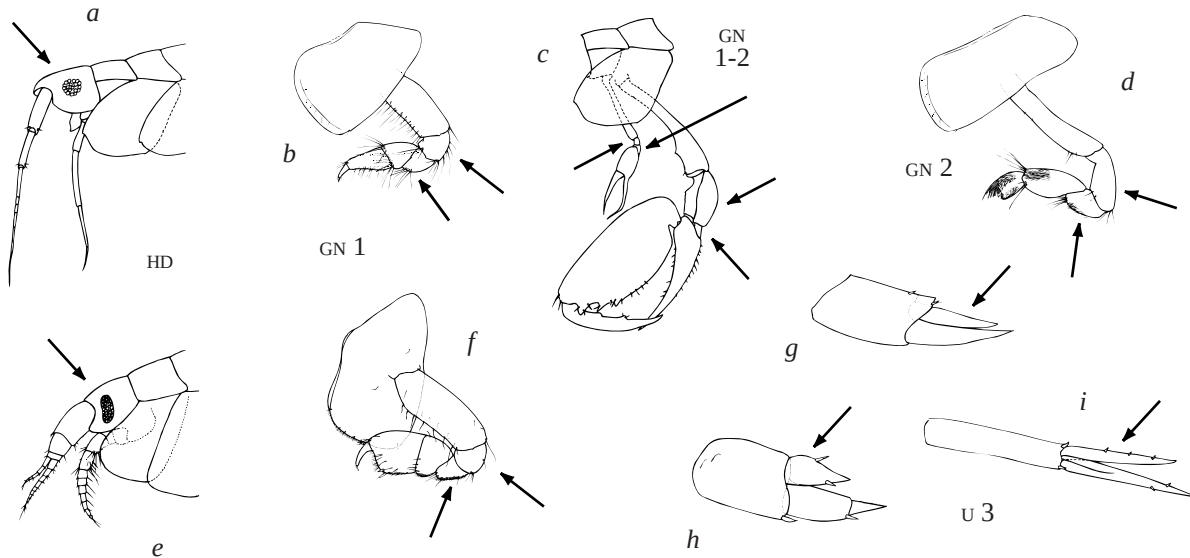


Figure 22.

10. < Antenna 1, peduncle short, stout, accessory flagellum well-developed; eyes large, subrectangular or narrowly ovate vertically; gnathopod 2 minutely chelate or subchelate, carpus and propodus covered with dense, fine, short setae, propodus unenlarged, dactyl minute; coxa 1 not reduced, as large as or larger than coxa 2; coxa 4, posterior margin strongly excavate; uropod 3, peduncle short, extending no more than halfway along rami of uropod 2 LYSIANASSIDAE

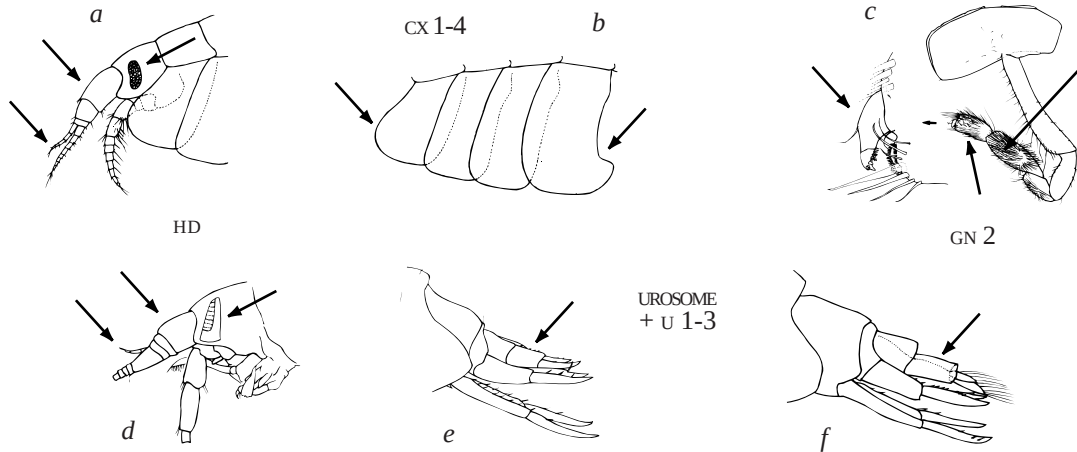


Figure 23.

- < Antenna 1, peduncle elongate, slender, accessory flagellum vestigial or absent; eyes small, round; gnathopod 2 carpocheate, carpus and propodus without dense, fine, short setae, propodus and dactyl enlarged; coxa 1 reduced, much smaller than coxa 2; coxa 4, posterior margin at most weakly excavate; uropod 3, peduncle elongate, extending almost as far as tips of rami of uropod 2 ANAMIXIDAE (in part)

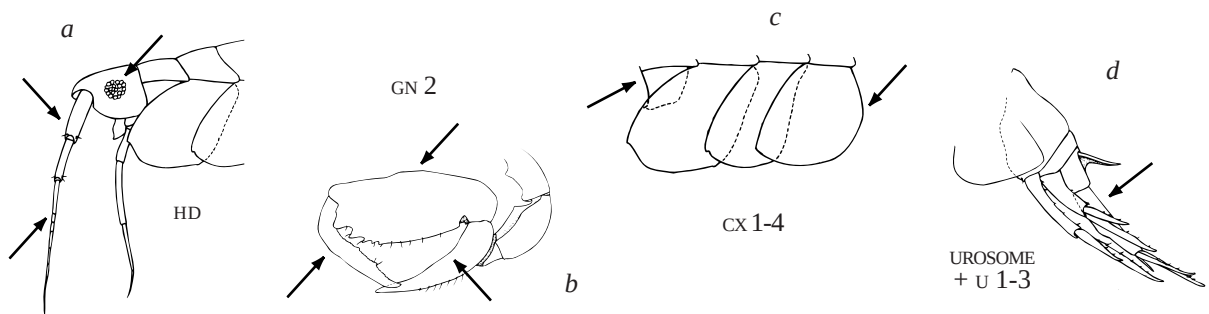


Figure 24.

11. < Gnathopod 1 vestigial, small and biarticulate BATEIDAE



Figure 25.

< Gnathopod 1 well-developed, with 6-7 articles 12

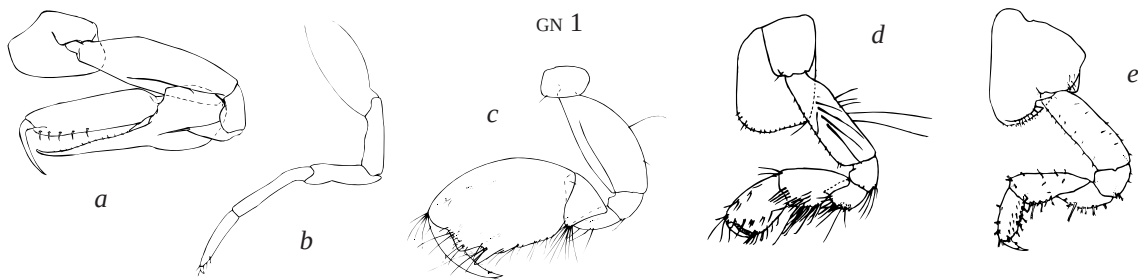


Figure 26.

12. < Eyes each with 4 paired peripheral facets; coxae 1-3 becoming shorter posteriorly ARGISSIDAE

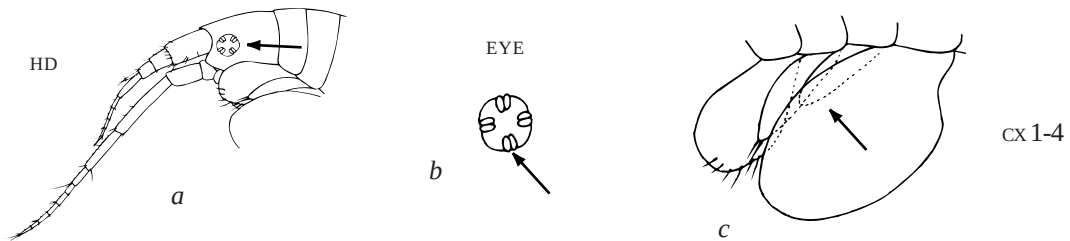


Figure 27.

< Eyes (if present) without 4 paired peripheral facets; coxae 1-3 not becoming shorter posteriorly 13

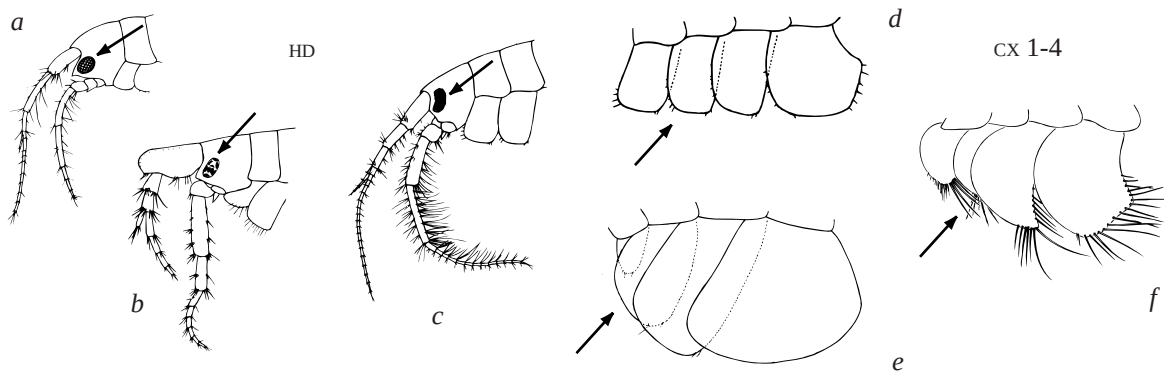


Figure 28.

13. < Coxa 1 or coxae 1-2 reduced, distinctly shorter than and mostly hidden by following coxae ...
 14

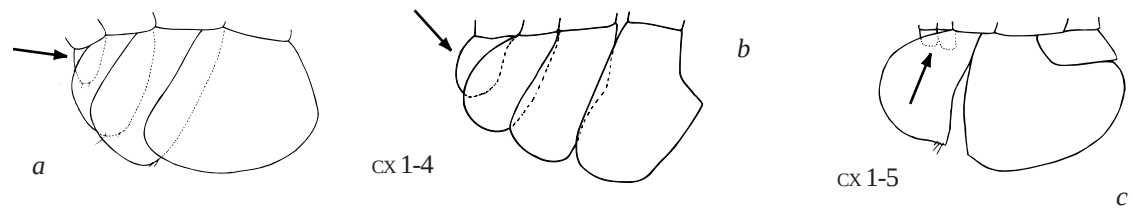


Figure 29.

- < Coxa 1 or coxa 1-2 usually not reduced (if reduced, then not hidden by following coxae),
 slightly shorter than, subequal to or longer than following coxae, not mostly hidden 17

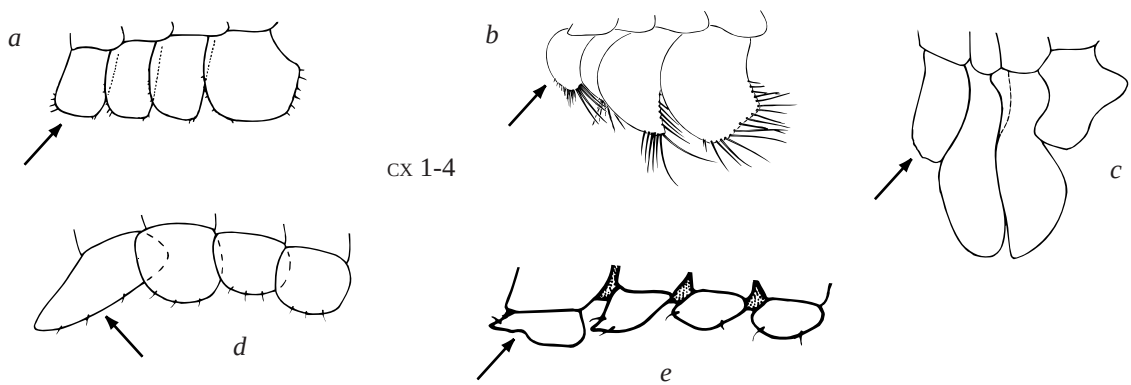


Figure 30.

14. < Antenna 1 stout, flagellum subequal to or shorter than peduncle article 3; pereaeon segments 3-5 forming subtriangular lateral expansion above coxal plates; coxae 1-2 reduced; gnathopod 2 very slender, parachelate; urosome segment 1 elongate, approximately 3 times length of segments 2 and 3 combined, with thin, lamellar dorsal crest CYROIDEIDAE

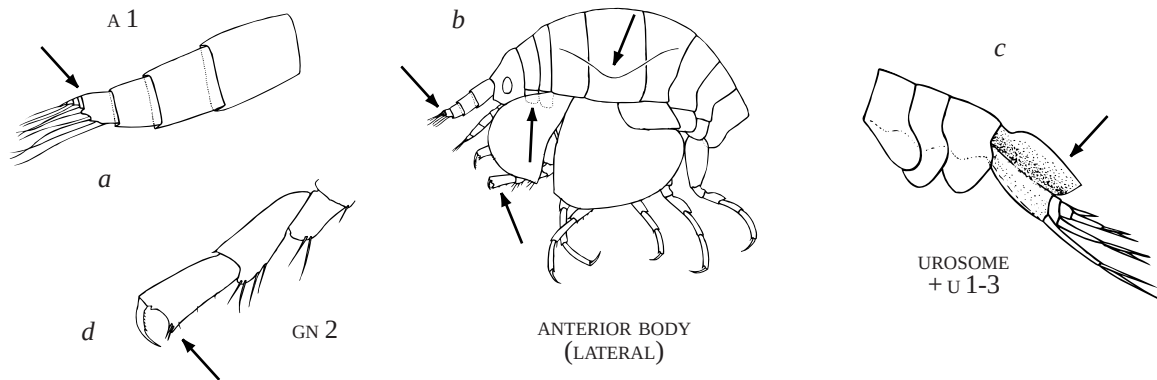


Figure 31.

- < Antenna 1 slender, flagellum longer than peduncle article 3; pereaeon segments 3-5 not forming subtriangular lateral expansion above coxal plates; coxa 1 only reduced; gnathopod 2 not very slender, subchelate; urosome segment 1 not elongate, less than twice length of segments 2 and 3 combined, without dorsal crest 15

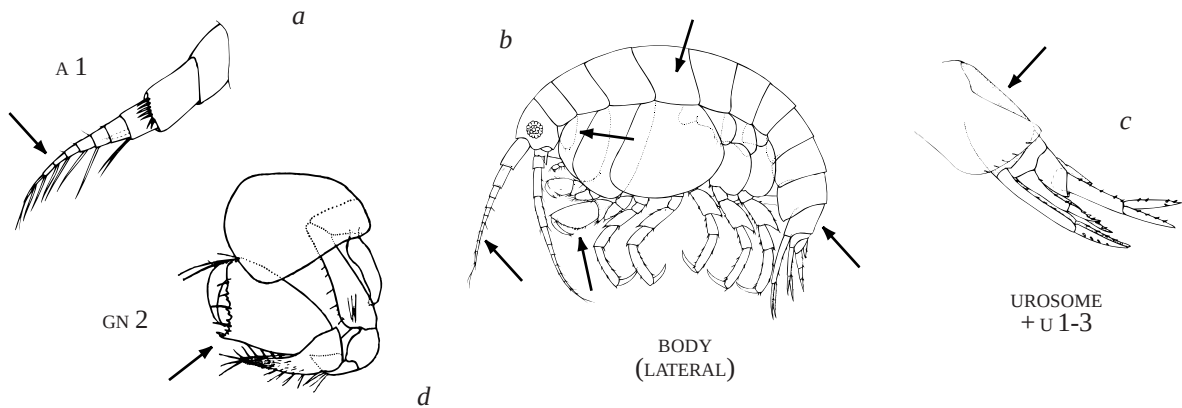


Figure 32.

15. < Coxa 4 shield-like, not excavate posterodorsally; peraeopod 5, basis linear; uropod 2 subequal to or longer than uropod 3; uropod 3 uniramous, ramus 2-articulate STENOTHOIDAE

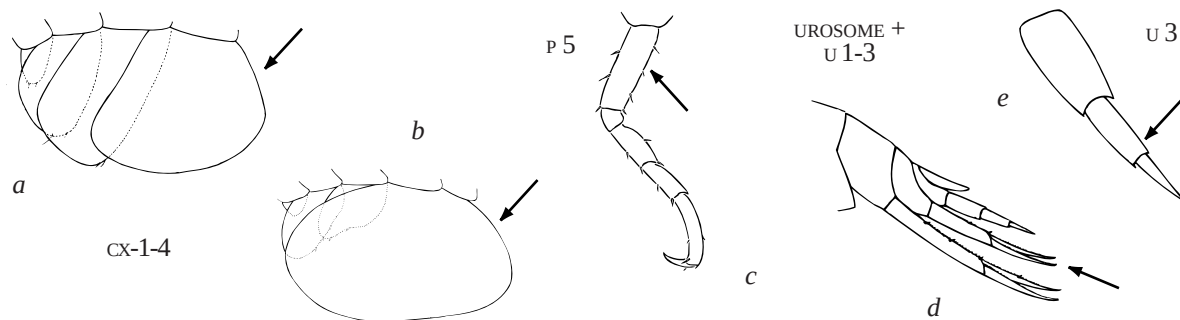


Figure 33.

- < Coxa 4 not shield-like, excavate posterodorsally; peraeopod 5 basis expanded; uropod 2 much shorter than uropod 3; uropod 3 biramous, both rami 1-articulate 16

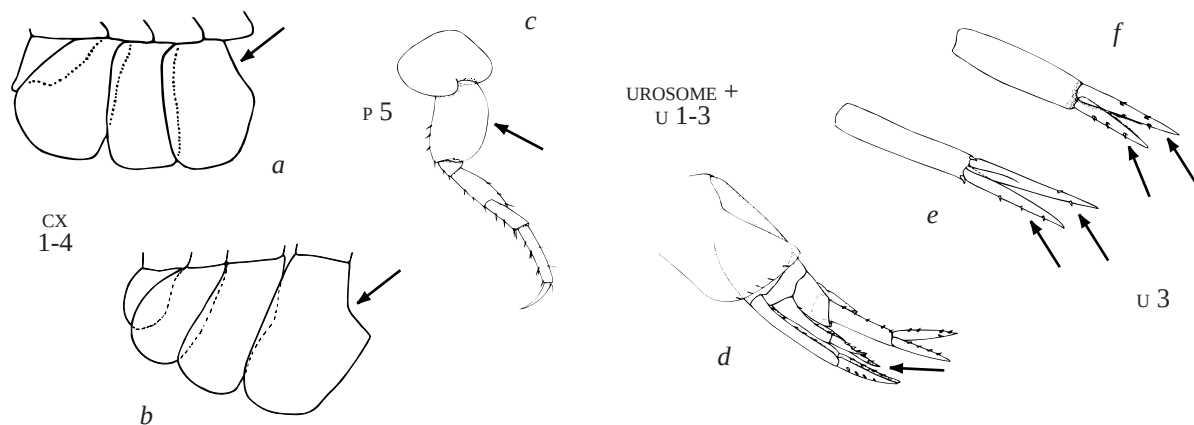


Figure 34.

16. < Mandible, palp 1-articulate, molar lacking; maxilliped, inner plates absent or greatly reduced, outer plates, inner lobes absent or greatly reduced; coxa 1 subquadrate or subtriangular; coxa 4 shallowly excavate posterodorsally; gnathopod 1 carpochelate, dactyl minute ANAMIXIDAE (in part)

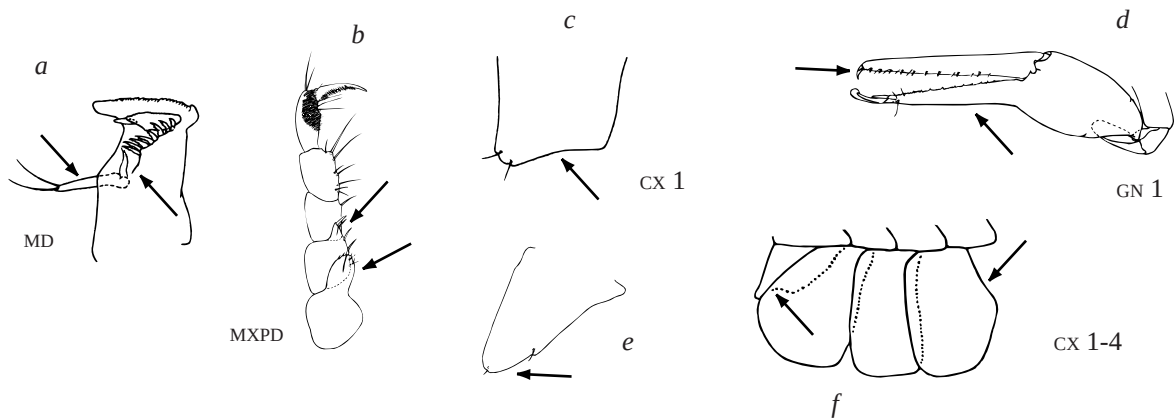


Figure 35.

- < Mandible, palp 3-articulate, molar present; maxilliped, inner plates present, not reduced, outer plates, inner lobes well-developed; coxa 1 subovate; coxa 4 deeply excavate posterodorsally; gnathopod 1 subchelate, dactyl normal AMPHILOCHIDAE

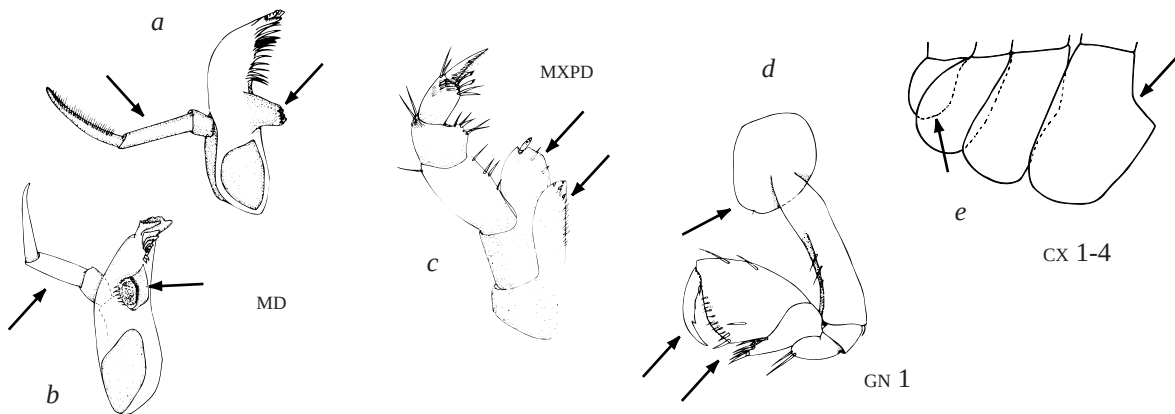


Figure 36.

17. < Gnathopod 1 simple, very weakly subchelate, or “pseudochelate” (dactyl closing against large serrate spine arising from palmar angle) 18

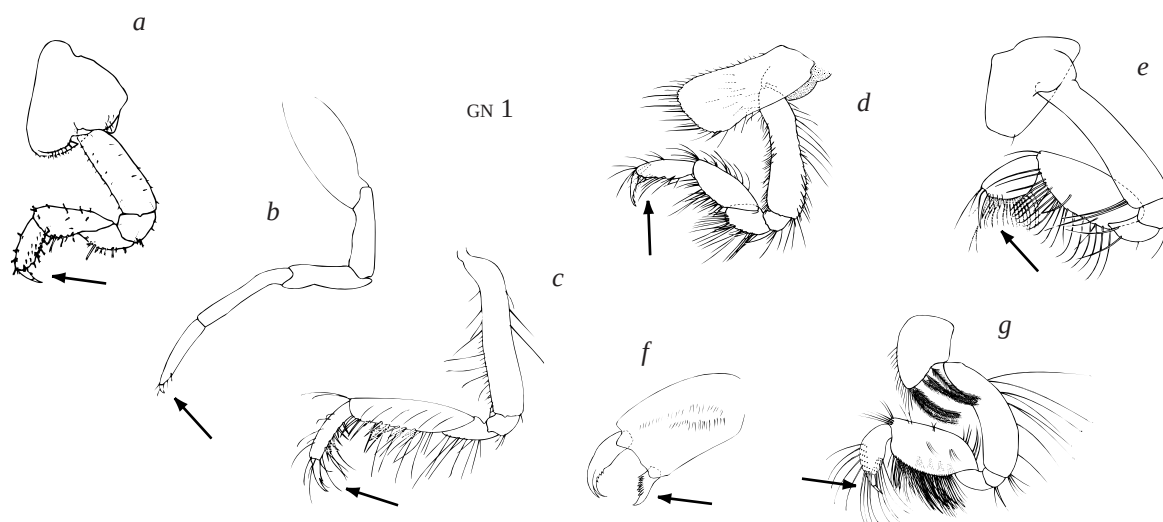


Figure 37.

- < Gnathopod 1 normally or complexly subchelate, or parachelate 24

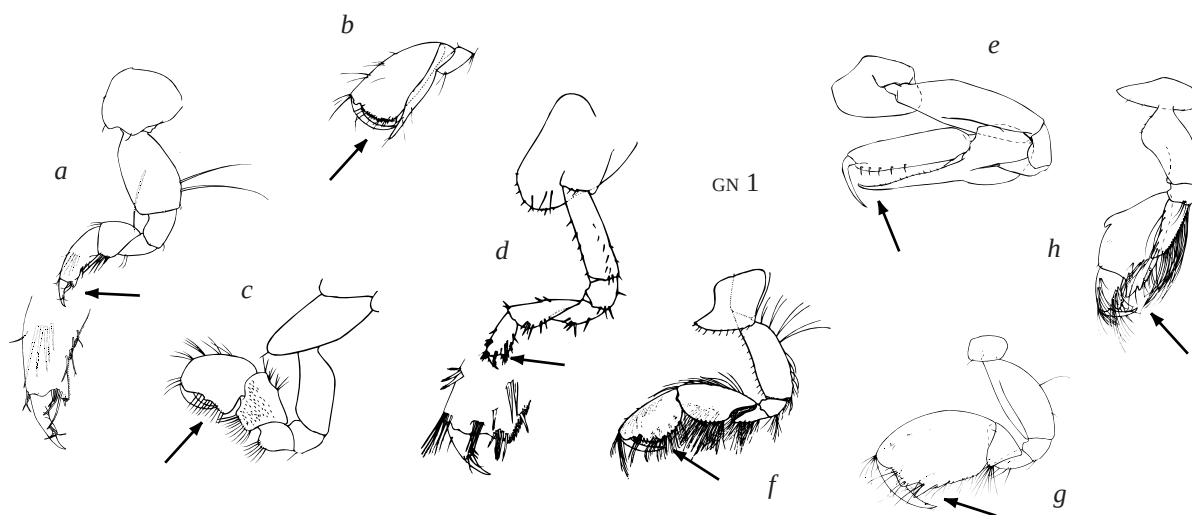


Figure 38.

18. < Antenna 1 strongly geniculate between peduncle articles 1 and 2, peduncle article 1 greatly enlarged, dwarfing and overhanging articles 2-3; eyes with 4-6 pigmented marginal facets; peraeopod 5 doubly geniculate at article 4 PONTOPOREIIDAE

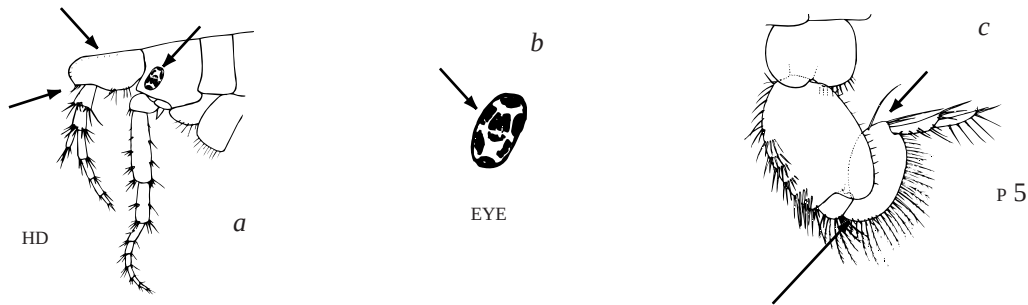


Figure 39.

- < Antenna 1 not strongly geniculate between peduncle articles 1 and 2 (may be weakly geniculate), peduncle article 1 not greatly enlarged, not overhanging articles 2-3; eyes (if present) without 4-6 pigmented marginal facets; peraeopod 5 not doubly geniculate at article 4 19

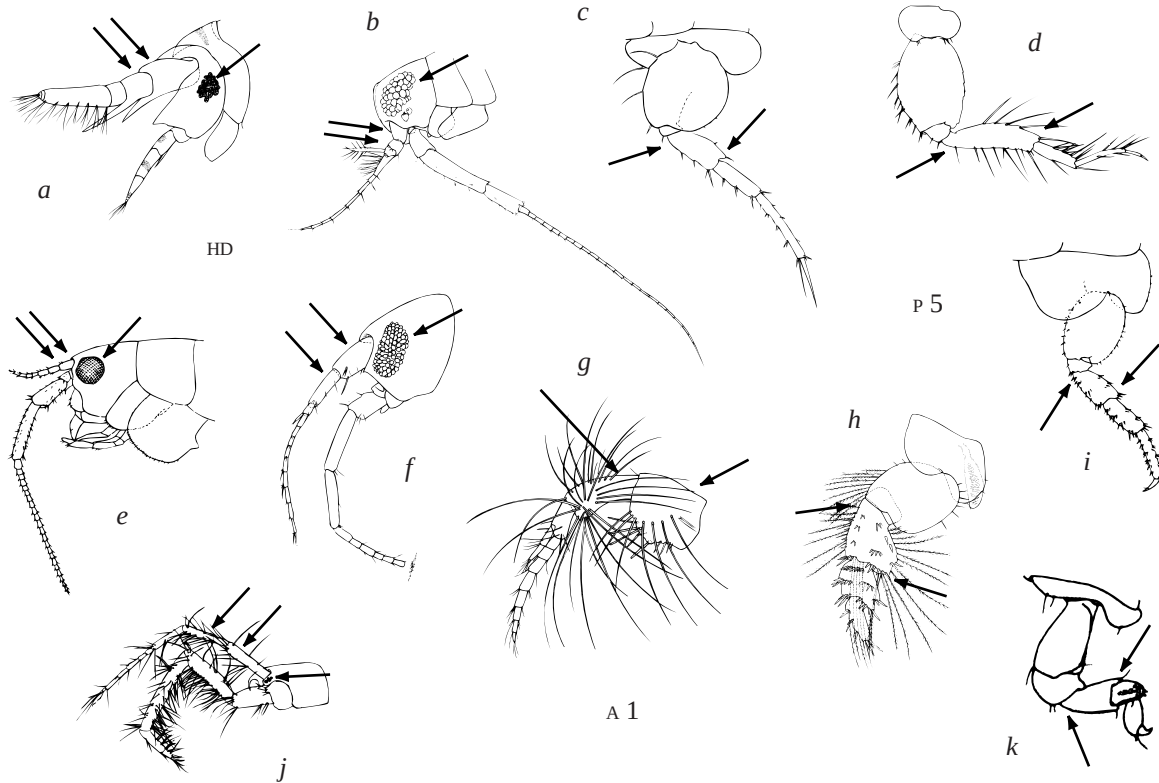


Figure 40.

19. < Ocular lobe narrowly produced anteriorly, distally rounded, bearing eye; pereopods 5-6 geniculate at article 5; uropod 1, inner ramus one third or less length of outer ramus; uropod 2 absent; uropod 3 vestigial, rami lacking; telson partially fused to urosome segment 3 ISCHYROCERIDAE (in part)

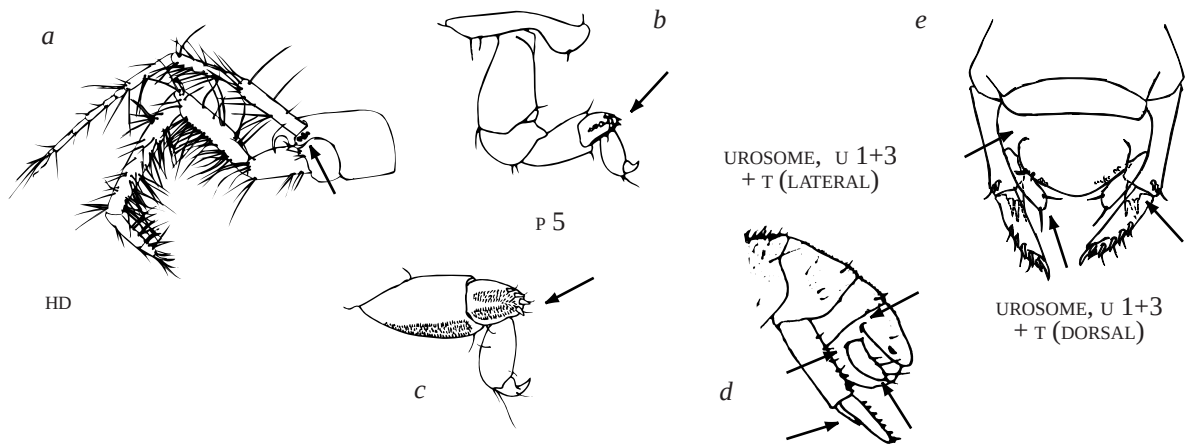


Figure 41.

- < Ocular lobe broad, usually not produced anteriorly, if produced, then distally acute and not bearing eye; pereopods 5-6 not geniculate at article 5; uropod 1, inner ramus at least one half length of outer ramus; uropod 2 present; uropod 3 not vestigial, bearing 1-2 rami; telson not partially fused to urosome segment 3 20

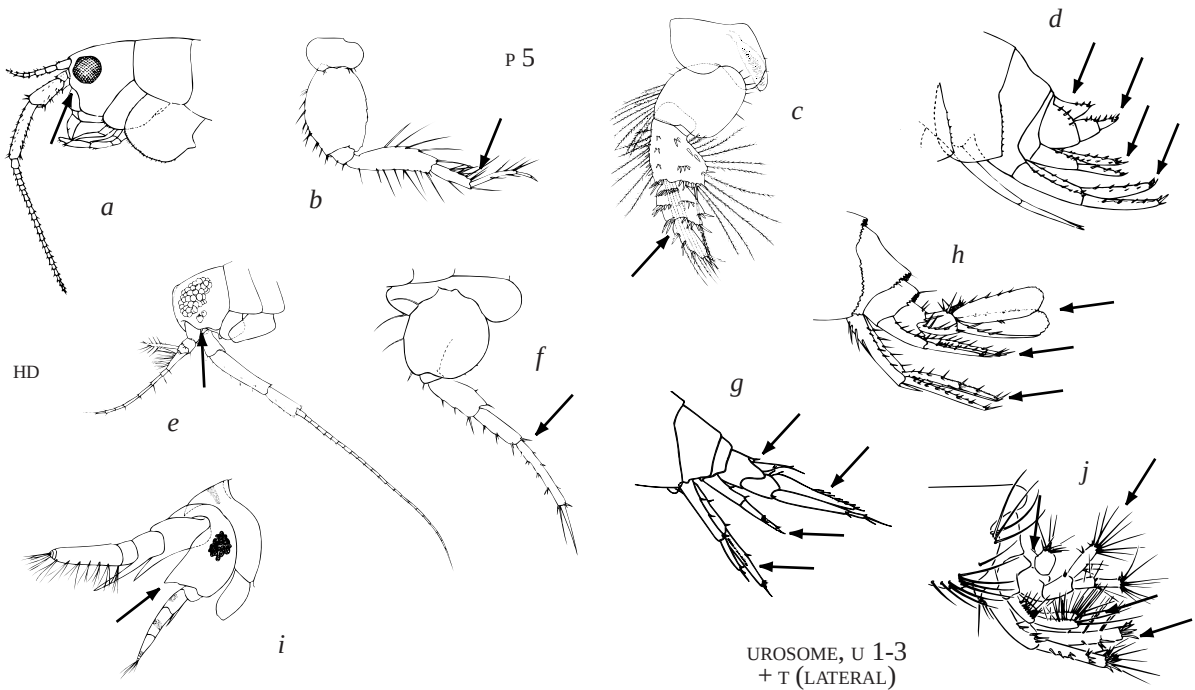


Figure 42.

20. < Antenna 1 much shorter than peduncle of antenna 2; coxae 2-4 with small medial process on posterior margin; gnathopod 2, propodus and dactyl together mitten-shaped; uropod 3 uniramous; terrestrial or semi-terrestrial TALITRIDAE (in part)

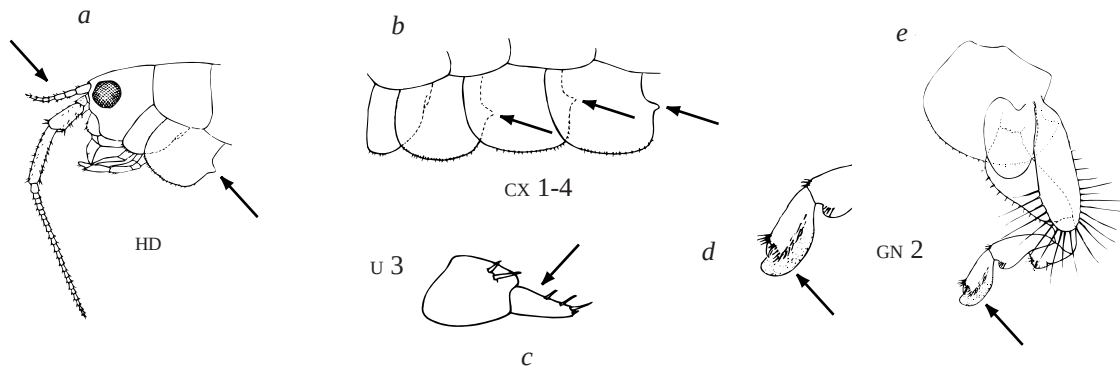


Figure 43.

- < Antenna 1 subequal to or longer than peduncle of antenna 2; coxae 2-4 without small medial process on posterior margin; gnathopod 2, propodus and dactyl together not mitten-shaped; uropod 3 biramous; aquatic 21

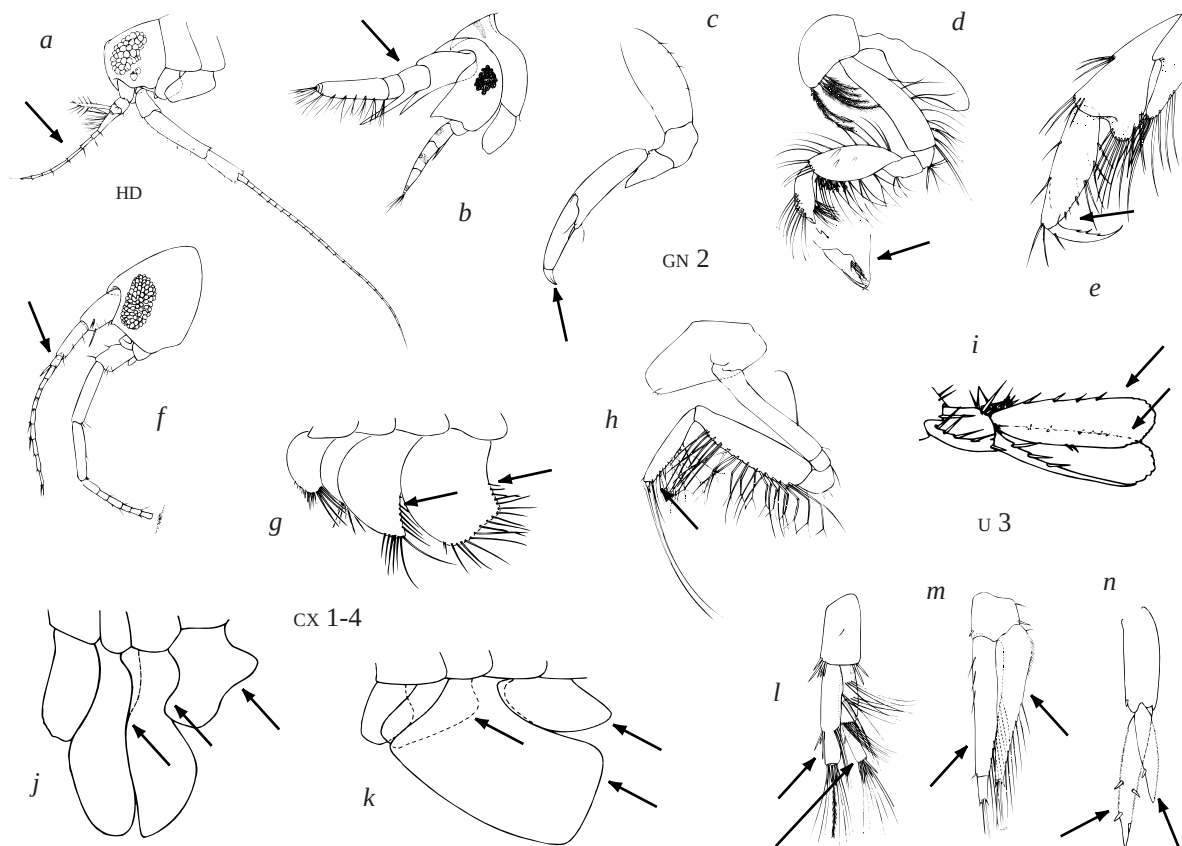


Figure 44.

21. < Antenna 1, accessory flagellum absent; maxilliped, palp reduced, 1-articulate or absent; buccal mass large, strongly produced ventrally as a subconical bundle; coxae 2-3 approximately twice as long as coxae 1 and 4 OCHLESIDAE

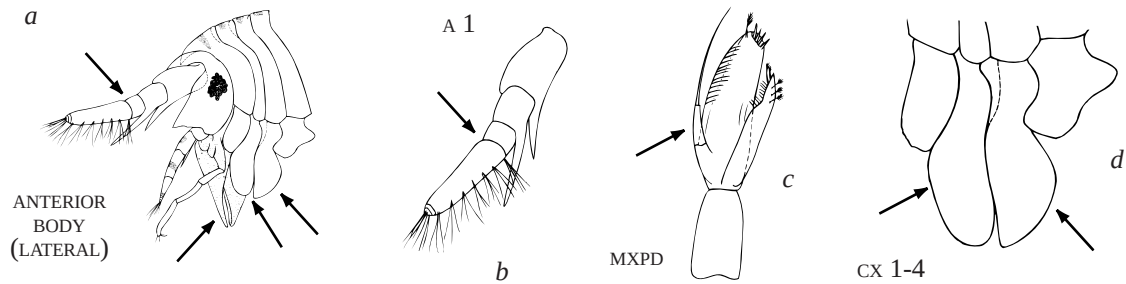


Figure 45.

- < Antenna 1, accessory flagellum present; maxilliped, palp well-developed, 3-4 articulate; buccal mass normal, rounded or subquadrate, not strongly produced ventrally; coxae 2-3 not twice as long as coxae 1 and 4 22

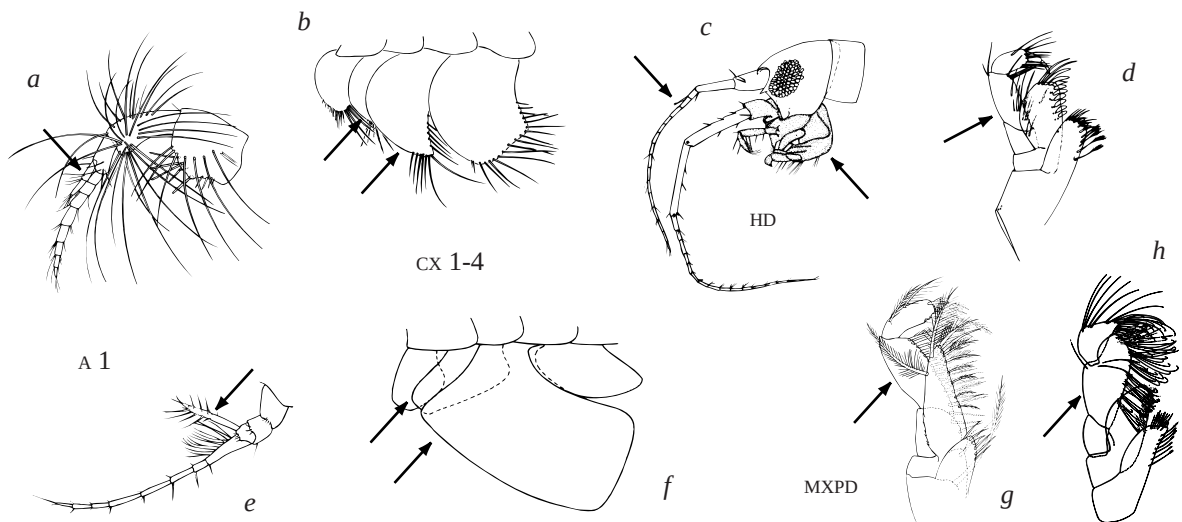


Figure 46.

22. < Ocular lobe of head with small, sharp angle or cusp; peraeopod 7 elongate, distal articles extremely slender, article 6 subdivided, multiarticulate; uropod 3, rami broadly paddle-shaped MEGALUROPIDAE

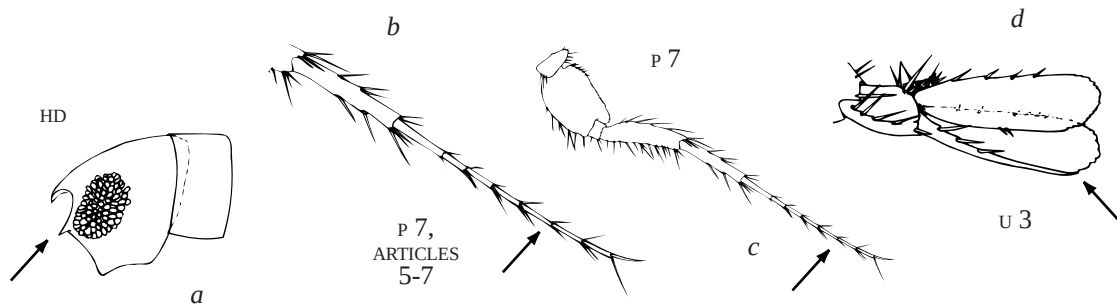


Figure 47.

- < Ocular lobe of head without small, sharp angle or cusp; peraeopod 7 not elongate, distal articles not unusually slender, article 6 not subdivided, uniarticulate; uropod 3, rami lanceolate or subrectangular, not broadly paddle-shaped 23

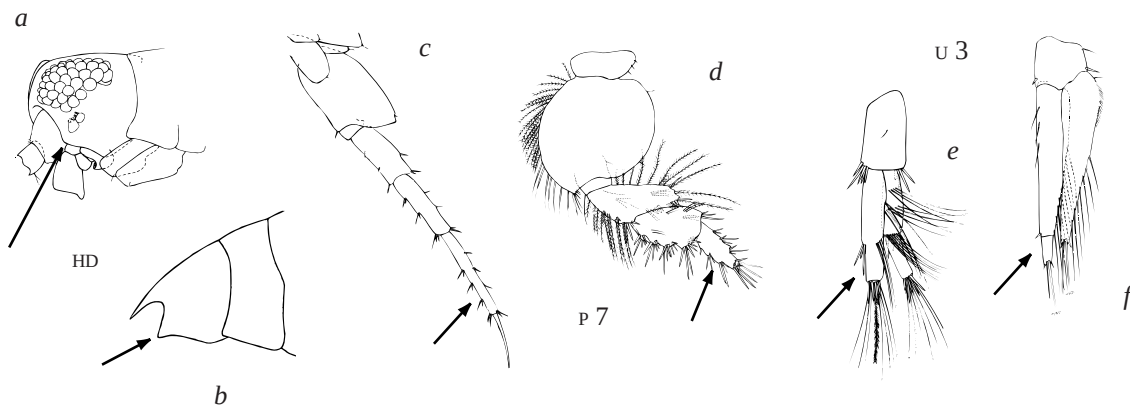


Figure 48.

23. < Eye large, accessory eye often present, composed of 2 or 3 ommatidia; appendages sparsely setose; peraeopods 3-7, dactyl present (may be very short); peraeopods 5-7, distal articles linear; telson cleft, lobes lanceolate, lateral margins without spines or setae, tips subacute SYNOPIIDAE

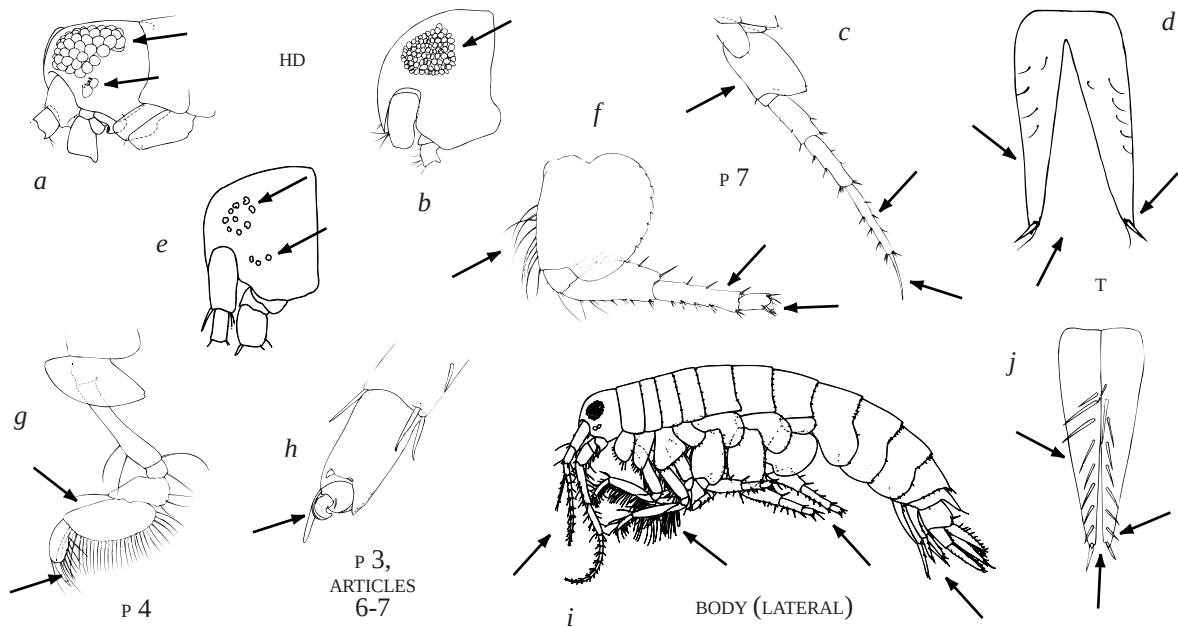


Figure 49.

- < Eye small or absent, accessory eye absent; appendages heavily setose; peraeopods 3-7, dactyl absent; peraeopods 5-7, distal articles broad, flattened; telson cleft, emarginate or entire, if cleft, lobes subquadrate or subovate, lateral margins with spines or setae, tips flattened or rounded HAUSTORIIDAE

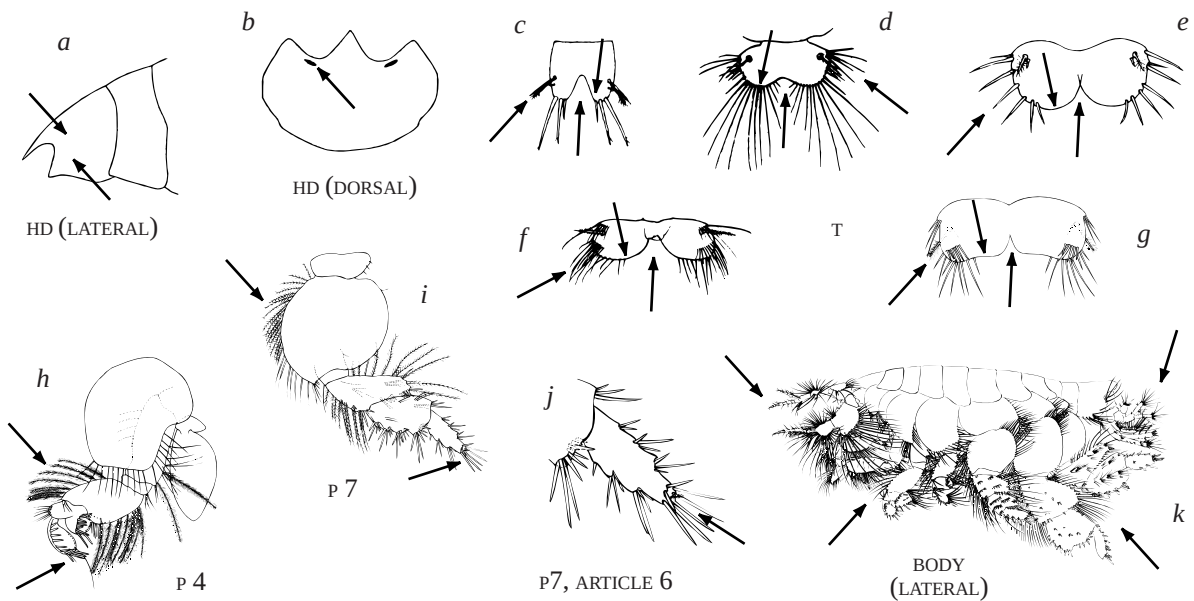


Figure 50.

24. < Antenna 2 very short, less than half length of antenna 1; head globular, buccal mass very large relative to size of head; mandible lacking both molar and palp; gnathopod 1 parachelate BIANCOLINIDAE

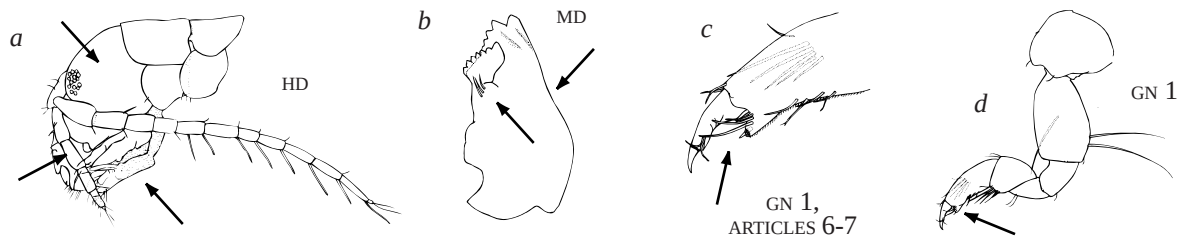


Figure 51.

- < Antenna 2 not very short, at least half length of antenna 1; head not globular, buccal mass not exceptionally large relative to size of head; mandible not lacking both molar and palp (one or the other may be absent, but not both); gnathopod 1 normally or complexly subchelate 25

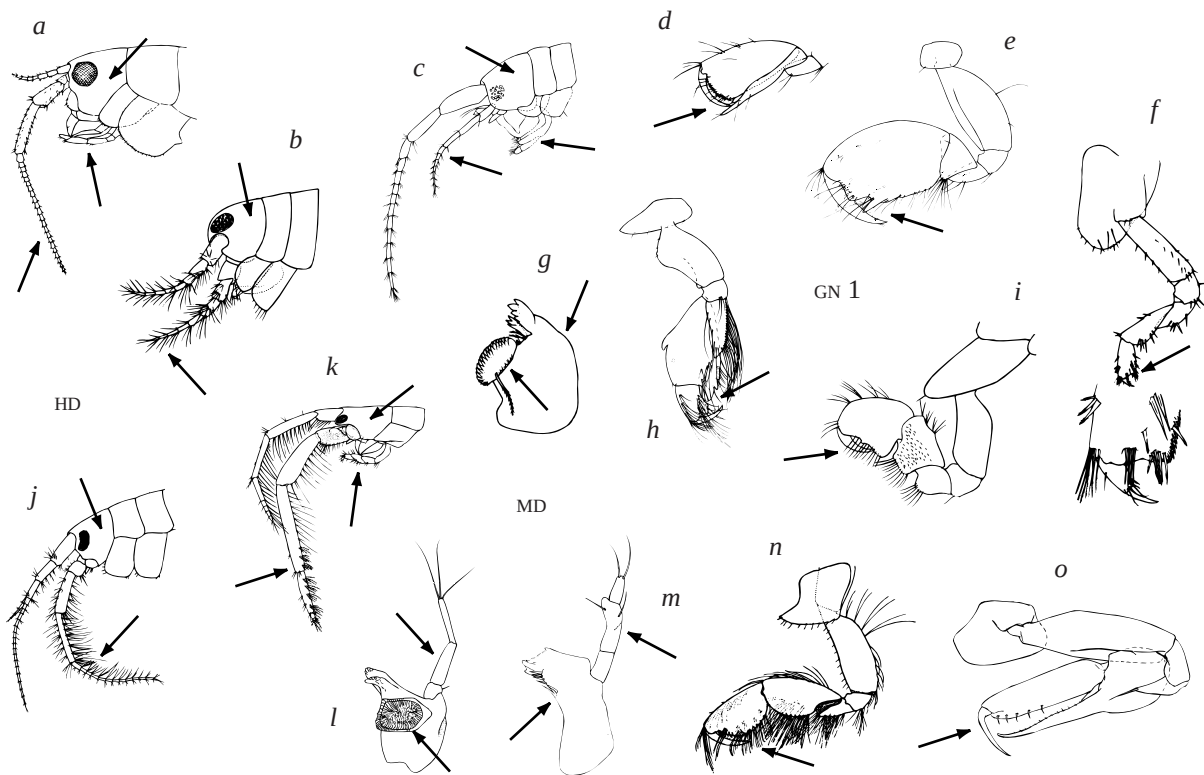


Figure 52.

25. < Urosome segment 1 elongate, much longer than deep, more than twice as long as segment 2;
 uropod 3 vestigial, lacking rami **PODOCERIDAE**

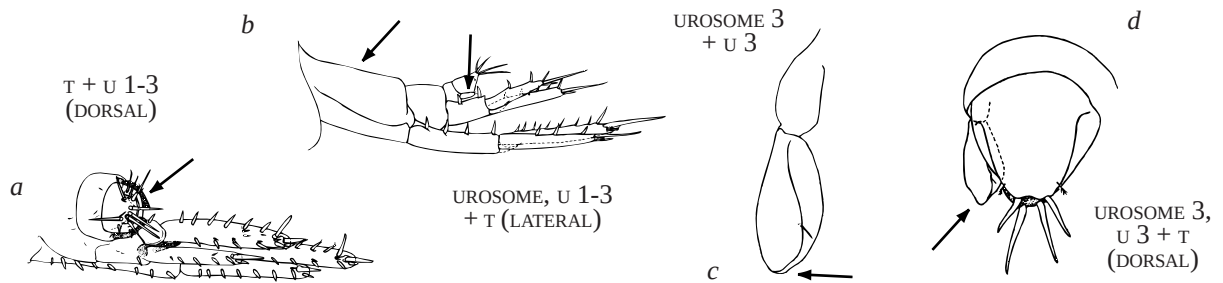


Figure 53.

- < Urosome segment 1 not elongate, at most slightly longer than deep, usually less than twice as
 long as segment 2 (if more than twice as long as segment 2, then at least as deep as long);
 uropod 3 bearing at least 1 ramus (may be reduced) 26

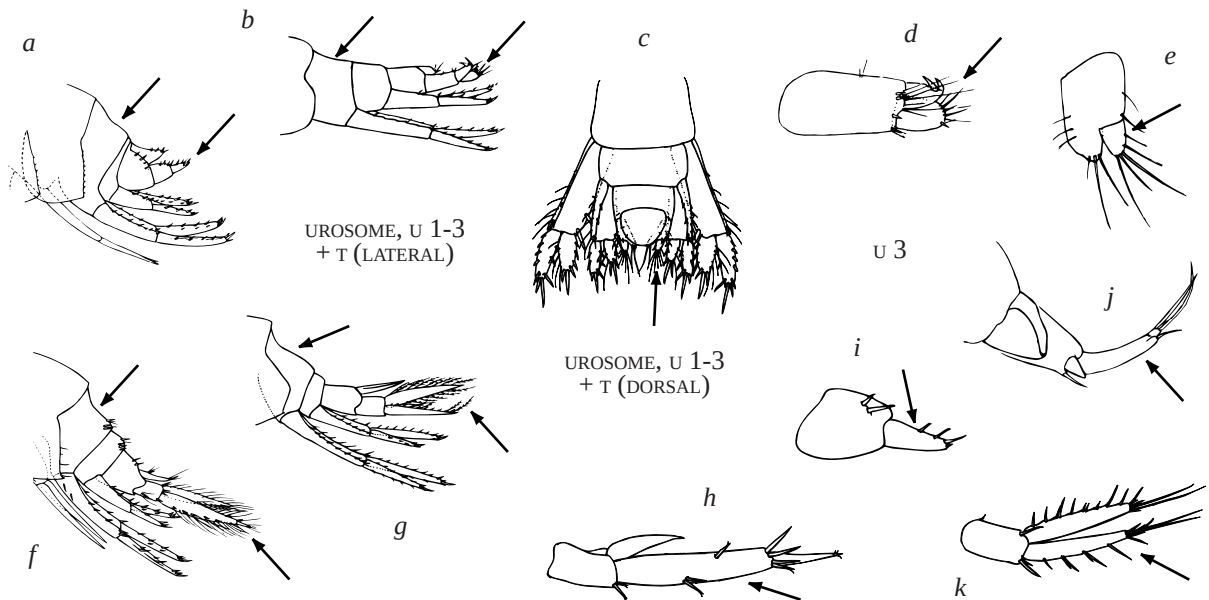


Figure 54.

26. < Antenna 1 very short, weak, not reaching much beyond peduncle article 4 of antenna 2;
maxilliped, palp article 4 vestigial or absent; terrestrial or semi-terrestrial
..... TALITRIDAE (in part)

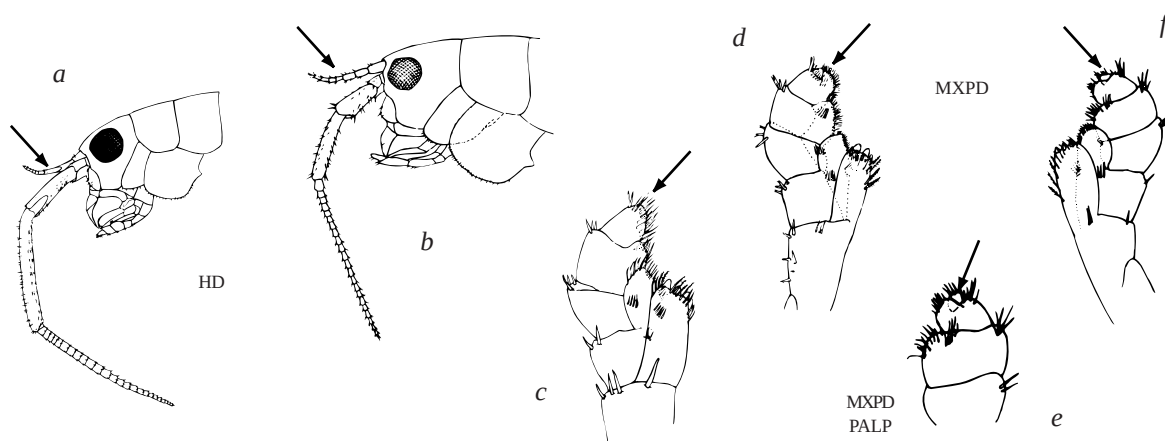


Figure 55.

- < Antenna 1 not exceptionally short, well-developed, usually reaching well beyond peduncle
article 4 of antenna 2; maxilliped, palp article 4 normally developed, not vestigial (may be
somewhat reduced); aquatic 27

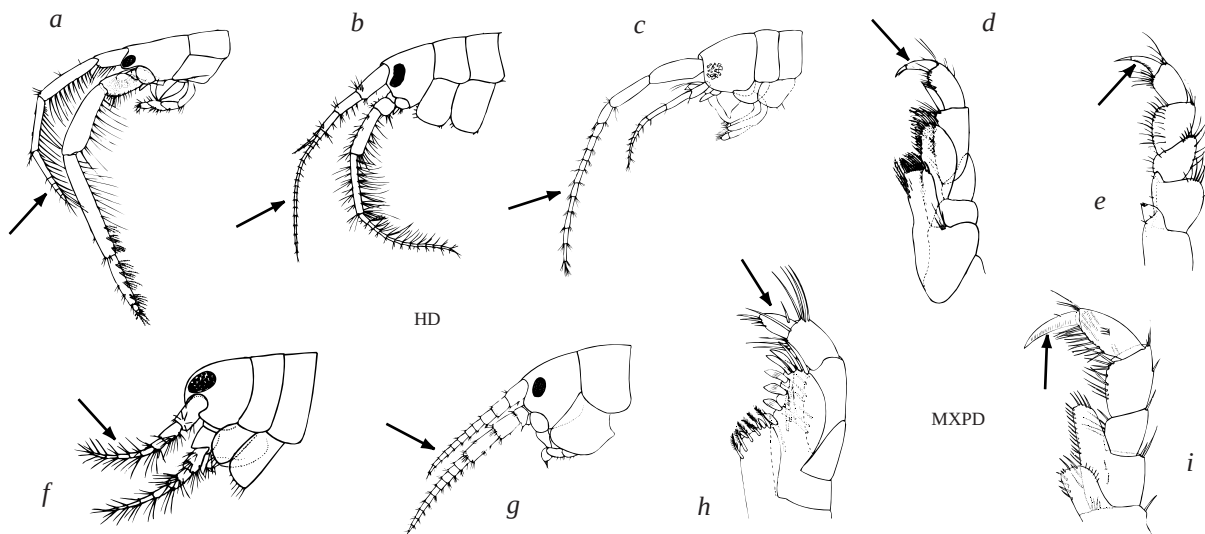


Figure 56.

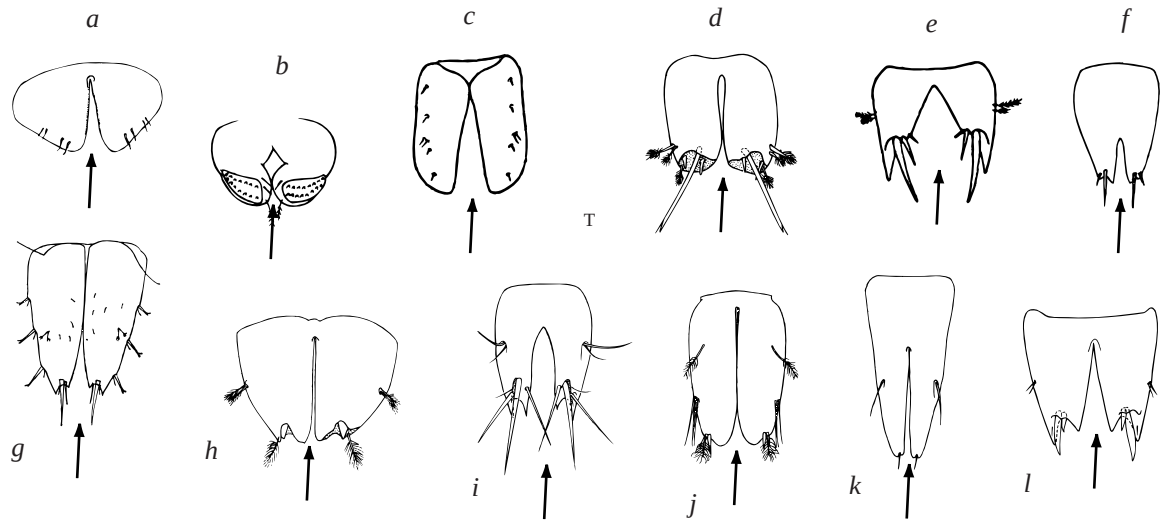


Figure 57.

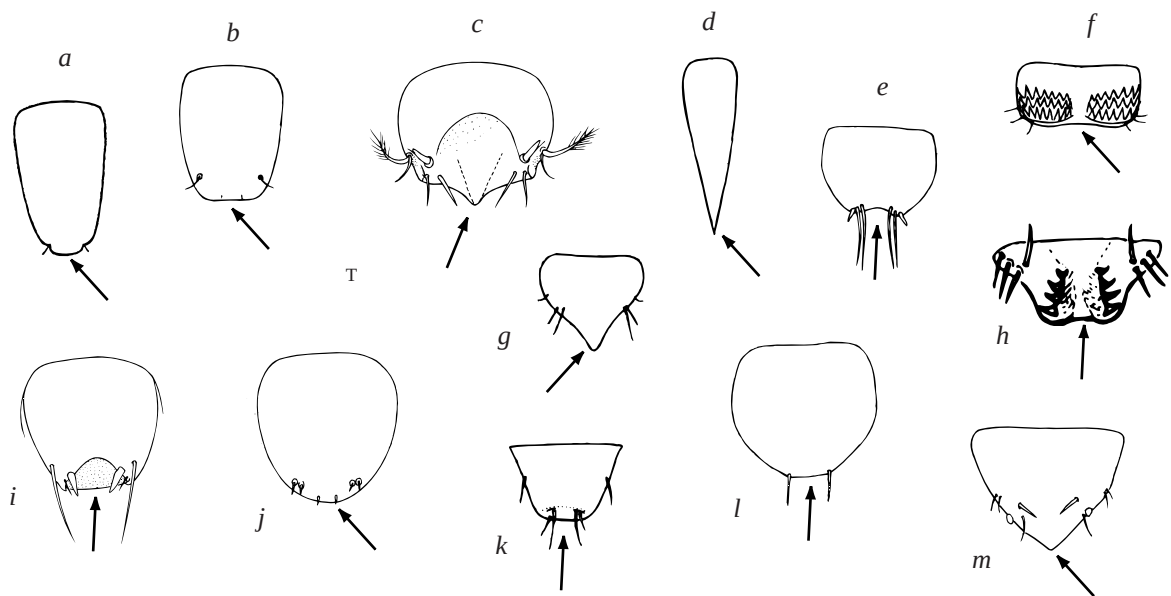


Figure 58.

28. < Rostrum elongate, hood-like or laminar; peraeopod 7 much shorter than peraeopod 6 (usually less than three fourths as long) PHOXOCEPHALIDAE

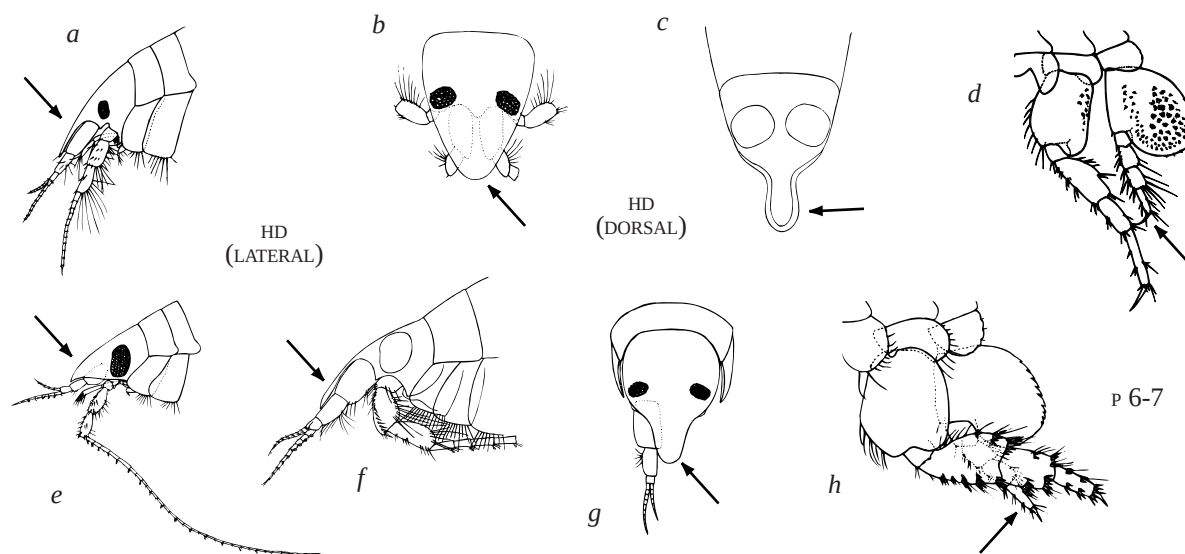


Figure 59.

- < Rostrum small or obsolescent, not hood-like or laminar; peraeopod 7 subequal to or longer than peraeopod 6 29

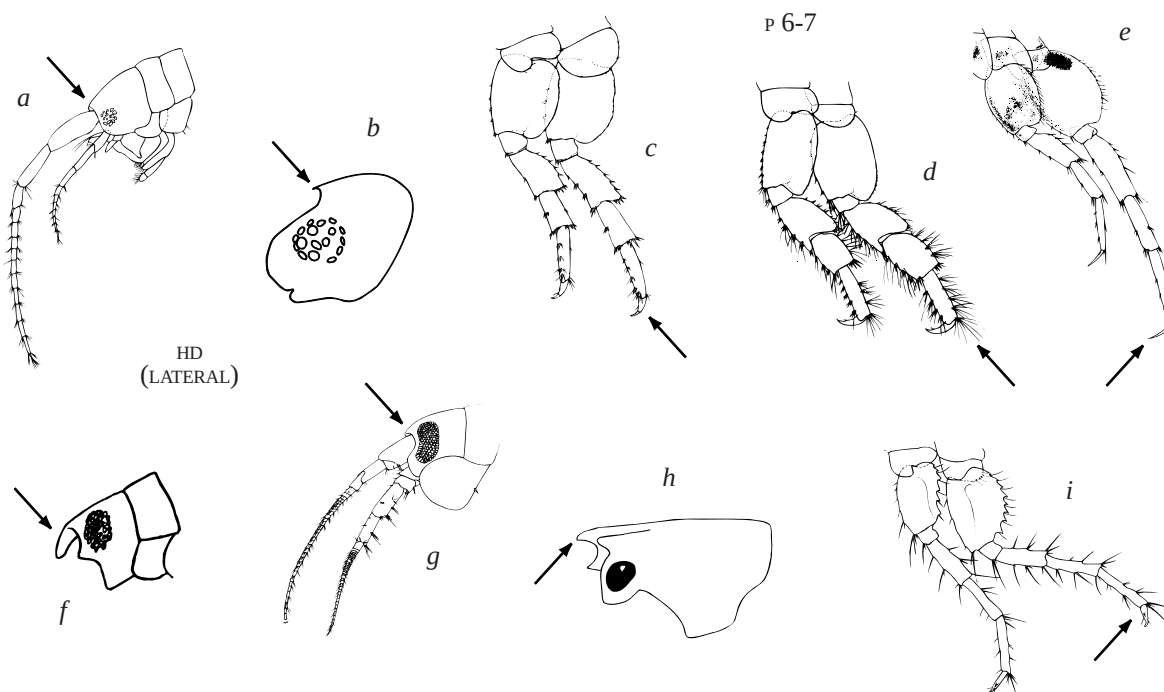


Figure 60.

29. < Gnathopod 2 not strongly sexually dimorphic, small and unenlarged or slightly enlarged relative to gnathopod 1 in both sexes; uropod 1, outer ramus distinctly shorter than inner ... 30

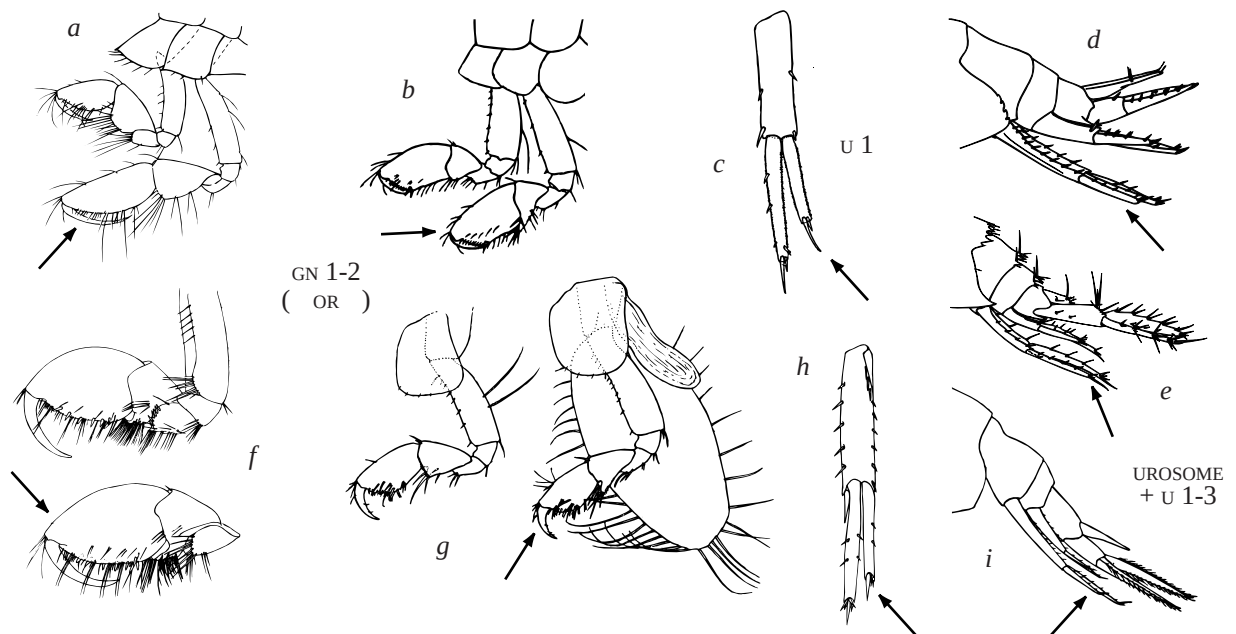


Figure 61.

- < Gnathopod 2 usually strongly sexually dimorphic, greatly enlarged relative to gnathopod 1 in male, if not dimorphic then greatly enlarged relative to gnathopod 1 in both sexes or peduncle of uropod 1 with basofacial spine; uropod 1, outer ramus subequal to or longer than inner 31

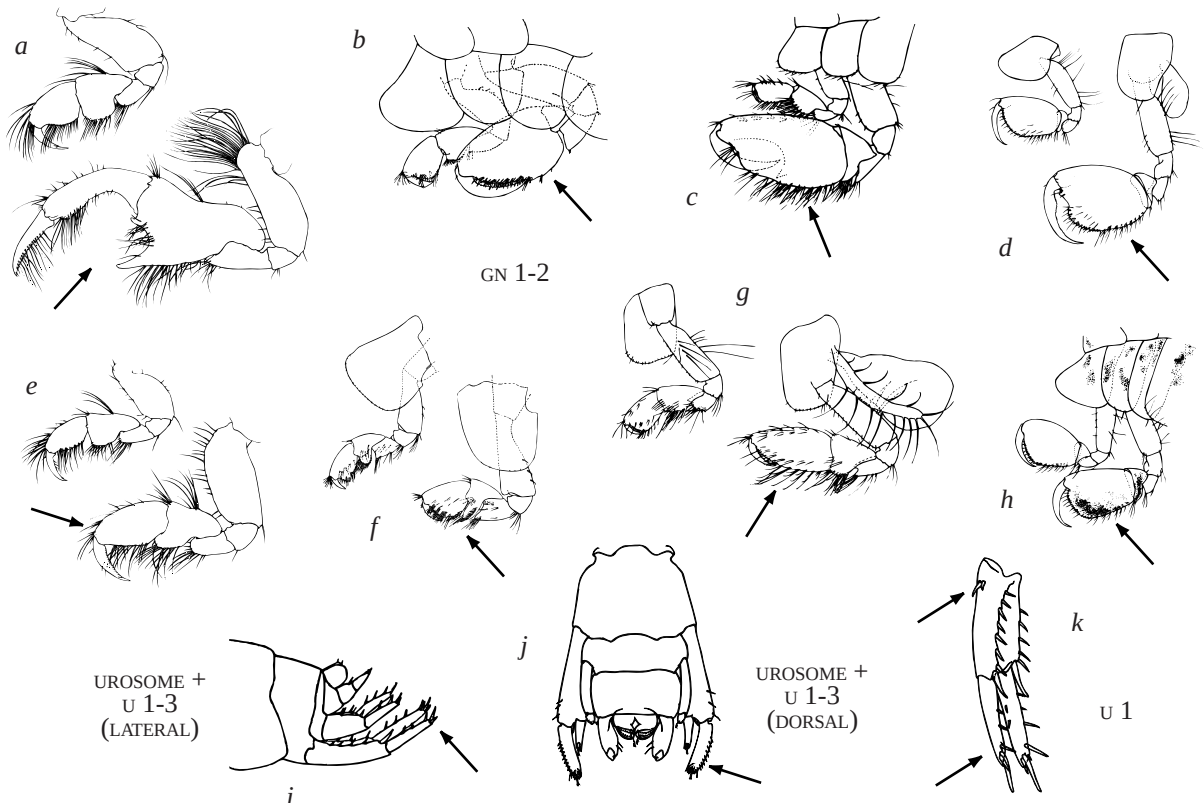


Figure 62.

30. < Antenna 1, accessory flagellum reduced or absent, 0-2 articles in length; antenna 2, peduncle with calceoli in male; coxa 4, ventral margin convex, posterior margin slightly excavate; peraeopods 5-7, basis broadly expanded; epimeron 3, posteroventral angle without large hook; pleon segments 1-3 and urosome segments 1-2 without posterodorsal serrations; telson, tips of lobes not notched EUSIRIDAE

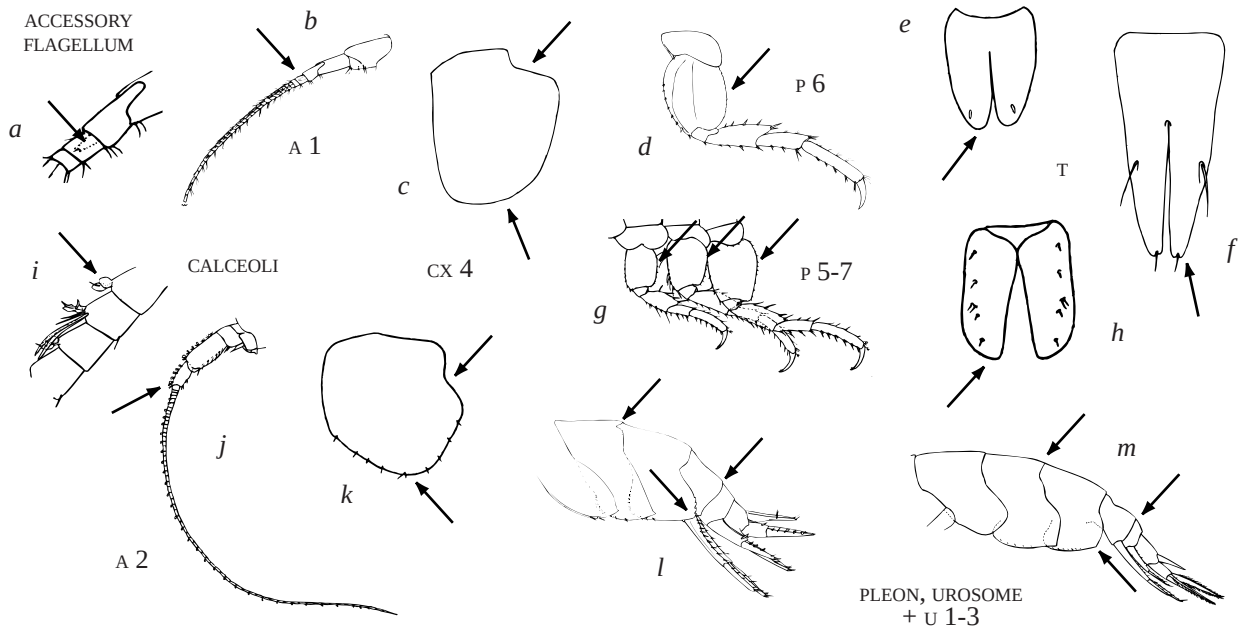


Figure 63.

- < Antenna 1, accessory flagellum well-developed, 3-5 articles in length; antenna 2, peduncle without calceoli in male; coxa 4, ventral margin straight or concave, posterior margin not excavate; peraeopods 5-7, basis weakly expanded; epimeron 3, posteroventral angle with large hook; pleon segments 1-3 and urosome segments 1-2 with posterodorsal serrations; telson, tips of lobes notched MELPHIDIPPIDAE

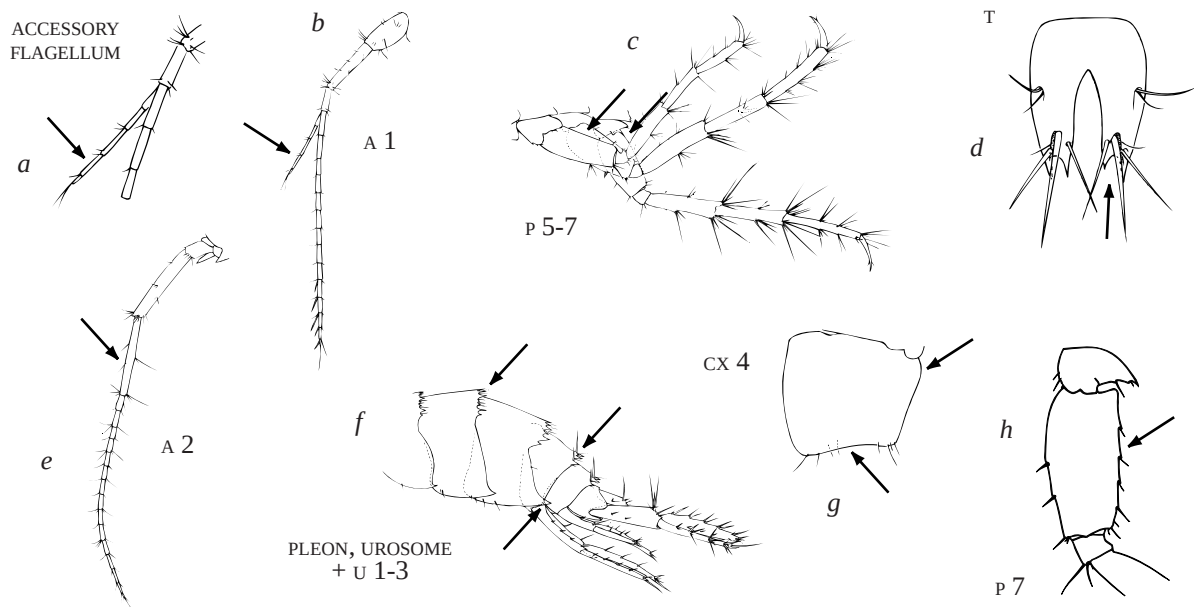


Figure 64.

31. < Antenna 1, accessory flagellum absent; telson lobes thick, fleshy 32

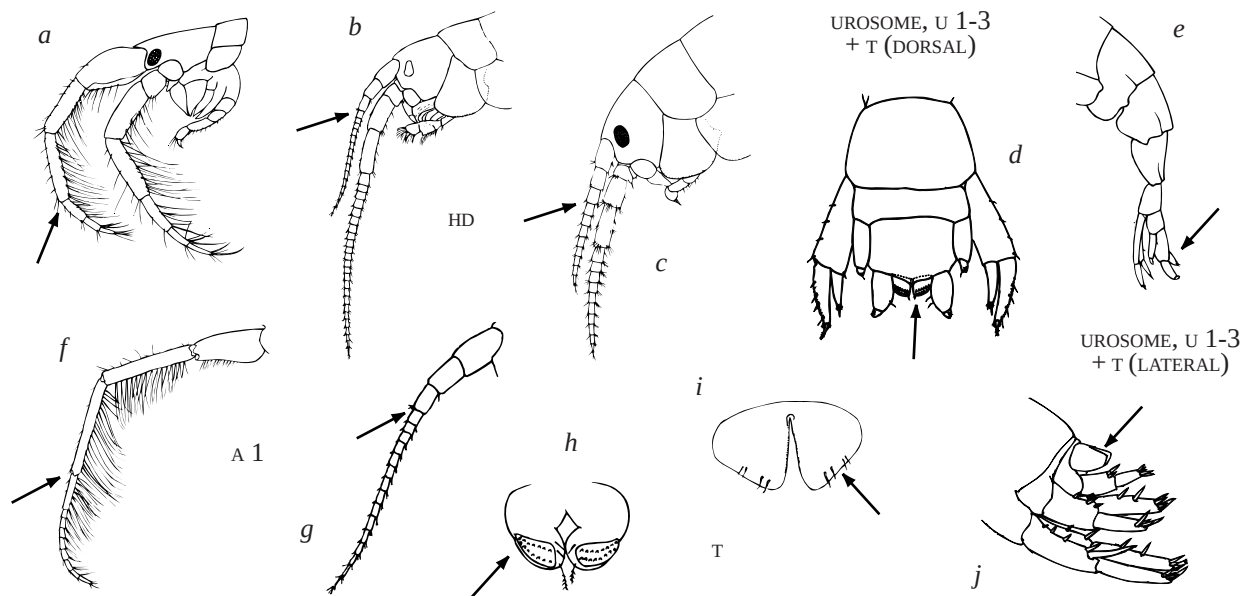


Figure 65.

< Antenna 1, accessory flagellum present (may be very short); telson lobes flat, laminar 33

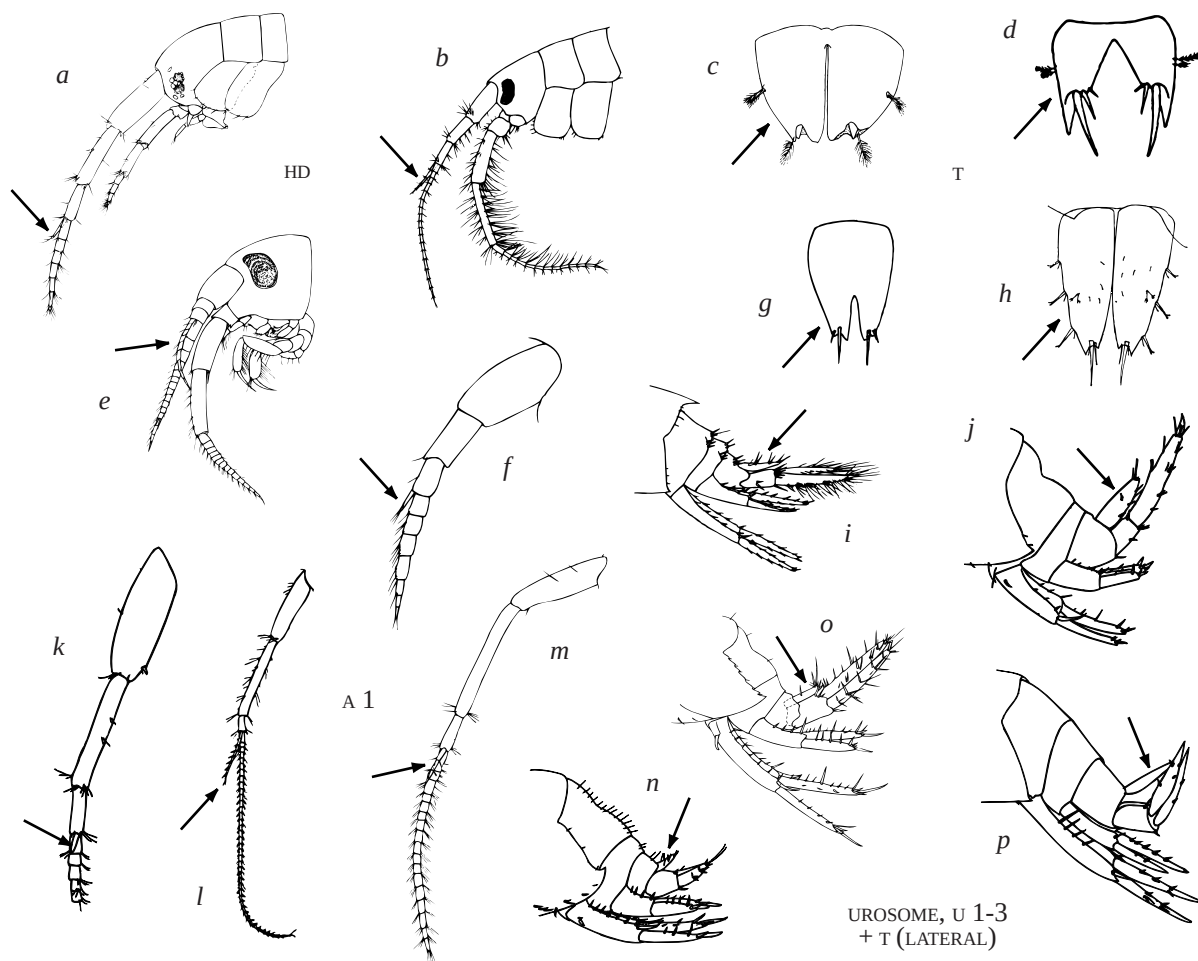


Figure 66.

32. < Antennae 1-2, posterior margins of articles heavily setose; antenna 1, peduncle article 1 enlarged, robust, distinctly broader than article 2; coxae 1-4 very shallow, not overlapping, without process on posterior margin; coxa 5 much larger than anterior coxae; pleopod 1, outer ramus enlarged proximally; uropod 2 uniramous, short, barely extending beyond peduncle of uropod 1 ISCHYROCERIDAE (in part)

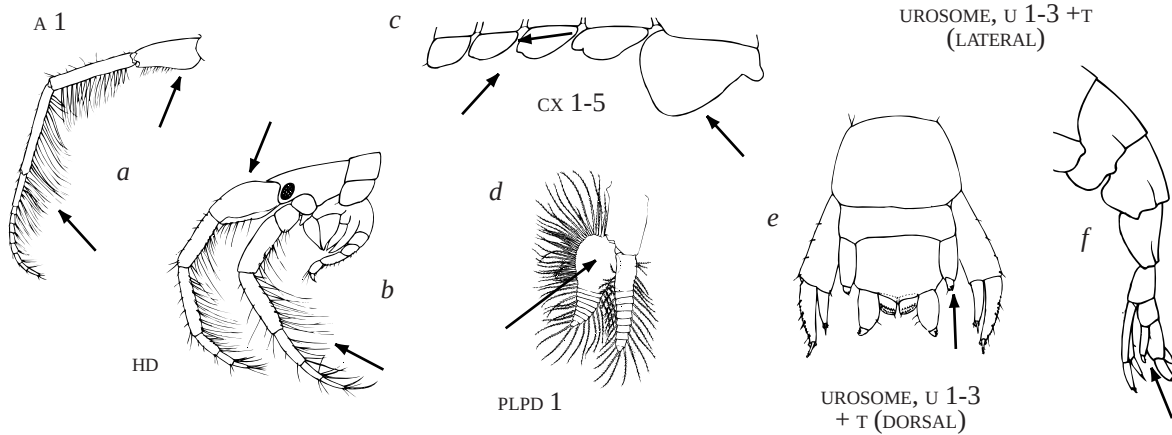


Figure 67.

- < Antennae 1-2, posterior margins of articles not heavily setose; antenna 1, peduncle article 1 not enlarged, normal, at most slightly broader than article 2; coxae 1-4 deep, margins overlapping, with process on posterior margin; coxa 5 not larger than anterior coxae; pleopod 1, outer ramus not enlarged proximally; uropod 2 biramous, long, extending well beyond peduncle of uropod 1 HYALIDAE

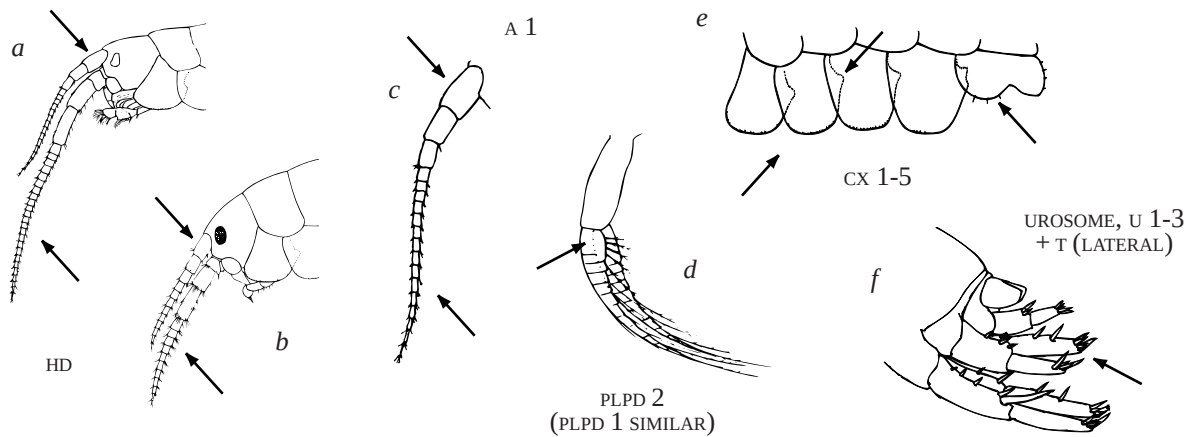


Figure 68.

33. < Antenna 1 elongate, at least 1/3 length of body; mandible, molar strong, tritulative;
 pereopods 6-7 subequal or slightly unequal in length; uropod 1, peduncle with basofacial
 spine MARINE GAMMARIDA (GAMMARIDAE, HADZIIDAE, MELITIDAE)*

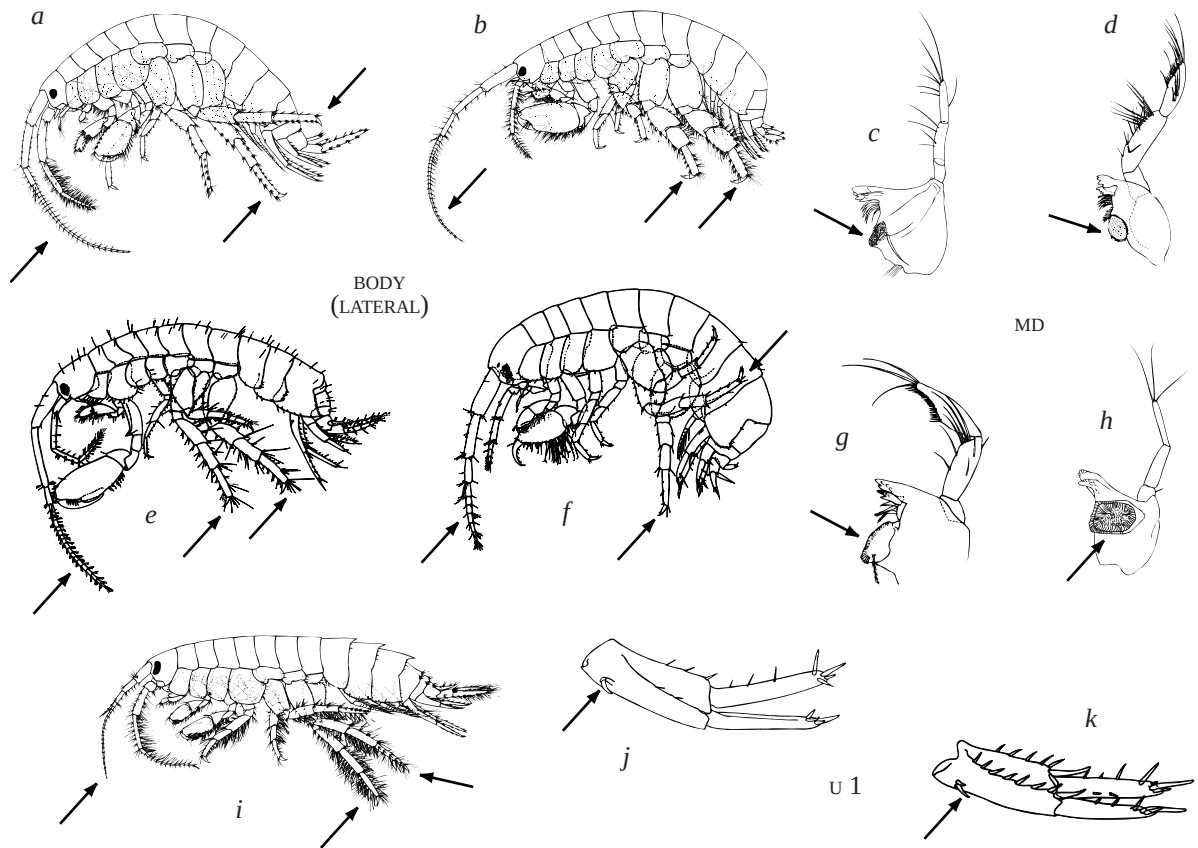


Figure 69.

- < Antenna 1 short, less than 1/4 length of body; mandible, molar weak, non-tritulative;
 pereopod 7 distinctly longer than pereopod 6; uropod 1, peduncle without basofacial spine
 LILJEBORGIIDAE

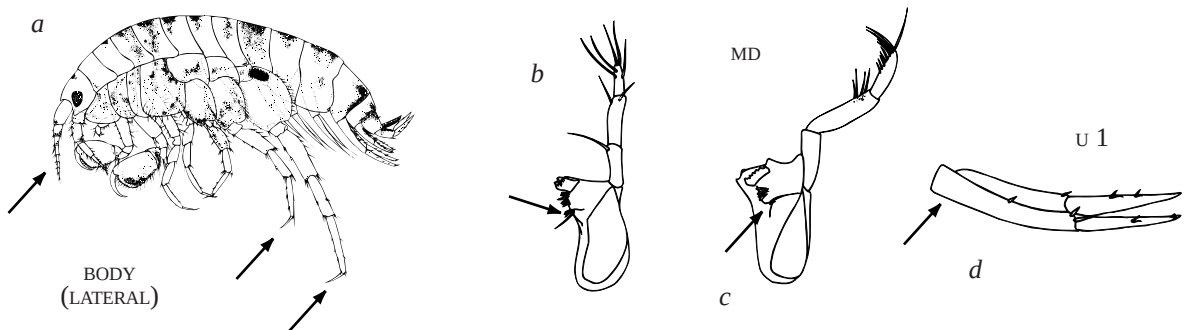


Figure 70.

* Because of the taxonomic confusion surrounding these three families, they are treated together in the keys to families and genera, and a single key to the Florida genera is presented in the section on marine Gammarida (See **Remarks** under Marine Gammarida.)

34. < Rostrum strong, downcurved; eyes dorsolateral, closely approximated or fused dorsally; peraeopod 7 much longer and more slender than peraeopod 6, attenuate distally
 OEDICEROTIDAE

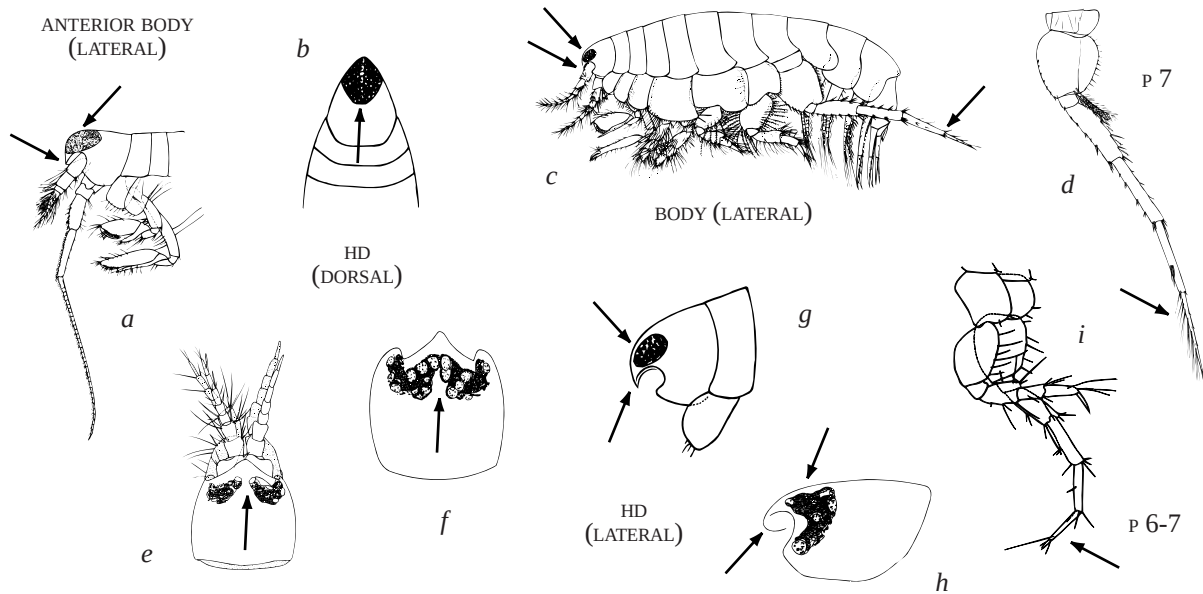


Figure 71.

- < Rostrum small and straight or absent; eyes lateral, not closely approximated or fused dorsally; peraeopod 7 usually shorter than, subequal to or slightly longer than peraeopod 6, if much longer, then not slender and attenuate distally 35

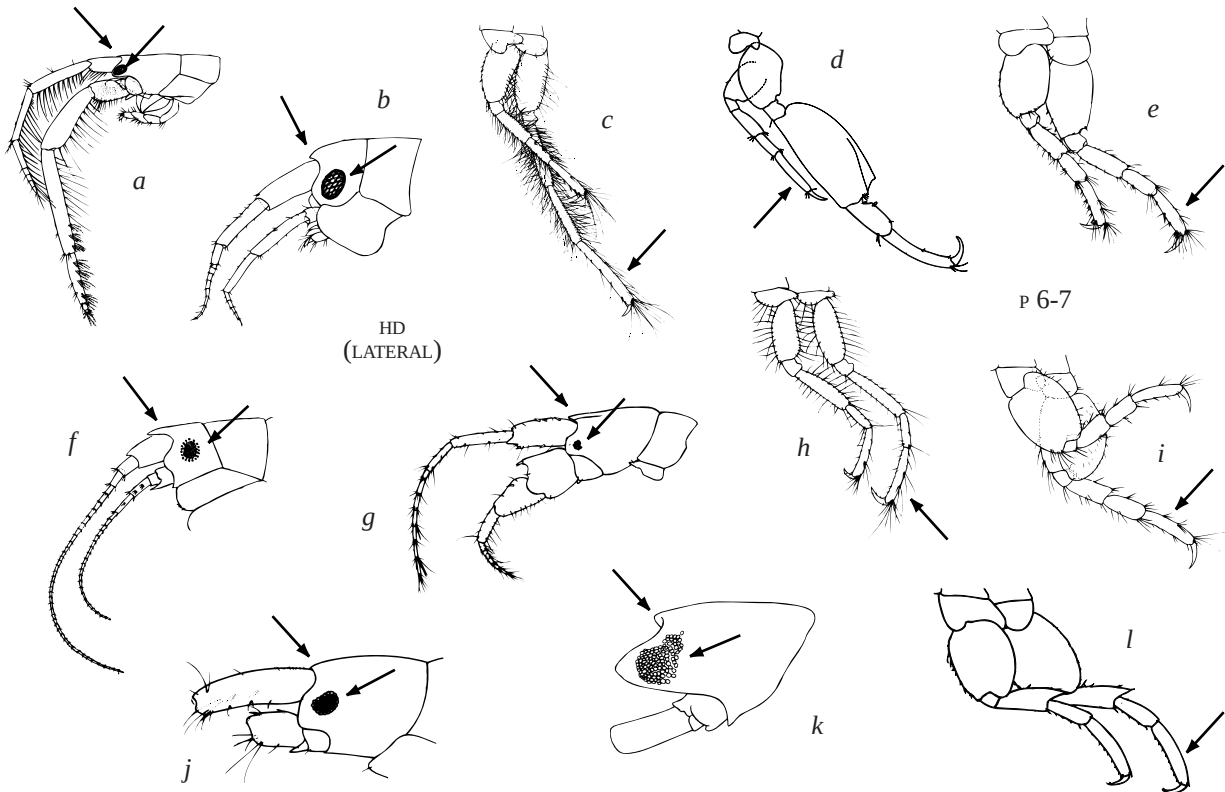


Figure 72.

35. < Gnathopod 1 carpochele, smaller than gnathopod 2; gnathopod 2, carpal lobe strongly produced, elongate, reaching or nearly reaching palmar angle and tip of closed dactyl, propodus stout, subovate, larger than carpus LEUCOTHOIDAE

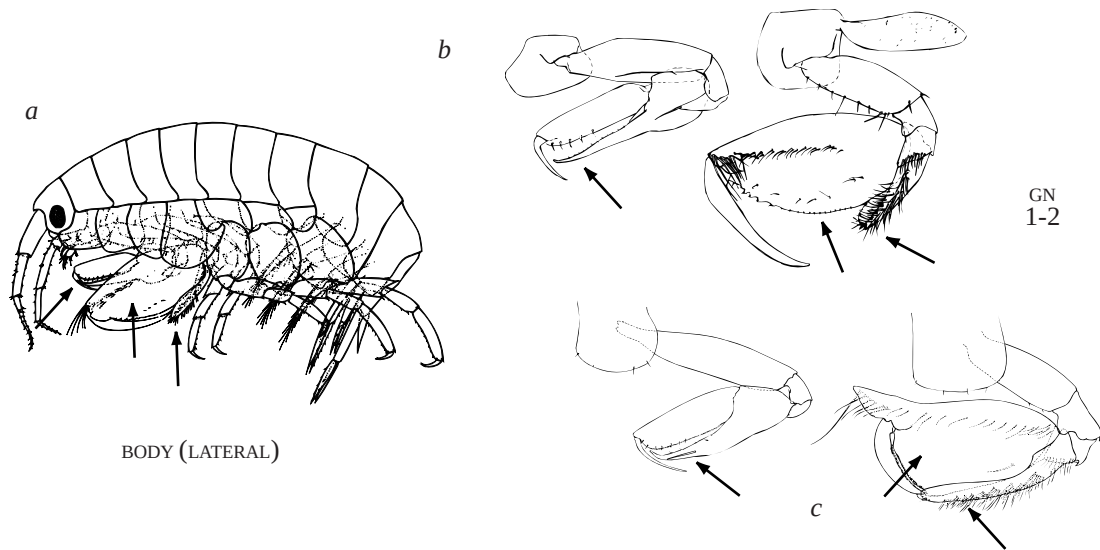


Figure 73.

- < Gnathopod 1 usually not carpochele, if carpochele then larger than gnathopod 2; gnathopod 2, carpal lobe usually unproduced or slightly produced, falling far short of palmar angle and tip of closed dactyl, if strongly produced, then propodus slender, subrectangular, smaller than carpus 36

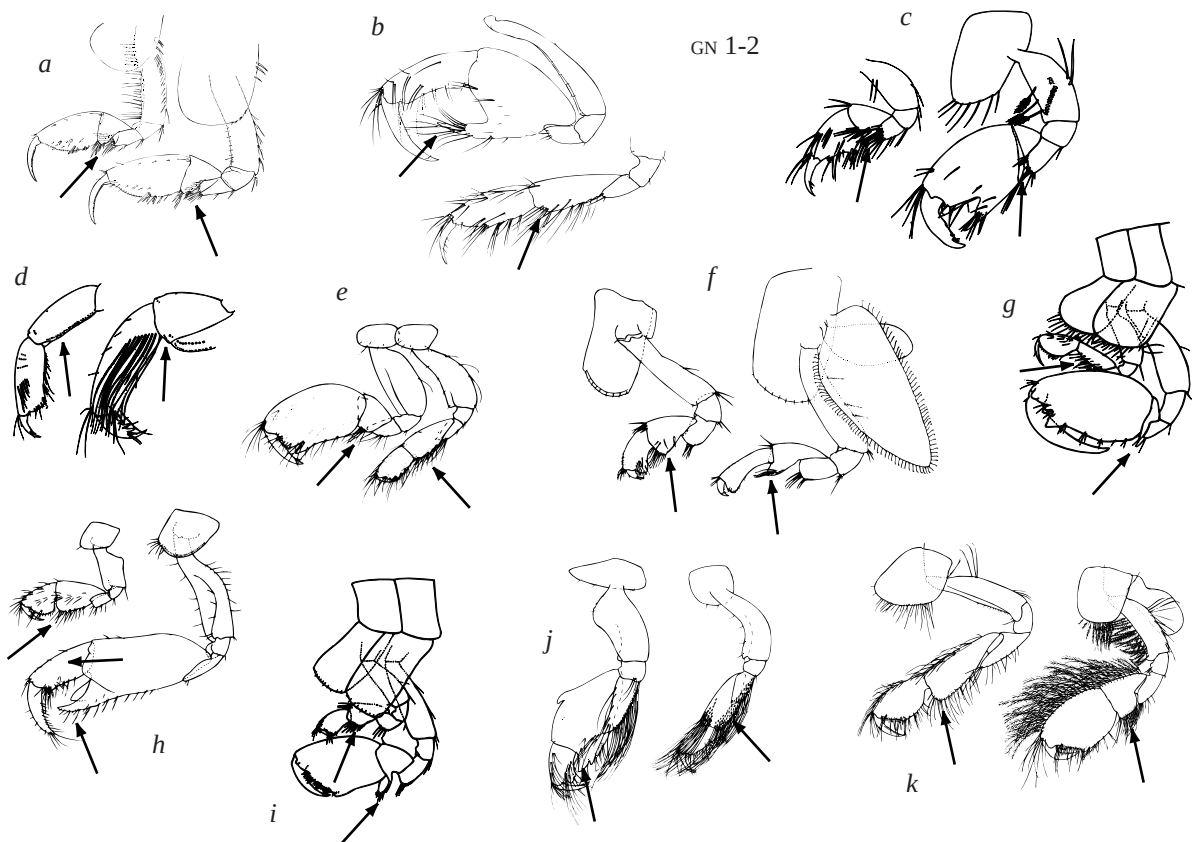


Figure 74.

36. < Coxal plates 1-4 deep, extending well beyond proximal end of basis 37

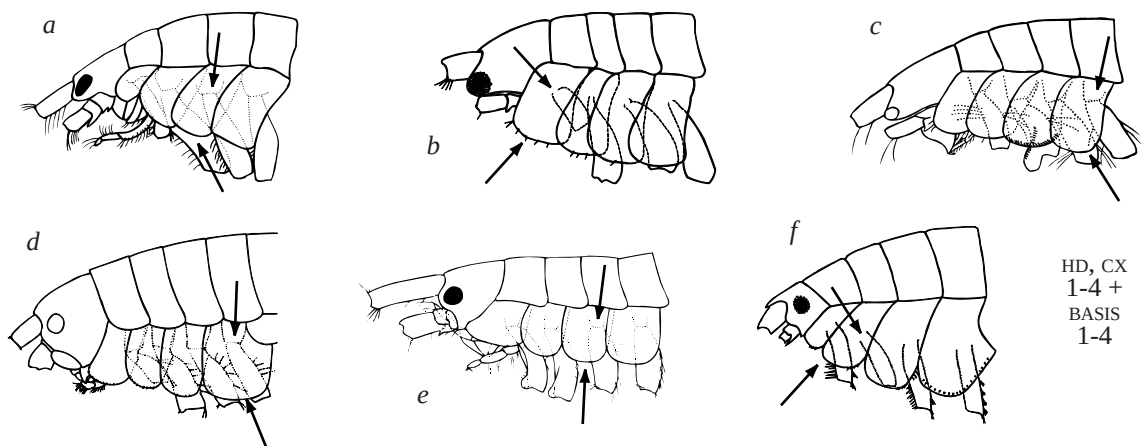


Figure 75.

< Coxal plates 1-4 (occasionally only 1-2) shallow, extending only slightly beyond proximal end of basis 40

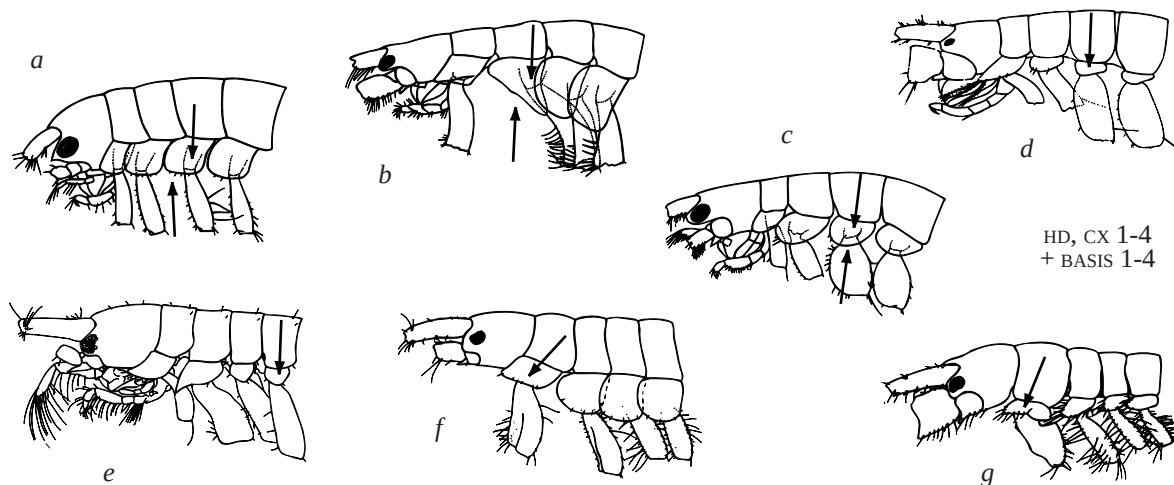


Figure 76.

37. < Coxa 4, posterior margin excavate proximally; coxa 5, anterior lobe much shorter than coxa 4, similar to coxae 6-7 in depth 38

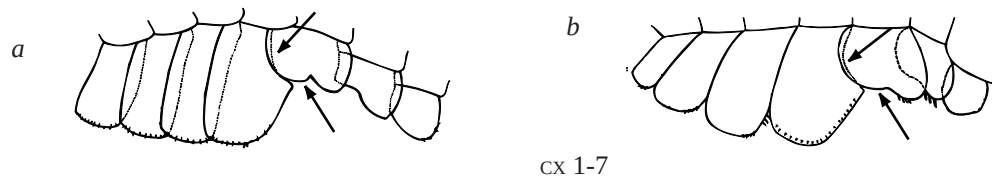


Figure 77.

- < Coxa 4, posterior margin not excavate proximally; coxa 5, anterior lobe as deep or almost as deep as coxa 4, much deeper than coxae 6-7 39

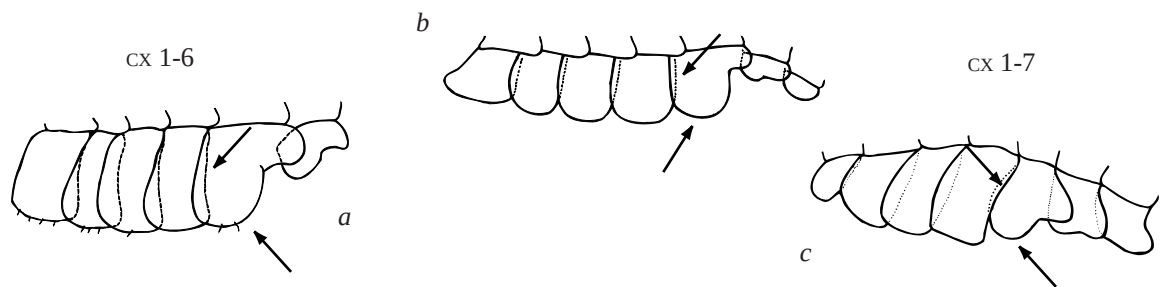


Figure 78.

38. < Antenna 1 shorter than antenna 2; mandible, palp absent; maxilla 1, palp vestigial or absent; gnathopod 2 sexually dimorphic, larger in male; uropod 3 uniramous, ramus subequal to or shorter than peduncle HYALELLIDAE

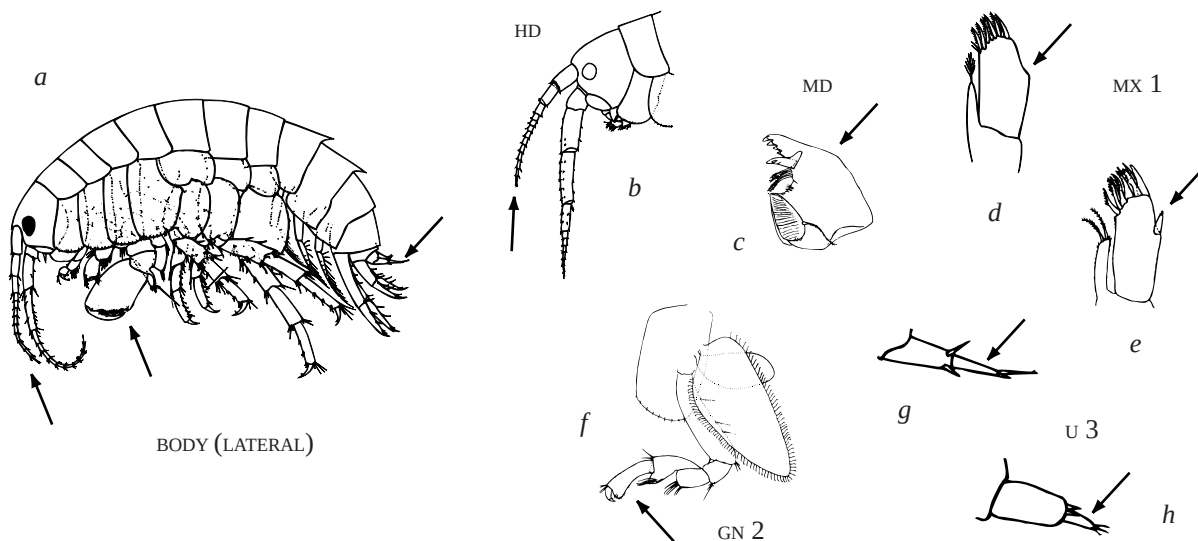


Figure 79.

- < Antenna 1 subequal to or longer than antenna 2; mandible, palp present; maxilla 1 palp present, well-developed; gnathopod 2 not sexually dimorphic; uropod 3 biramous, rami much longer than peduncle PLEUSTIDAE

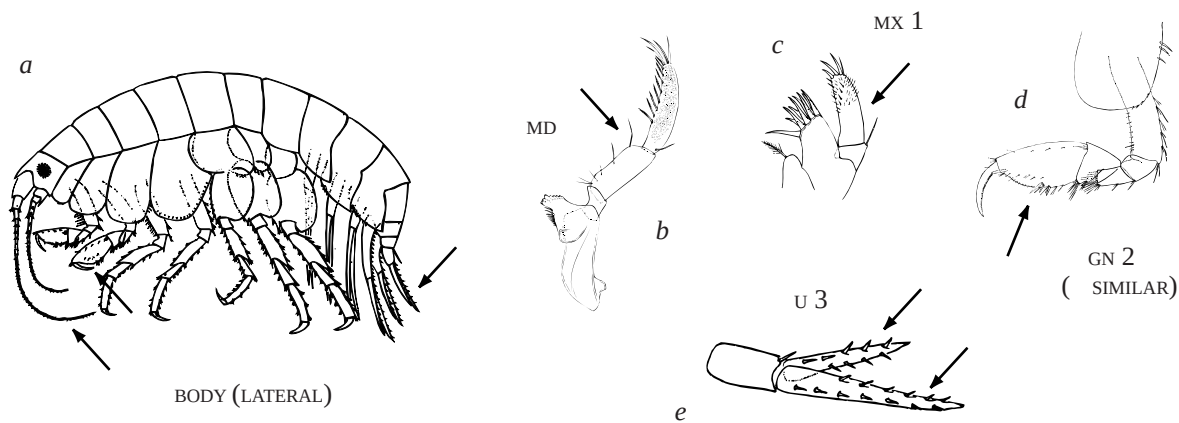


Figure 80.

39. < Antenna 1, flagellum much longer than peduncle; head, ocular lobe broadly rounded or subquadrate anteriorly, inferior antennal sinus not deeply recessed for insertion of antenna 2; uropod 3 biramous, rami stout, subequal or outer slightly shorter, outer ramus with 2 short, hook-like distal spines or processes..... AMPITHOIDAE

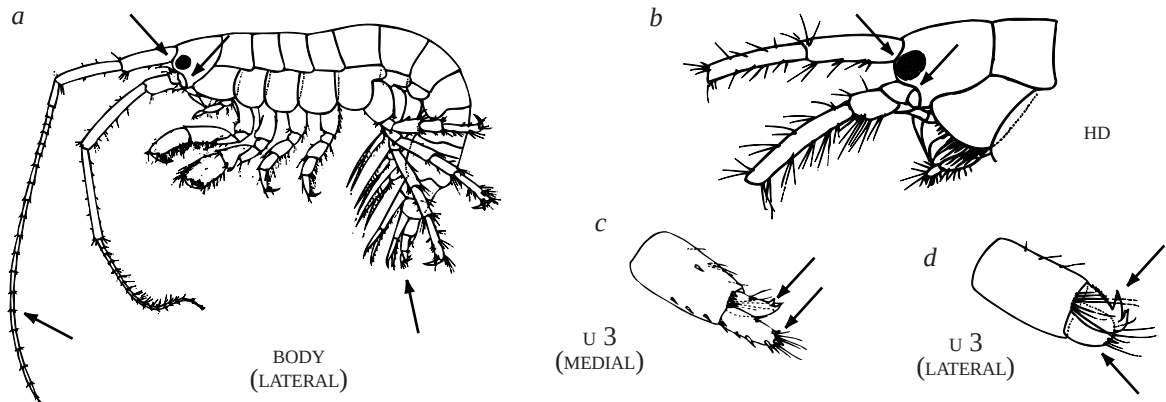


Figure 81.

- < Antenna 1, flagellum subequal to or shorter than peduncle; head, ocular lobe acute, subacute or narrowly rounded anteriorly, inferior antennal sinus deeply recessed for insertion of antenna 2; uropod 3 usually uniramous or unequally biramous (inner ramus scale-like), occasionally equally biramous (rami subequal), if equally biramous, then rami slender, outer ramus without hook-like distal spines or processes..... ISAEIDAE (in part)

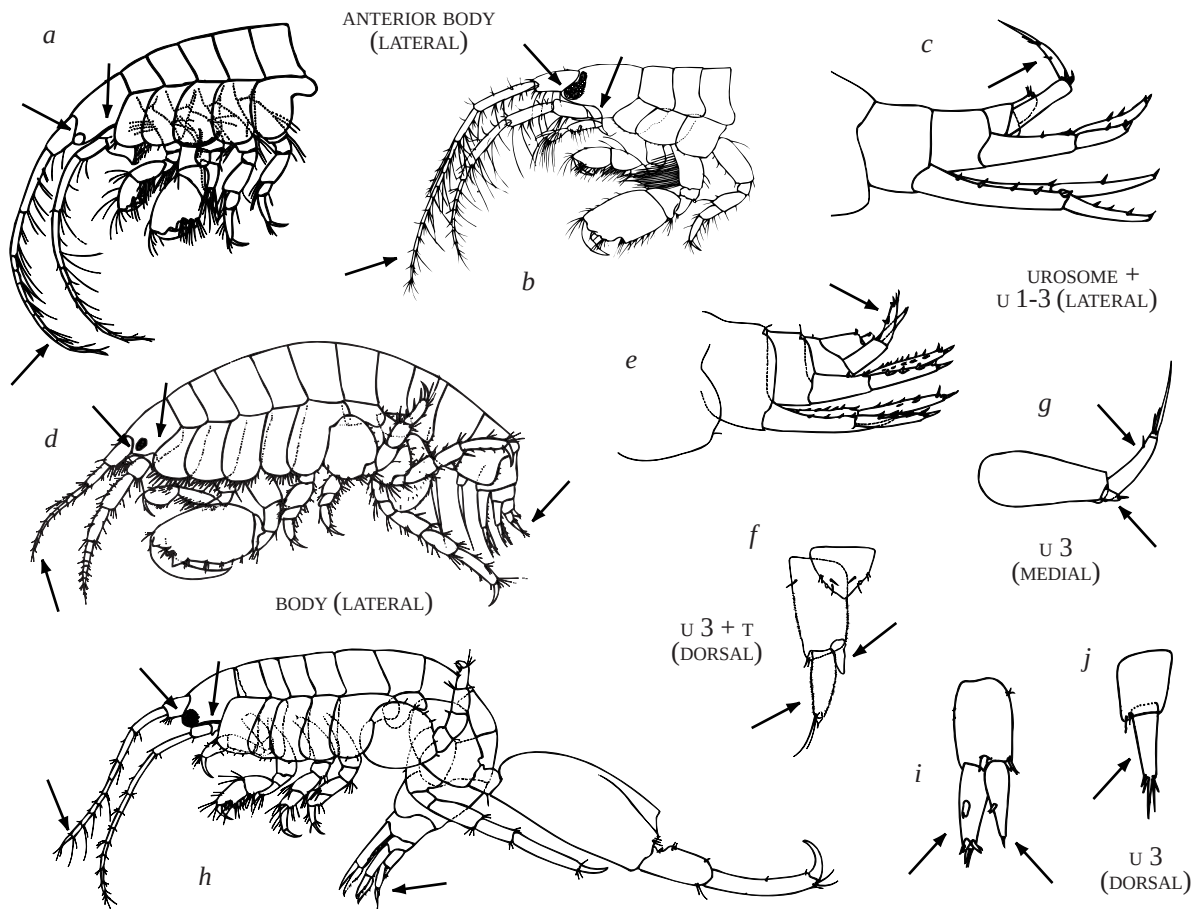


Figure 82.

40. < Gnathopod 1 usually larger than gnathopod 2, occasionally subequal, similar (especially in females) 41

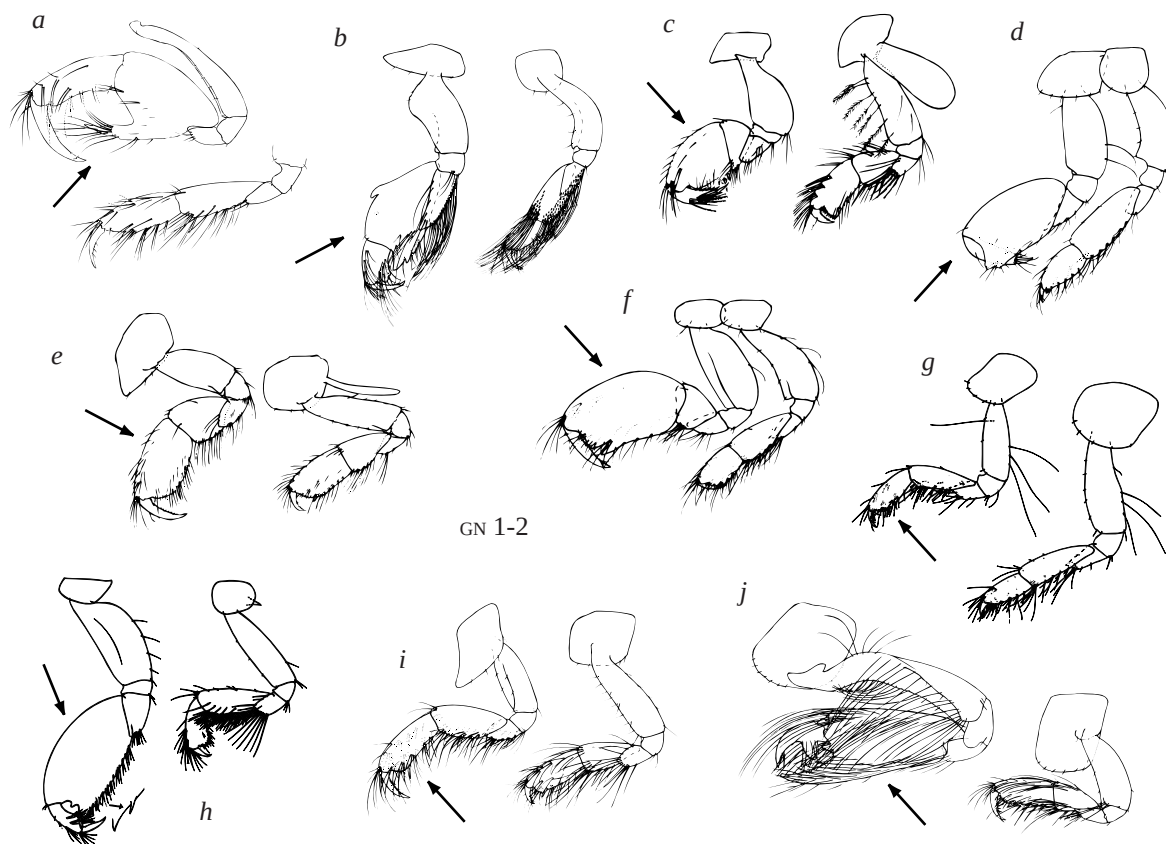


Figure 83.

- < Gnathopod 1 subequal to or smaller than gnathopod 2, if subequal, then dissimilar 42

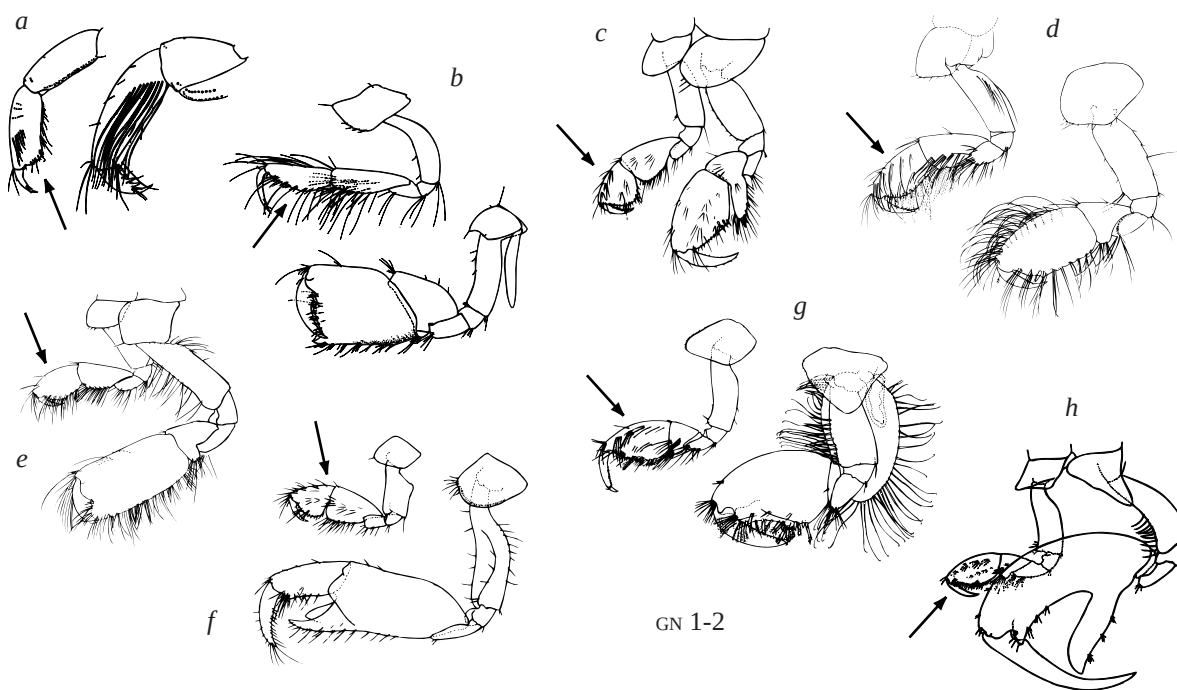


Figure 84.

41. < Head, inferior antennal sinus not deeply recessed for insertion of antenna 2 (may be slightly recessed); ocular lobe usually broadly rounded or subquadrate, rarely acute; mandible, palp article 3 not clavate AORIDAE

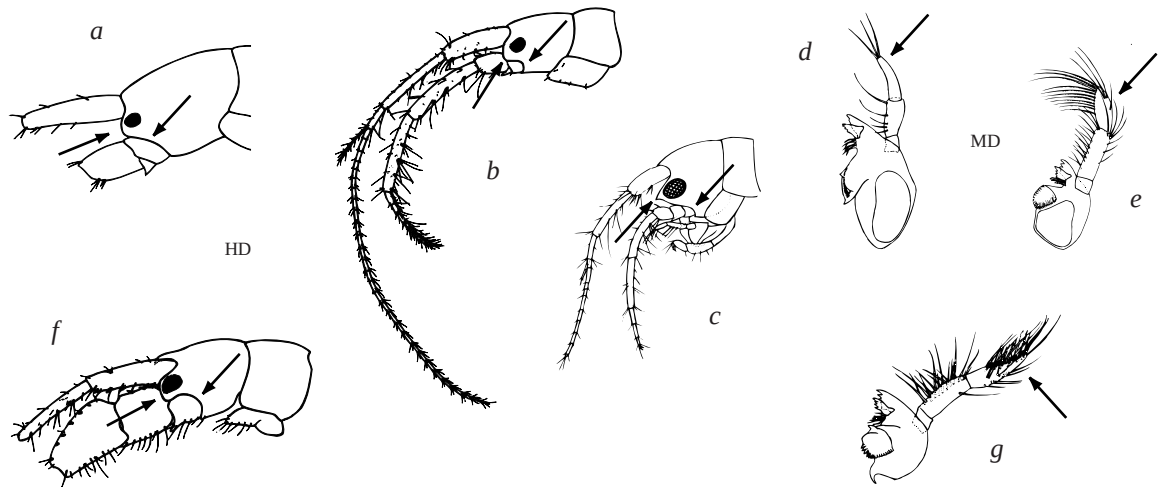


Figure 85.

- < Head, inferior antennal sinus deeply recessed for insertion of antenna 2; ocular lobe narrowly rounded or subacute; mandible, palp article 3 clavate NEOMEGAMPHOPIDAE

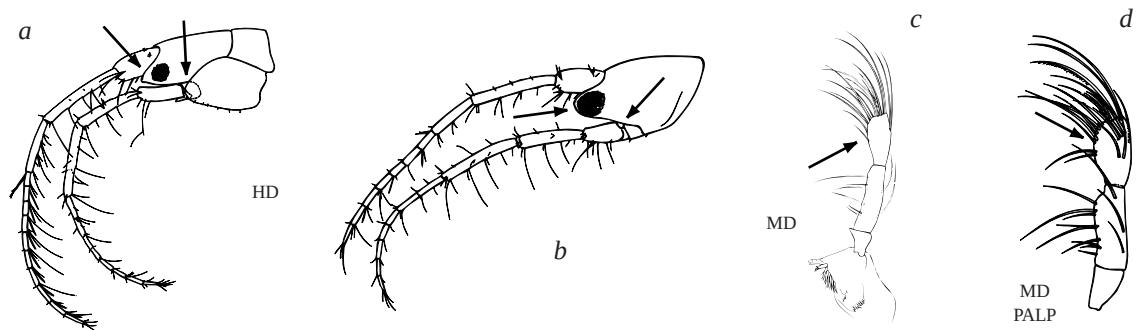


Figure 86.

42. < Antenna 2, peduncle article 4 with 2 strong distal processes or teeth; mandible, palp short, weak, scarcely extending beyond incisor process; gnathopod 1 subequal to gnathopod 2; uropod 1, rami stout, much shorter than peduncle, outer margins strongly spinose; uropod 3 uniramous, ramus broadly rounded, paddle-like COROPHIIDAE (in part)

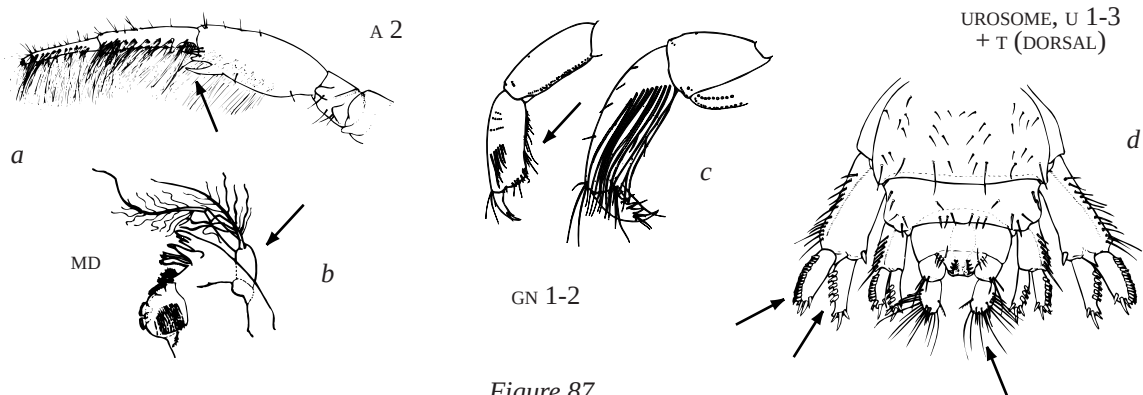


Figure 87.

- < Antenna 2, peduncle article 4 without distal processes or teeth; mandible, palp long, well-developed, extending well beyond incisor process; gnathopod 1 smaller than gnathopod 2; uropod 1, rami slender, slightly shorter than, subequal to or longer than peduncle, outer margins weakly spinose; uropod 3 usually biramous, if uniramous then ramus not broadly rounded or paddle-like 43

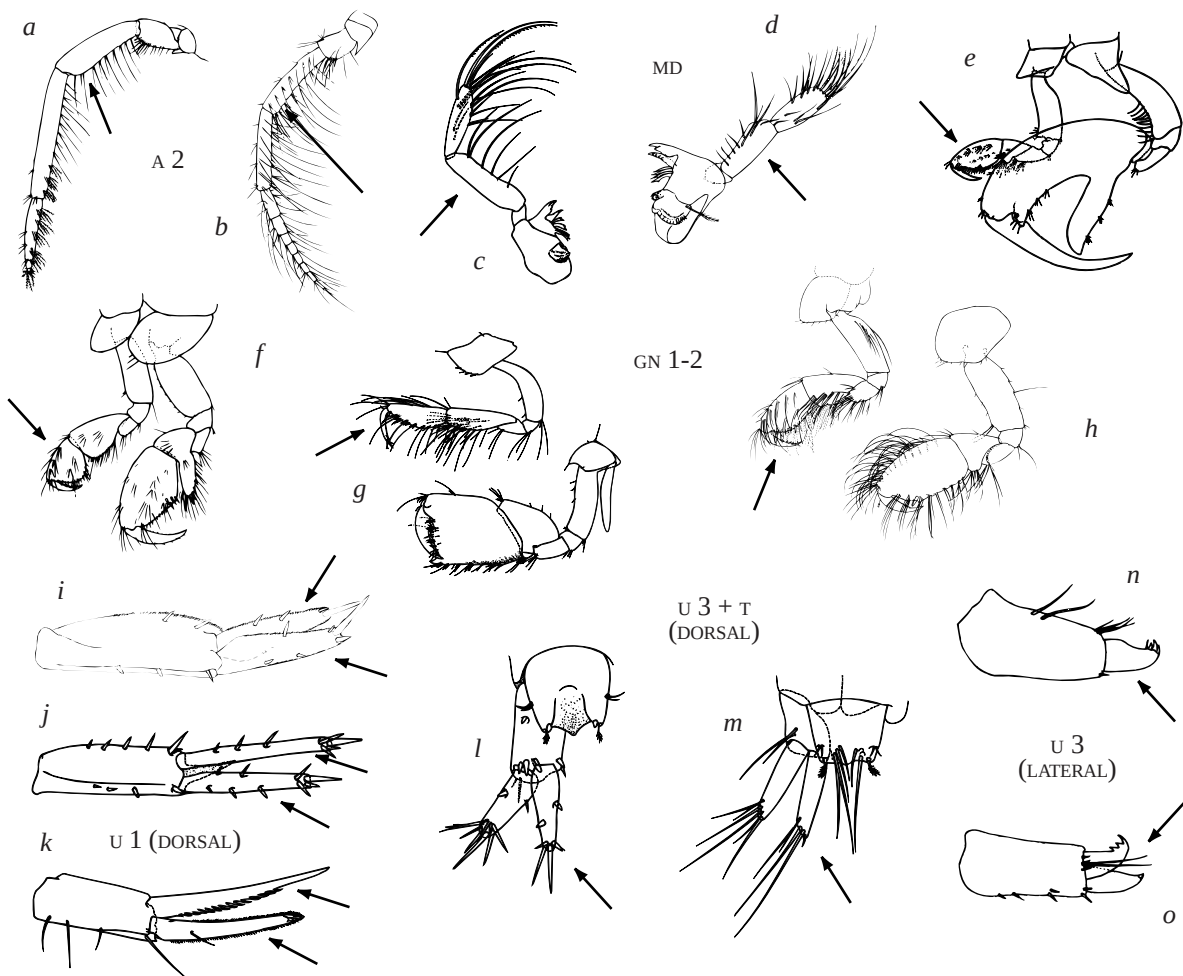


Figure 88.

43. < Antenna 1, accessory flagellum well-developed, 2+-articulate, longer than first flagellar article; gnathopod 2 () subchelate, propodus subquadrate or subrectangular, without deep palmar excavation, without large “thumb” at palmar angle (may have shallow excavation and very small “thumb”); peraeopods 3-4, basis, anterior margin not expanded distally or medially, only slightly wider than ischium at point of articulation, merus subrectangular, not expanded distally; uropod 3, peduncle not elongate, subequal to or shorter than rami, outer ramus without hooked apical teeth or processes ISAEIDAE (in part)

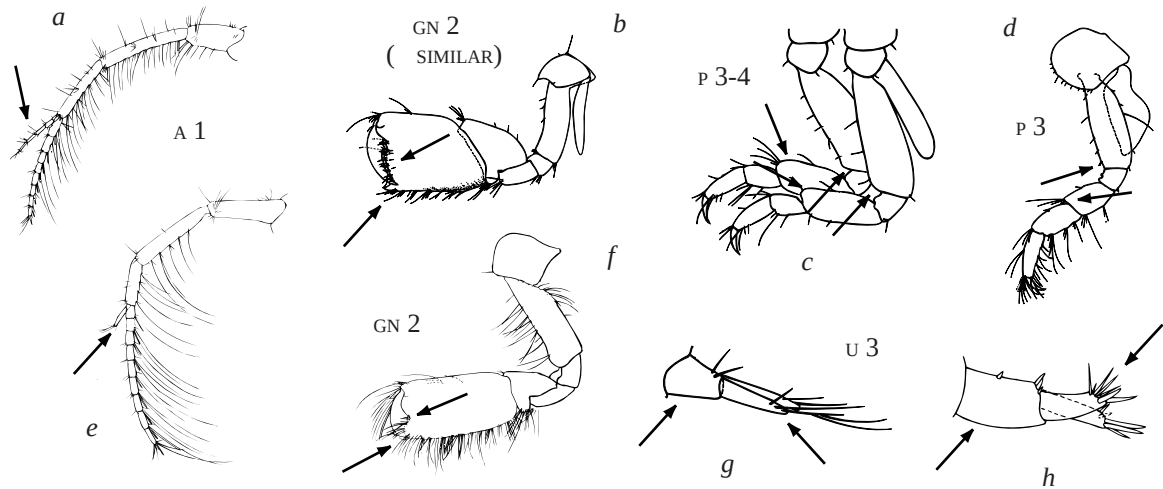


Figure 89.

- < Antenna 1, accessory flagellum minute, 1-articulate, shorter than first flagellar article, or vestigial (only visible under compound microscope); gnathopod 2 () carpochele, or subchelate, if subchelate, then propodus subtriangular, with deep palmar excavation, with large “thumb” at palmar angle; peraeopods 3-4, basis, anterior margin expanded distally or medially, distinctly wider than ischium at point of articulation, merus subtriangular, expanded distally; uropod 3, peduncle elongate, longer than ramus (or rami, if biramous), ramus (or outer ramus, if biramous) with hooked apical teeth or processes ISCHYROCERIDAE (in part)

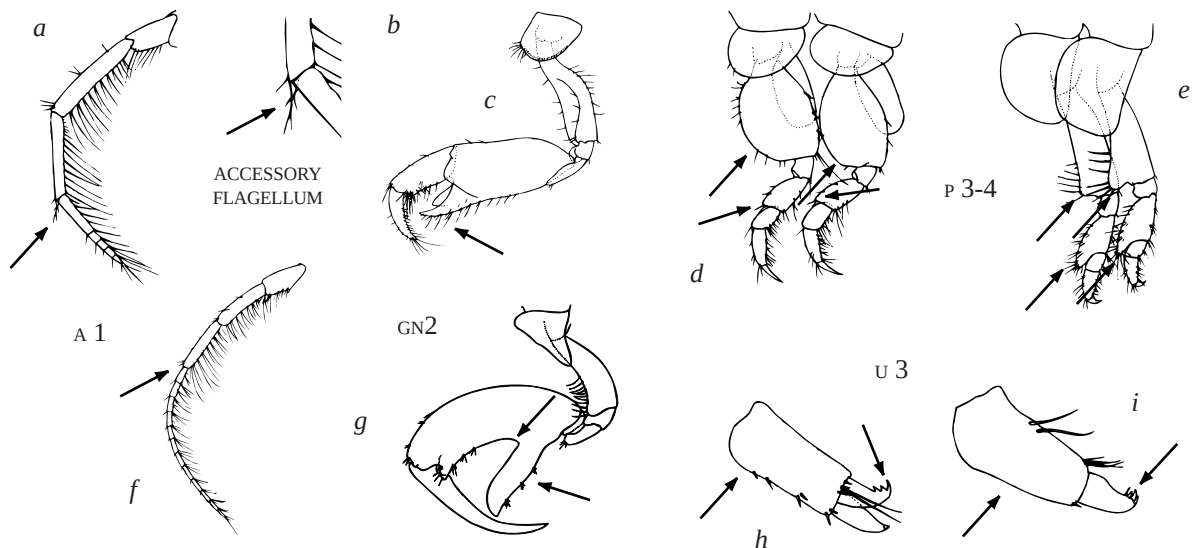


Figure 90.

Marine Gammarida (*sensu* Barnard and Barnard, 1983)

Regional diagnosis: Antenna 1 well-developed, at least one third length of body, reaching well beyond peduncle article 4 of antenna 2, accessory flagellum present (may be very short); antenna 2 at least half length of antenna 1; head normal, not globular, rostrum small or obsolescent; mandible with both palp and molar, molar strong, tritulative; maxilliped, palp article 4 normally developed, not vestigial; coxae 1-2 not reduced, not hidden by following coxae; coxae 1-3 subequal in depth or becoming longer posteriorly; gnathopod 1 well-developed, subchelate, with 7 articles; gnathopod 2, article 3 not elongate; pereopods 6-7 subequal or slightly unequal in length; urosome segments 1-3 separate, segment 1 not elongate; uropod 1, peduncle with basofacial spine(s), outer ramus subequal to or longer than inner; uropod 3 biramous (inner ramus may be reduced); telson cleft, lobes flat, laminar.

Florida families: Gammaridae, Hadziidae, Melitidae

Remarks: The marine Gammarida includes members of both the gamaroid group (Barnard and Barnard, 1983) (= superfamily Gammaroidea of Bousfield, 1983; Bousfield and Shih, 1994) and the hadzoid group (Barnard and Barnard, 1983) (= superfamily Hadzioidea of Bousfield, 1983; Bousfield and Shih, 1994). The family Gammaridae is included in the former group, while the families Hadziidae and Melitidae belong to the latter. However, the taxonomy of these two groups and their component families is currently in a state of flux, with the placement of a number of genera within them not widely agreed upon and subject to change. Because of this, Thomas and Barnard (1985b) decided to use the classical definition of the family Gammaridae, which includes the melitids and hadziids, in their paper describing the genera *Anamera* and *Spathiopus* from the Florida Keys. Although they placed these two genera in the Gammaridae *sensu lato*, they state that they probably belong in the hadzioid family group (= superfamily Hadzioida) of Bousfield (1983). They should probably be placed in the family Melitidae; however, Jarrett and Bousfield (1996) did not list *Anamera* or *Spathiopus* among the genera included in that family and, for the moment at least, they remain in the Gammaridae.

At least in part because of the above confusion concerning the placement of genera within the families Gammaridae, Hadziidae and Melitidae, many of the characters usually used to define those families are not exclusive, making it difficult, if not impossible, to generate a reliable key for separating them. Because of this, they are treated together in the keys to families and genera and, although the current familial affiliations are given for the genera found in Florida waters, these will undoubtedly change for some taxa as further works on these groups are published.

KEY TO FLORIDA GENERA OF MARINE GAMMARIDA **(FAMILIES GAMMARIDAE, HADZIIDAE AND MELITIDAE)**

1. < Eyes well-developed, broadly reniform; coxal gills present on peraeon segment 7; urosome segments 1-3 with dorsal spine groups; uropod 3, margins of rami densely setose *Gammarus* (Gammaridae)

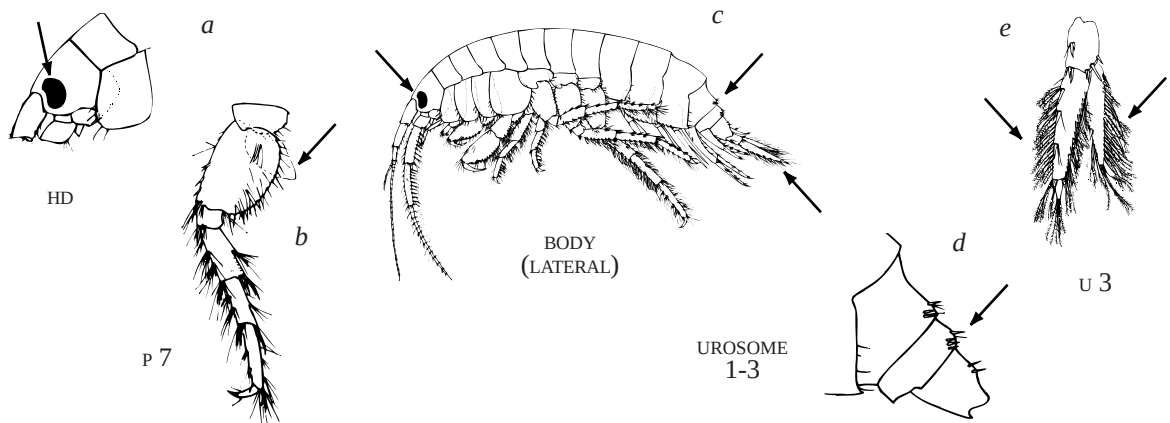


Figure 91.

- < Eyes weak or well-developed, usually round, ovate or pyriform, rarely narrowly reniform; coxal gills absent on peraeon segment 7; fewer than 3 urosome segments with dorsal spine groups (teeth or processes may be present); uropod 3, margins of rami spinose or sparsely setose 2

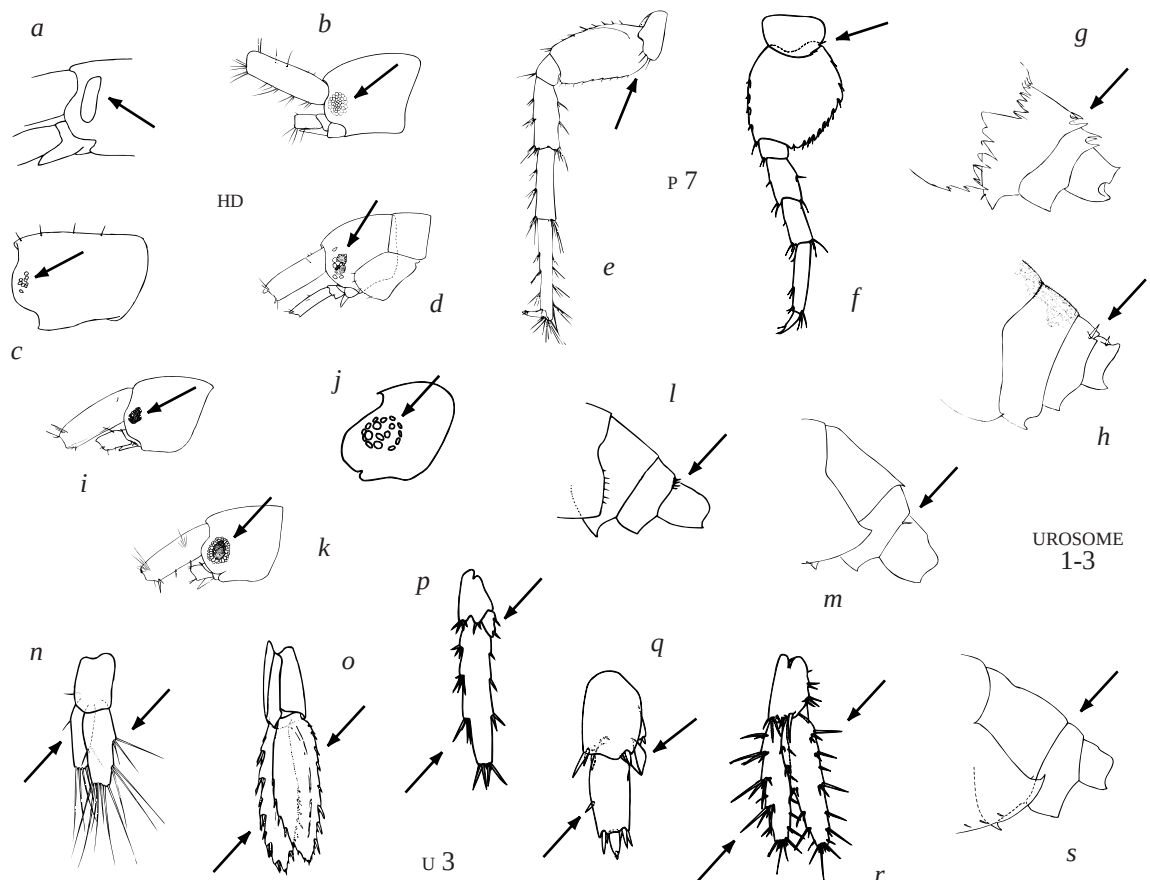


Figure 92.

2. < Uropod 3, rami very unequal in length, outer ramus elongate, inner ramus very short, scale-like 3

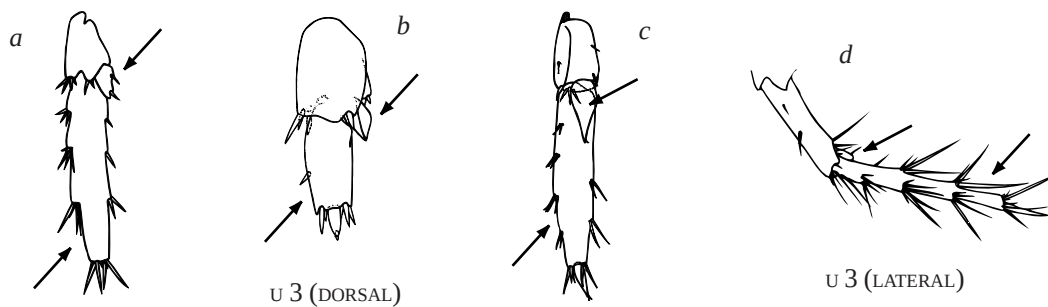


Figure 93.

- < Uropod 3, rami subequal or slightly unequal in length, both rami short or both long, inner ramus not short, scale-like 7

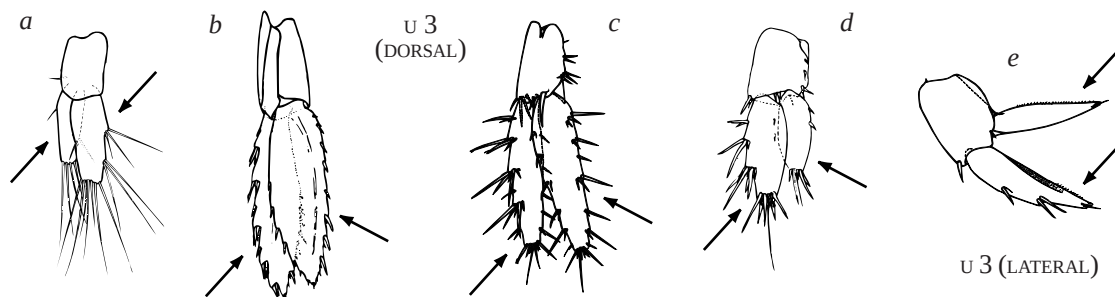


Figure 94.

3. < Maxilla 1, inner plate slender, curved, tapering distally; pleon segments 1-3, posterodorsal margin with strong serrations or teeth; male second gnathopods very dissimilar, extremely unequal in size, larger side chelate; telson lobes with lateral margins strongly convex, without apical or subapical spines *Dulichella* (Melitidae)

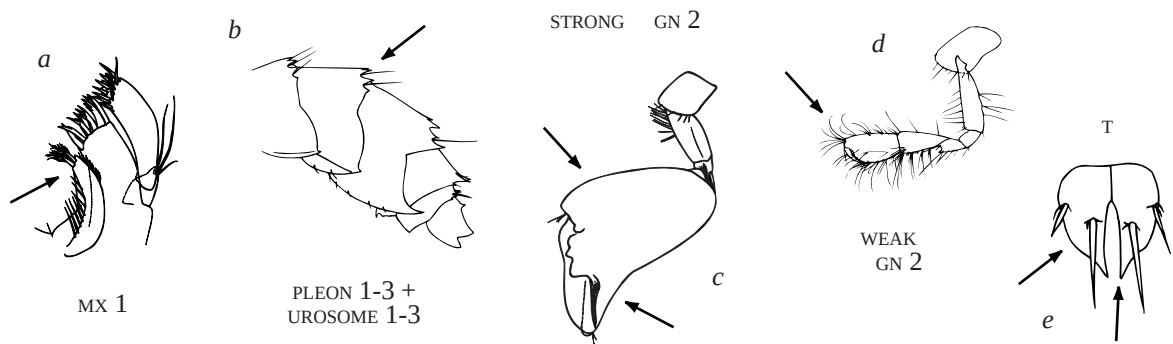


Figure 95.

- < Maxilla 1, inner plate subtriangular, subtruncate, or narrowly ovate (may have small distal process); pleon segments 1-3 entire, posterodorsal margin without serrations or teeth; male second gnathopods similar, subequal in size, both sides subchelate; telson lobes with lateral margins straight to slightly convex, with apical or slightly subapical spines 4

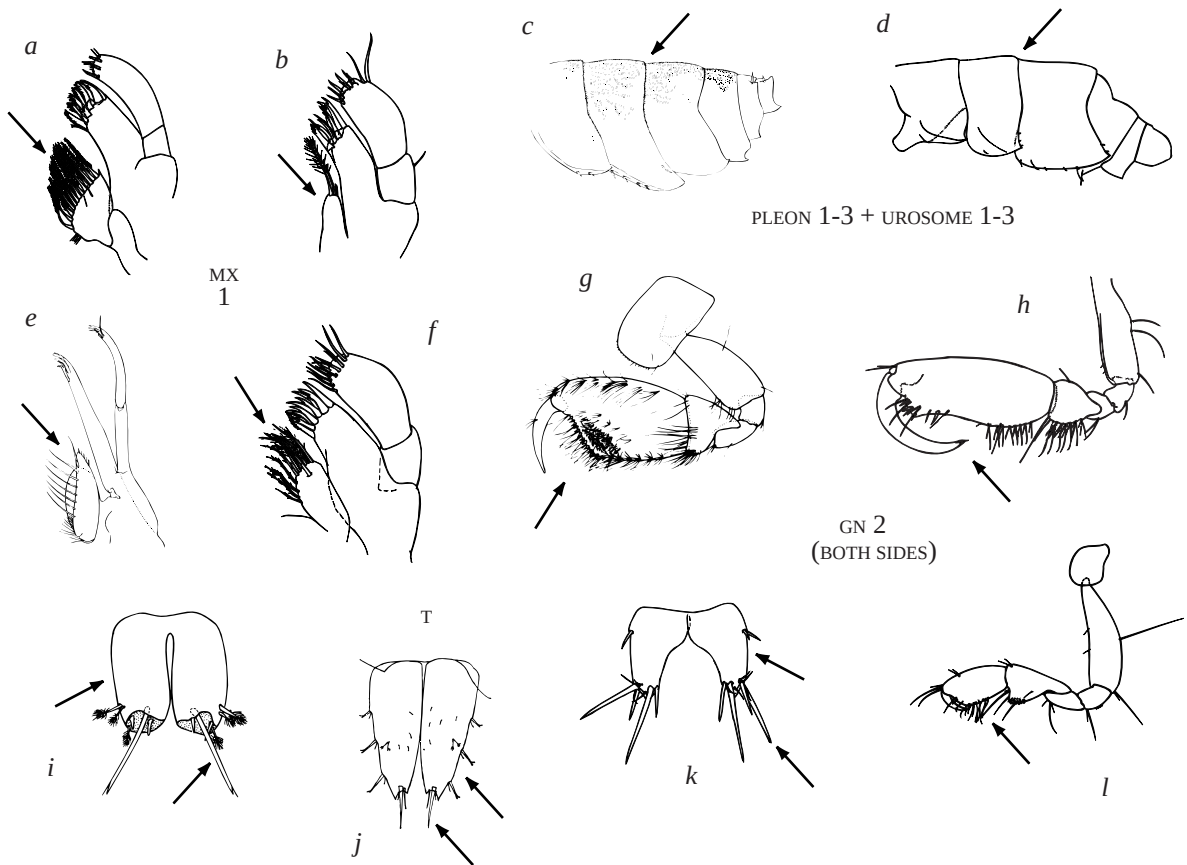


Figure 96.

4. < Lower lip, inner lobes present; uropod 3, outer ramus 1-articulate 5

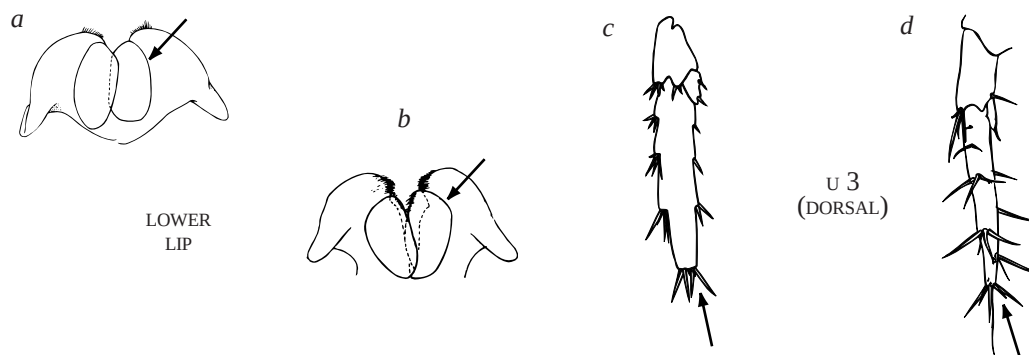


Figure 97.

- < Lower lip, inner lobes absent; uropod 3, outer ramus 2-articulate, distal article much smaller than proximal article 6

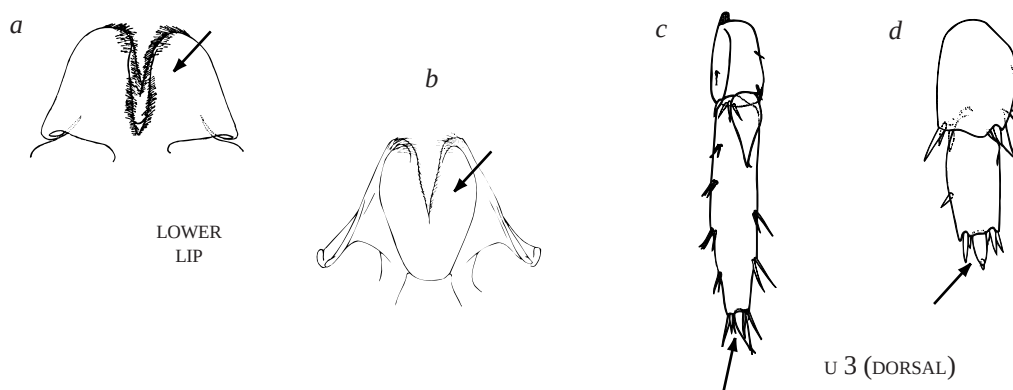


Figure 98.

5. < Antenna 2 extending well beyond peduncle of antenna 1; maxilla 1, palp asymmetrical, left and right sides dissimilar, distal margin of left article 2 toothed; coxa 1 subrectangular, not produced anteroventrally; coxa 6 of female with anterior lobe modified into a large, posteriorly directed hook; gnathopod 1 of male, dactyl short, stout, broadly expanded proximally; gnathopod 2 sexually dimorphic, greatly enlarged in male, larger than gnathopod 1 in both sexes; peraeopods 5-7, posterior margin of basis not strongly serrate; urosome segment 2 with spines on posterodorsal margin *Melita* (Melitidae)

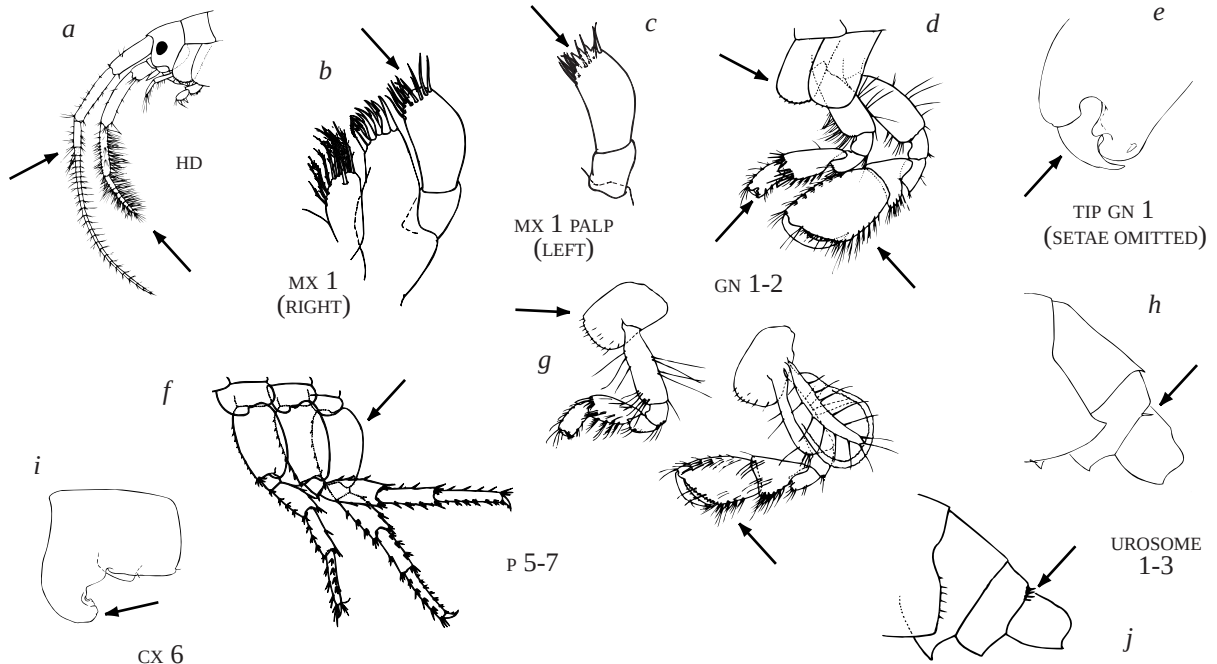


Figure 99.

- < Antenna 2 extending slightly beyond peduncle of antenna 1; maxilla 1, palp symmetrical, left and right sides similar, distal margin of article 2 entire; coxa 1 “shoe-shaped”, produced anteroventrally; coxa 6 of both sexes unmodified; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 not sexually dimorphic, similar to gnathopod 1 in size in both sexes; peraeopods 5-7, posterior margin of basis strongly serrate; urosome segment 2 without spines on posterodorsal margin *Netamelita* (Melitidae)

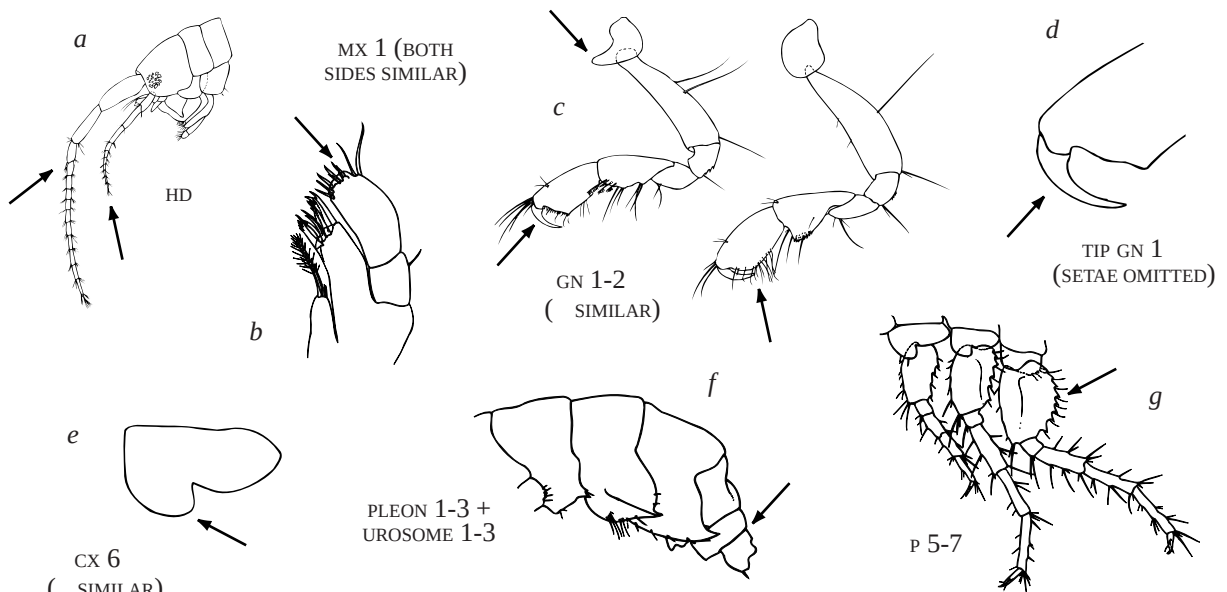


Figure 100.

6. < Mandible, palp article 3 slender, subequal to article 2 in length; maxilla 1, inner plate subtriangular, without small distal process, medial margin heavily setose, outer plate and palp broad, not styliform; gnathopod 2 of male, propodus without setose concavity on medial surface, dactyl strongly falcate; peraeopods 5-7, posterior margin of basis entire, not castellate; peraeopod 7, basis not expanded posteriorly; epimeron 2 not produced posteroventrally, shorter than epimeron 3; uropod 3 long, extending well beyond rami of uropods 1-2 *Protohadzia* (Hadziidae)

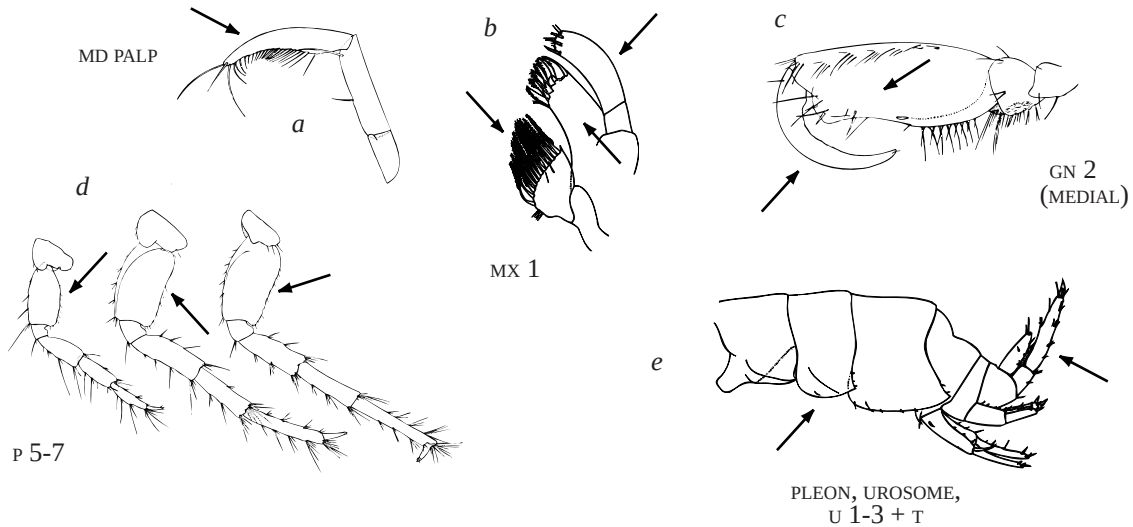


Figure 101.

- < Mandible, palp article 3 stout, shorter than article 2; maxilla 1, inner plate subovate, with small distal process, medial margin sparsely setose, outer plate and palp slender, styliform; gnathopod 2 of male, propodus with setose concavity on medial surface, dactyl not strongly falcate; peraeopods 5-7, posterior margin of basis castellate; peraeopod 7, basis broadly expanded posteriorly; epimeron 2 produced posteroventrally, longer than epimeron 3; uropod 3 short, extending slightly beyond rami of uropods 1-2 *Tabatzius* (Melitidae)

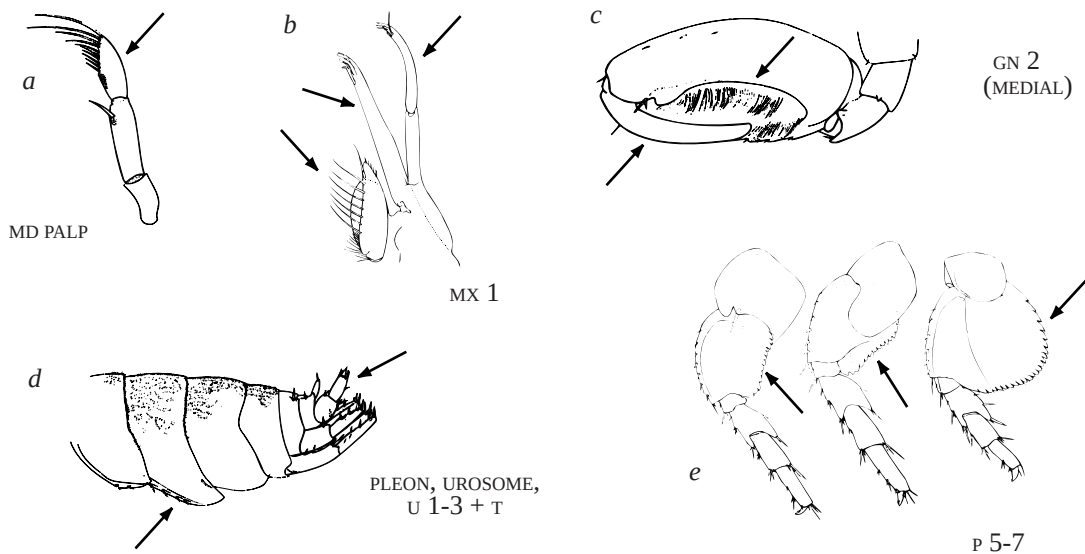


Figure 102.

7. < Antenna 1, accessory flagellum 2-3-articulate; maxilla 1, inner plate with 2 long apical setae; peraeopod 7, basis strongly expanded 8

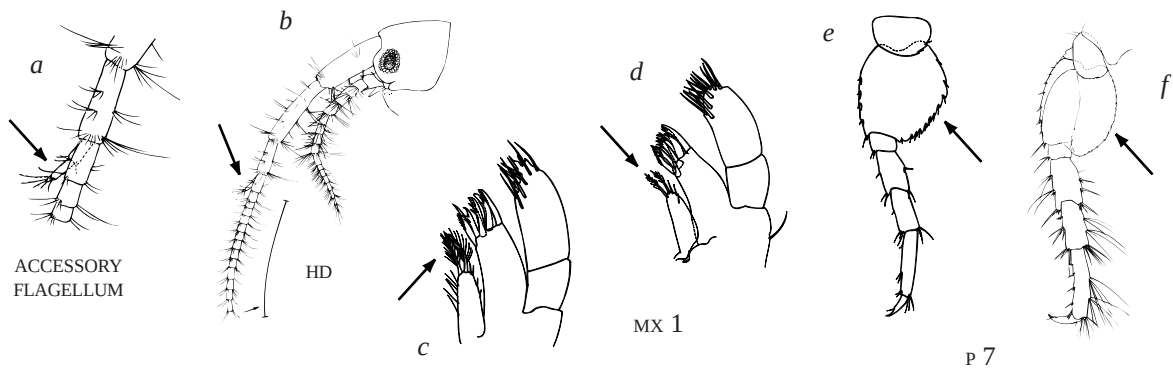


Figure 103.

- < Antenna 1, accessory flagellum 3+-articulate (usually 4+); maxilla 1, inner plate with 1 or 3+ long apical setae; peraeopod 7, basis usually weakly to moderately expanded, rarely strongly expanded, if strongly expanded then accessory flagellum 5+-articulate 10

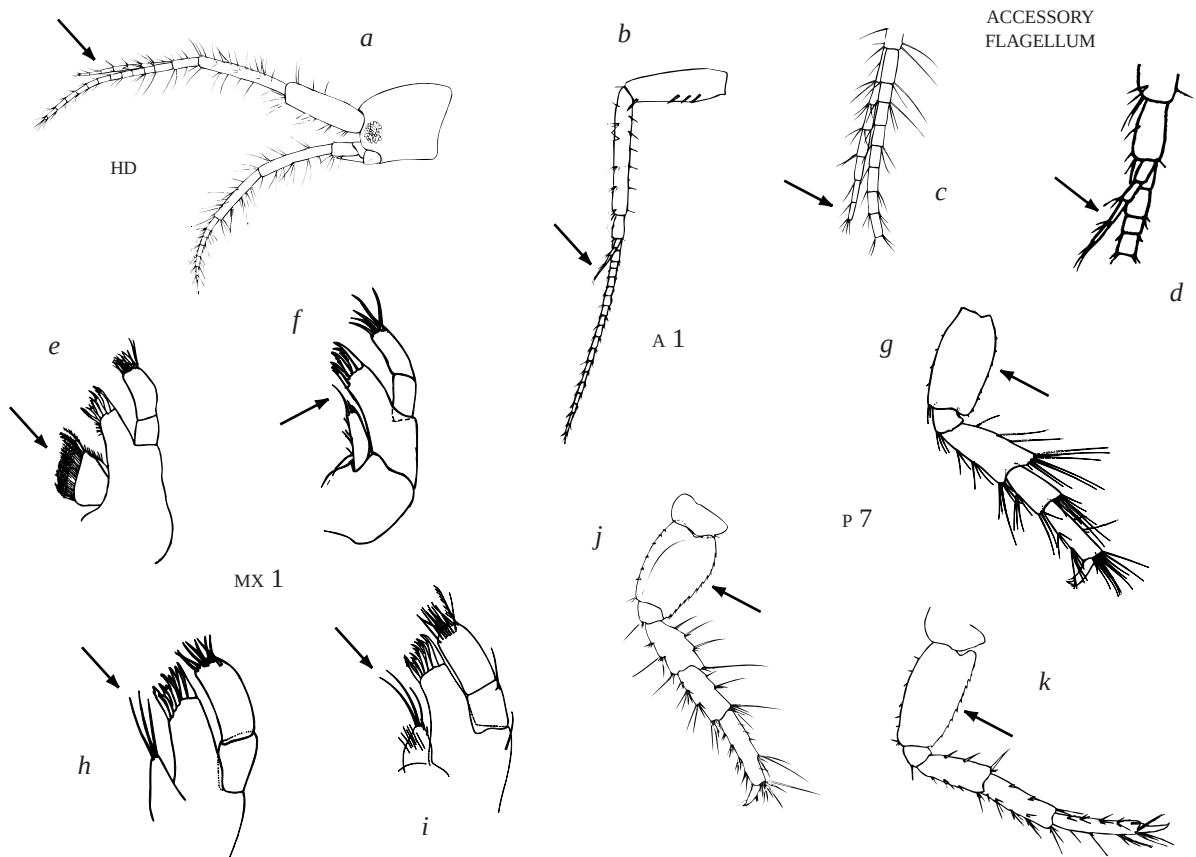


Figure 104.

8. < Antenna 2, flagellum 4-articulate, subequal to peduncle article 5 in length; mandibular palp slender, article 3 linear, without comb row of very short marginal setae; coxa 1 unproduced anteroventrally; uropod 3, rami subacute distally, without terminal spines (small seta present), inner ramus, inner margin without spines..... *Dumosus* (Melitidae)

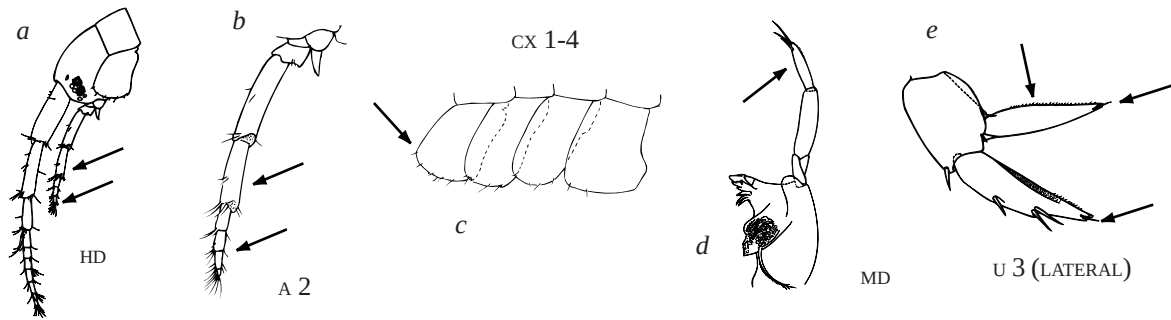


Figure 105.

- < Antenna 2, flagellum 5+-articulate, slightly to distinctly longer than peduncle article 5; mandibular palp stout, article 3 falcate, with comb row of very short marginal setae; coxa 1 weakly produced anteroventrally; uropod 3, rami subtruncate or notched distally, with moderate to strong terminal spines (setae also present), inner ramus, inner margin with 1+ spines..... 9

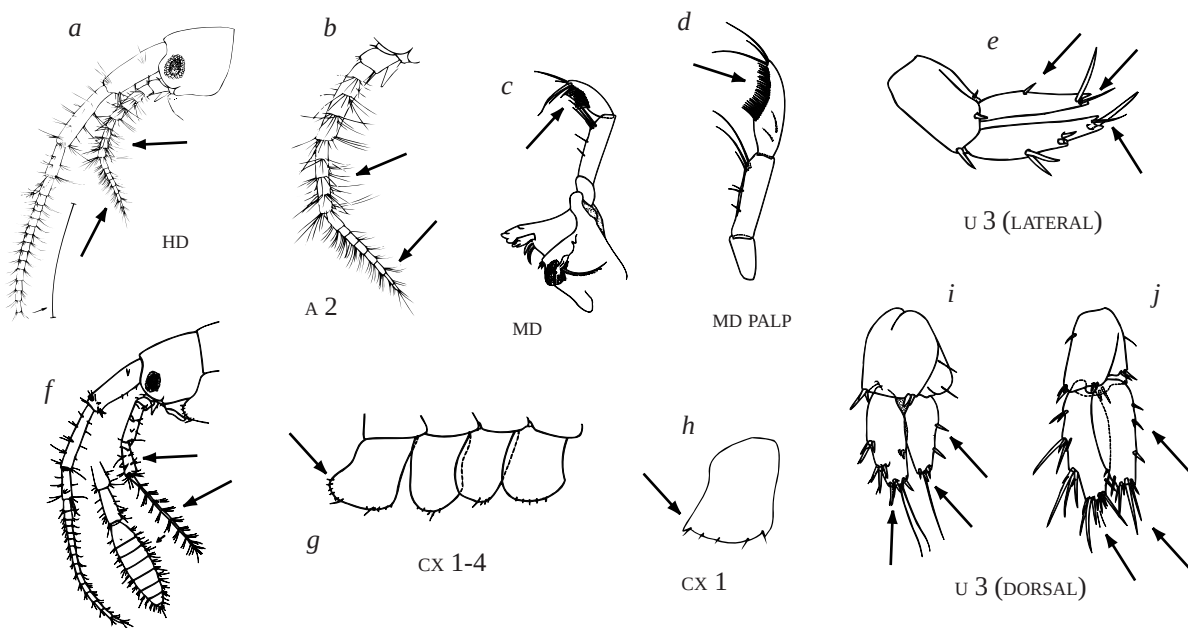


Figure 106.

9. < Antenna 2 of male, flagellum normal, articles unexpanded, not paddle-like, not appearing exceptionally thin in lateral view *Elasmopus* (Melitidae)



Figure 107.

- < Antenna 2 of male, flagellum paddle-like, articles flattened, broadly expanded, appearing very thin in lateral view *Spathiopus* (Gammaridae)

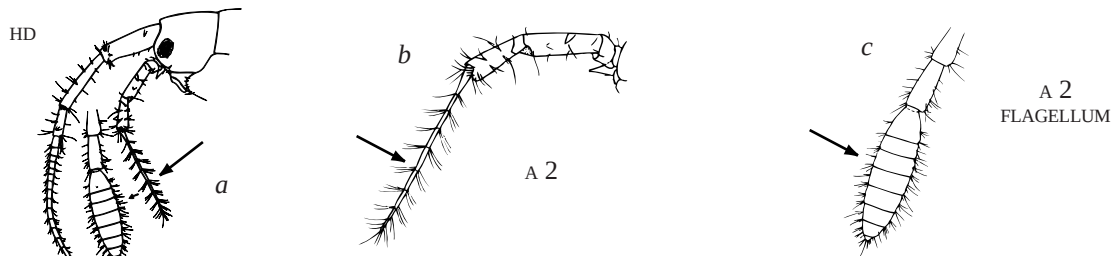


Figure 108.

10. < Mandible, palp article 1 with small distal tooth, article 3 short, less than half the length of article 2 ; maxilla 1, inner plate subtriangular, tip and medial margin lined with long setae; maxilla 2, inner plate with dense oblique row of facial setae; uropod 3, rami broad, foliaceous, tips subacute *Ceradocus* (Melitidae)

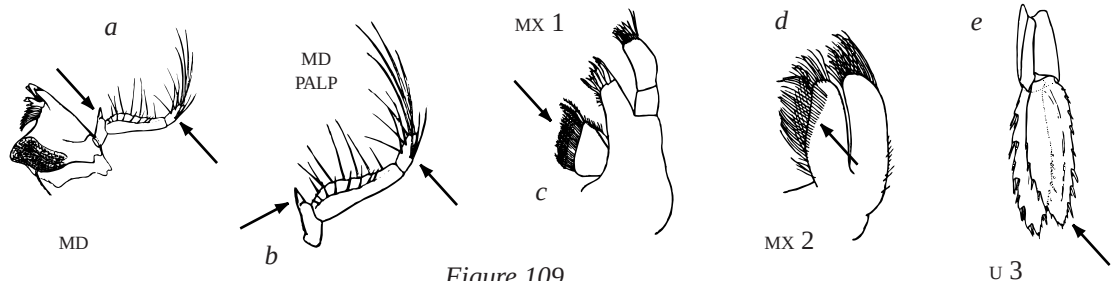


Figure 109.

- < Mandible, palp article 1 without small distal tooth, article 3 medium to long, greater than half the length of article 2; maxilla 1, inner plate narrowly ovate, with 1 or 3 long apical setae, medial margin without long setae; maxilla 2, inner plate without dense oblique row of facial setae (may have sparse setae); uropod 3, rami usually slender, tips subtruncate 11

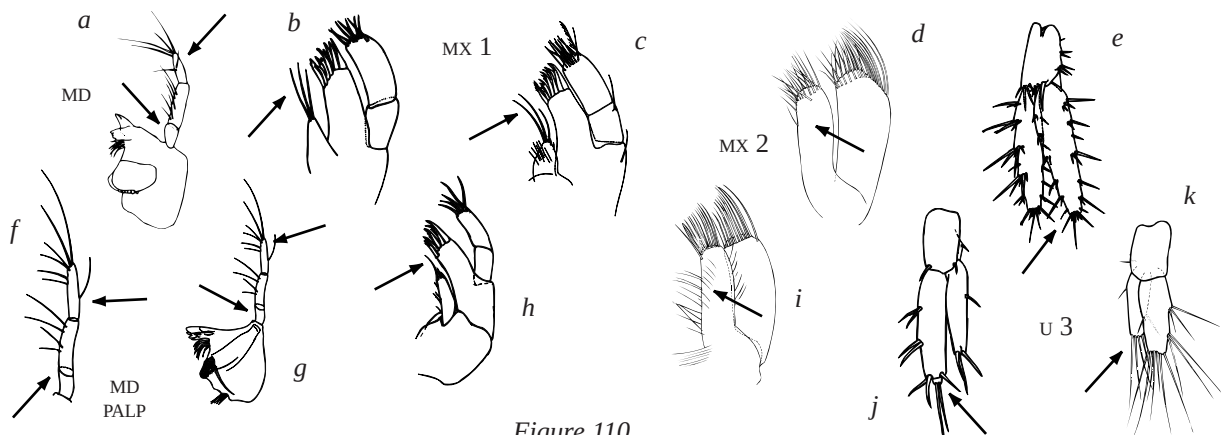


Figure 110.

11. < Antenna 1, accessory flagellum 3-articulate; eyes poorly developed, consisting of a few scattered ommatidia; maxilla 1, inner plate with 1 long apical seta; uropod 3, outer ramus 2-articulate, distal article small, greater than half the width of the proximal article, not hidden by surrounding spines Melitidae genus unknown (Melitidae)

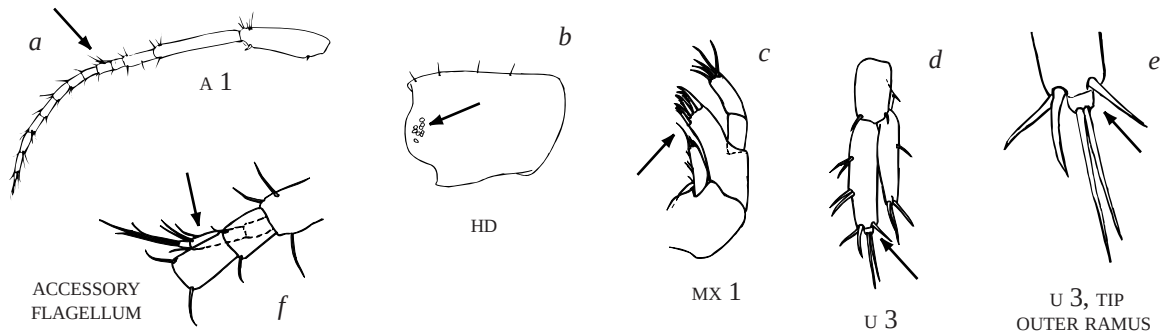


Figure 111.

- < Antenna 1, accessory flagellum 4+-articulate; eyes well-developed, consisting of many loosely or tightly grouped ommatidia; maxilla 1, inner plate with 3 long apical setae; uropod 3, outer ramus usually 1-articulate, if 2-articulate then distal article vestigial, less than half the width of the proximal article, hidden by surrounding spines 12

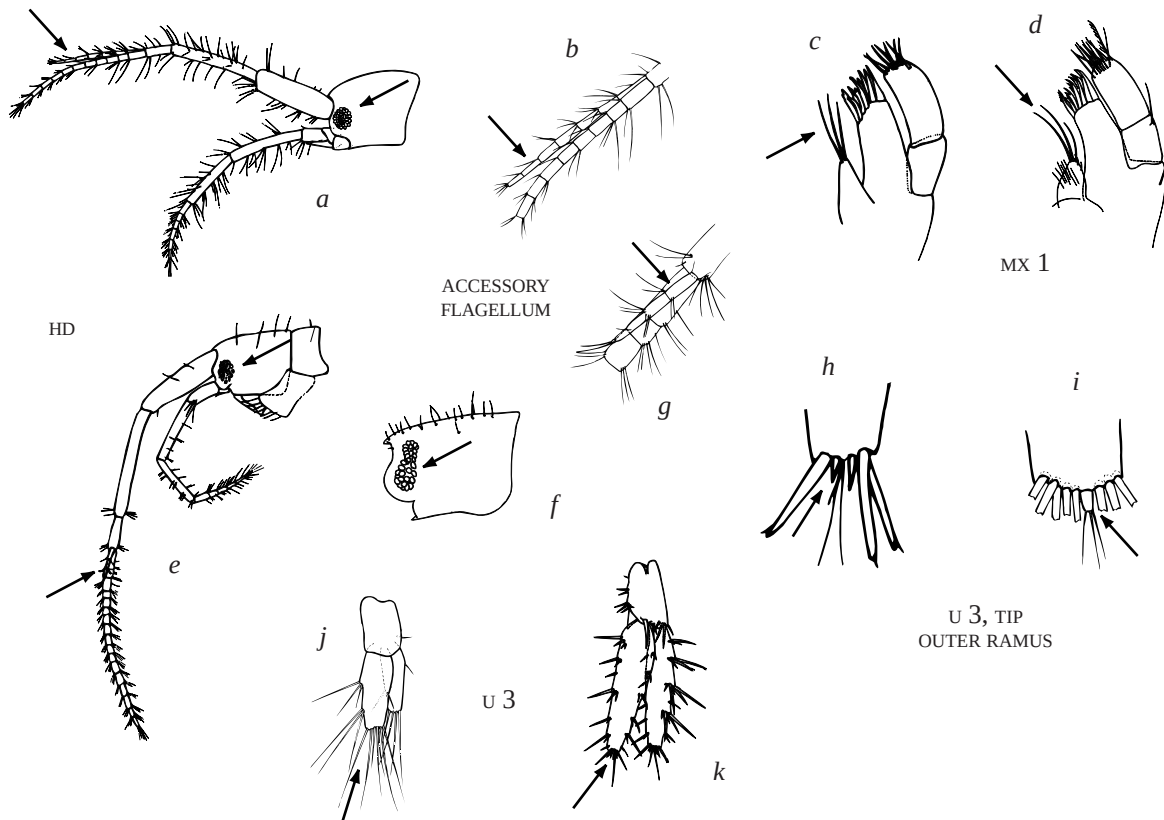


Figure 112.

12. < Maxilliped, inner plate without slender process on each side of distal margin (low rounded process may be present); coxa 1, posteroventral angle entire or serrate, without single small tooth; gnathopod 2 of male, right and left sides similar, equal in size; telson without strong dorsolateral spines at midpoint of each lobe (may have lateral spine at this location)
*Maera* (Melitidae)

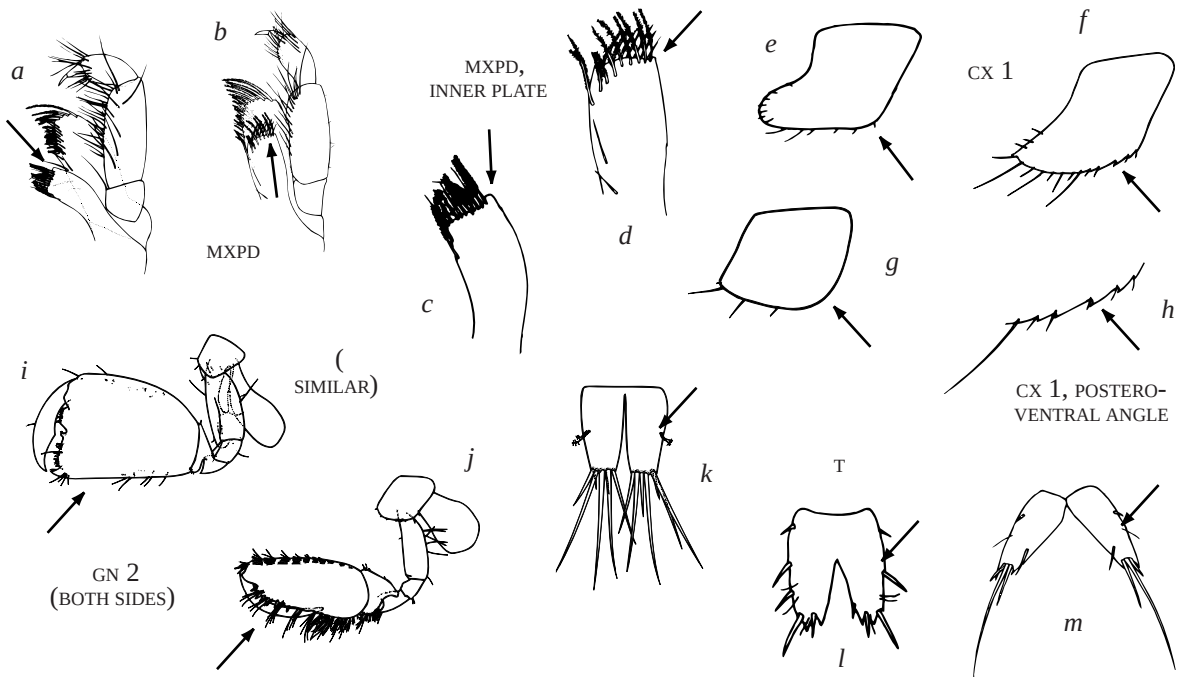


Figure 113.

- < Maxilliped, inner plate with slender process on each side of distal margin; coxa 1, posteroventral angle with single small tooth; gnathopod 2 of male, right and left sides dissimilar, one side much larger than other; telson with strong dorsolateral spines at midpoint of each lobe
*Anamaera* (Gammaridae)

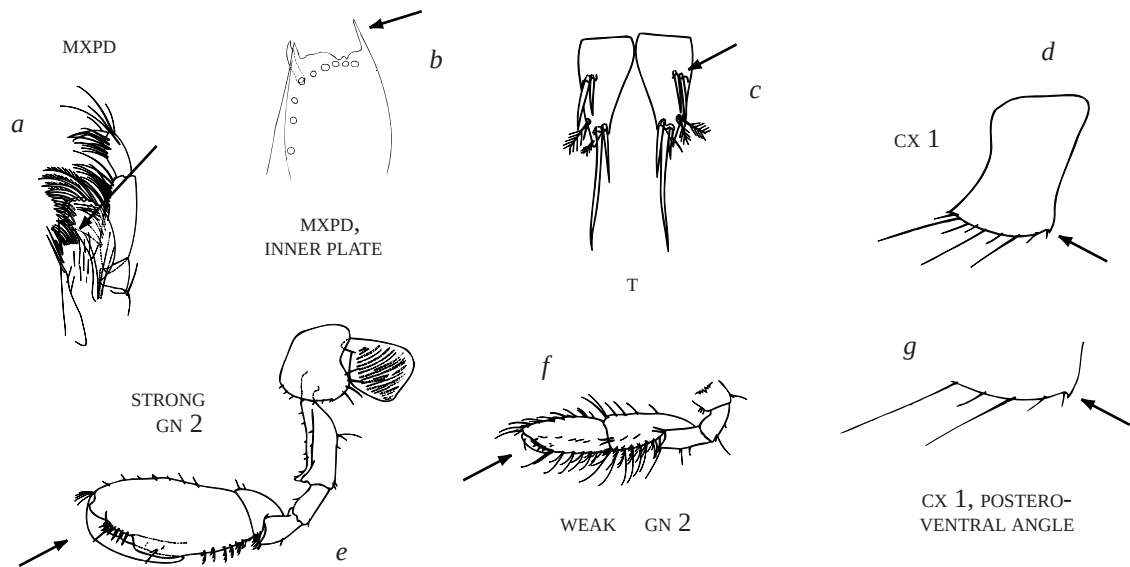


Figure 114.

Family Gammaridae Leach, 1814

Regional diagnosis: Not diagnosed separately; see diagnosis for marine Gammarida on p. 48.

Florida genera: *Anamaera*, *Gammarus*, *Spathiopus*

Remarks: Because of the difficulty involved in creating a reliable key separating the families Gammaridae, Hadziidae and Melitidae, the genera contained in these three families are included together in the key to marine Gammarida (p. 49).

Genus *Anamaera* Thomas and Barnard, 1985

Regional diagnosis: Antenna 1, accessory flagellum 3-5-articulate; antenna 2 extending slightly beyond peduncle of antenna 1, flagellum 5-7-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, ovate; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of short marginal setae, subequal to article 2 in length; lower lip, inner lobes present, fleshy; maxilla 1, inner plate subtriangular, without small distal process, with 3 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with slender process on each side of distal margin; peraeon segment 7 without coxal gills; coxa 1 slightly produced anteroventrally, anteroventral and posteroventral margins each with single small tooth; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, sexually dimorphic, that of male with right and left sides dissimilar, one side greatly enlarged, that of female with both sides similar, small; peraeopod 7, basis moderately expanded, posterior margin weakly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin serrate, epimeron 2 not produced posteroventrally, shorter than epimeron 3; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3, rami long, slender, not foliaceous, margins spinose, tips subtruncate with weak to moderate terminal spines, inner ramus, inner margin with 5-6 spine groups, outer ramus slightly shorter than inner, minutely 2-articulate; telson, lobes with lateral margins slightly convex, with strong dorsolateral spines at midpoint of each lobe, with apical spines.

Florida species: *A. hixoni*

Anamaera hixoni Thomas and Barnard, 1985 (Figure 114)

Anamaera hixoni: Thomas and Barnard, 1985b, pp. 198-203, figs. 5-7.

Regional diagnosis: That of the genus.

Distribution: South Florida from Biscayne Bay south to the Lower Florida Keys, 1-2 m (Thomas and Barnard, 1985b).

Ecology: This species occurs on shallow, algae- and sponge-covered coral rubble, usually over a sand bottom (Thomas and Barnard, 1985b; pers. obs.) where it apparently feeds on the algae (Thomas and Barnard, 1985b).

Remarks: The color of *A. hixoni* in life is white with a pattern of wine-rose diffused blotches, bands and spots (Thomas and Barnard, 1985b). Adults range in size from 3-6 mm.

See Thomas and Barnard, 1985b; Thomas, 1993.

Genus *Gammarus* Linnaeus, 1768

Regional diagnosis: Antenna 1, accessory flagellum 3-7-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 8-18-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, broadly reniform; mandible, palp stout, article 1 without small distal tooth, article 3 broadest medially, with comb row of short marginal setae, subequal to or slightly shorter than article 2 in length; lower lip, inner lobes present, reduced; maxilla 1, inner plate subtriangular, without small distal process, medial and apical margins lined with long setae, outer plate and palp broad, not styliiform, palps symmetrical, left and right sides similar; maxilla 2, inner plate with dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; pereaeon segment 7 with coxal gills; coxa 1 subrectangular, not produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or serrations; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, sexually dimorphic, that of male enlarged, right and left sides similar, subequal in size; pereopod 7, basis moderately expanded, posterior margin entire; pleon segments 1-3, posterodorsal margin entire or with strong median processes; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 with dorsal spine groups; uropod 3, rami long, somewhat broadened, foliaceous, margins moderately to densely setose, tips subacute, outer ramus longer than inner, 2-articulate; telson, lobes with lateral margins straight to slightly convex, with strong dorsolateral spine(s) in proximal one third of each lobe, with apical spines.

Florida species: *G. mucronatus*, *G. palustris*, *G. cf tigrinus*, *Gammarus* sp. B ("macromucronate" species)

KEY TO FLORIDA SPECIES OF *GAMMARUS*

1. < Eye of male large, extending almost to dorsal margin of head; pleon 1-3, posterodorsal margin entire, without processes; telson lobes of male not elongate, tip with spines interspersed with long setae, setae longer than spines 2

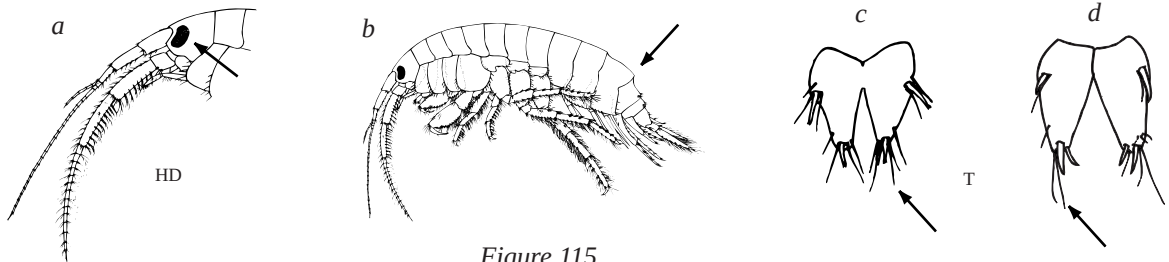


Figure 115.

- < Eye of male medium, not extending almost to dorsal margin of head; pleon 1-3 (occasionally only 1-2), posterodorsal margin with median posteriorly directed process; telson lobes of male elongate, tip with spines only, lacking terminal setae, or with spines interspersed with short setae, setae not longer than spines 3

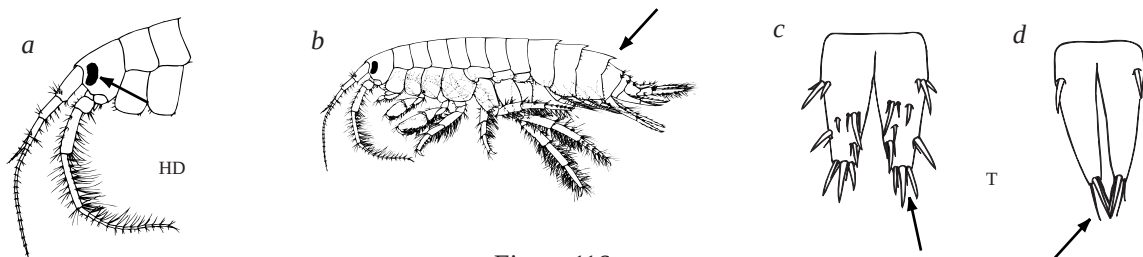


Figure 116.

2. < Antenna 2 of male with curly setae, flagellum with long setae, approximately 2 flagellar articles in length; coxa 1, anteroventral margin with long setae; peraeopods 5-7 of male, distal articles with long, dense curly marginal setae; peraeopod 7 of both sexes, basis, posterior margin with long setae; urosome 1-2, dorsolateral spine groups with 2-3 spines; uropod 3, outer ramus with well-developed distal article *Gammarus cf tigrinus*

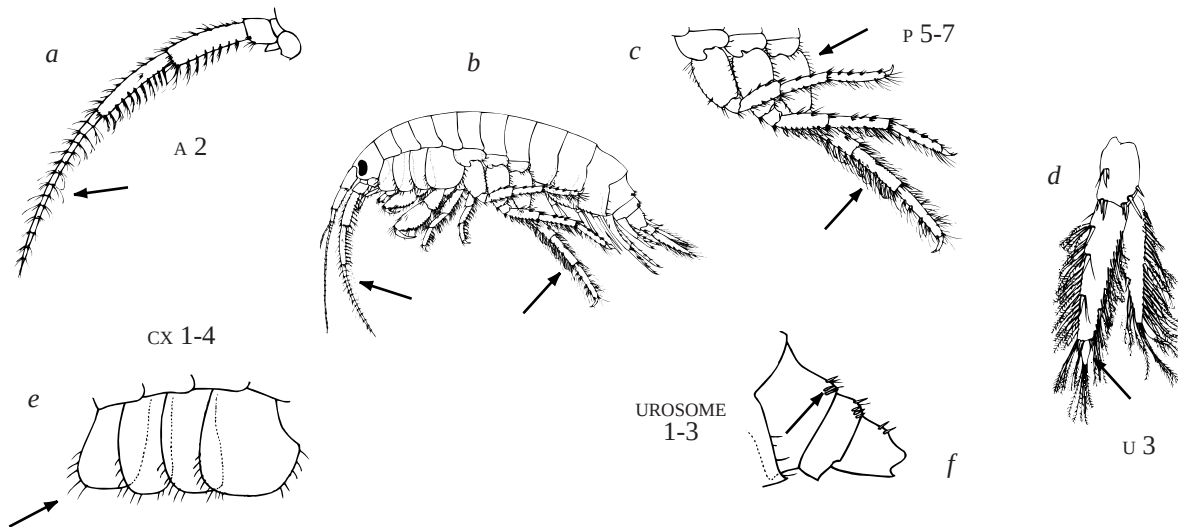


Figure 117.

- < Antenna 2 of male without curly setae, flagellum with short setae, approximately 1 flagellar article in length; coxa 1, anteroventral margin with very short setae; peraeopods 5-7 of male, distal articles without long, dense curly marginal setae; peraeopod 7 of both sexes, basis, posterior margin with very short setae; urosome 1-2, dorsolateral spine groups with 1 spine; uropod 3, outer ramus with very short distal article *Gammarus palustris*

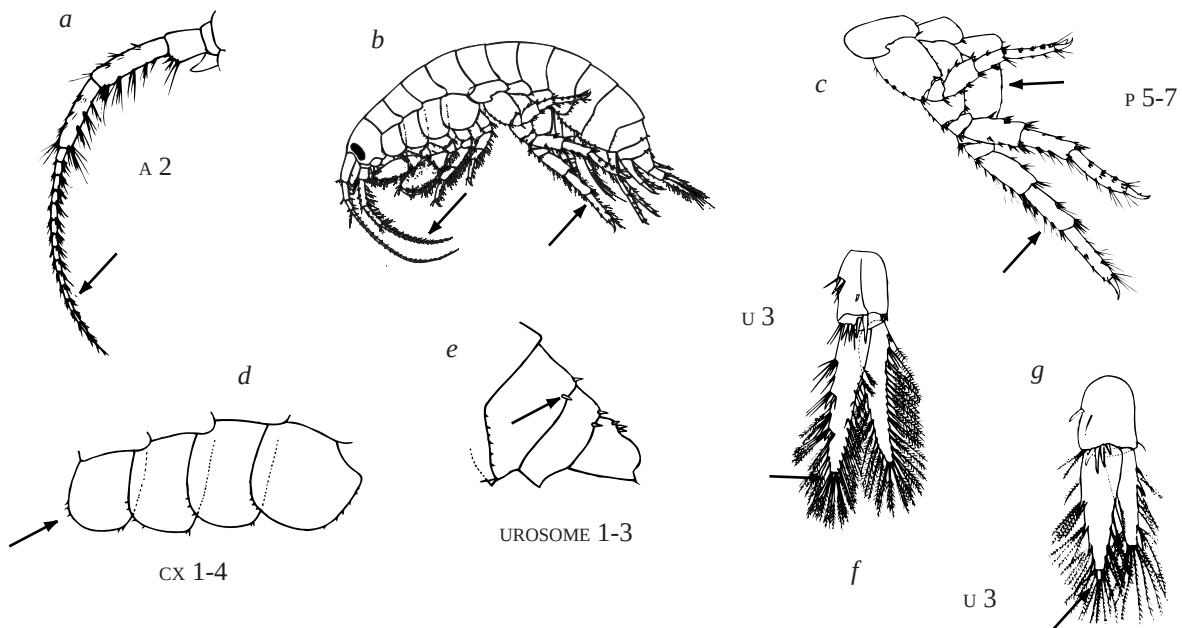


Figure 118.

3. < Antenna 2 of male, flagellum with long setae, approximately 2 flagellar articles in length; peraeopods 5-7 of male, distal articles with long dense marginal setae; peraeopod 7 of both sexes, basis without posteromedial submarginal patch of long simple setae (1-3 setae may be present); pleon 1-3, posterodorsal process small; uropod 3 of male, rami with dense plumose marginal setae, outer ramus stout, much stouter than inner; telson lobes of male with 2-3 groups of lateral marginal spines, with dorsal spines; telson lobes of female with lateral marginal spine in distal two thirds..... *Gammarus mucronatus*

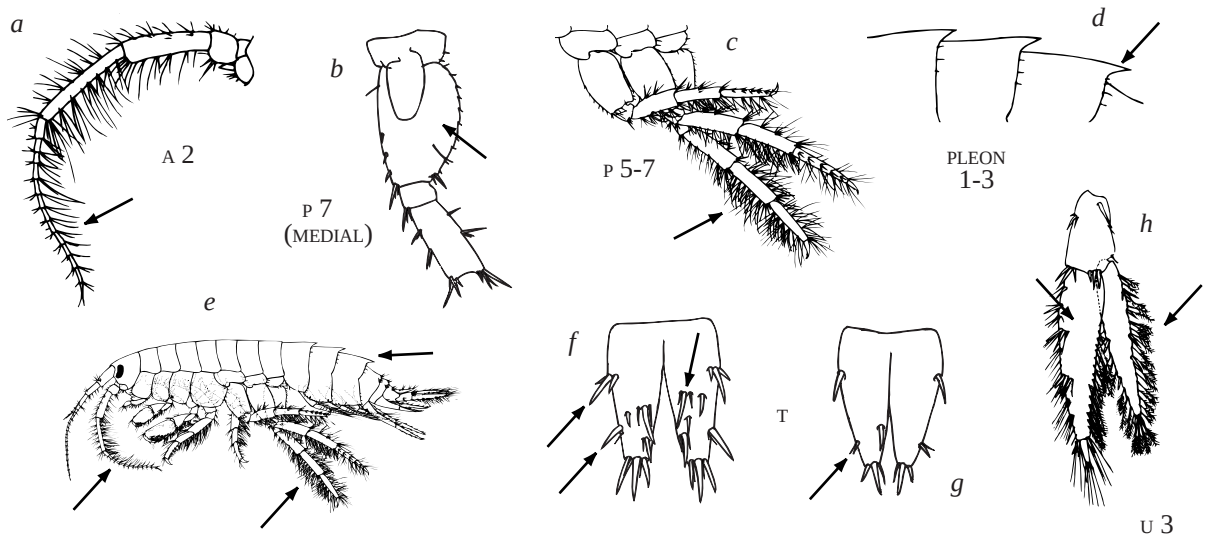


Figure 119.

- < Antenna 2 of male, flagellum with short setae, approximately 1 flagellar article in length; peraeopods 5-7 of male, distal articles without long dense marginal setae; peraeopod 7 of both sexes, basis with posteromedial submarginal patch of long simple setae; pleon 1-3, posterodorsal process large; uropod 3 of male, rami with moderate number of plumose marginal setae, outer ramus slender, slightly stouter than inner; telson lobes of male with single lateral marginal spine in proximal one third, without dorsal spines; telson lobes of female without lateral marginal spine in distal two thirds..... *Gammarus* sp. B

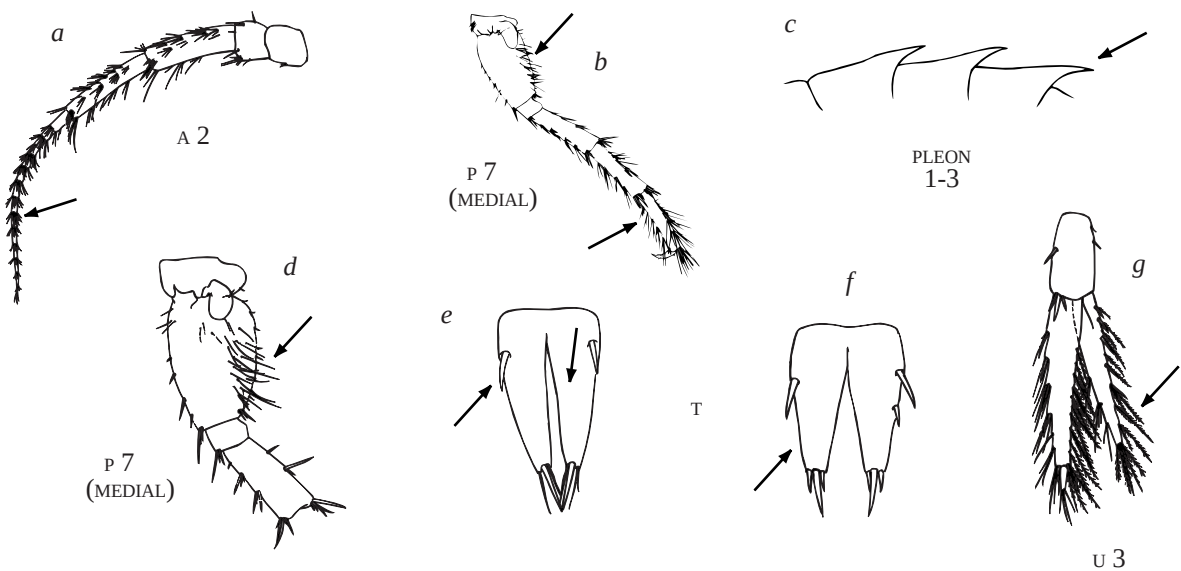


Figure 120.

***Gammarus mucronatus* Say, 1818
(Figure 119)**

Gammarus mucronatus: Say, 1818, p. 376.
Gammarus macrophthalmus: Stimpson, 1853, p. 55.
Gammaracanthus mucronatus: Bate, 1862, p. 203.
Amathilla? mucronatus: Sars, 1895, p. 494.
Carinogammarus mucronatus: Stebbing, 1899, p. 430.
Carinogammarus macrophthalmus: Stebbing, 1906, p. 506.
Gammarus (Mucrogammarus) mucronatus: Barnard and Gray, 1968, pp. 221-227, figs. 1-4.
Mucrogammarus (Gammarus) mucronatus: Thomas, 1976, p. 91.

Regional diagnosis: Antenna 2 of male without curly setae (setae may be long and dense), flagellum with long setae, approximately 2 flagellar articles in length; eye of male medium, not extending almost to dorsal margin of head; coxa 1, anteroventral margin with short setae; pereopods 5-7 of male, distal articles with long dense marginal setae; pereopod 7 of both sexes, basis without posteromedial submarginal patch of long simple setae (1-3 setae may be present), posterior margin with short setae; pleon 1-3 (occasionally only 1-2), posterodorsal margin with small, medial, posteriorly directed process; urosome 1-2, dorsolateral spine groups with 2-3 spines; uropod 3 of male, rami with dense plumose marginal setae, outer ramus stout, much stouter than inner, that of both sexes with well-developed distal article; telson lobes of male elongate, with 2-3 groups of lateral marginal spines, tip with spines only, lacking terminal setae, or with short setae, setae shorter than spines; telson lobes of female with lateral marginal spine in distal two thirds.

Distribution: Gulf of St. Lawrence (Chaleur Bay and southwestern Newfoundland) south to the Florida Keys; Gulf coast from south Florida to south Texas (Bousfield, 1973; pers. obs); Laguna Alvarado, State of Veracruz, Mexico (Ortiz and Winfield, 1995); Salton Sea, California (Barnard and Gray, 1968).

Ecology: This species usually occurs associated with hydroids or epiphytic algae, in grassbeds or algal mats and in salt marshes among the roots of *Spartina* or in marsh pools (Farrell, 1970; Bousfield, 1969, 1973; Thomas, 1976; Heard, 1982). It is found over a wide range of salinities (Thomas, 1976; Heard, 1982) and is an important contributor to the breakdown of marsh grasses and the formation of detritus in salt marshes (Heard, 1982), as well as an important part of the diet of many estuarine fish species (Thomas, 1976; Heard, 1982).

Remarks: Some confusion exists in the literature concerning the correct name for this species. It has been referred to both as *Gammarus mucronatus* (eg. Bousfield, 1973; Heard, 1982) and as *Mucrogammarus mucronatus* (eg. Thomas, 1976; Sheridan, 1980); however, the former appears to be the appropriate name. This confusion may arise from a paper by Barnard and Gray (1968) wherein they establish the subgenus *Mucrogammarus* for the species *Gammarus mucronatus*, but they refer to the species throughout the paper as both *Gammarus (Mucrogammarus) mucronatus* and *Mucrogammarus mucronatus*. In Barnard and Barnard's (1983) monograph, they list the species as *Gammarus mucronatus* and do not list *Mucrogammarus* as a valid genus.

There is some variation in the size of the posterodorsal processes on the pleon segments in adults, but they are usually considerably smaller than those of *Gammarus* sp. B. Occasionally, only two processes are present and very occasionally an individual will have only one process. The processes are smaller in juveniles and small juveniles may lack dorsal processes entirely. In life, this species has a mottled color pattern, with spots and splotches of green, brown and red on a lighter green background. Adult size ranges from 6-13 mm, with smaller individuals usually occurring in the more southern parts of its range.

See Holmes, 1905 (as *Carinogammarus mucronatus*); Kunkel, 1918 (as *Carinogammarus mucronatus*); Shoemaker, 1930 (as *Carinogammarus mucronatus*); Barnard and Gray, 1968; Bousfield, 1969, 1973; Heard, 1982.

***Gammarus palustris* Bousfield, 1969
(Figure 118)**

Gammarus palustris: Bousfield, 1969, pp. 9–11, 13–14, figs. 2–3.

Regional diagnosis: Antenna 2 of male without curly setae, flagellum with short setae, approximately 1 flagellar article in length; eye of male large, extending almost to dorsal margin of head; coxa 1, anteroventral margin with very short setae; peraeopods 5–7 of male, distal articles without long, dense curly marginal setae; peraeopod 7 of both sexes, basis without posteromedial submarginal patch of long simple setae, posterior margin with very short setae; pleon 1–3, posterodorsal margin entire, without processes; urosome 1–2, dorsolateral spine groups with 1 spine; uropod 3 of male, rami with dense plumose marginal setae, outer ramus slender, slightly stouter than inner, that of both sexes with very short distal article; telson lobes of male not elongate, with single lateral marginal spine in proximal one third (setae also present), tip with spines interspersed with long setae, setae longer than spines; telson lobes of female without lateral marginal spine in distal two thirds.

Distribution: Piscataqua Estuary, New Hampshire, south to the St. John's Estuary in northeastern Florida (Bousfield, 1969; 1973).

Ecology: This is an estuarine and salt marsh species, occurring intertidally on mud bottoms under stones, boards and other debris, as well as among *Spartina* roots at low to medium salinities (Bousfield, 1969; 1973).

Remarks: Live specimens of *G. palustris* are brownish green mottled with red and brown (Bousfield, 1973). Adult size in this species ranges from 8–14 mm.

See Bousfield, 1969; Bousfield, 1973.

***Gammarus cf tigrinus* Sexton, 1939
(Figure 117)**

Gammarus tigrinus: Sexton, 1939, p. 543, figs. 1–27.

Gammarus sp. (nr *tigrinus*): Heard, 1982, p. 37, fig. 41.

Regional diagnosis: Antenna 2 of male with curly setae, flagellum with long setae, approximately 2 flagellar articles in length; eye of male large, extending almost to dorsal margin of head; coxa 1, anteroventral margin with long setae; peraeopods 5–7 of male, distal articles with long, dense, curly marginal setae; peraeopod 7 of both sexes, basis without posteromedial submarginal patch of long simple setae, posterior margin with long setae; pleon 1–3, posterodorsal margin entire, without processes; urosome 1–2, dorsolateral spine groups with 2–3 spines; uropod 3 of male, rami with dense plumose marginal setae, outer ramus slender, slightly stouter than inner, that of both sexes with well-developed distal article; telson lobes of male not elongate, with single lateral marginal spine in proximal one third (setae also present), tip with spines interspersed with long setae, setae longer than spines; telson lobes of female without lateral marginal spine in distal two thirds.

Distribution: North shore of the Gulf of St. Lawrence south to Florida (Bousfield, 1973); northern Gulf coast from the Florida panhandle (pers. obs.) to Barataria Bay, Louisiana (Thomas, 1976).

Ecology: *Gammarus cf tigrinus* occurs in low salinity marshes and tidal fresh water areas, among *Eichornia* roots and in bottom debris (Thomas, 1976; Heard, 1982).

Remarks: Although Gulf coast material has been reported as an undescribed species near *G. tigrinus* (Heard, 1982), it does not appear to differ substantially from the description of east coast material in Bousfield (1958, 1973) (it has a more subquadrate ocular lobe than that indicated for Atlantic coast *G. tigrinus* and it appears to be restricted to somewhat lower salinities (Thomas, 1976)). It seems more likely that the Gulf coast specimens merely represent a slightly different form of *G. tigrinus*. Subadult males *G. cf tigrinus* only have a few curly setae on antenna 2 and pereopods 5-7; however, these specimens can be distinguished by the absence of dorsal processes on the pleon and by the presence of at least a few long setae on the anteroventral margin of coxa 1 and the posterior margin of the basis of pereopod 7. Adult size ranges from 7-14 mm.

See Bousfield, 1958, 1969, 1973; Thomas, 1976; Heard, 1982.

***Gammarus* sp. B (Figure 120)**

Mucrogammarus sp.: Thomas, 1976, p. 91.

?*Gammarus macromucronatus*: Stoner, 1979, p. 203; 1980, p.67.

Gammarus sp. (macromucronate form): Heard, 1982, p. 37, Fig. 41.

Regional diagnosis: Antenna 2 of male without long curly setae, flagellum with short setae, approximately 1 flagellar article in length; eye of male medium, not extending almost to dorsal margin of head; coxa 1, anteroventral margin with short to medium setae; pereopods 5-7 of male, distal articles without long dense marginal setae; pereopod 7 of both sexes, basis with posteromedial submarginal patch of long simple setae, posterior margin with short setae; pleon 1-3 (occasionally only 1-2), posterodorsal margin with large, medial, posteriorly directed process; urosome 1-2, dorso-lateral spine groups with 2-3 spines; uropod 3 of male, rami with moderate number of plumose marginal setae, outer ramus slender, slightly stouter than inner, that of both sexes with well-developed distal article; telson lobes of male elongate, with single lateral marginal spine in proximal one third, tip with spines only, lacking terminal setae, or with spines interspersed with short setae, setae subequal to spines in length; telson lobes of female without lateral marginal spine in distal two thirds.

Distribution: Tampa Bay, Florida to Barataria Bay, Louisiana.

Ecology: *Gammarus* sp. B is found among root mats and bottom debris in the low salinity marshes of upper bays and estuaries (Thomas, 1976; Heard, 1982), where it can cooccur with both *G. mucronatus* and *G. cf tigrinus*.

Remarks: Although this species is undescribed, its occurrence in the northeastern Gulf is well known and it is not uncommon. The diagnostic setae on the medial surface of the basis of pereopod 7 tend to be more numerous in females than in males. The adult size of *Gammarus* sp. B ranges from 7-14 mm.

See Thomas, 1976 (as *Mucrogammarus* sp.); Sheridan, 1980 (as *Mucrogammarus* sp.); Heard, 1982 (as *Gammarus* sp. [macromucronate form]).

Genus *Spathiopus* Thomas and Barnard, 1985

Regional diagnosis: Antenna 1, accessory flagellum 2-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 6-9-articulate, longer than peduncle article 5, that of male paddle-like, articles flattened, broadly expanded; eyes well-developed, ovate; mandible, palp stout, article 1 without small distal tooth, article 3 falcate, more than half the length of article 2, with comb row of very short marginal setae; lower lip, inner lobes present, fleshy; maxilla 1, inner plate subovate, without small distal process, with 2 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 weakly produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or processes; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, right and left sides similar, sexually dimorphic, that of male enlarged; peraeopod 7, basis strongly expanded, posterior margin weakly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3, rami short, stout, subequal in length, margins spinose, tips subtruncate, with moderate terminal spines, inner ramus, inner margin with 2 spines, outer ramus minutely 2-articulate; telson, lobes with lateral margins slightly convex, without strong dorsolateral spines at midpoint of each lobe, with apical spines.

Florida species: *S. looensis*

Remarks: The genus *Spathiopus* is very close to *Elasmopus* (Melitidae), with the main difference between the two genera being the presence of an expanded, paddle-like flagellum on antenna 2 in the adult male of *Spathiopus*.

Spathiopus looensis Thomas and Barnard, 1985 (Figure 108)

Spathiopus looensis: Thomas and Barnard, 1985b, pp.192-196, figs. 1-3.

Regional diagnosis: That of the genus.

Distribution: South Florida from Biscayne Bay south to Looe Key Reef (Thomas and Barnard, 1985b).

Ecology: *Spathiopus looensis* is found on algae-covered coral rubble or rock over sand bottoms in the shallow (1-7 m) backreef zone of coral reefs or other shallow protected areas (Thomas and Barnard, 1985b).

Remarks: Adult size ranges from 4-5 mm in *S. looensis*.

See Thomas and Barnard, 1985b; Thomas, 1993.

Family Hadziidae Karaman, 1943

Regional diagnosis: Not diagnosed separately; see diagnosis for marine Gammarida on p. 48.

Florida genera: *Protohadzia*

Remarks: Because of the difficulty involved in creating a reliable key separating the families Gammaridae, Hadziidae and Melitidae, the genera contained in these three families are included together in the key to marine Gammarida (p. 49).

Genus *Protohadzia* Zimmerman and Barnard, 1977

Regional diagnosis: Antenna 1, accessory flagellum 2-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 13-14-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes weak, ovate, usually consisting of a ring of 4 ommatidia; mandible, palp stout, article 1 without small distal tooth, article 3 weakly falcate, with comb row of short marginal setae, subequal to article 2 in length; lower lip, inner lobes absent; maxilla 1, inner plate subtriangular, without small distal process, medial and apical margins lined with long setae, outer plate and palp broad, not styliform, palps asymmetrical, left and right sides dissimilar, distal margin of left article 2 with stout spines; maxilla 2, inner plate with dense oblique row of facial setae; maxilliped, inner plate, distal margin with 2-3 small processes; peraeon segment 7 without coxal gills; coxa 1 subrectangular, not produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or processes; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl short, slender, not broadly expanded proximally; gnathopod 2 subchelate, right and left sides similar, subequal in size, sexually dimorphic, that of male enlarged, propodus without setose concavity on medial surface, dactyl strongly falcate; peraeopods 5-7, basis with posterior margin entire, not castellate or serrate; peraeopod 7, basis not expanded posteriorly; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, shorter than epimeron 3; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3 long, extending well beyond rami of uropods 1-2, rami very unequal in length, tips subacute, outer ramus elongate, 2-articulate, margins spinose, inner ramus short, scale-like, margins without spines or setae; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spines at midpoint of each lobe, with apical spines.

Florida species: *P. schoenerae*

***Protohadzia schoenerae* (Fox, 1973)
(Figure 101)**

Eriopisa schoenerae: Fox, 1973, pp.153-159, figs. 5-8.

Protohadzia schoenerae: Zimmerman and Barnard, 1977, pp. 571-579, figs. 1-5.

Regional diagnosis: That of the genus.

Distribution: Bahama Islands; Puerto Rico; South Florida from Biscayne Bay and Cape Romano south to the Dry Tortugas (Zimmerman and Barnard, 1977; Thomas, 1993; pers. obs.).

Ecology: This species occurs in shallow (intertidal - 3m) coral rubble habitats, in or near *Thalassia* beds (Zimmerman and Barnard, 1977; Thomas, 1993).

Remarks: Specimens stained with rose bengal often seem to accumulate the stain in the telson and, to a lesser degree, the proximal part of uropod 3, resulting in very distinct dark pink patches in these areas. The strongly colored telson is useful for rough sorting specimens, especially if the distinctive third uropod is missing. The eyes are also characteristic, but they may be difficult to see, especially in juveniles; they are seldom as evident as shown by Zimmerman and Barnard (1977). Adult size in *P. schoenerae* ranges from 3-6 mm.

See Fox, 1973; Zimmerman and Barnard, 1977; Thomas, 1993.

Family Melitidae Bousfield, 1973

Regional diagnosis: Not diagnosed separately; see diagnosis for marine Gammarida on p. 48.

Florida genera: *Ceradocus*, *Dulichella*, *Dumosus*, *Elasmopus*, *Maera*, *Melita*, Melitidae genus unknown, *Netamelita*, *Tabatzius*

Remarks: Because of the difficulty involved in creating a reliable key separating the families Gammaridae, Hadziidae and Melitidae, the genera contained in these three families are included together in the key to marine Gammarida (p. 49).

Genus *Ceradocus* Costa, 1853

Regional diagnosis: Antenna 1, accessory flagellum 4-8-articulate; antenna 2 extending beyond peduncle of antenna 1, flagellum 8-16-articulate, subequal to or slightly longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, round or ovate; mandible, palp slender, article 1 with small distal tooth, article 3 short, not falcate, without comb row of short marginal setae, less than half the length of article 2; lower lip, inner lobes present; maxilla 1, inner plate subtriangular, without small distal process, tip and medial margin lined with long setae, outer plate and palp broad, not styliiform, palps symmetrical, left and right sides similar; maxilla 2, inner plate with dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 produced anteroventrally, anteroventral margin with small, acute tooth, posteroventral margin entire, without teeth or processes; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, slightly or not sexually dimorphic, right and left sides usually similar, occasionally dissimilar, one side larger than other; peraeopod 7, basis weakly expanded, posterior margin weakly serrate; pleon segments 1-3, posterodorsal margin usually with, occasionally without strong teeth or serrations; epimera 1-3, posterior margin usually serrate (occasionally epimera 1-2 only serrate posteroventrally), epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal spine groups (teeth or processes usually present); uropod 3 extending well beyond tips of uropods 1-2, rami long, broad, foliaceous, subequal in length, margins spinose, tips subacute, outer ramus 1-articulate; telson, lobes with lateral margins straight to slightly convex, without dorsolateral spines in proximal one third of each lobe, without apical spines (may have strong subapical spines).

Florida species: *C. sheardi*, *C. shoemakeri*, *Ceradocus* sp. B

KEY TO FLORIDA SPECIES OF *CERADOCUS*

1. < Gnathopod 2 sexually dimorphic, that of male with right and left sides dissimilar, one side greatly enlarged, palm of enlarged (strong) side with 2 broad subquadrate processes; pleon segments 1-3, posterodorsal margin entire, without strong teeth or serrations; urosome segments 1-2, posterodorsal margin with single weak median tooth; telson lobes without strong subapical spines on medial margin *Ceradocus shoemakeri*

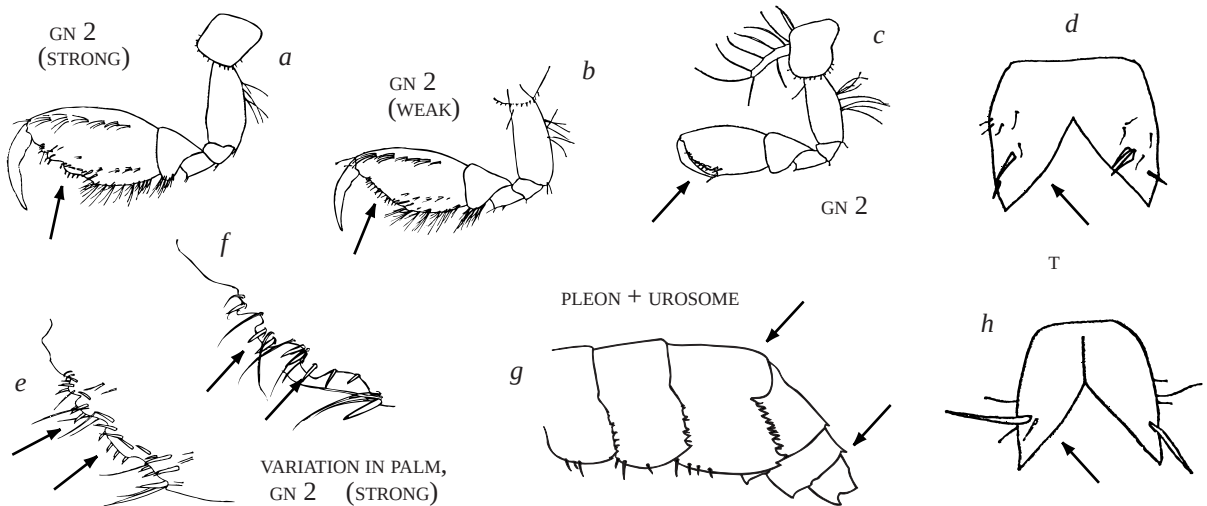


Figure 121.

- < Gnathopod 2 not sexually dimorphic, right and left sides similar, both sides greatly enlarged, palm without subquadrate processes; pleon segments 1-3, posterodorsal margin with strong teeth or serrations; urosome segments 1-2, posterodorsal margin with 3-10 variably sized teeth; telson lobes with strong subapical spines on medial margin 2

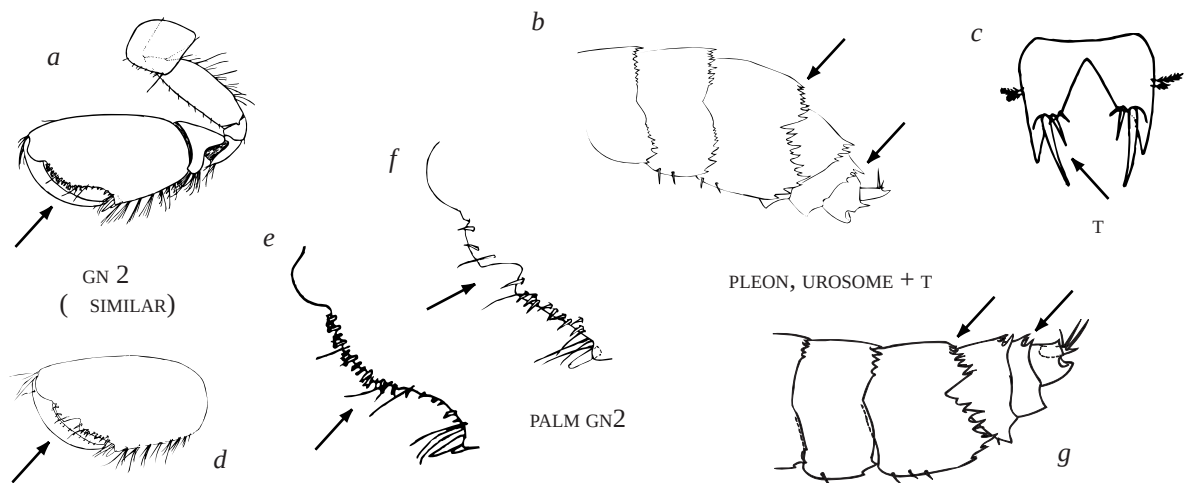


Figure 122.

2. < Antenna 1, accessory flagellum 4-5-articulate; antenna 2, flagellum 8-10-articulate; gnathopod 2, palmar margin straight, with median notch; peraeopod 7, basis with posteroventral angle projecting downward to form narrow, acute lobe; epimera 1-2 with posteroventral serrations only; urosome 1-2, posterodorsal margin with 3-5 teeth
 *Ceradocus* sp. B

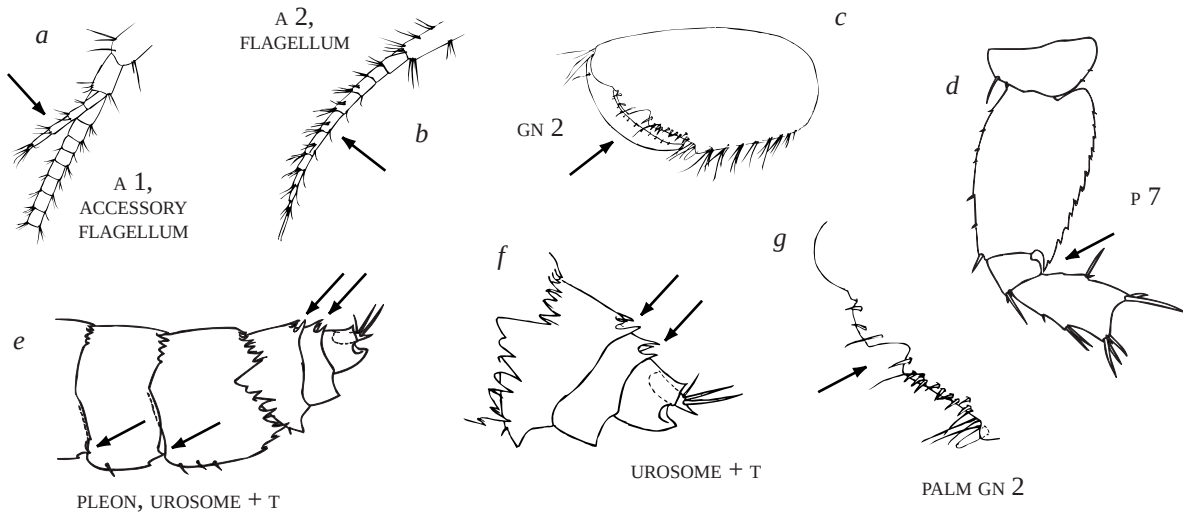


Figure 123.

- < Antenna 1, accessory flagellum 7-8-articulate; antenna 2, flagellum 13-16-articulate; gnathopod 2, palmar margin sinuous, without median notch; peraeopod 7, basis with posteroventral angle not projecting downward to form acute lobe; epimera 1-2 with serrations along entire posterior margin; urosome 1-2, posterodorsal margin with 9-10 teeth
 *Ceradocus sheardi*

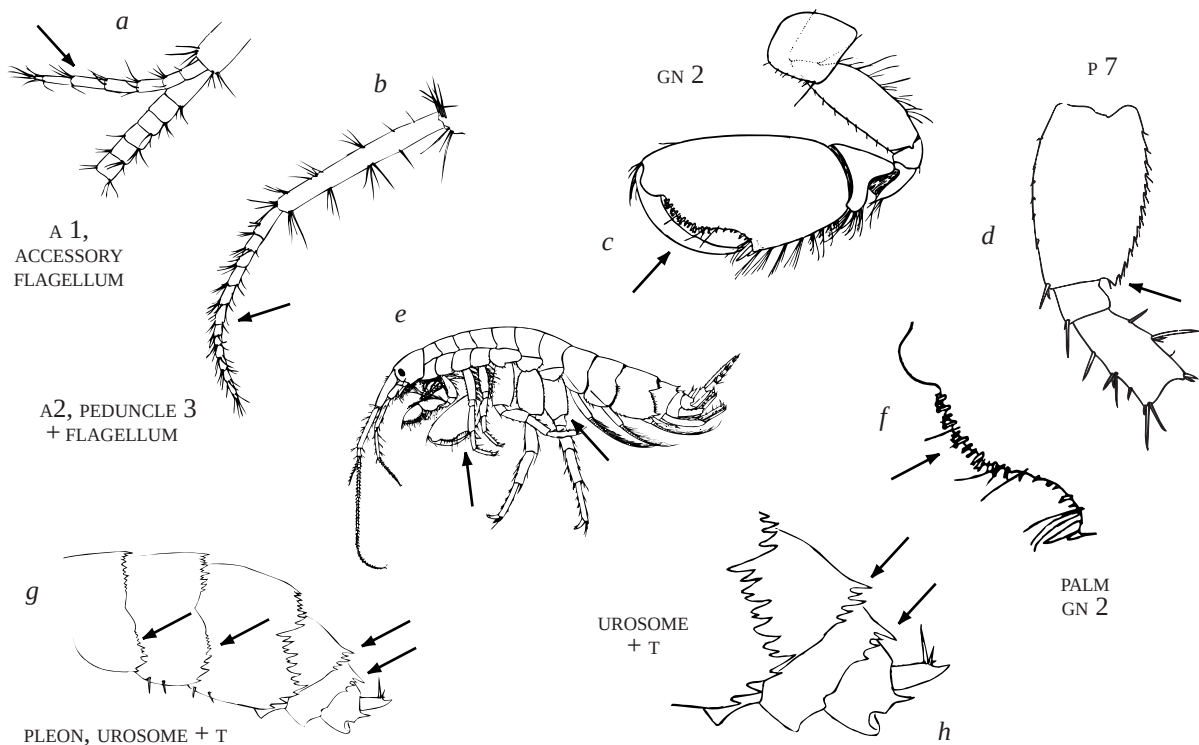


Figure 124.

***Ceradocus sheardi* Shoemaker, 1948
(Figure 124)**

Ceradocus sheardi: Shoemaker, 1948, pp. 7-9, fig. 2.

Regional diagnosis: Antenna 1, accessory flagellum 7-8-articulate; antenna 2, flagellum 13-16-articulate; gnathopod 2 not sexually dimorphic, right and left sides similar, both sides greatly enlarged, palmar margin sinuous, without median notch or subquadrate processes; peraeopod 7, basis with posteroventral angle not projecting downward to form acute lobe; pleon segments 1-3, posterodorsal margin with strong teeth or serrations; epimera 1-2 with serrations along entire posterior margin; urosome segments 1-2, posterodorsal margin with 9-10 variably sized teeth; telson lobes with strong subapical spines on medial margin.

Distribution: South Florida from Biscayne Bay south to the Dry Tortugas; Belize; Yucatan, Mexico (Thomas, 1993; Shoemaker, 1948); Cuba (Shoemaker, 1948); Puerto Rico (unpublished *Fish Hawk* material in USNM collections).

Ecology: This species is common under rocks and coral rubble on shallow (1-2 m) sandy bottoms in lagoon and forereef habitats (Thomas, 1993). However, it can also occur in deeper water and has been reported from a depth of 26 fathoms (48m) in the northeastern Gulf of Mexico (Shoemaker, 1948) and to depths of 52 m by Thomas (1993).

Remarks: Shoemaker's unpublished color notes based on live material from the Dry Tortugas describe *C. sheardi* as follows: "Whole animal pure transparent white. Rami of ur. 1-2 faint salmon pink. Eye very dark red, divisions white". Thomas (1993) reports that both live and preserved material are ivory in color. There is some variation in the serration of the posterior margin of epimera 2 and 3, with females and subadults having somewhat weaker serrations than adult males. *Ceradocus sheardi* is a relatively large species, usually 9-16 mm long, and is somewhat larger than the other two Florida species of *Ceradocus*, which range from 4-8 mm in length.

See Shoemaker, 1948; Thomas, 1993.

***Ceradocus shoemakeri* Fox, 1973
(Figure 121)**

Ceradocus shoemakeri: Fox, 1973, pp. 147-152, figs. 1-4

Regional diagnosis: Antenna 1, accessory flagellum 4-5-articulate; antenna 2, flagellum 8-articulate; gnathopod 2 sexually dimorphic, that of male with right and left sides dissimilar, one side greatly enlarged, palmar margin of enlarged side straight, with 2 broad subquadrate processes; pleon segments 1-3, posterodorsal margins entire, without strong teeth or serrations; epimera 1-2, with serrations along entire posterior margin; urosome segments 1-2, posterodorsal margin with single weak median tooth; telson lobes without strong subapical spines on medial margin.

Distribution: Bahama Islands (Fox, 1973); south Florida from Biscayne Bay south to the Dry Tortugas; Apalachee Bay and Perdido Key, Florida; Caribbean.

Ecology: Common on coral rubble, algae and sponge bottoms at depths of 0.5-6m; also occasionally found in grassbeds.

Remarks: Subadults and juveniles have fewer articles in the accessory flagellum than adults and, in subadult males, the spines on the telson are longer than in the adults. Occasionally, the weak gnathopod 2 of the male will have 2 very small subquadrate palmar processes. This is a small species, with adults ranging in size from 4 to 7 mm.

See Fox, 1973.

***Ceradocus* sp. B**
(Figure 123)

Ceradocus orchestiipes: Kunkel, 1910, pp. 37-39, fig. 13 (not *C. orchestiipes* Costa, 1853).

Regional diagnosis: Antenna 1, accessory flagellum 4-5-articulate; antenna 2, flagellum 8-10-articulate; gnathopod 2 not sexually dimorphic, right and left sides similar, both sides greatly enlarged, palmar margin straight, without subquadrate processes, with median notch; peraeopod 7, basis with posteroventral angle projecting downward to form narrow, acute lobe; pleon segments 1-3, posterodorsal margin with strong teeth or serrations; epimera 1-2 with posteroventral serrations only; urosome segments 1-2, posterodorsal margin with 3-5 variably sized teeth; telson lobes with strong subapical spines on medial margin.

Distribution: Bermuda (Kunkel, 1910), Dry Tortugas (*Fish Hawk* and W.L. Schmitt material in USNM collections).

Ecology: In Bermuda, this species was found in sand at depths of less than 6 fathoms (3.6 m) (Kunkel, 1910); material from the Tortugas occurred at 3-4 m depths.

Remarks: This species differs from *C. orchestiipes* of Costa (1853), a Mediterranean species, by having strong teeth on the posterodorsal margins of pleon segments 1-3 (very weak to absent in *C. orchestiipes*), 3-5 teeth on the posterodorsal margin of urosome segments 1-2 (1 tooth in *C. orchestiipes*), a shorter flagellum on antenna 2, and a notch in the palmar margin of gnathopod 2 (no notch in *C. orchestiipes*). It is very similar to *C. rubromaculatus*, described from Australia, but often reported to be circumtropical, in many respects; however, that species does not have a notch in the palm of gnathopod 2 (although McKinney (1977) states that some individuals do) and the posterior margins of epimera 1-2 are serrate along the entire margin. Additional material needs to be examined before it can be determined if *Ceradocus* sp. B represents an undescribed species or possibly a form of *C. rubromaculatus*. Adult size in *Ceradocus* sp. B ranges from 5-8 mm.

See Kunkel, 1910.

Genus *Dulichchiella* Stout, 1912

Regional diagnosis: Antenna 1, accessory flagellum 3-7-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 10-18-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, round; mandible, palp slender, article 1 with small distal tooth, article 3 long, linear, without comb row of short marginal setae, subequal to article 2 in length; lower lip, inner lobes present; maxilla 1, inner plate slender, curved, tapering distally, with 2 long apical setae, medial margin with sparse submarginal row of long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate with dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 subrectangular, not produced anteroventrally, anteroventral margin entire, posteroventral margin entire or with 1-2 weak teeth; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl short, slender, not broadly expanded proximally; gnathopod 2 sexually dimorphic, that of male with right and left sides dissimilar, extremely unequal in size, larger side chelate; peraeopod 7, basis weakly expanded, posterior margin weakly serrate; epimera 1-3, posterior margin very weakly or not serrate; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; pleon segments 1-3, posterodorsal margin with strong teeth or serrations; urosome segments 1-3 without dorsal spine groups, with teeth or processes; uropod 3, rami very unequal in length, outer ramus elongate, extending well beyond tips of uropods 1-2, slender, 2-articulate, margins spinose, sometimes with long sparse setae in male, inner ramus short, scale-like; telson lobes with lateral margins strongly convex, with strong dorsolateral spines in proximal one third of each lobe, without apical spines.

Florida species: *D. appendiculata*, *Dulichchiella* sp. A

KEY TO FLORIDA SPECIES OF *DULICHIELLA*

1. < Antennae 1-2 of male, peduncle and flagellum densely setose; gnathopod 2 of male (strong side), propodus with 2 large, blunt-tipped palmar processes, that of female with propodus slightly larger than that of gnathopod 1, palm evenly convex, palmar angle rounded; pereaeopods 5-7 of male, posterior margin of basis lined with long marginal and submarginal setae; pleon and urosome segments with relatively weak posterodorsal teeth, especially on urosome segments 1-2; uropod 3 of male, outer ramus with long, sparse setae arising from spine groups on dorsal margin *Dulichchiella appendiculata*

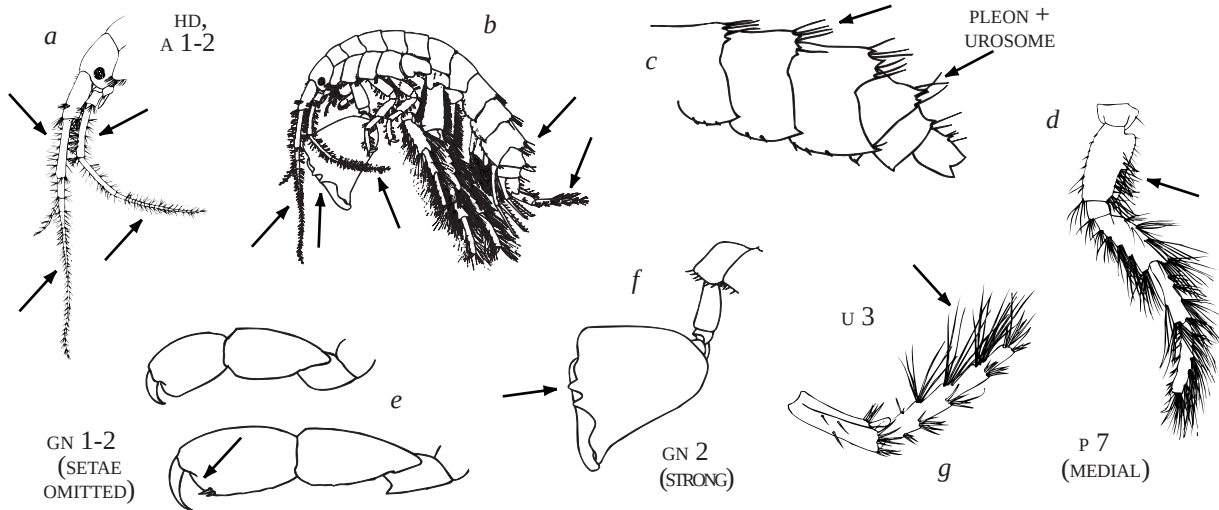


Figure 125.

- < Antennae 1-2 of male, peduncle and flagellum weakly setose; gnathopod 2 of male (strong side), propodus with 3 large, subacute palmar processes, that of female with propodus much larger than that of gnathopod 1, palm sinuous or flat, palmar angle subacute; pereaeopods 5-7 of male, posterior margin of basis with few short marginal setae; pleon and urosome segments with relatively strong posterodorsal teeth, especially on urosome segments 1-2; uropod 3 of male, outer ramus without long setae arising from spine groups on dorsal margin
..... *Dulichchiella* sp. A

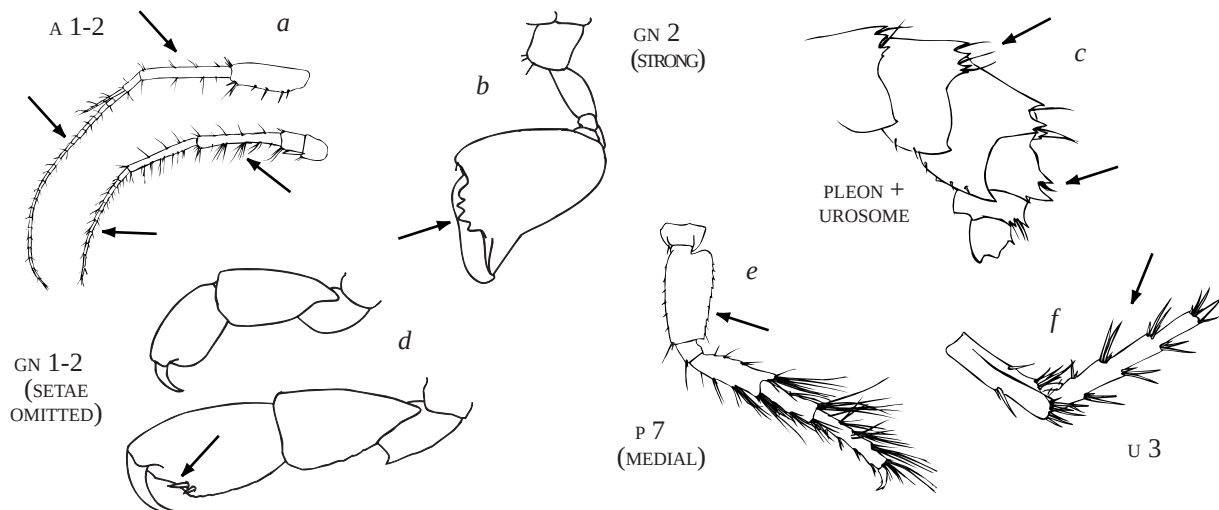


Figure 126.

***Dulichiesta appendiculata* (Say, 1818)**
(Figure 125)

Gammarus appendiculatus: Say, 1818, pp. 377-379.

Melita appendiculata: Stebbing, 1906, p. 428.

Dulichiesta appendiculata: Karaman & Barnard, 1979, pp. 152-153.

Regional diagnosis: Antennae 1-2 of male, peduncle and flagellum densely setose; gnathopod 2 of male (strong side), propodus with 2 large blunt-tipped palmar processes, that of female with propodus slightly larger than that of gnathopod 1, palm evenly convex, palmar angle rounded; peraeopods 5-7, basis of male with posterior margin lined with long marginal and submarginal setae, dactyl of both sexes with tip slightly recurved; pleon and urosome segments with relatively weak posterodorsal teeth, especially on urosome segments 1-2; uropod 3 of male, outer ramus with long sparse setae arising from spine groups on dorsal margin.

Distribution: Delaware Bay (Watling and Maurer, 1972) south to Biscayne Bay and the Florida Keys; Gulf coast from Florida Bay to the Chandeleur Islands and Cameron, Louisiana. Often reported to be cosmopolitan in warm-temperate, subtropical and tropical regions (eg. Jarrett and Bousfield, 1996; Barnard, 1970), but these reports probably include records for a number of very similar, closely related species.

Ecology: This species is found in nearshore grassbeds and fouling communities, among algae and hydroids.

Remarks: There appears to be some individual variation in the size of the posterodorsal teeth on the pleon and urosome, and also in the size of the dactyls on peraeopods 5-7. In addition, there is occasionally a small, obscure third palmar process on gnathopod 2 of the male. There is some developmental variation in the setation of the antennae and peraeopods 5-7 of males as well. In subadult males, the antennae are weakly setose and the bases of peraeopods 5-7 do not have the long setae found on the adults. Adult sizes range from 4-10 mm. Color in live material usually consists of reddish brown mottling on a pale cream background. Some individuals are very heavily pigmented, with spots almost obscuring the background color, and others are less so, appearing quite light.

A slightly different, usually somewhat smaller, form of this species occurs in shallow, high-salinity grass and algae beds of south Florida and St. Joe Bay on the Florida panhandle. In this form, the strong gnathopod 2 of the male has a third small but distinct palmar process just distal to the two large processes and the long marginal setae are restricted to the posterodistal margins of the bases of peraeopods 6-7. In addition, the teeth on the pleon and urosome are slightly larger than in the typical *D. appendiculata* and gnathopod 2 of the female is somewhat larger and has a flatter palm. Additional material will have to be carefully examined to determine whether or not this form represents a third species of *Dulichiesta* in the region.

Pearse's (1912) record of *Melita dentata* (= *Megamoera dentata*) from Cameron, Louisiana, reported by Shoemaker (1955) to be *Melita appendiculata* (= *Dulichiesta appendiculata*), is indeed the latter species, based on a reexamination of Pearse's specimens contained in the collections of the U.S. National Museum.

See Sheridan, 1980.

***Dulichhiella* sp. A**
(Figure 126)

? *Melita fresnelii*: Kunkel, 1910, pp. 31-34, fig. 11.

Regional diagnosis: Antenna 1-2 of male, peduncle and flagellum weakly setose; gnathopod 2 of male (strong side), propodus with three large, subacute palmar processes, that of female with propodus much larger than that of gnathopod 1, palm sinuous or flat, palmar angle subacute; pereopods 5-7, basis of male with posterior margin lined with sparse short marginal setae, dactyl of both sexes with tip strongly recurved; pleon and urosome segments with relatively strong posterodorsal teeth, especially on urosome segments 1-2; uropod 3 of male, outer ramus without long setae arising from spine groups on dorsal margin.

Distribution: Live bottom habitats off Georgia (R. Heard, pers. comm.); Hutchinson Island, Florida south to the Florida Keys and Dry Tortugas; Gulf coast from Florida Bay to Perdido Key, Florida; 7 ½ Fathom Reef, Texas.

Ecology: This species is often associated with sponges in offshore live-bottom areas in the more northern parts of its range, also occurring nearer shore further south.

Remarks: In this species, as in *D. appendiculata*, there is some variation in the size of the dorsal teeth and in the size of the pereopod dactyls. Also, in some females, especially larger specimens, there is a small marginal process on the palm of gnathopod 2, near the dactylar hinge. In subadult females, gnathopod 2 is somewhat smaller relative to gnathopod 1, but the palm is still sinuous or flat, not convex as in *D. appendiculata*. Adult sizes range from 5-10 mm.

The material from Bermuda, reported by Kunkel (1910) as *Melita fresnelii* (Audouin, 1876), appears to be *Dulichhiella* sp. A based on Kunkel's figures and habitat information; however, his specimens will have to be reexamined before a positive identification can be made.

Genus *Dumosus* Thomas and Barnard, 1985

Regional diagnosis: Antenna 1, accessory flagellum 3-articulate; antenna 2 shorter than peduncle of antenna 1, flagellum 4-articulate, subequal to peduncle article 5 in length, that of male cylindrical, not paddle-like; eyes weakly developed, consisting of a pigment mass with several scattered ommatidia; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of very short marginal setae, shorter than article 2; lower lip, inner lobes present; maxilla 1, inner plate subtriangular, without small distal process, with 2 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps asymmetrical, left and right sides dissimilar, distal margin of left article 2 with stout spines; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 subrectangular, unproduced anteroventrally, anteroventral margin entire, without teeth or processes, posteroventral margin with small tooth or cusp; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, right and left sides similar, sexually dimorphic, that of male with propodus enlarged; peraeopod 7, basis strongly expanded, posterior margin serrate or castellate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire, epimeron 2 not produced posteroventrally, subequal to or slightly deeper than epimeron 3 in depth; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3 extending subequally with uropods 1-2, rami short, lanceolate, subequal in length, margins poorly spinose, tip subacute, without terminal spines (small seta present), inner ramus, inner margin without spines, outer ramus 1-articulate; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spines at midpoint of each lobe, with apical spines.

Florida species: *D. atari*

Dumosus atari Thomas and Barnard, 1985 (Figure 105)

Dumosus atari: Thomas and Barnard, 1985c, pp. 634-635, figs. 1-3.

Regional diagnosis: That of the genus.

Distribution: Biscayne Bay, Florida ; southeastern Gulf of Mexico between Cape Romano, Florida, and the lower Florida Keys; Carrie Bow Cay, Belize (Thomas and Barnard, 1985c).

Ecology: This species is found in shallow (0.5-1m) coral rubble habitats in Belize (Thomas and Barnard, 1985c). The habitat in south Florida is unknown, but is probably similar, although it also occurs in deeper water there (10-20m).

Remarks: Although the female of *D. atari* is currently undescribed, there were females present in the south Florida material examined. The female of this species is very similar to the male except in the morphology of gnathopod 2, which is relatively quite small. The propodus is subrectangular, with subparallel anterior and posterior margins, the palm is flat and oblique, and the posterior margin lacks the long curved setae found in the male. Instead, this margin has 2-3 long, straight, stout, slightly proximally directed setae. *Dumosus atari* is a small species, ranging in size from 2-4 mm. See Barnard and Thomas, 1985c.

Genus *Elasmopus* Costa, 1853

Regional diagnosis: Antenna 1, accessory flagellum 2-3-articulate; antenna 2 extending beyond peduncle of antenna 1, flagellum 7-12-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, round or pyriform; mandible, palp stout, article 1 without small distal tooth, article 3 falcate, with comb row of very short marginal setae, slightly longer than article 2; lower lip, inner lobes present; maxilla 1, inner plate subovate, without small distal process, with 2 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps usually symmetrical (rarely asymmetrical); maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; pereopod segment 7 without coxal gills; coxa 1 weakly produced anteroventrally, anteroventral and posteroventral margins entire or with single small tooth or cusp; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl slender, elongate, not broadly expanded basally; gnathopod 2 sexually dimorphic, subchelate, right and left sides similar, that of male with propodus enlarged; pereopod 7, basis strongly expanded, posterior margin weakly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire (extreme posteroventral margin may be serrate or crenulate), epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3 extending subequally with or slightly beyond tips of uropods 1-2, rami short, subequal or slightly unequal in length, subtruncate or notched distally, with moderate to strong terminal spines, margins spinose, inner ramus, inner margin with 1+ spines, outer ramus 1-articulate; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spines at midpoint of each lobe, with apical or subapical spines.

Florida species: *E. balkomanus*, *E. levis*, *E. pectinicus*, *E. pocillimanus*, *E. rapax*, *Elasmopus* sp. A, *Elasmopus* sp. B

KEY TO FLORIDA SPECIES OF *ELASMOPUS*

1. < Antenna 2, peduncle articles 4-5 without or with very few marginal setae; coxa 1, anteroventral angle with small tooth or cusp; gnathopod 2 of male, propodus, palmar margin with deep median notch; epimeron 3, ventral margin serrate posteriorly, curved sharply upwards below large posteroventral hook or tooth *Elasmopus* sp. A

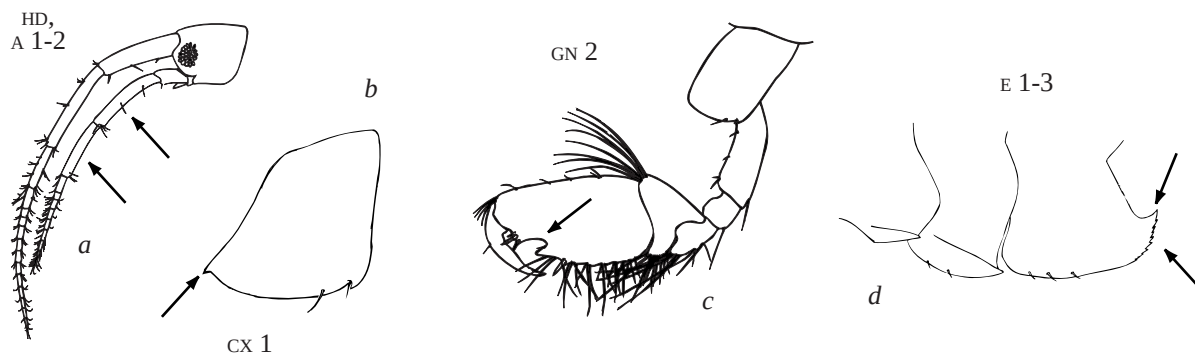


Figure 127.

- < Antenna 2, peduncle articles 4-5 with many marginal setae; coxa 1, anteroventral angle entire, without tooth or cusp; gnathopod 2 of male, propodus, palmar margin without deep median notch; epimeron 3, ventral margin entire, not curved sharply upwards posteriorly (may curve upwards gradually), posteroventral hook or tooth small or absent 2

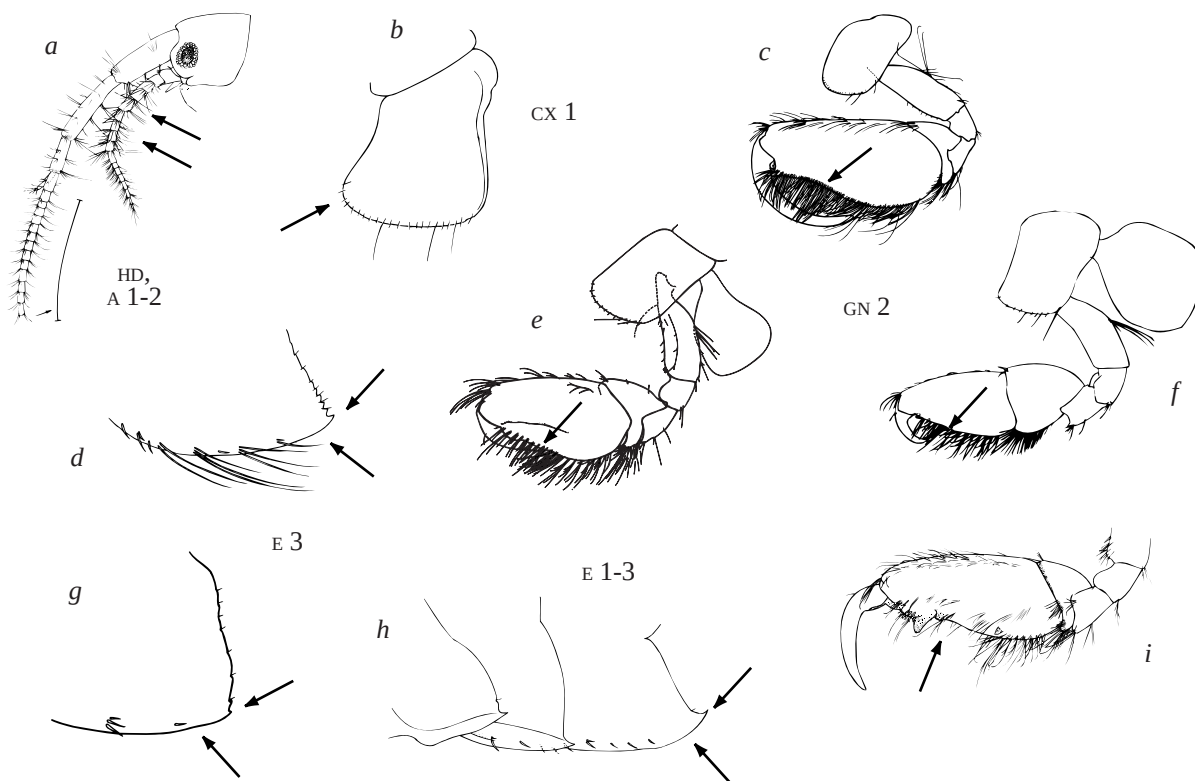


Figure 128.

2. < Antenna 2, peduncle articles 4-5 with setae 4-5 times width of article in length; gnathopod 1 of male, carpus with fringe of very long, dense setae on dorsal margin; gnathopod 2 of male, propodus with ventral margin lined with dense row of singly inserted, very long setae; peraeopod 6 of male, basis with posterior margin narrowing in distal one half, castelloserrate in both sexes; telson lobes subtruncate terminally, with apical spines.. *Elasmopus pecteniscrus*

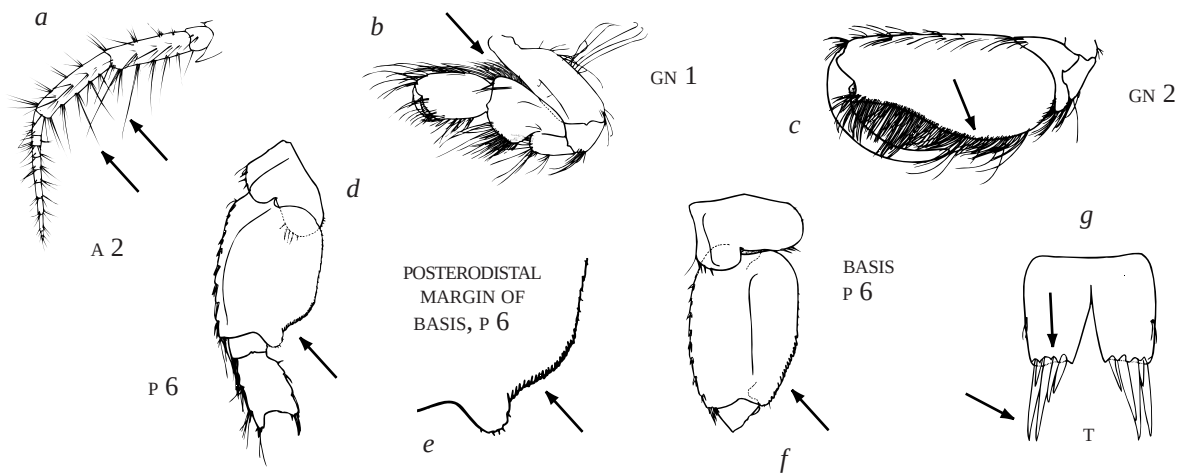


Figure 129.

- < Antenna 2, peduncle articles 4-5 with setae 2-3 times width of article in length; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (sparse groups of long setae may be present); gnathopod 2 of male, propodus with ventral margin lined with groups of long setae; peraeopod 6 of male, basis with posterior margin evenly convex or narrowing in distal two thirds, entire or minutely serrate in both sexes; telson lobes not subtruncate terminally, with subapical spines 3

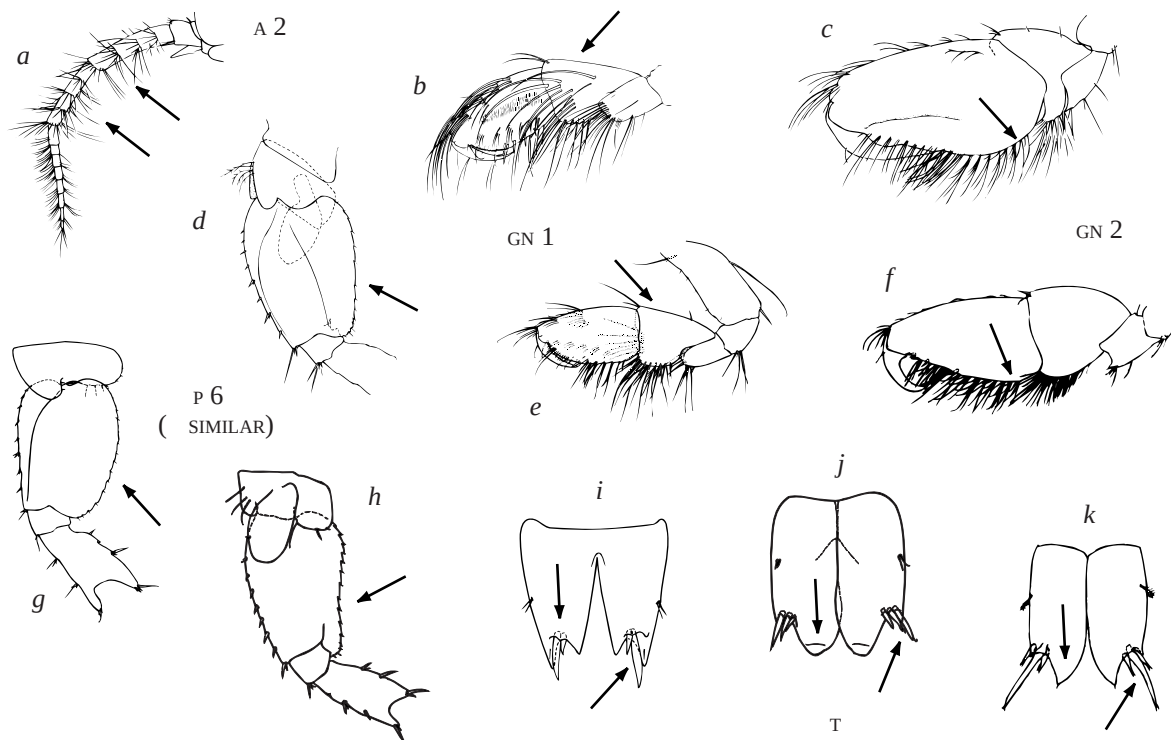


Figure 130.

3. < Peraeopod 5, basis with posterior margin concave, narrowing distally; peraeopod 7 of male, articles 4-5 unexpanded, slender; uropod 2, peduncle with 1 distal spine on lateral margin; telson lobes with medial cusp of apical notch shorter than lateral cusp 4

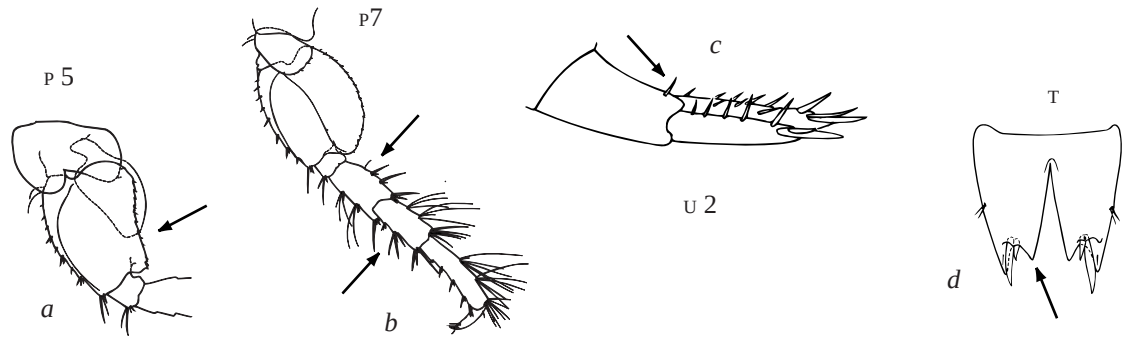


Figure 131.

- < Peraeopod 5, basis with posterior margin evenly convex, not narrowing distally; peraeopod 7 of male, articles 4-5 expanded, stout; uropod 2, peduncle with 2-4 spines on lateral margin; telson lobes with medial cusp of apical notch longer than lateral cusp 5

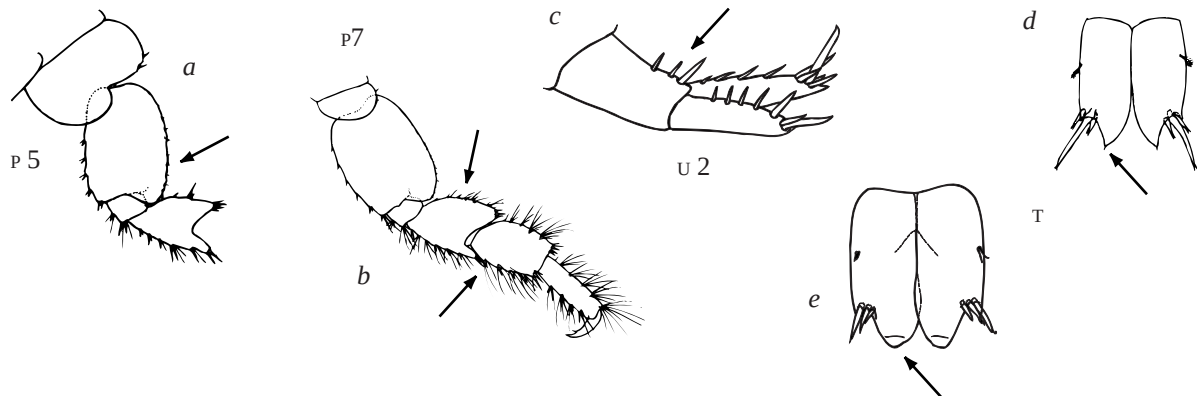


Figure 132.

4. < Coxa 1, posteroventral margin without very small tooth or cusp; gnathopod 1 of female, propodus relatively slender, twice as long as wide, ventral margin straight; gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus with long, straight, crenulate longitudinal ridge on medial surface, with shorter smooth ridge on lateral surface, without small medial tooth at palmar angle, dactyl at least one half length of propodus; peraeopod 6, basis with posterior margin evenly convex, not narrowing distally; peraeopod 7 of male, articles 5-6 with long setae on posterior margin *Elasmopus balkomanus*

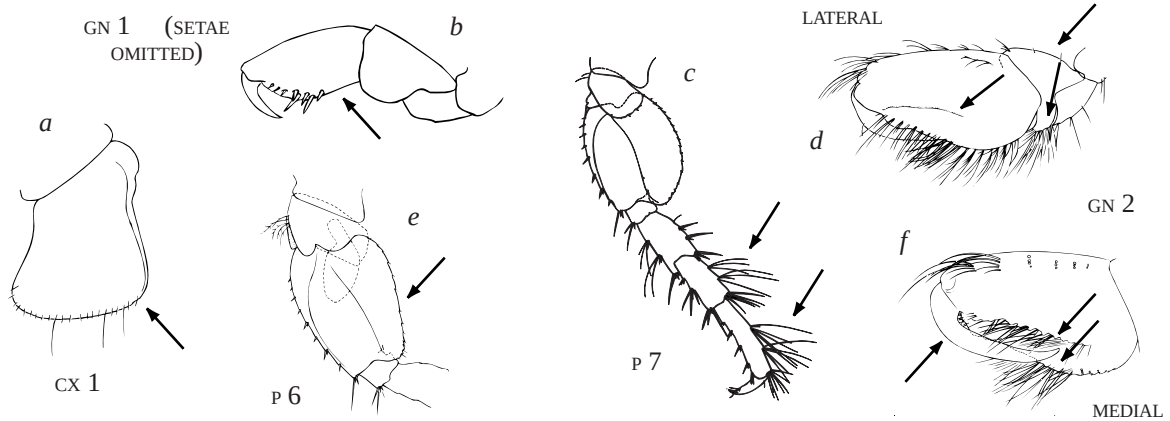


Figure 133.

- < Coxa 1, posteroventral margin with very small tooth or cusp; gnathopod 1 of female, propodus relatively stout, less than twice as long as wide, ventral margin slightly convex; gnathopod 2 of male, carpus relatively large, stout, dorsal margin often sharply angled proximally, carpal lobe broad, propodus without long, straight, crenulate longitudinal ridge on medial surface, without ridge on lateral surface, with small medial tooth at palmar angle, dactyl one third length of propodus; peraeopod 6, basis with posterior margin concave, narrowing distally; peraeopod 7 of male, articles 5-6 without long setae on posterior margin .
..... *Elasmopus* sp. B

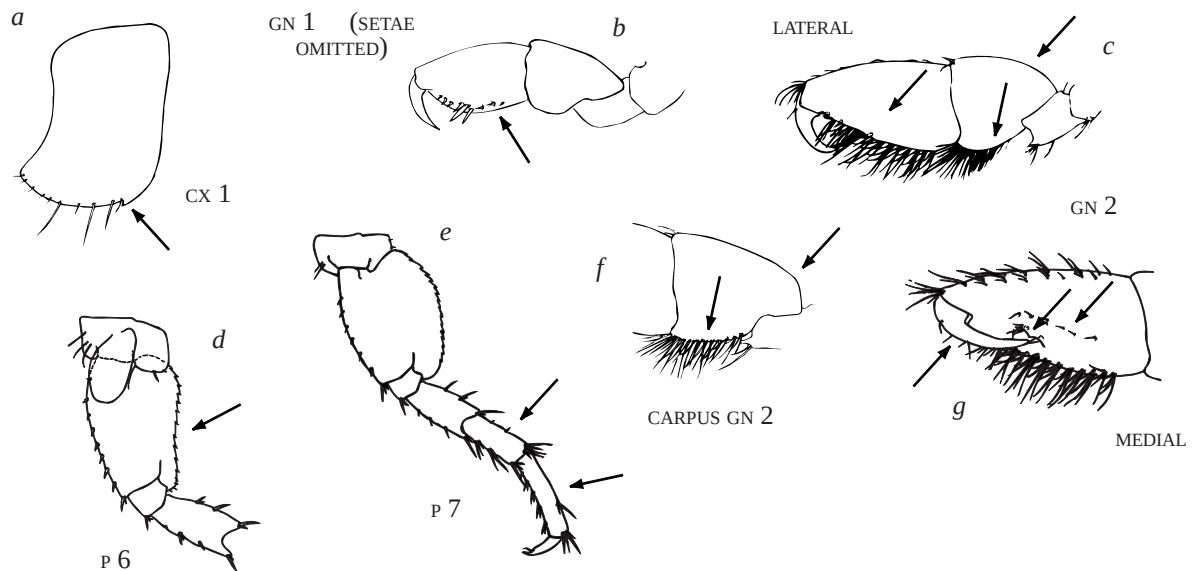


Figure 134.

5. < Coxae 1-3, ventral margin lined with long setae; gnathopod 1, propodus subovate, palm oblique; gnathopod 2 of male, propodus without deep medial depression, palm with dactylar hinge tooth and smaller adjacent tooth, palmar angle broadly convex, dactyl elongate, slender; gnathopod 2 of female, propodus with 2-3 spines at palmar angle much longer than those of palmar margin; epimera 2-3 of male, ventral margin with long setae ... *Elasmopus cf rapax*

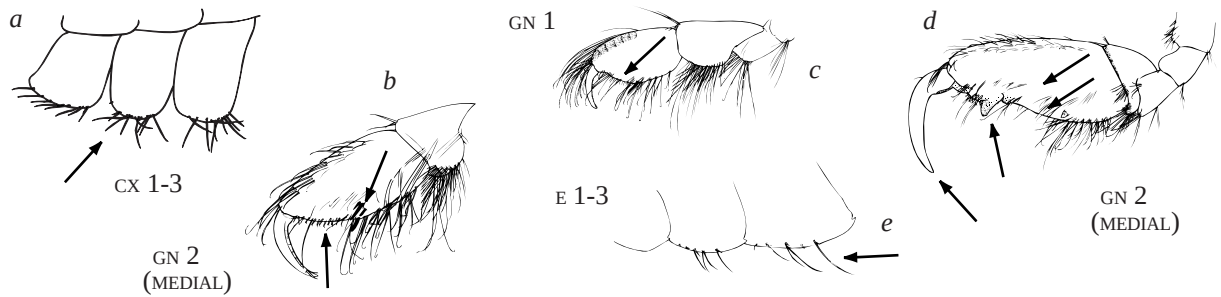


Figure 135.

- < Coxae 1-3, ventral margin with sparse short to medium setae; gnathopod 1, propodus subrectangular, palm transverse; gnathopod 2 of male, propodus with deep medial depression, palm without dactylar hinge tooth or smaller adjacent tooth, palmar angle expanded, becoming subquadrate in large adults, dactyl stout; gnathopod 2 of female, propodus with 1-2 spines at palmar angle slightly longer than those of palmar margin; epimera 2-3 of male, ventral margin with short spines (rarely 1-2 long setae) 6

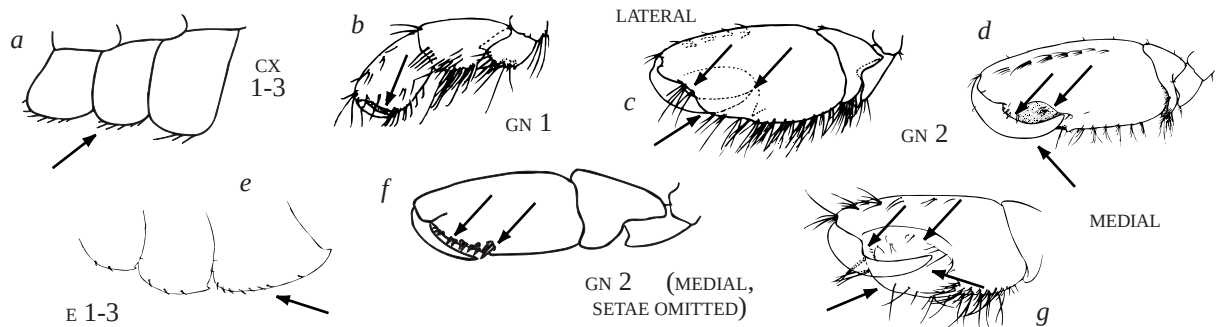


Figure 136.

6. < Epimeron 3, posteroventral margin entire, posteroventral tooth small but distinct; telson lobes apically acute or subacute *Elasmopus levis*

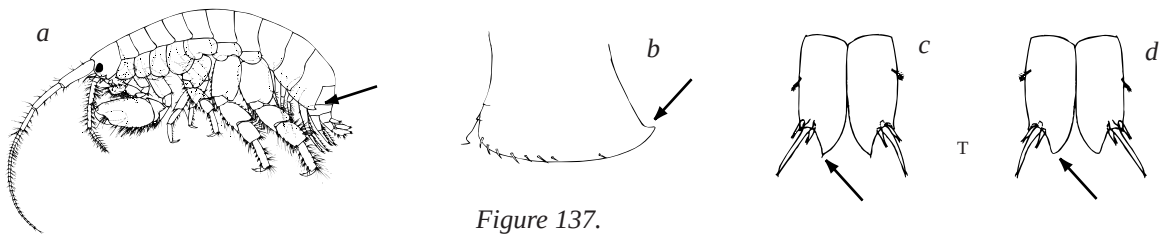


Figure 137.

- < Epimeron 3, posteroventral margin weakly crenulate, posteroventral tooth weak or lacking; telson lobes apically rounded *Elasmopus pocillimanus*

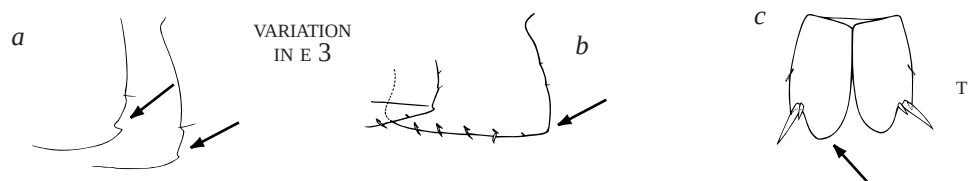


Figure 138.

***Elasmopus balkomanus* Thomas and Barnard, 1988
(Figure 133)**

Elasmopus balkomanus: Thomas and Barnard, 1988, pp. 838-842, figs. 1-3.

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 2-3 times width of article in length; coxae 1-3, ventral margin with sparse long setae; coxa 1, anteroventral and posteroventral margins entire, without tooth or cusp; gnathopod 1, propodus subovate, palm oblique; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (sparse groups of long setae present); gnathopod 1 of female, propodus relatively slender, ventral margin straight; gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without deep medial depression, with long, straight crenulate longitudinal ridge on medial surface, with shorter smooth ridge on lateral surface, ventral margin lined with groups of long setae, palmar margin without deep median notch, with low, blunt dactylar hinge tooth, without small adjacent tooth, palmar angle unexpanded, without small medial tooth, dactyl slender, at least one half length of propodus; gnathopod 2 of female, propodus with 2 spines at palmar angle slightly longer than those of palmar margin; pereopod 5, basis with posterior margin concave, narrowing distally; pereopod 6, basis with posterior margin evenly convex, minutely serrate; pereopod 7 of male, articles 4-5 unexpanded, slender, articles 5-6 with long setae on posterior margin; epimera 2-3 of male, ventral margin with short spines; epimeron 3, ventral margin entire, not curved sharply upwards posteriorly, posteroventral margin entire, posteroventral tooth small; uropod 2, peduncle with 1 distal spine on lateral margin; telson, lobes notched terminally, with subapical spines, medial cusp of apical notch acute terminally, shorter than lateral cusp.

Distribution: Florida Keys; Looe Key Reef (Thomas, 1993); Dry Tortugas; Biscayne Bay, Florida.

Ecology: This species occurs in algal turf on coral rubble in backreef and lagoon areas (Thomas and Barnard, 1988; Thomas, 1993) and also in shallow (1-3 m) nearshore rubble, algae and sponge habitats. In addition, it occasionally may be found in *Thalassia* grassbeds, especially if algae and small sponges are present as well.

Remarks: *Elasmopus balkomanus* is a relatively small species, with adult sizes ranging from 6-8 mm. The diagnostic ridge on the lateral surface of the propodus of gnathopod 2 in the male is not present in subadult males. *Elasmopus balkomanus* and *Elasmopus* sp. B are the only two Florida representatives of the genus known to date in which the basis of pereopod 5 is concave and narrowing distally, although the morphology of the basis of pereopod 5 in male *E. lamaitrei* from Cuba appears to be somewhat similar (Ortiz and Lalana, 1994).

See Thomas and Barnard, 1988; Thomas, 1993

***Elasmopus levis* (Smith, 1873)**
(Figure 137)

Moera levis: Smith, 1873, p. 559.

Elasmopus levis: Paulmier, 1905, p. 162, fig. 32.

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 2-3 times width of article in length; coxae 1-3, ventral margin with sparse, short to medium setae; coxa 1 anteroventral and posteroventral margins entire, without tooth or cusp; gnathopod 1, propodus subrectangular, palm transverse; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (sparse groups of long setae may be present); gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without straight medial or lateral ridges, with deep medial depression, ventral margin lined with groups of long setae, palmar margin without deep median notch, without dactylar hinge tooth or smaller adjacent tooth, palmar angle expanded, becoming subquadrate in larger adults, with small medial tooth, dactyl stout; gnathopod 2 of female, propodus with 1-2 spines at palmar angle slightly longer than those of palmar margin; peraeopod 5, basis with posterior margin evenly convex, not narrowing distally; peraeopod 6, basis with posterior margin evenly convex, minutely serrate; peraeopod 7 of male, articles 4-5 expanded, stout, articles 5-6 with long setae on posterior margin; epimera 2-3 of male, ventral margin with short spines (rarely 1-2 long setae); epimeron 3, ventral margin entire, not curved sharply upwards posteriorly, posteroventral margin entire, posteroventral tooth small; uropod 2, peduncle with 2-4 spines on lateral margin; telson, lobes notched terminally, with subapical spines, medial cusp of apical notch acute or subacute terminally, longer than lateral cusp.

Distribution: Cape Cod, Massachusetts (Bousfield, 1973) to Biscayne Bay, Florida; Gulf coast from the Florida Keys to Yucatan, Mexico. Caribbean Sea (McKinney, 1977).

Ecology: This species is commonly found in grassbeds and among algae on hard substrates, but it sometimes occurs on sand bottoms as well, usually in the presence of detritus, drift algae, or *Diopatra* tubes.

Remarks: *Elasmopus levis* is a very variable species in terms of both size and morphology, with adults ranging from 5 to 12 mm in length. In addition to developmental variations in morphology, there are some morphological differences between Gulf of Mexico specimens and those from the east coast of the United States. The most obvious of these is the difference in the stoutness of peraeopods 5-7 of adult males, with material from the Gulf having somewhat more slender peraeopods than east coast material. Small juveniles of *E. levis* may be recognized by the combination of the absence of very long setae on the peduncle of antenna 2, the evenly convex posterior margin of the basis of peraeopod 5, and the posteroventral tooth on epimeron 3.

Much confusion exists in the literature concerning the identity of this species and the very similar *E. pocillimanus* (Bate, 1862). Indeed, the two species were synonymized by Shoemaker (1948) as *E. pocillimanus*, although this synonymy has not generally been accepted (Bousfield, 1973; Barnard and Barnard, 1983). The characters usually used to separate these species (i.e. telson apices acute and posterior margin of epimeron 3 entire in *E. levis* vs. telson apices rounded and posterior margin of epimeron 3 crenulate in *E. pocillimanus*) appear to vary within populations along the U.S. east coast and in the Gulf. In addition, there are several differences between western Atlantic "*E. pocillimanus*" material and the Mediterranean material illustrated by Karaman (1982). These include the transverse palm of gnathopod 1 (oblique in Mediterranean specimens) and the acute to subacute apices of the telson lobes (very broadly rounded in Mediterranean material). Also, the distal locking spines on the propodus of peraeopods 3-4, mentioned as a diagnostic character for *E. pocillimanus* by Thomas (1993) and Barnard (1970), are much smaller in western Atlantic specimens than those illustrated by Barnard (1970) for material from Hawaii, and are similar in size to those of other

species in this region. Finally, cotypes of *E. (= Moera) levis* deposited at the USNM appear to be identical to material of "*E. pocillimanus*" from various locations along the U.S. east coast. Thus, it may be that all material from the western Atlantic is actually *E. levis* and not *E. pocillimanus*; however, the type material of the latter species (from Genoa, Italy) will have to be reexamined before the true status of these two species can be determined.

See Kunkel, 1918; Bousfield, 1973; McKinney, 1977.

***Elasmopus pecteniscus* (Bate, 1862)**
(Figure 129)

Moera pecteniscus: Bate, 1862, p. 192, fig. 8, pl. 34.

Elasmopus pecteniscus: Barnard, K. H., 1916, pp. 197-199, fig. 33, pl. 28.

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 4-5 times width of article in length; coxae 1-3, ventral margin with sparse short to medium setae; coxa 1, anteroventral and posteroventral margin entire, without tooth or cusp; gnathopod 1, propodus subrectangular, palm slightly oblique; gnathopod 1 of male, carpus with fringe of very long dense setae on dorsal margin; gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without straight medial or lateral ridges, without deep medial depression, ventral margin lined with dense row of singly inserted, very long setae, palmar margin without deep median notch, with dactylar hinge tooth, without small adjacent tooth, palmar angle unexpanded, with small, broad medial tooth, dactyl elongate, slender; gnathopod 2 of female, propodus with 2 spines at palmar angle slightly longer than those on palmar margin; peraeopod 5, basis with posterior margin evenly convex, not narrowing distally; peraeopod 6 of male, basis with posterior margin narrowing in distal one half, castelloserrate in both sexes; peraeopod 7 of male, articles 4-5 unexpanded, slender, articles 5-6 without long setae on posterior margin; epimera 2-3 of male, ventral margins with short spines; epimeron 3, ventral margin entire, not curved sharply upwards posteriorly, posteroventral margin entire or very weakly crenulate, posteroventral tooth absent; uropod 2, peduncle with 2-4 spines on lateral margin; telson, lobes subtruncate terminally, with apical spines.

Distribution: Cosmopolitan in tropical marine waters (McKinney, 1977; Karaman, 1982). In Florida, this species occurs south of Hutchinson Island on the east coast, throughout South Florida, the Florida Keys and Dry Tortugas, and north to St. Andrew Bay on the west coast.

Ecology: Found on hard substrates such as oyster reefs, worm reefs (*Phragmatopoma lapidosa*), jetties, pilings, etc. This species has occasionally even been found on the carapace of the loggerhead sea turtle (*Caretta caretta*) off the east coast of Florida (pers. obs.).

Remarks: The castelloserrate margins of peraeopods 6-7 are very distinctive; unfortunately, they are not well-developed in small juveniles. However, even small specimens have a few very long setae on the peduncle of antenna 2 and the posteroventral margin of epimeron 3 is slightly crenulate or evenly rounded. Descriptions of this species based on material from different parts of the world differ in some respects and, as with other widespread species, it is possible that a complex of similar species is actually represented. Adult size ranges from 6 to 14 mm.

See McKinney, 1977.

***Elasmopus pocillimanus* (Bate, 1862)**
(Figure 138)

Moera pocillimanus: Bate, 1862, p. 191, pl. 34, fig. 7.

Elasmopus pocillimanus: Della Valle, 1893, p. 733, pl. 1, fig. 4; pl. 22, figs. 23-25.

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 2-3 times width of article in length; coxae 1-3, ventral margin with sparse, short to medium setae; coxa 1 anteroventral and posteroventral margins entire, without tooth or cusp; gnathopod 1, propodus subrectangular, palm transverse; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (sparse groups of long setae may be present); gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without straight medial or lateral ridges, with deep medial depression, ventral margin lined with groups of long setae, palmar margin without deep median notch, without dactylar hinge tooth or smaller adjacent tooth, palmar angle expanded, becoming subquadrate in larger adults, with small medial tooth, dactyl stout; gnathopod 2 of female, propodus with 1-2 spines at palmar angle slightly longer than those of palmar margin; peraeopod 5, basis with posterior margin evenly convex, not narrowing distally; peraeopod 6, basis with posterior margin evenly convex, minutely serrate; peraeopod 7 of male, articles 4-5 expanded, stout, articles 5-6 with long setae on posterior margin; epimera 2-3 of male, ventral margin with short spines (rarely 1-2 long setae); epimeron 3, ventral margin entire, not curved sharply upwards posteriorly, posteroventral margin weakly crenulate, posteroventral tooth weak or lacking; uropod 2, peduncle with 2-4 spines on lateral margin; telson, lobes notched terminally, with subapical spines, medial cusp of apical notch rounded terminally, longer than lateral cusp.

Distribution: Cosmopolitan in warm temperate and tropical waters (McKinney, 1977; Karaman, 1982; Thomas, 1993). Occurs from New England south on the east coast of the U. S. and throughout the Gulf of Mexico and Caribbean.

Ecology: *Elasmopus pocillimanus* is commonly found in grassbeds and among algae on hard substrates at depths of 0-30 m. It also is known to occur in lagoon, coral and coral rubble habitats (Thomas, 1993).

Remarks: *Elasmopus pocillimanus* material from the western Atlantic is very similar to, and may prove to be synonymous with, *E. levis*. It may, however, be different from the Mediterranean *E. pocillimanus*, which was described from Genoa, Italy by Bate (1862) (see **Remarks** section for *E. levis*).

See Kunkel, 1910; Shoemaker, 1948; McKinney, 1977; Thomas, 1993.

***Elasmopus cf rapax* Costa, 1853
(Figure 135)**

Elasmopus rapax: Costa, 1853, p.175.

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 2-3 times width of article in length; coxae 1-3, ventral margin lined with long setae; coxa 1, anteroventral and posteroventral margins entire, without tooth or cusp; gnathopod 1, propodus subovate, palm oblique; gnathopod 1 of male, carpus without fringe of very long dense setae on dorsal margin (sparse groups of long setae may be present); gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without medial or lateral ridges, without deep medial depression, ventral margin lined with groups of long setae, palmar margin without deep median notch, with dactylar hinge tooth and smaller adjacent tooth, palmar angle unexpanded, broadly convex, with small medial tooth, dactyl elongate, slender; gnathopod 2 of female, propodus with 2-3 spines at palmar angle much longer than those of palmar margin; pereopod 5, basis with posterior margin evenly convex, not narrowing distally; pereopod 6, posterior margin evenly convex, entire or minutely serrate; pereopod 7 of male, articles 4-5 expanded, stout, articles 5-6 with long setae on posterior margin; epimera 2-3 of male, ventral margin with long setae; epimeron 3, ventral margin entire, not curved sharply upwards posteriorly, posteroventral margin crenulate, posteroventral tooth absent; uropod 2, peduncle with 2-4 spines on lateral margin; telson, lobes notched terminally, with subapical spines, medial cusp of apical notch subacute or rounded terminally, longer than lateral cusp.

Distribution: Cosmopolitan in tropical and warm temperate waters (McKinney, 1977; Karaman, 1982). Regionally, this species occurs from Little Cumberland Island, Georgia to Biscayne Bay, Florida and Key West, Florida to Yucatan, Mexico; also reported from Bermuda (Kunkel, 1910).

Ecology: *Elasmopus cf rapax* is common on hard substrates such as jetties, piers, rocks and dead coral. It is also found on mangrove roots, among algae and sponges, and on sand or mud bottoms. In addition, it may occasionally be found on the carapace of the Loggerhead sea turtle (*Caretta caretta*) (USNM collection, Little Cumberland Island, Georgia).

Remarks: This is a highly variable species found in a broad range of habitats, and records may actually refer to a complex of similar, closely related species. Karaman (1982) mentions the occurrence of two forms of the male of this species in the Mediterranean. The Form A male appears to be similar to western Atlantic and Gulf of Mexico material, with long marginal setae on epimera 1-3, long posterior marginal setae on the basis of pereopods 5-7, and short subapical spines on the telson lobes. The Form B male has marginal spines on epimera 1-3, very short posterior marginal setae on the basis of pereopods 5-7, and long subapical spines on the telson lobes. One extremely large male specimen (12 mm) from Lake Worth, Florida, has very broadly rounded telson lobes with no subapical spines. In addition, individuals from populations in the Florida Keys occasionally have nearly fused telson lobes (Shoemaker, 1933b). Adult size ranges from 6 to 12 mm.

See Kunkel, 1910; Shoemaker, 1933b; McKinney, 1977; Karaman, 1982.

***Elasmopus* sp. A**
(Figure 127)

Regional diagnosis: Antenna 2, peduncle articles 4-5 without or with very few marginal setae, scarcely longer than width of article, if present; coxa 1, anteroventral angle with small tooth or cusp, posteroventral margin entire, without tooth or cusp; gnathopod 1, propodus subrectangular, palm transverse; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (very sparse groups of long setae present); gnathopod 2 of male, carpus relatively small, dorsal margin evenly convex, not sharply angled proximally, carpal lobe narrow, propodus without medial or lateral ridges, without deep medial depression, ventral margin lined with groups of long setae, palmar margin with deep median notch, with dactylar hinge tooth, without small adjacent tooth, palmar angle unexpanded, without small medial tooth, dactyl slender, approximately one half length of propodus; gnathopod 2 of female, propodus with 1-2 spines at palmar angle much longer than those of palmar margin; peraeopod 5, basis with posterior margin straight to slightly concave, not narrowing distally; peraeopod 6, basis with posterior margin evenly convex, minutely serrate; peraeopod 7 of male, article 4-5 unexpanded, slender, articles 5-6, without long setae on posterior margin; epimera 2-3 of male, ventral margin with few short spines; epimeron 3, ventral margin serrate and curved sharply upwards posteriorly, posteroventral margin entire, posteroventral tooth large; uropod 2, peduncle with 1 distal spine on lateral margin, telson, lobes notched terminally, with subapical spines, medial cusp of apical notch acute terminally, subequal to or slightly shorter than lateral cusp.

Distribution: Biscayne Bay, Florida; southeastern Gulf of Mexico and western Florida Bay between Cape Sable and the lower Florida Keys.

Ecology: *Elasmopus* sp. A is found in silty or muddy sand or sandy shell, sometimes with sparse seagrass, at depths of 4-10 m. It appears to be somewhat uncommon; however, further sampling may reveal that it is actually more widespread than is indicated by the material currently available.

Remarks: *Elasmopus* sp. A most closely resembles *E. molokai* Barnard, 1970, a Hawaiian species, in the morphology of the male gnathopod 2; however it differs from that species in many respects (eg. the more slender rami of uropod 3, the more slender telson lobes with acute terminal cusps, the sharply upturned ventral margin of epimeron 3). In particular, the shape of epimeron 3 is quite distinctive and *Elasmopus* sp. A may be separated from all other known species of *Elasmopus* in the region on the strength of that character alone. Some variation, possibly developmental, occurs in the size of the tooth on the anteroventral angle of coxa 1, which is often very small and may be more evident in juveniles and subadults than in adults. *Elasmopus* sp. A, like *E. molokai*, is a small species, with adults ranging in size from 3-5 mm.

***Elasmopus* sp. B**
(Figure 134)

Regional diagnosis: Antenna 2, peduncle articles 4-5 with numerous marginal setae 2-3 times width of article in length; coxa 1, anteroventral angle entire, without tooth or cusp, posteroventral margin with single, very small tooth or cusp; gnathopod 1 propodus subovate, palm oblique; gnathopod 1 of male, carpus without fringe of very long, dense setae on dorsal margin (sparse groups of long setae present); gnathopod 1 of female, propodus relatively stout, ventral margin convex; gnathopod 2 of male, carpus relatively large, stout, dorsal margin often sharply angled proximally, carpal lobe broad, propodus without medial or lateral ridges, ventral margin lined with groups of long setae, palmar margin without deep median notch, with low rounded dactylar hinge tooth, without small adjacent tooth, palmar angle unexpanded, with small medial tooth, dactyl short, approximately one third length of propodus; gnathopod 2 of female, propodus with 2-3 spines at palmar angle much longer than those of palmar margin; pereopod 5, basis with posterior margin concave, narrowing distally; pereopod 6, basis with posterior margin concave, narrowing in distal two thirds, minutely serrate; pereopod 7 of male, articles 4-5 unexpanded, slender, articles 5-6 without long setae on posterior margin; epimera 2-3 of male, ventral margin with short spines; epimeron 3, ventral margin entire, not curved sharply upwards posteriorly (may curve upwards gradually), posteroventral tooth small; uropod 2, peduncle with 1 distal spine on lateral margin; telson, lobes notched terminally, with subapical spines, medial cusp of apical notch acute terminally, slightly shorter than lateral cusp.

Distribution: To date, this species has only been found in the vicinity of Long Key, Florida, although it is probably more widespread.

Ecology: *Elasmopus* sp. B occurs in shallow water (1-2 m) among algae on rubble or sand bottoms.

Remarks: As mentioned in the remarks for *E. balkomanus*, that species and *E. sp. B* are the only known Florida species of *Elasmopus* to have a concave, distally narrowing basis on pereopod 5. In addition, gnathopod 2 of the adult male *E. sp. B* is very distinctive; it is the only known species of *Elasmopus* in the area to have an enlarged carpus with a sharply angled dorsal margin and a broad carpal lobe. The angle of the dorsal margin changes developmentally, however, and in subadults and small adults it is not as sharply angled as it is in large adult males. *Elasmopus* sp. B is relatively small, with adult sizes ranging from 6-8 mm.

Genus *Maera* Leach, 1814

Regional diagnosis: Antenna 1, accessory flagellum 4-7-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 6-10-articulate, subequal to peduncle article 5 in length, that of male cylindrical, not paddle-like; eyes well-developed, round, narrowly reniform or pyriform; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of short marginal setae, greater than one half length of article 2; lower lip, inner lobes present; maxilla 1, inner plate narrowly ovate, without small distal process, with 3 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate without dense oblique row of facial setae (may have sparse setae); maxilliped, inner plate without slender process on each side of distal margin (low, rounded process may be present); peraeon segment 7 without coxal gills; coxa 1, anteroventral angle produced or subquadrate, anteroventral margin entire or with single small tooth, posteroventral margin entire or serrate, without single small tooth; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl slender, elongate, not broadly expanded proximally; gnathopod 2 slightly sexually dimorphic, subchelate, right and left sides similar, equal in size; peraeopod 7, basis weakly to moderately expanded (rarely strongly expanded), posterior margin entire or serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin usually entire (occasionally serrate), epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal spine groups (teeth or processes may be present); uropod 3 extending subequally with or well beyond tips of uropods 1-2, rami usually slender, not foliaceous, subequal or slightly unequal in length, both long or both short, margins spinose or sparsely setose, tips subtruncate with moderate to long terminal spines, inner ramus not scale-like, outer ramus 1-articulate or minutely 2-articulate, distal article vestigial, hidden by surrounding spines; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spines at midpoint of each lobe (may have lateral spine), with apical spines.

Florida species: *M. caroliniana*, *M. miranda*, *M. quadrimana*, *M. williamsi*, *Maera* sp. B, *Maera* sp. C

KEY TO FLORIDA SPECIES OF *MAERA*

1. < Eye narrowly reniform or pyriform; coxa 1, posteroventral margin serrate; peraeopod 7, basis with posterior margin distinctly serrate; epimeron 3, posterior margin serrate; urosome segments 1-2, posterodorsal margin with teeth; uropod 1, peduncle with distomedial spine long, approximately one third length of inner ramus, inner ramus with median spine on medial margin much longer than other marginal spines..... 2

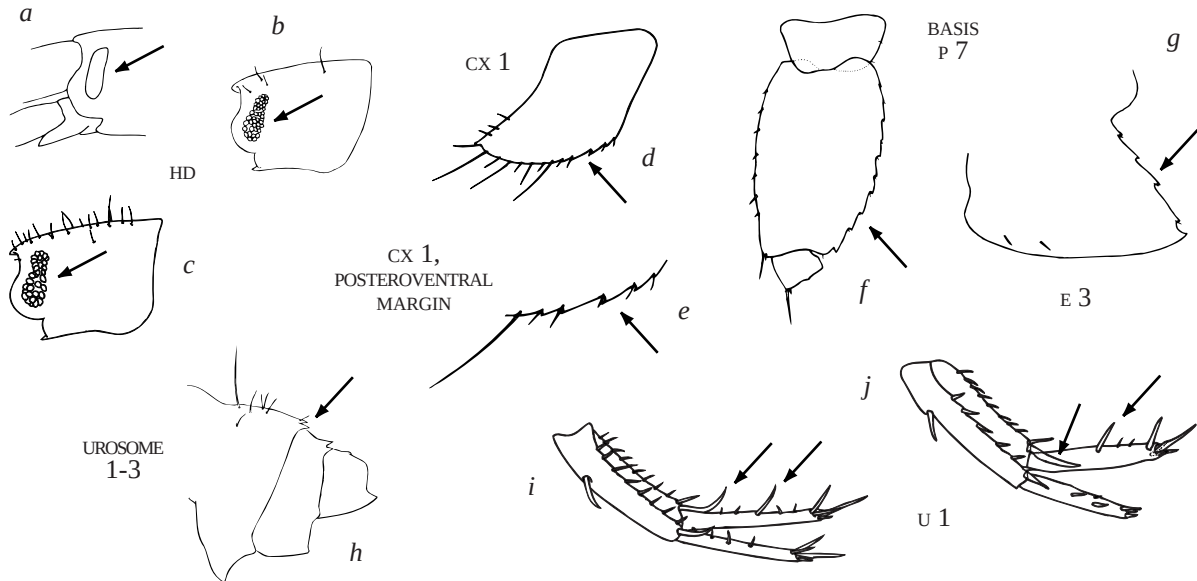


Figure 139.

- < Eye round or broadly pyriform; coxa 1, posteroventral margin entire, without teeth or serrations; peraeopod 7, basis with posterior margin weakly serrate or entire; epimeron 3, posterior margin entire; urosome segments 1-2, posterodorsal margin without teeth; uropod 1, peduncle with distomedial spine short, approximately one quarter length of inner ramus, inner ramus with median spine on medial margin not much longer than other marginal spines (may be slightly longer)..... 3

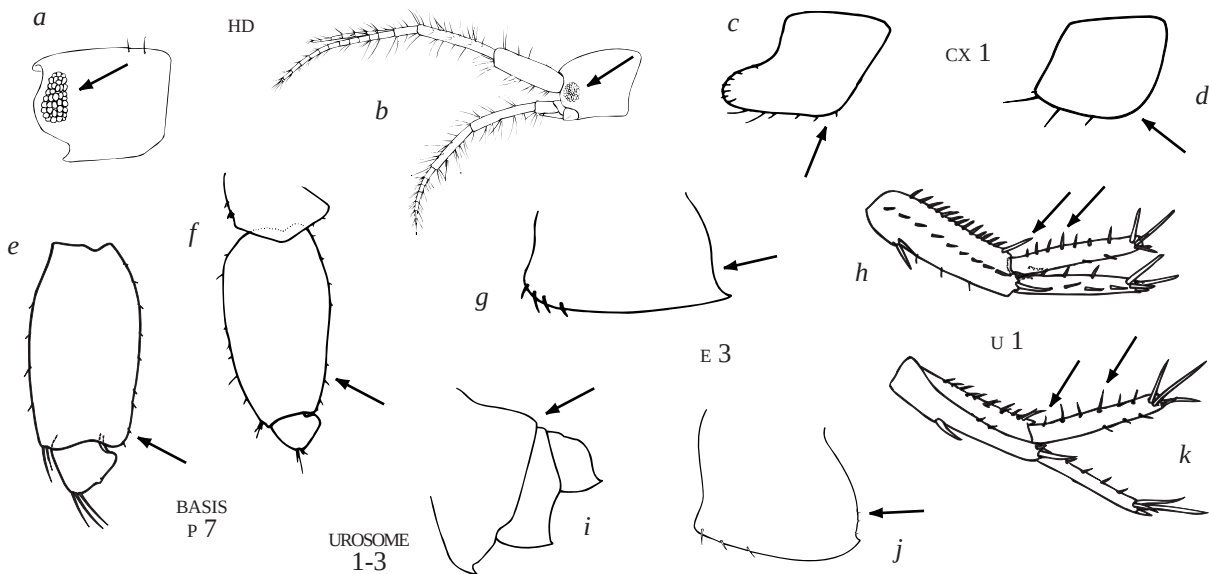


Figure 140.

2. < Gnathopod 2 of male, palm without 3 evenly spaced marginal processes, with low, broad, rounded process near dactylar articulation; coxa 7, posterior margin without strong spines; epimera 2-3, anteroventral margin without long spines (may have 1-3 short spines); uropod 2, peduncle with distomedial spine short, approximately one quarter length of inner ramus; telson, lobes without strong median lateral spine (seta or small spine may be present)
 *Maera williamsi*

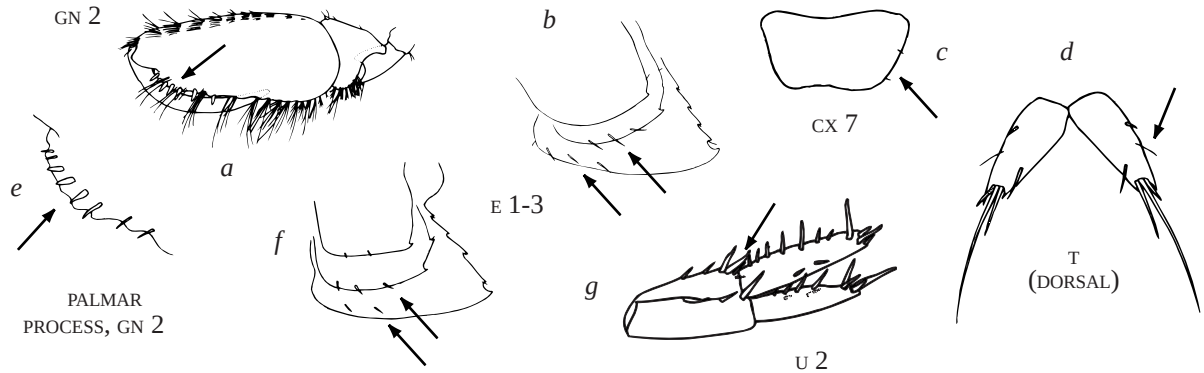


Figure 141.

- < Gnathopod 2 of male, palm with 3 evenly spaced marginal processes (1 bifurcate, 2 subtriangular), without low, broad, rounded process near dactylar articulation; coxa 7, posterior margin with strong spines; epimera 2-3, anteroventral margin with 2-5 long spines; uropod 2, peduncle with distomedial spine long, approximately one third length of inner ramus; telson, lobes with strong median lateral spine *Maera* sp. B

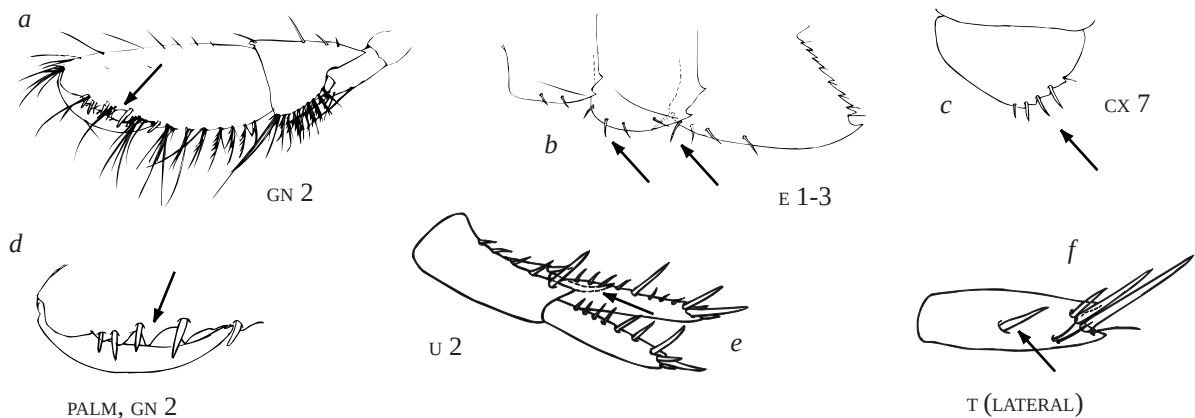


Figure 142.

3. < Mandible, palp article 3 shorter than article 2; coxa 1, anteroventral angle produced, broadly rounded (“shoe-shaped”); gnathopod 2, propodus subovate, not greatly enlarged, slightly larger than that of gnathopod 1; uropod 3, rami elongate, much longer than peduncle, terminal spines short, one quarter length of rami *Maera caroliniana*

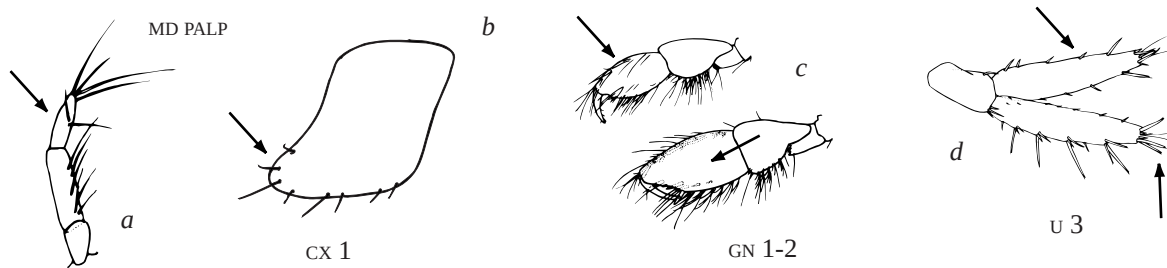


Figure 143.

- < Mandible, palp article 3 not shorter than article 2; coxa 1, anteroventral angle usually unproduced, subquadrate (if produced, then narrowly, not broadly rounded); gnathopod 2, propodus subquadrate or subrectangular, greatly enlarged, much larger than that of gnathopod 1; uropod 3, rami short, slightly longer than peduncle, terminal spines long, at least one half length of rami 4

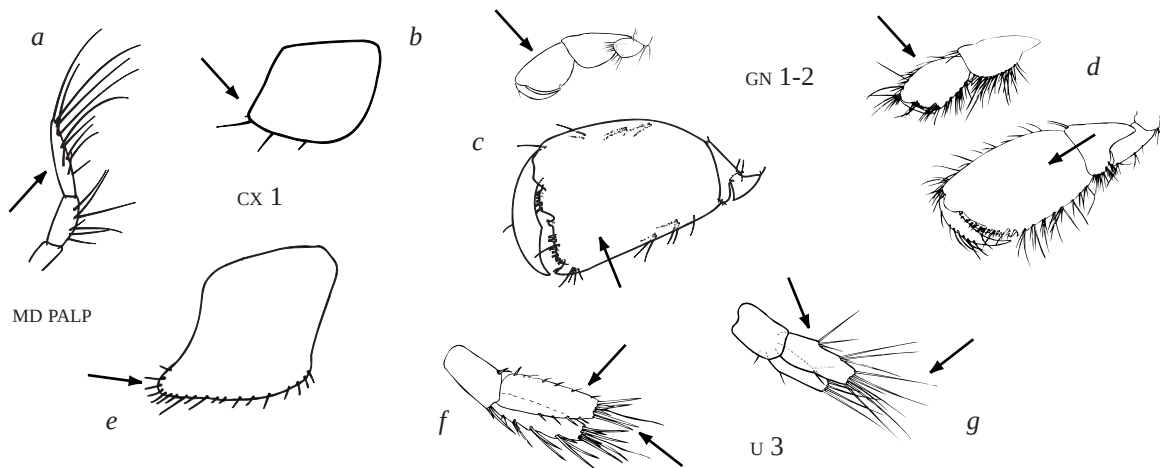


Figure 144.

4. < Eye broadly pyriform; coxa 1, anteroventral angle produced, narrowly rounded; gnathopod 2, propodus subrectangular, palm slightly oblique, dactyl, extensor margin lined with setae; peraeopod 7, merus and carpus without cluster of long setae at posterodistal angle, setae shorter than length of next article; telson, lobes with spines on lateral margins, notched apically, with short terminal spines, less than one third length of telson (subterminal spines may be somewhat longer) *Maera* sp. C

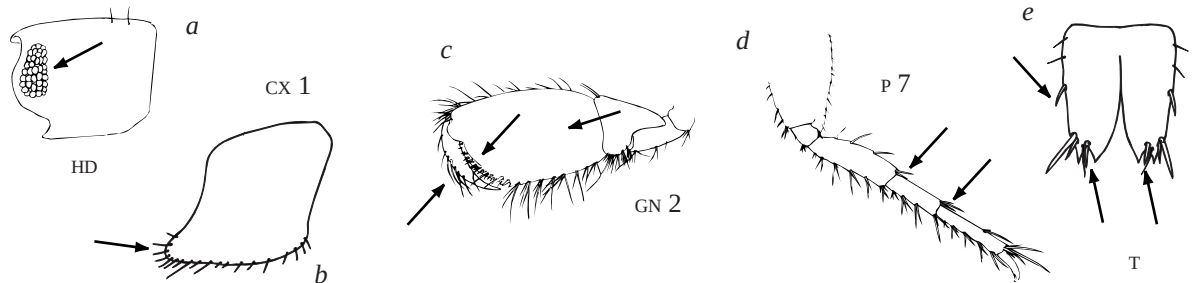


Figure 145.

- < Eye round; coxa 1, anteroventral angle unproduced, subquadrate; gnathopod 2, propodus subquadrate, palm transverse, dactyl, extensor margin with single median seta; peraeopod 7, merus and carpus with cluster of long setae at posterodistal angle, at least some setae as long as next article; telson, lobes without spines on lateral margins (setae may be present), subtruncate apically, with elongate terminal spines, as long as or longer than telson 5

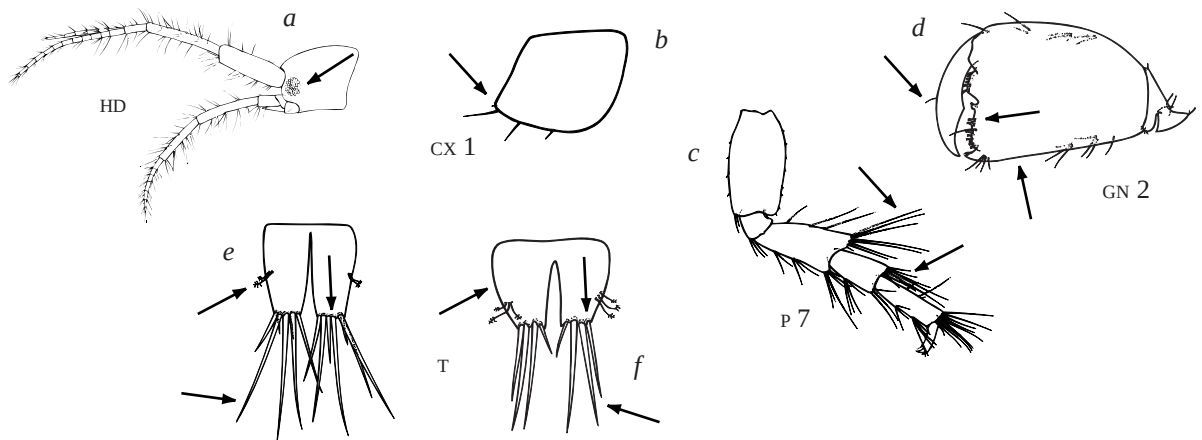


Figure 146.

5. < Mandible, palp article 3 subequal to article 2 in length; gnathopod 2, , propodus with palmar angle defined by elongate triangular process below deep u-shaped notch, palmar margin with subacute process near dactylar articulation, followed by 2 narrow subtruncate median processes, dactyl broadest proximally, without minute median point on flexor margin; telson, width greater than length, lobes with 4 terminal spines *Maera quadrimana*

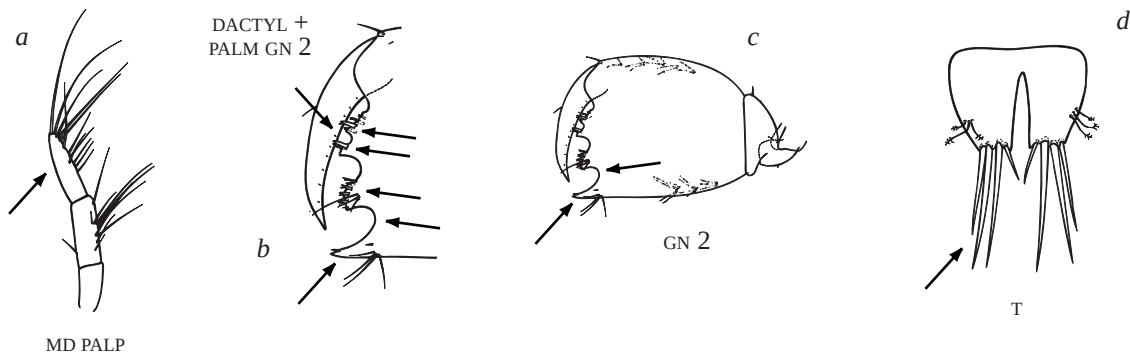


Figure 147.

- < Mandible, palp article 3 longer than article 2; gnathopod 2, propodus with palmar angle defined by short triangular process below shallow v-shaped notch, palmar margin with broad, low process near dactylar articulation followed by minute, subtruncate median process and broad, low process above palmar angle, dactyl broadest medially, with minute median point on flexor margin; telson, width subequal to length, lobes with 5-7 terminal spines
 *Maera miranda*

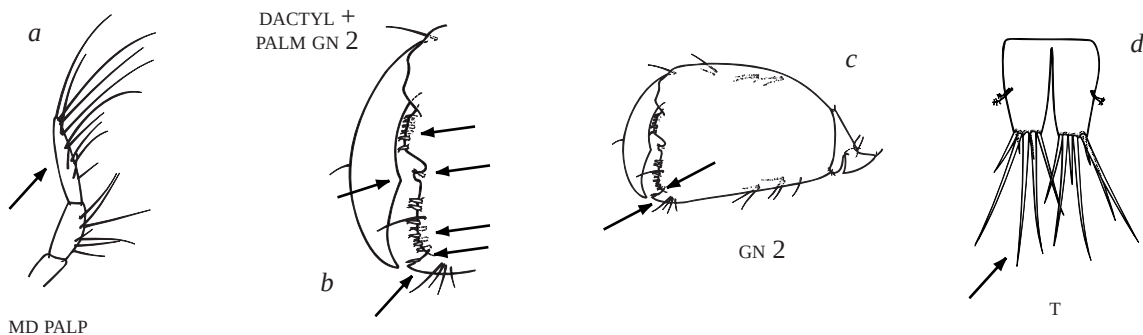


Figure 148.

***Maera caroliniana* Bynum and Fox, 1977
(Figure 143)**

Maera caroliniana: Bynum and Fox, 1977, pp. 11-14, figs. 6-7

Regional diagnosis: Eye round; mandible, palp article 3 shorter than article 2; coxa 1, anteroventral angle produced, broadly rounded, posteroventral margin entire, without teeth or serrations; coxa 7, posterior margin without strong spines (small spines may be present); gnathopod 2, propodus subovate, not greatly enlarged, slightly larger than that of gnathopod 1, palm oblique, palmar angle defined by stout spine, palmar margin without notches or processes, dactyl broadest proximally, without median point on flexor margin, extensor margin with single median seta; peraeopod 7, basis with posterior margin weakly serrate, merus and carpus without cluster of long setae at posterodistal angle, setae shorter than length of next article; epimera 2-3, anteroventral margin without long spines (may have short spines); epimeron 3, posterior margin entire; urosome segments 1-2, posterodorsal margin entire, without teeth; uropods 1-2, peduncle with distomedial spine short, approximately one quarter length of inner ramus, inner ramus with median spine on medial margin not much longer than other marginal spines; uropod 3, rami elongate, much longer than peduncle, terminal spines short, one quarter length of rami, inner ramus subequal to or slightly shorter than outer; telson, width less than length, lobes with spines on lateral margin, notched apically, with 1-2 terminal spines, terminal spines short, not more than one third length of telson.

Distribution: Cape Lookout, North Carolina (Bynum and Fox, 1977) south to Biscayne Bay, Florida; Florida Bay; Tampa Bay; Apalachee Bay, Florida.

Ecology: *Maera caroliniana* is found on shelly bottoms, as part of the community associated with the maldanid polychaete *Petaloproctus socialis*, and in the nocturnal plankton off the U.S. east coast (Bynum and Fox, 1977). It has also been found on sandy shell bottoms in Florida Bay at depths of 3-4 m.

Remarks: Among the Florida species of the genus *Maera*, the “shoe-shaped” coxa 1, with its broadly rounded anteroventral angle, appears to be a good diagnostic character for *M. caroliniana*, separating it from all other *Maera* species in the area except for *Maera* sp. C, in which the anteroventral angle on coxa 1 is narrowly rounded. However, *Maera* sp. C has a much larger gnathopod 2 and much shorter rami on uropod 3 than does *M. caroliniana*. *Ceradocus shoemakeri*, with which *M. caroliniana* frequently cooccurs, has a similarly shaped coxa 1, although the anteroventral angle is more narrowly rounded than in *M. caroliniana*. *Maera caroliniana* can be readily separated from *C. shoemakeri* at all but the smallest sizes by the lack of any processes on the urosome segments, the lack of serrations on the posterior margin of epimeron 3 and the narrower rami of uropod 3. *Maera caroliniana* is a relatively small species, with adult sizes ranging from 4-6 mm.

See Bynum & Fox, 1977

***Maera miranda* Ruffo, Krapp and Gable, 2000
(Figure 148)**

Maera miranda: Ruffo, Krapp and Gable, 2000, pp. 14-17, 19, figs. 7-8.

Regional diagnosis: Eye round; mandible, palp article 3 longer than article 2; coxa 1, anteroventral angle unproduced, subquadrate, posteroventral margin entire, without teeth or serrations; coxa 7, posterior margin without spines; gnathopod 2, propodus subquadrate, greatly enlarged, much larger than that of gnathopod 1, palm transverse, palmar angle defined by short triangular process below shallow v-shaped notch, palmar margin with broad low process near dactylar articulation followed by minute, subtruncate median process and broad low process above palmar angle, dactyl broadest medially, with minute median point on flexor margin, extensor margin with single median seta; pereopod 7, basis with posterior margin weakly serrate, merus and carpus with cluster of long setae at posterodistal angle, at least some setae as long as next article; epimera 2-3, anteroventral margin without long spines (may have short spines); epimeron 3, posterior margin entire; urosome segments 1-2, posterodorsal margin entire, without teeth; uropods 1-2, peduncle with distomedial spine short, approximately one quarter length of inner ramus, inner ramus with median spine on medial margin not much longer than other marginal spines; uropod 3, rami short, slightly longer than peduncle, terminal spines long, at least one half length of rami, inner ramus shorter than outer; telson, width subequal to length, lobes without spines on lateral margin, subtruncate apically, with 5-7 terminal spines, terminal spines elongate, as long as or longer than telson.

Distribution: Biscayne Bay, Florida; Florida Keys; Bermuda (Ruffo, et al., 2000); Laguna de Terminos, Mexico (Ledoyer, 1986 [as *M. quadrimana*]).

Ecology: *Maera miranda* occurs among algae and sponges on rubble or sand bottoms. It is also occasionally found among sponges on mangrove prop roots.

Remarks: *Maera miranda* is probably more widespread than is indicated by the distribution given above. Because it is very close to *M. quadrimana*, it may have been confused with that species in the past and records of *M. quadrimana* from the region need to be rechecked. Adult sizes for this species range from 5-7 mm.

See Ruffo, et al., 2000.

***Maera quadrimana* (Dana, 1853)
(Figure 147)**

Gammarus quadrimanus: Dana, 1853, pp. 955-956, pl. 65, fig. 9.

Maera quadrimanus: Bate, 1862, pp. 194-195, pl. 35, fig. 5.

Maera quadrimana: Schellenberg, 1938, pp. 45-48, figs. 21-22.

Regional diagnosis: Eye round, mandible, palp article 3 subequal to article 2 in length; coxa 1, anteroventral angle unproduced, subquadrate, posteroventral margin entire, without teeth or serrations; coxa 7, posterior margin without spines; gnathopod 2, propodus subquadrate, greatly enlarged, much larger than that of gnathopod 1, palm transverse, palmar angle defined by elongate triangular process below deep u-shaped notch, palmar margin with subacute process near dactylar articulation followed by 2 narrow, subtruncate median processes, dactyl broadest proximally, without minute median point on flexor margin, extensor margin with single median seta; peraeopod 7, basis with posterior margin entire, merus and carpus with cluster of long setae at posterodistal angle, at least some setae as long as next article; epimera 2-3, anteroventral margin without long spines (may have short spines); epimeron 3, posterior margin entire; urosome segments 1-2, posterodorsal margin entire, without teeth; uropods 1-2, peduncle with distomedial spine short, approximately one quarter length of inner ramus, inner ramus with median spine on medial margin not much longer than other marginal spines; uropod 3, rami short, slightly longer than peduncle, terminal spines long, at least one half length of rami, inner ramus shorter than outer; telson, width greater than length, lobes without spines on lateral margin, subtruncate apically, with 4 terminal spines, terminal spines elongate, as long as or longer than telson.

Distribution: Widespread in the Indo-Pacific; Bermuda (Ruffo, et al., 2000); Sebastian Inlet, Florida? (Nelson, 1995); Biscayne Bay, Florida?; Florida Keys?; Belize? (Thomas, 1993); Yucatan, Mexico? (McKinney, 1977); Brazil? (Wakabara, et al., 1991; Wakabara and Serejo, 1998).

Ecology: This species is usually found in shallow water on hard substrates such as rocks or coral rubble with heavy growths of algae (Thomas, 1993; Nelson, 1995).

Remarks: Although this species has been reported to occur in Florida waters and is included here for that reason, because of its similarity to the recently described *Maera miranda* and other species in the *quadrimana* complex, these distribution records need to be confirmed.

See Thomas, 1993; Ruffo, et al., 2000.

***Maera williamsi* Bynum and Fox, 1977
(Figure 141)**

Maera williamsi: Bynum and Fox, 1977, pp. 6-11, figs. 4-6f.

Regional diagnosis: Eye narrowly reniform; mandible, palp article 3 subequal to article 2 in length; coxa 1, anteroventral angle produced, acuminate or with small tooth, posteroventral margin serrate; coxa 7, posterior margin without spines; gnathopod 2, propodus subovate, enlarged, larger than that of gnathopod 1, palm oblique, palmar angle rounded, poorly defined, palmar margin without subtriangular or bifurcate processes, with low, broad, rounded process near dactylar articulation, slightly stronger in male, dactyl broadest proximally, without minute median point on flexor margin, extensor margin without setae; pereopod 7, basis with posterior margin distinctly serrate, merus and carpus without cluster of long setae at posterodistal angle, setae shorter than length of next article; epimera 2-3, anteroventral margin without long spines (may have 1-3 short spines); epimeron 3, posterior margin serrate; urosome segments 1-2, posterodorsal margin with teeth; uropod 1, peduncle with distomedial spine long, approximately one third length of inner ramus, inner ramus with median spine on medial margin much longer than other marginal spines; uropod 2, peduncle with distomedial spine short, approximately one quarter length of inner ramus; uropod 3, rami elongate, much longer than peduncle, terminal spines short, one quarter length of rami, inner ramus slightly longer than outer; telson, length greater than width, lobes without strong median lateral spine (seta or small spine may be present), notched apically, with 2-3 terminal spines (setae may also be present), terminal spines short, not more than one half length of telson.

Distribution: Bogue Sound, North Carolina to Price Creek, South Carolina (Bynum and Fox, 1977); Florida (Camp, 1998); ?Cuba (Ortiz, 1989).

Ecology: This species occurs on muddy shell or shell bottoms at 4-15 m depths and has also been collected in night plankton tows (Bynum and Fox, 1977). The Cuban material collected by Ortiz (1989) came from *Thalassia* grassbeds at a depth of 3 m.

Remarks: *Maera williamsi* is an uncommon, but fairly distinctive species. The only other species of *Maera* in the region with narrowly reniform or pyriform eyes is *Maera* sp. B, from which it can be distinguished by the lack of subtriangular or bifurcate marginal processes on the palm of the male second gnathopod and the lack of a strong median lateral spine on the telson. Adult size in *M. williamsi* ranges from 6-10 mm. Although it has not been reported from specific localities in Florida, *M. williamsi* very likely occurs on the shell hash bottoms off the northeast Florida coast. Because of the very different habitat recorded for *M. williamsi* from Cuba, it remains possible that the material from that region represents a similar, but as yet undescribed, species.

See Bynum and Fox, 1977.

***Maera* sp. B**
(Figure 142)

Regional diagnosis: Eye narrowly pyriform; mandible, palp article 3 subequal to article 2 in length; coxa 1, anteroventral angle produced, acuminate or with small tooth, posteroventral margin serrate; coxa 7, posterior margin with strong spines; gnathopod 2, propodus subovate, enlarged, larger than that of gnathopod 1, palm oblique, palmar angle defined by small tooth and stout spine, palmar margin with 3 evenly spaced processes (1 bifurcate, 2 subtriangular), slightly stronger in male, without low rounded process near dactylar articulation, dactyl broadest proximally, without minute median point on flexor margin, extensor margin with single median seta; pereopod 7, basis with posterior margin distinctly serrate, merus and carpus without cluster of long setae at posterodistal angle, setae shorter than length of next article; epimera 2-3, anteroventral margin with 2-5 long spines; epimeron 3, posterior margin serrate; urosome segments 1-2, posterodorsal margin with teeth; uropods 1-2, peduncle with distomedial spine long, approximately one third length of inner ramus, inner ramus with median spine on medial margin much longer than other marginal spines; uropod 3, rami elongate, much longer than peduncle, terminal spines short, less than one quarter length of rami (long setae may be present), inner ramus slightly longer than outer; telson, length slightly longer than width, lobes with strong median lateral spine, notched apically, with 2-3 terminal spines, at least 1 terminal spine long, subequal to or greater than half length of telson.

Distribution: Biscayne Bay, Florida.

Ecology: *Maera* sp. B has been found in shallow (4 m) grassbed habitats on somewhat silty sand and shell hash bottoms.

Remarks: *Maera* sp B is very close to *M. williamsi*; however, in gnathopod 2 the palmar margin has 3 evenly spaced processes in *Maera* sp. B versus a single low, broad rounded process in *M. williamsi*. Additional differences occur in the spination of uropods 1-2 and the telson. Eyes in juveniles of *Maera* sp. B are somewhat more ovate than in adults and the eyes of some adult specimens may be narrowly reniform. Adult size in this species ranges from 6-9 mm.

***Maera* sp. C**
(Figure 145)

? *Ceradocus* sp.: Camp, et al., 1977, p.18.

Regional diagnosis: Eye broadly pyriform; mandible, palp article 3 subequal to article 2 in length; coxa 1, anteroventral angle produced, narrowly rounded, posteroventral margin entire, without teeth or serrations; coxa 7, posterior margin without strong spines (small spines may be present); gnathopod 2, propodus subrectangular, greatly enlarged, much larger than that of gnathopod 1, palm slightly oblique, palmar angle defined by 2 marginal teeth and 1 stout spine, palmar margin with subtruncate process near dactylar articulation, followed by small, shallow notch, dactyl broadest proximally, without minute median point on flexor margin, extensor margin lined with setae; peraeopod 7, basis with posterior margin very weakly serrate, merus and carpus without cluster of long setae at posterodistal angle, setae shorter than length of next article; epimera 2-3, anteroventral margin with 3-5 long spines; epimeron 3, posterior margin entire; urosome segments 1-2, posterodorsal margin entire, without teeth; uropods 1-2, peduncle with distomedial spine short, approximately one quarter length of inner ramus, inner ramus with median spine on medial margin not much longer than other marginal spines (may be slightly longer); uropod 3, rami short, slightly longer than peduncle, terminal spines long, at least one half length of rami, inner ramus slightly shorter than outer; telson longer than wide, lobes with small median spine on lateral margin, notched apically, terminal spines short, less than one third length of telson (subterminal spines may be somewhat longer).

Distribution: Hutchinson Island, Florida.

Ecology: *Maera* sp. C occurs in high salinity waters on slightly muddy, sandy shell hash bottoms at depths of 10-11 m.

Remarks: The female gnathopod 2 has a somewhat less well-developed process and notch on the palmar margin, but it is otherwise similar to that of the male. Adult sizes range from 6-7 mm. This species appears to be quite uncommon, although this may be a sampling artifact and further examination of shell hash habitats, especially those in slightly deeper water, may result in additional distribution records.

Maera sp. C belongs to the *M. grossimana* species group, characterized, in part, by having the extensor margin of the dactyl of gnathopod 2 lined with setae. It appears to be most similar to the eastern Atlantic and Mediterranean species *M. hirondellei* Chevreux, 1900, but differs in having a more well-developed eye, a less acute anteroventral angle on coxa 1, a less distinct notch on the palm of the male gnathopod 2 (this may be developmental), and longer posterodistal setae on the carpus and merus of peraeopod 7. In addition, *Maera* sp. C has a cluster of long setae on the posterior margin of the propodus of peraeopod 7; this cluster appears to be lacking in *M. hirondellei*. It is possible that *Maera* sp. C represents a western Atlantic form of *M. hirondellei*; however, it will be necessary to compare material of the two species directly to be sure.

Genus *Melita* Leach, 1814

Regional diagnosis: Antenna 1, accessory flagellum 2-4-articulate; antenna 2 extending well beyond peduncle of antenna 1, flagellum 7-10-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes well-developed, round; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of short marginal setae, subequal to article 2 in length; lower lip, inner lobes present; maxilla 1, inner plate narrowly subovate, without small distal process, with 6-12 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palp asymmetrical, left and right sides dissimilar, distal margin of left article 2 toothed; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 subrectangular, not produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or serrations; coxa 6 of female, anterior lobe modified into large, posteriorly directed hook; gnathopod 1 of male, dactyl short, stout, broadly expanded proximally; gnathopod 2 subchelate, larger than gnathopod 1, sexually dimorphic, that of male greatly enlarged, left and right sides similar, subequal in size; peraeopod 7, basis moderately to strongly expanded, posterior margin entire or weakly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1 and 3 without dorsal spines, segment 2 with dorsal spines (teeth or processes may also be present); uropod 3 extending well beyond tips of uropods 1-2, rami very unequal in length, outer ramus elongate, 1-articulate, margins spinose, tip subacute or subtruncate with weak to moderate terminal spines, inner ramus very short, scale-like, margins entire or weakly spinose; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spine at midpoint of each lobe, with apical spines.

Florida species: *M. elongata*, *M. intermedia*, *M. longisetosa*, *M. nitida*, *M. cf planaterga*, *Melita* sp. C

KEY TO FLORIDA SPECIES OF *MELITA*

1. < Coxa 6 of female with lateral ridge at base of hook, anteroventral angle flattened or notched; urosome segment 1, posterodorsal margin with median process; urosome segment 2, posterior margin with 1 dorsolateral spine on each side *Melita planaterga*

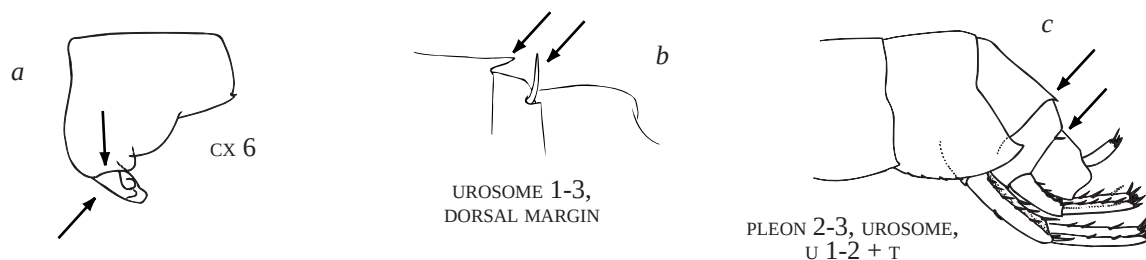


Figure 149.

- < Coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin with 2 dorsolateral spines on each side 2

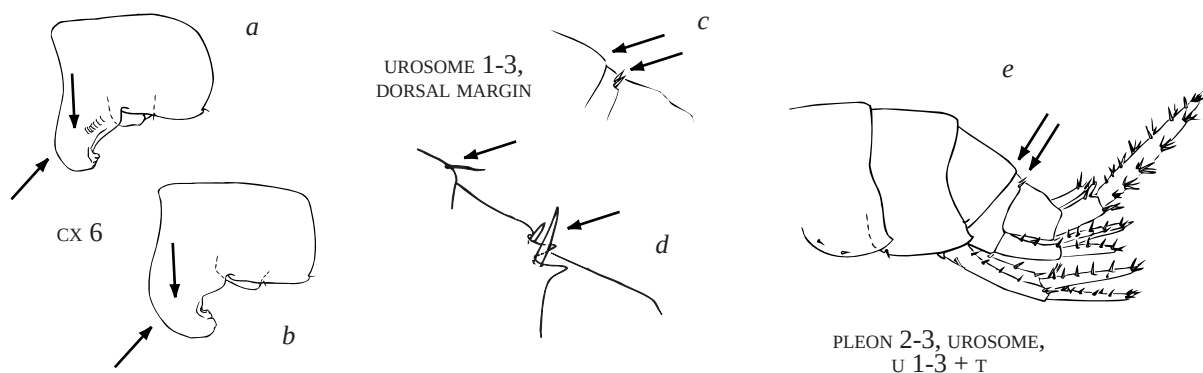


Figure 150.

2. < Antenna 1, peduncle article 1 of both sexes with 3-4 long, slender spines on posterior margin, those of male interspersed with elongate setae, setae subequal to article in length; gnathopod 2 of male, palmar margin with very long setae, at least one half length of propodus; urosome segment 2, posterodorsal margin with small processes or teeth at base of dorsolateral spines, spines unequal in size (1 long, 1 short); telson, lobes with strong lateral spine in proximal one third *Melita* sp. C

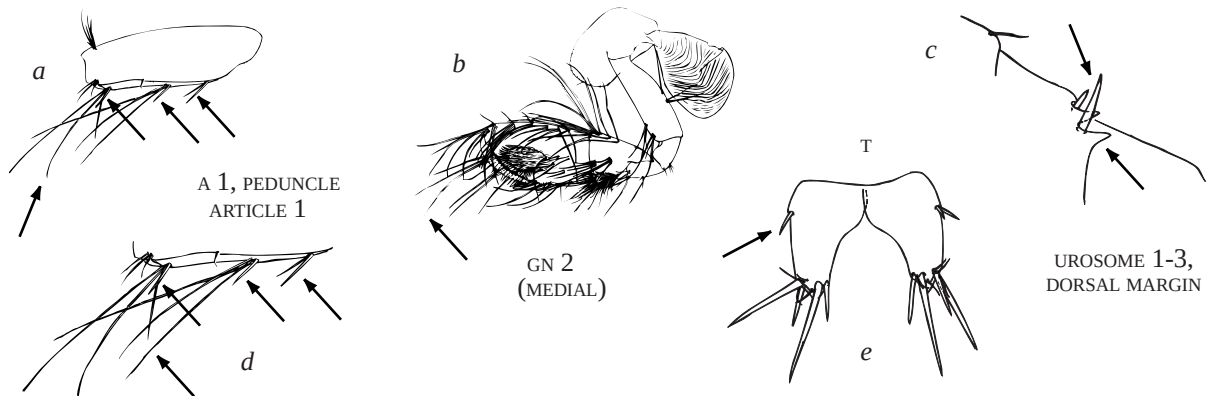


Figure 151.

- < Antenna 1, peduncle article 1 of both sexes with 1-2 moderately stout (occasionally slender) spines on posterior margin, posterior margin without setae or with short setae, one half length of article or less; gnathopod 2 of male, palmar margin without very long setae, setae less than one third length of propodus; urosome segment 2, posterodorsal margin entire, without processes or teeth, dorsolateral spines subequal in size (both short); telson, lobes without strong lateral spine in proximal one third 3 (*nitida* complex)

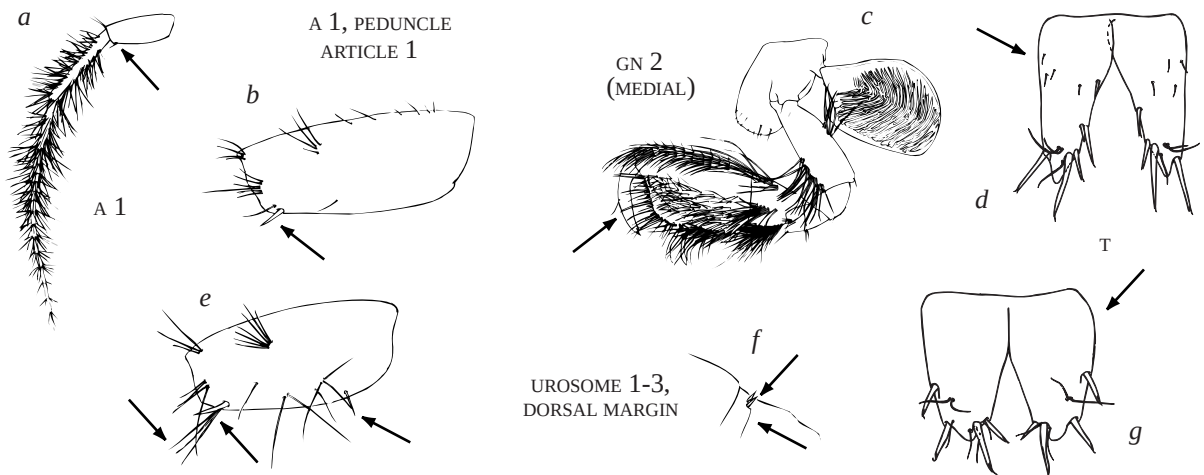


Figure 152.

3. < Antennae 1-2 of male, distal peduncle articles and flagellum with very long, dense setae; antenna 2, peduncle article 5 longer than article 4; peraeopod 7, basis narrowly ovate, length greater than 1.5 times width, dactyl elongate, tip not recurved, seta on flexor margin short or absent *Melita elongata*

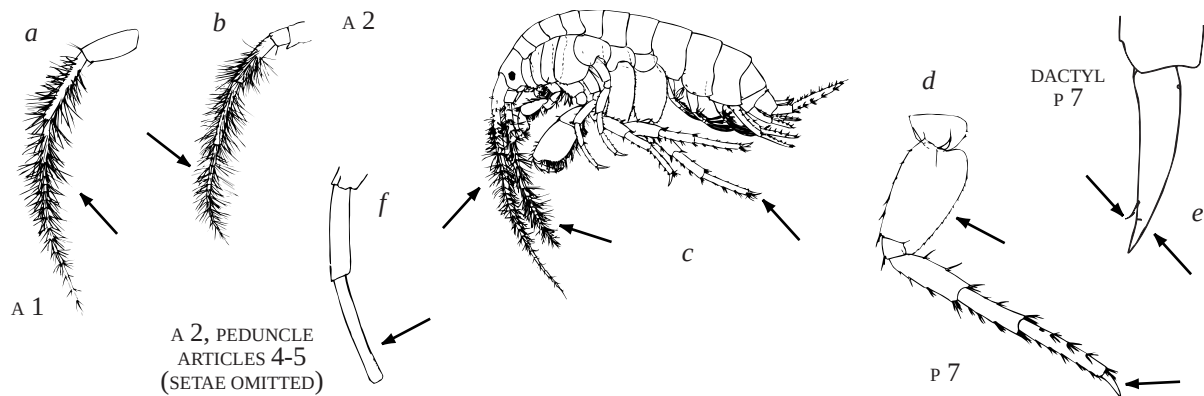


Figure 153.

- < Antennae 1, antenna 2 or both of male, distal peduncle articles and flagellum without very long, dense setae; antenna 2, peduncle article 5 subequal to or shorter than article 4; peraeopod 7, basis broadly ovate, length less than 1.5 times width, dactyl robust, tip re-curved, seta on flexor margin long 4.

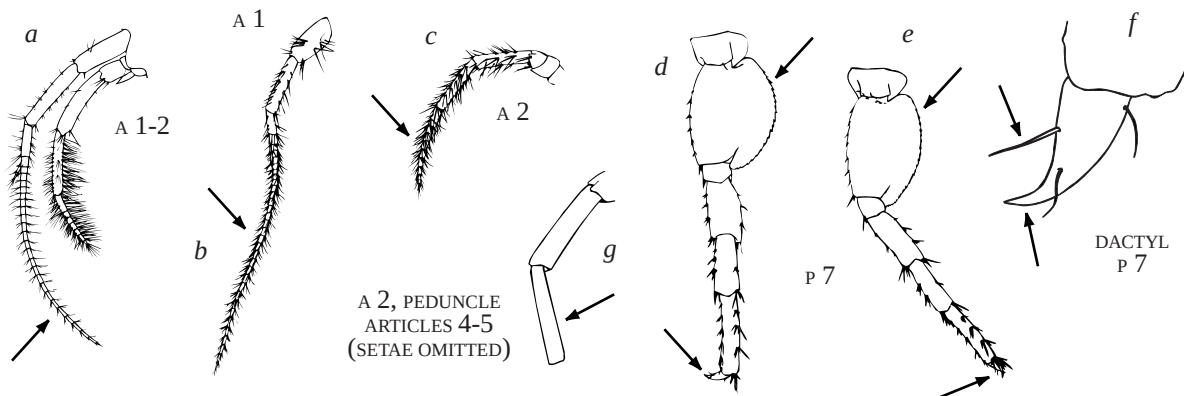


Figure 154.

4. < Antenna 1, peduncle article 2, setae longer than width of article, peduncle article 3 approximately one third length of article 2; antenna 2 of male, peduncle article 4, setae longer than width of article, flagellum with medium to long non-“bottle-brush” setae; coxa 6 of female without stridulating ridges on anteroventral process; peraeopods 6-7, propodus setose, spine groups on extensor margin with numerous thin, elongate setae; uropod 3, outer ramus densely setose, marginal spine groups with numerous thin, elongate setae *Melita longisetosa*

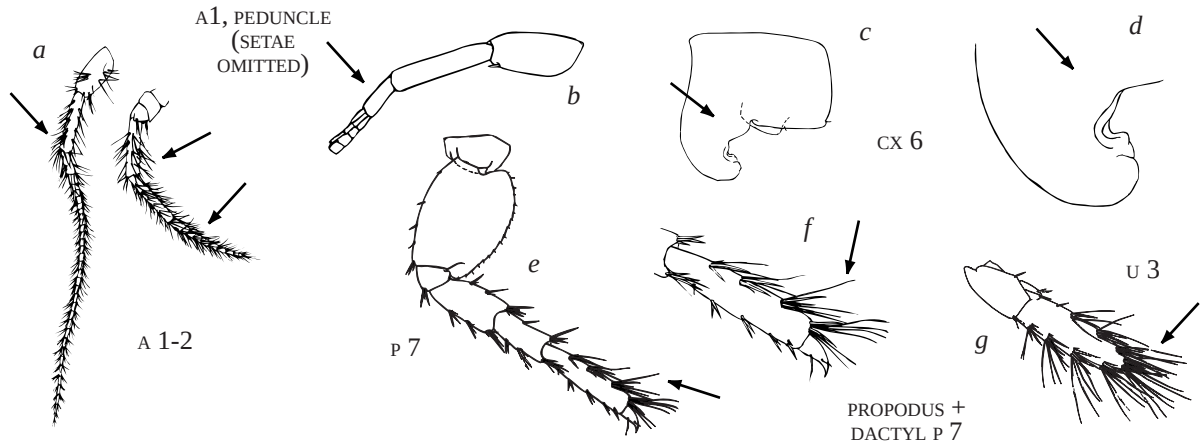


Figure 155.

- < Antenna 1, peduncle article 2, setae subequal to or shorter than width of article, peduncle article 3 approximately one half length of article 2; antenna 2 of male, peduncle article 4, setae much shorter than width of article, flagellum with short or medium to long “bottle-brush” setae; coxa 6 of female with stridulating ridges on anteroventral process; peraeopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; uropod 3, outer ramus sparsely or not setose, marginal spine groups without numerous thin, elongate setae. 5

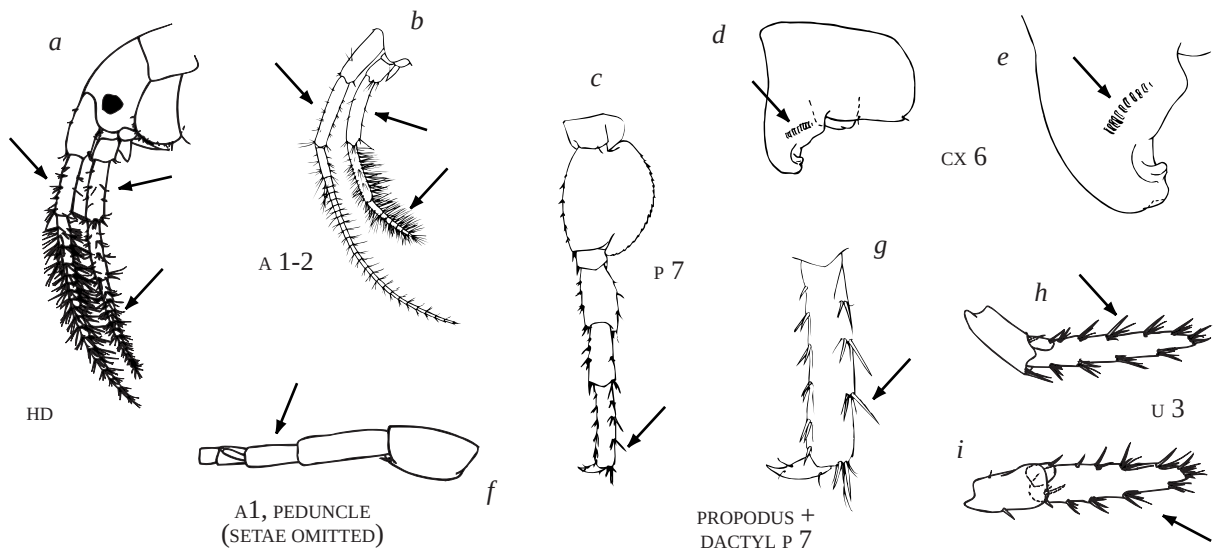


Figure 156.

5. < Antenna 1 subequal to or slightly longer than antenna 2; antenna 1 of male, peduncle article 3 and flagellum with “bottle-brush” setae; antenna 2 of male, flagellum only with short “bottle-brush” setae; antenna 2 of female, peduncle articles 4-5, setae shorter than width of article; telson lobes relatively stout, approximately twice as long as wide, somewhat rounded terminally, lateral margins with spines. *Melita intermedia*

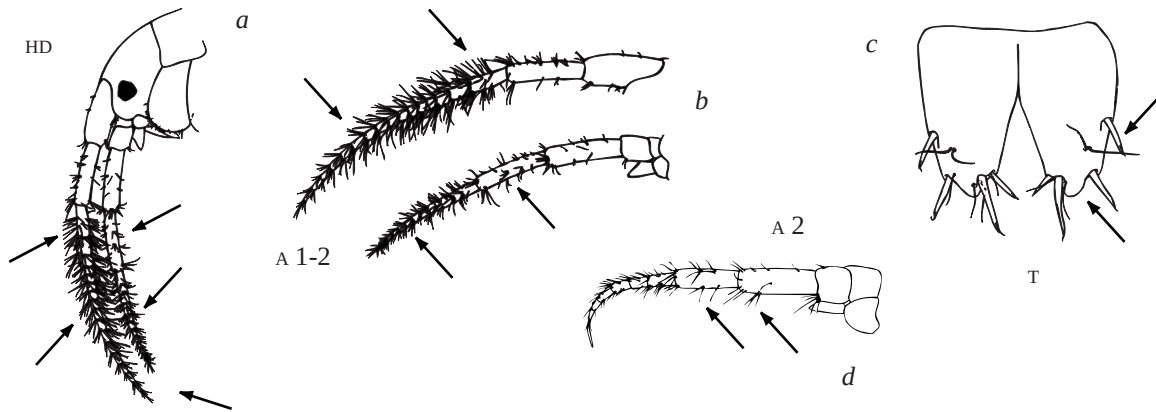


Figure 157.

- < Antenna 1 distinctly longer than antenna 2; antenna 1 of male, peduncle article 3 and flagellum without “bottle-brush” setae; antenna 2 of male, peduncle article 5 and flagellum with medium to long “bottle-brush” setae; antenna 2 of female, peduncle articles 4-5, setae longer than width of article; telson lobes relatively elongate, approximately 3 times as long as wide, subacute terminally, lateral margins without spines *Melita nitida*

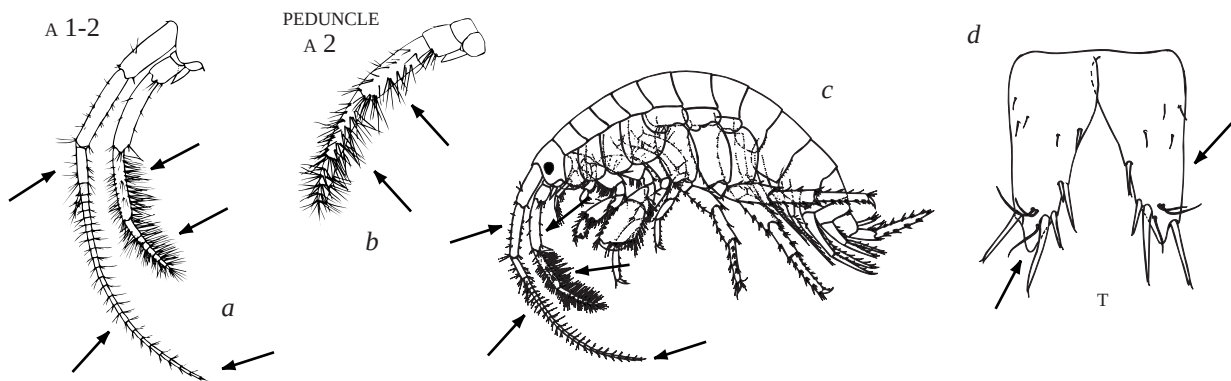


Figure 158.

***Melita elongata* Sheridan, 1980
(Figure 153)**

Melita elongata: Sheridan, 1980, pp. 62-64, figs. 4-6.

Regional diagnosis: Antenna 1 distinctly longer than A2, peduncle article 1 with 1 moderately stout (occasionally slender) distal spine on posterior margin, posterior margin without setae, article 2, setae much longer than width of article, article 3 approximately one half length of article 2; antenna 1 of male, peduncle article 3 and flagellum without “bottle-brush” setae, articles 2-3 and flagellum with very long, dense setae; antenna 2, peduncle article 5 longer than article 4; antenna 2 of male, peduncle article 4 with setae much longer than width of article, flagellum without “bottle-brush” setae, articles 4-5 and flagellum with very long, dense setae; antenna 2 of female, peduncle articles 4-5, setae longer than width of article; coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded, without stridulating ridges on anteroventral process; gnathopod 2 of male, palmar margin without very long setae, setae less than one third length of propodus; peraeopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; peraeopod 7, basis narrowly ovate, length greater than 1.5 times width, dactyl elongate, tip not recurved, seta on flexor margin short or absent; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin entire, without processes or teeth, each side with 2 dorsolateral spines, spines subequal in size, both short; uropod 3, outer ramus sparsely or not setose, marginal spine groups without numerous thin, elongate setae; telson lobes relatively slender, more than twice as long as wide, subacute terminally, terminal spines not elongate, much shorter than telson, lateral margins without spines.

Distribution: Banana River and Indian River Lagoon systems (Sheridan, 1980) south to Biscayne Bay, Florida Bay and the Florida Keys. Tampa Bay, Florida to southern Laguna Madre, Texas.

Ecology: *Melita elongata* is common in grassbeds and salt marshes in medium to high salinity water. It is also found in fouling growth on seawalls and oyster reefs adjacent to marsh habitats. This species is most abundant in spring, with reproductive females occurring in spring, summer and fall (Sheridan, 1980).

Remarks: The setae on the antennae of subadult males, while longer than those of other species of *Melita* in the *nitida* group, are not nearly as dense or elongate as those of adult males. This may even be true of fairly large subadult specimens. If the peraeopods are undamaged, the easiest way to separate this species from others in the *nitida* complex, at all stages and for both sexes, is by the elongate dactyl on peraeopods 6-7. Adult size ranges from 3-7 mm, with males reaching a larger size than females.

See Sheridan, 1980; Heard, 1982.

***Melita intermedia* Sheridan, 1980
(Figure 157)**

Melita intermedia: Sheridan, 1980, pp. 66-68, figs. 10-12.

Regional diagnosis: Antenna 1 subequal to or slightly longer than antenna 2, peduncle article 1 with 1 moderately stout (occasionally slender) distal spine on posterior margin, posterior margin without setae, article 2, setae subequal to or shorter than width of article, article 3 approximately one half length of article 2; antenna 1 of male, peduncle article 3 with “bottle-brush” setae, flagellum with medium “bottle-brush” setae, articles 2-3 and flagellum without very long, dense setae; antenna 2, peduncle article 5 subequal to or shorter than article 4; antenna 2 of male, article 4 with setae much shorter than width of article, flagellum with short “bottle-brush” setae, peduncle articles 4-5 and flagellum without very long, dense setae; antenna 2 of female, peduncle articles 4-5, setae shorter than width of article; coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded, with stridulating ridges on anteroventral process; gnathopod 2 of male, palmar margin without very long setae, setae less than one third length of propodus; peraeopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; peraeopod 7, basis broadly ovate, length less than 1.5 times width, dactyl robust, tip recurved, seta on flexor margin long; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin entire, without processes or teeth, each side with 2 dorsolateral spines, spines subequal in size, both short; uropod 3, outer ramus sparsely or not setose, marginal spine groups without numerous thin, elongate setae; telson lobes relatively stout, approximately twice as long as wide, somewhat rounded terminally, terminal spines not elongate, much shorter than telson, lateral margins with small spines, without strong spine in proximal one third.

Distribution: Apalachicola Bay, Florida to the Lower Atchafalaya Basin, Louisiana (Sheridan, 1980).

Ecology: This species is most commonly found in low salinity marshes and is most abundant in spring, with reproductive females occurring in spring and fall (Sheridan, 1980).

Remarks: The body of *M. intermedia* is somewhat more robust than that of other Florida species of *Melita* and the antennae are usually shorter relative to the overall body length, especially in females. Although antenna 2 of subadult males has much sparser setae than that of the adult male, in antenna 1 the setation pattern remains similar across a wide range of sizes. In addition, there appears to be a greater difference in size between adult males and females in *M. intermedia* than in the other species. Adult sizes for this species range from 4-7 mm, with adult females generally 4-5 mm in length.

See Sheridan, 1980; Heard, 1982.

***Melita longisetosa* Sheridan, 1980**
(Figure 155)

Melita longisetosa: Sheridan, 1980, pp. 64-66, figs. 7-9.

Regional diagnosis: Antenna 1 distinctly longer than antenna 2, peduncle article 1 with 1-2 moderately stout (occasionally slender) distal spines on posterior margin, posterior margin with short setae, setae less than one half length of article, article 2, setae much longer than width of article, article 3 approximately one third length of article 2; antenna 1 of male, peduncle article 3 and flagellum without "bottle-brush" setae, articles 2-3 and flagellum without very long, dense setae; antenna 2, peduncle article 5 subequal to or shorter than article 4; antenna 2 of male, peduncle article 4 with setae longer than width of article, articles 4-5 and flagellum without "bottle-brush" setae, with medium to long setae; antenna 2 of female, peduncle articles 4-5, setae much longer than width of article; coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded, without stridulating ridges on anteroventral process; gnathopod 2 of male, palmar margin without very long setae, setae less than one third length of propodus; peraeopods 6-7, propodus setose, spine groups on extensor margin with numerous thin, elongate setae; peraeopod 7, basis broadly ovate, length less than 1.5 times width, dactyl robust, tip recurved, seta on flexor margin long; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin entire, without processes or teeth, each side with 2 dorsolateral spines, spines subequal in size, both short; uropod 3, outer ramus densely setose, marginal spine groups with numerous thin, elongate setae; telson lobes relatively stout, approximately twice as long as wide, somewhat rounded terminally, terminal spines not elongate, much shorter than telson, lateral margins without spines.

Distribution: Estero Bay, Florida to Galveston Bay, Texas (Sheridan, 1980; pers. obs.); Laguna Alvarado, State of Veracruz, Mexico (Ortiz and Winfield, 1995).

Ecology: *Melita longisetosa* is found in medium to high salinity marsh, grassbed, oyster reef and mangrove habitats. It is most abundant in spring, with reproductive females occurring in the spring and fall (Sheridan, 1980; pers. obs.).

Remarks: This species is most easily distinguished from other species of *Melita* in the *nitida* group by the presence of the long, thin setae interspersed among the spine groups of the propodus of peraeopods 6-7 and the outer ramus of uropod 3. Although they are much more numerous in adults, a few of these setae are usually present even in quite small juveniles. There is some variation in the relative length of antenna 1 with size and in exceptionally large specimens, antenna 1 may be almost as long as the body. Adult size ranges from 6 to 9 mm, with males reaching a larger size than females.

See Sheridan, 1980; Heard, 1982.

***Melita nitida* Smith, 1873
(Figure 158)**

Melita nitida: Smith, 1873, pp. 560-561.

Regional diagnosis: Antenna 1 distinctly longer than antenna 2, peduncle article 1 with 1 moderately stout (occasionally slender) distal spine on posterior margin, posterior margin without setae, article 2, setae subequal to or shorter than width of article, article 3 approximately one half length of article 2; antenna 1 of male, peduncle article 3 and flagellum without “bottle-brush” setae, articles 2-3 and flagellum without very long dense setae; antenna 2, peduncle article 5 subequal to or shorter than article 4; antenna 2 of male, peduncle article 4 with setae much shorter than width of article, article 5 and flagellum with dense, medium to long “bottle-brush” setae, articles 4-5 and flagellum without very long setae; antenna 2 of female, peduncle articles 4-5, setae longer than width of article; coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded, with stridulating ridges at base of anteroventral process; gnathopod 2 of male, palmar margin without very long setae, setae less than one third the length of the propodus; peraeopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; peraeopod 7, basis broadly ovate, length less than 1.5 times width, dactyl robust, tip recurved, seta on flexor margin long; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin entire, without processes or teeth, each side with 2 dorsolateral spines, spines subequal in size, both short; uropod 3, outer ramus sparsely or not setose, marginal spine groups without numerous thin, elongate setae; telson lobes relatively elongate, approximately 3 times as long as wide, subacute terminally, terminal spines not elongate, much shorter than telson, lateral margins without spines.

Distribution: Gulf of St. Lawrence to northern Florida; Cape Romain, Florida to Yucatan, Mexico; Mazatlán, Mexico to Ecuador (Pacific) (Sheridan, 1980).

Ecology: This species is most common in fouling communities and on oyster reefs, but also occurs in marshes and grassbeds over a wide range of salinities. It is often found associated with hydroids or branching bryozoans such as *Amathia alternata*.

Remarks: In the Gulf of Mexico, adult size ranges from 4-6 mm, although specimens from the north Atlantic coast may be as large as 12 mm (Bousfield, 1973). Regional records of *Melita nitida* published prior to Sheridan’s (1980) work on the *nitida* complex may actually refer to a mixture of species and should be regarded as suspect until the specimens concerned can be reexamined.

See Mills, 1964 (Atlantic coast); Sheridan, 1980; Heard, 1982.

***Melita planaterga* Kunkel, 1910
(Figure 149)**

Melita planaterga: Kunkel, 1910, pp. 34-37, fig. 12.

Regional diagnosis: Antenna 1 distinctly longer than antenna 2, peduncle article 1 with 3-4 long slender spines on posterior margin, posterior margin without setae, article 2, setae subequal to or shorter than width of article, article 3 approximately one half length of article 2; antenna 1 of male, peduncle article 3 and flagellum without “bottle-brush” setae, without very long dense setae; antenna 2, peduncle article 5 subequal to article 4 in length; antenna 2 of male, peduncle article 4 with setae subequal to or shorter than width of article, articles 4-5 and flagellum without “bottle-brush” setae, without long dense setae; antenna 2 of female, peduncle articles 4-5, setae longer than width of article; coxa 6 of female with lateral ridge at base of hook, anteroventral angle flattened or notched, without stridulating ridges at base of anteroventral process; gnathopod 2 of male, palmar margin without very long setae, setae less than one third the length of the propodus; pereopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; pereopod 7, basis broadly ovate, length less than 1.5 times width, dactyl slender, elongate, tip slightly recurved, seta on flexor margin long; urosome segment 1, posterodorsal margin with median process; urosome segment 2, posterior margin entire, without strong processes or teeth (small tooth may be present), each side with one long dorsolateral spine; uropod 3, outer ramus sparsely or not setose, marginal spine groups without numerous thin, elongate setae; telson lobes moderately elongate, slightly more than twice as long as wide, subacute terminally, terminal spines elongate, subequal to telson in length, lateral margin without spines.

Distribution: Southeastern Gulf of Mexico (Ten Thousand Islands area near Cape Romano, Florida); Florida Keys; Bermuda (Kunkel, 1910; Lazo-Wasem and Gable, 1987); Terminos Lagoon, Bay of Campeche, Mexico (Ledoyer, 1986).

Ecology: *Melita planaterga* is found in shallow rubble or rock habitats with abundant algal growth (Lazo-Wasem and Gable, 1987; pers. obs.). It also occurs in *Thalassia* beds and is sometimes collected in night plankton tows over grassbed and rubble bottoms (pers. obs.).

Remarks: *Melita planaterga* specimens from Florida differ from the *M. planaterga* material of Kunkel (1910), as illustrated by Lazo-Wasem and Gable (1987), in the slightly longer peduncle article 3 of antenna 1; however, they are otherwise very similar. The distinctive posterodorsal process on urosome segment 1 is somewhat larger in females than in males, and in small subadult males it is sometimes absent. *Melita persona* Karaman, 1987 from Bermuda is a closely related species that has been confused with *M. planaterga* in the past (Karaman, 1981 as *M. planaterga*) and could potentially be found in Florida waters. However, this species differs from *M. planaterga* in the somewhat more setose antennae, the very setose pereopods 5-7, the single well-developed lateral tooth on the posterodorsal margin of urosome segment 2 (*M. planaterga* sometimes has a small tooth), and the spinose medial margins of the telson lobes.

See Kunkel, 1910; Karaman, 1981 (*M. persona* as *M. planaterga*); Ledoyer, 1986; Karaman, 1987 (*M. persona*); Lazo-Wasem and Gable, 1987.

***Melita* sp. C**
(Figure 151)

?*Melita* sp. 1: Thomas, 1993, pp. 40, 44.

Regional diagnosis: Antenna 1 distinctly longer than antenna 2, peduncle article 1 with 3-4 long slender spines on posterior margin, article 2, setae much longer than width of article, article 3 approximately one third length of article 2; antenna 1 of male, peduncle article 1, spines on posterior margin interspersed with elongate setae, setae subequal to article in length, peduncle article 3 and flagellum without “bottle-brush” setae, without very long, dense setae; antenna 2, peduncle article 5 shorter than article 4; antenna 2 of male, peduncle article 4 with setae much longer than width of article, article 5 without “bottle-brush” setae, flagellum unknown; antenna 1 of female, peduncle article 1 without setae on posterior margin; antenna 2 of female unknown; coxa 6 of female without lateral ridge at base of hook, anteroventral angle rounded, without stridulating ridges at base of anteroventral process; gnathopod 2 of male, palmar margin with very long setae, at least one half length of propodus; peraeopods 6-7, propodus not setose, spine groups on extensor margin without numerous thin, elongate setae; peraeopod 7, basis narrowly ovate, length greater than 1.5 times width, dactyl unknown; urosome segment 1, posterodorsal margin entire, without median process; urosome segment 2, posterior margin, each side with 2 dorsolateral spines, spines unequal in size, 1 long and 1 short, 2 dorsolateral teeth or processes at base of spines; telson lobes moderately elongate, slightly more than twice as long as wide, subacute terminally, terminal spines elongate, subequal to telson in length, lateral margin with strong spine in proximal one third.

Distribution: Southeastern Gulf of Mexico, in the vicinity of the Ten Thousand Islands south of Cape Romano, Florida.

Ecology: The specific habitat preferred by this species is unknown.

Remarks: *Melita* sp. C appears to be quite rare, although that may be a reflection of collection effort rather than actual distribution. It may be the species referred to as *Melita* sp. 1 by Thomas (1993), which he places near *M. pahuwai* of Barnard (1970); however there are some differences in the morphology of the gnathopods. In *Melita* sp. C, there are 2 medial spines at the palmar angle of gnathopod 1 and the basis of the male second gnathopod is densely setose only on the anterodistal margin, whereas *Melita* sp. 1 of Thomas (1993) has 1 spine at the palmar angle of gnathopod 1 and the entire (?) anteromedial margin of the basis of gnathopod 2 is setose. It is entirely possible that these are not the same species and there may be additional regional species in this large and complex genus as well.

Genus *Netamelita* Thomas and Barnard, 1991

Regional diagnosis: Antenna 1, accessory flagellum 1-articulate; antenna 2 extending slightly beyond peduncle of antenna 1, flagellum 7-8-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes moderately well-developed, round; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of short marginal setae, subequal to article 2 in length; lower lip, inner lobes present; maxilla 1, inner plate subovate, without small distal process, with 2 long apical setae, medial margin without long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 “shoe-shaped”, produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or serrations; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl elongate, slender, not broadly expanded proximally; gnathopod 2 subchelate, subequal to gnathopod 1 in size, not sexually dimorphic, right and left sides similar, subequal in size; peraeopod 7, basis moderately expanded, posterior margin strongly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3 extending well beyond tips of uropods 1-2, rami very unequal in length, outer ramus elongate, 1-articulate, margins spinose, tip subtruncate with moderate terminal spines, inner ramus very short, scale-like, margins entire or weakly spinose; telson, lobes with lateral margins straight to slightly convex, without strong dorso-lateral spine at midpoint of each lobe, with slightly subapical spines.

Florida species: *N. brocha*

Netamelita brocha Thomas and Barnard, 1991 (Figure 100)

Netamelita brocha: Thomas and Barnard, 1991c, pp. 585-589, figs. 1-3 (top).

Regional diagnosis: Coxa 1, anteroventral angle strongly produced; peraeopods 5-7, basis without posteroventral lobe, posterior margin serrate; epimeron 1 with 2 small posteroventral teeth, without stout anteroventral spine; epimera 2-3 with acute posteroventral process or tooth; uropods 1-2, outer ramus not much shorter than inner, with marginal spines; uropod 2, peduncle with large distomedial spine and adjacent small spine; telson lobes, long subapical spine at least three quarters length of telson (modified from Thomas and Barnard, 1991c).

Distribution: Florida Keys (off Big Pine Key and Looe Key Reef) (Thomas and Barnard, 1991c); southeastern Gulf of Mexico between Cape Romano, Florida and the lower Florida Keys.

Ecology: *Netamelita brocha* is usually found on muddy or muddy sand bottoms in somewhat deeper water (35-76 m) (Thomas and Barnard, 1991c), although it occasionally occurs at depths as shallow as 10 m (pers. obs).

Remarks: The third uropod of *N. brocha* is very similar to that of *Melita*, but it can be readily distinguished from members of that genus by the strongly serrate basis of peraeopod 7, the non-sexually dimorphic, relatively small gnathopod 2, and the lack of spines on the posterodorsal margin of urosome segment 2. Although *N. brocha* is the only species of *Netamelita* found to date in Florida waters, two additional species are known to occur in the western Gulf of Mexico (*N. barnardi* McKinney et al., 1978) and in the Caribbean Sea at Belize (*N. tabaci* Thomas and Barnard, 1991c). Thomas and Barnard (1991c) present a key separating the three Gulf and Caribbean species and the eastern Pacific species *N. cortada* Barnard, 1962.

See Thomas and Barnard, 1991c; Thomas, 1993.

Genus *Tabatzius* McKinney and Barnard, 1977

Regional diagnosis: Antenna 1, accessory flagellum 3-articulate; antenna 2 extending beyond peduncle of antenna 1, flagellum 6-articulate, subequal to peduncle article 5 in length, that of male cylindrical, not paddle-like; eyes moderately developed, round; mandible, palp moderately slender, article 1 without small distal tooth, article 3 stout, with weak comb row of short marginal setae, shorter than article 2; lower lip, inner lobes absent; maxilla 1, inner plate subovate, with small distal process, without long apical setae, medial margin with sparse, long submarginal setae, outer plate and palp slender, styliiform, palps symmetrical, right and left sides similar; maxilla 2, inner plate with sparse oblique row of facial setae; maxilliped with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 subrectangular, not produced anteroventrally, anteroventral angle broadly rounded, anteroventral and posteroventral margins entire, without teeth or serrations; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl short, moderately stout, not broadly expanded proximally; gnathopod 2 subchelate, larger than gnathopod 1 (only slightly larger in female), sexually dimorphic, propodus enlarged in male, with setose concavity on medial surface, right and left sides similar, subequal in size, dactyl not strongly falcate; peraeopod 7, basis very broadly expanded, posterior margin castellate; pleon segments 1-3, posterodorsal margin entire, without serrations or teeth; epimera 1-3, posterior margin entire; epimeron 2 produced posteroventrally, longer than epimeron 3; urosome segment 1 without dorsal teeth, processes or spine groups; urosome segments 2-3, posterior margin with dorsolateral spines; uropod 3 extending slightly beyond tips of uropods 1-2, rami very unequal in length, outer ramus elongate, 2-articulate, margins weakly spinose, tip subacute, with single short terminal spine, inner ramus very short, scale-like, margins entire; telson, lobes with lateral margins slightly convex, without strong dorsolateral spine at midpoint of each lobe, with apical spines.

Florida species: *T. muelleri*

Tabatzius muelleri (Ortiz, 1976) (Figure 102)

Nuuanu muelleri: Ortiz, 1976, pp. 13-20, figs. 1-3.

Tabatzius copillius: McKinney and Barnard, 1977, pp. 164-169, figs. 1-3.

Tabatzius muelleri: Karaman and Barnard, 1979, pp. 157-158.

Regional diagnosis: That of the genus.

Distribution: Cayo Diego Pérez, south of the Zapata Peninsula, Cuba (Ortiz, 1976); southeastern Gulf of Mexico; Florida Keys (Thomas, 1993); Yucatan, Mexico (McKinney and Barnard, 1977); Belize (Thomas, 1993).

Ecology: *Tabatzius muelleri* prefers relatively shallow coral rubble habitats that are heavily overgrown with algae and small sponges. It is most commonly found at 1-2 m depths, but can occur in waters as deep as 10 m (Thomas, 1993; pers. obs.).

Remarks: *Tabatzius muelleri* is a small (3-4 mm), stout species, most easily recognized by its characteristic maxilla 1 and third uropod, and by the very broadly expanded basis of peraeopod 7. Although the genus *Tabatzius* was placed in the family Nuuanidae by Thomas, 1993, it appears that this family was never formally established and thus is not valid. The genus has most recently been included within the family Melitidae by Jarrett and Bousfield (1996).

See Ortiz, 1976 (as *Nuuanu muelleri*); McKinney and Barnard, 1977 (as *T. copillius*); Thomas, 1993.

Genus unknown
Melitidae sp. B
(Figure 111)

Regional diagnosis: Antenna 1, accessory flagellum 3-articulate; antenna 2 extending slightly beyond peduncle of antenna 1, flagellum 5-6-articulate, longer than peduncle article 5, that of male cylindrical, not paddle-like; eyes weak, poorly-developed, ovate; mandible, palp slender, article 1 without small distal tooth, article 3 linear, without comb row of short marginal setae, slightly shorter than article 2; lower lip, inner lobes present; maxilla 1, inner plate narrowly subovate, without small distal process, with 1 long apical seta, medial margin without long setae, outer plate and palp broad, not styliform, palps symmetrical, left and right sides similar; maxilla 2, inner plate without dense oblique row of facial setae; maxilliped, inner plate with distal margin entire, lacking processes; peraeon segment 7 without coxal gills; coxa 1 subquadrate, not produced anteroventrally, anteroventral and posteroventral margins entire, without teeth or serrations; coxa 6 of female unmodified, similar to that of male; gnathopod 1 of male, dactyl slender, elongate, not broadly expanded proximally; gnathopod 2 subchelate, slightly larger than gnathopod 1, not sexually dimorphic, right and left sides similar, subequal in size; peraeopod 7, basis weakly expanded, posterior margin very weakly serrate; pleon segments 1-3, posterodorsal margin entire, without teeth or serrations; epimera 1-3, posterior margin entire; epimeron 2 not produced posteroventrally, subequal to epimeron 3 in depth; urosome segments 1-3 without dorsal teeth, processes or spine groups; uropod 3 extending slightly beyond tips of uropods 1-2, rami short, slender, slightly unequal in length, margins spinose, tips subtruncate, outer ramus 2-articulate, distal article small, not hidden by surrounding spines, inner ramus not very short or scale-like; telson, lobes with lateral margins straight to slightly convex, without strong dorsolateral spine at midpoint of each lobe, with apical spines.

Distribution: Southeastern Gulf of Mexico just north of the lower Florida Keys.

Ecology: The preferred habitat for this species is unknown, but depths in the region where it was collected generally range from 10-20 m.

Remarks: Melitidae sp. B appears to be uncommon, although this may be the result of inadequate sampling rather than a reflection of its actual distribution. It is a small species, ranging in size from 3-4 mm, and there is little apparent difference in morphology between males and females. The eyes are difficult to see under a dissecting microscope, with the result that specimens often appear to be blind. Melitidae sp. B is closest to the genus *Maera*, from which it differs in the poorly developed eyes, the presence of only 1 long apical seta on the inner plate of maxilla 1, and the somewhat better developed distal article on the outer ramus of uropod 3.

Family Isaeidae Dana, 1855

Regional diagnosis: Antenna 1 well-developed, reaching well beyond peduncle article 4 of antenna 2, flagellum subequal to or shorter than peduncle; antenna 2 subequal to or longer than antenna 1, peduncle article 4 without distal processes or teeth; head normal, not globular, rostrum small and straight or absent, ocular lobe acute, subacute or narrowly rounded anteriorly (rarely subquadrate), inferior antennal sinus moderately to deeply recessed for insertion of antenna 2, buccal mass not exceptionally large relative to size of head; eyes lateral, not closely approximated or fused dorsally, without 4 paired peripheral facets; mandible, palp and molar well-developed, palp extending well beyond incisor process; maxilliped, palp article 4 normally developed, not vestigial; coxae 1-2 not reduced, not hidden by following coxae; coxae 1-3 not decreasing in length; coxa 4, posterior margin not excavate proximally; coxa 5, anterior lobe, if present, as deep or almost as deep as coxa 4; gnathopod 1 subchelate (occasionally very weakly so, especially in females), smaller than gnathopod 2, with 7 articles; gnathopod 2 subchelate (occasionally very weakly so, especially in females), article 3 not elongate, less than twice as long as wide, carpal lobe not strongly produced; peraeopods 3-4, basis not expanded distally or medially; peraeopod 7 not much longer and more slender than peraeopod 6, not attenuate distally; urosome segments 1-3 separate or, rarely, urosome segments 1-2 fused; urosome segment 1 not elongate (if urosome segments 1-2 fused, then combined segments may appear elongate); uropod 1, rami slender, not much shorter than peduncle; uropod 3 uniramous, ramus slender, or biramous, outer ramus without hook-like distal spines or processes; telson entire or emarginate.

Florida genera: *Audulla*, *Chevalia*, *Gammaropsis*, *Microprotopus*, *Photis*

KEY TO FLORIDA GENERA OF ISAEIDAE

1. < Head, ocular lobe subquadrate anteriorly; coxae 3-4 reduced, much shorter than coxae 1-2; coxa 5 greatly reduced, anterior lobe absent; gnathopod 2 of male and female similar, not strongly sexually dimorphic, that of both sexes enlarged; gnathopod 2 of female, oostegite absent; peraeopods 5-7, dactyl bifurcate distally; urosome segments 1-2 fused; uropods 1-2, inner ramus styliform, without terminal spines *Chevalia*

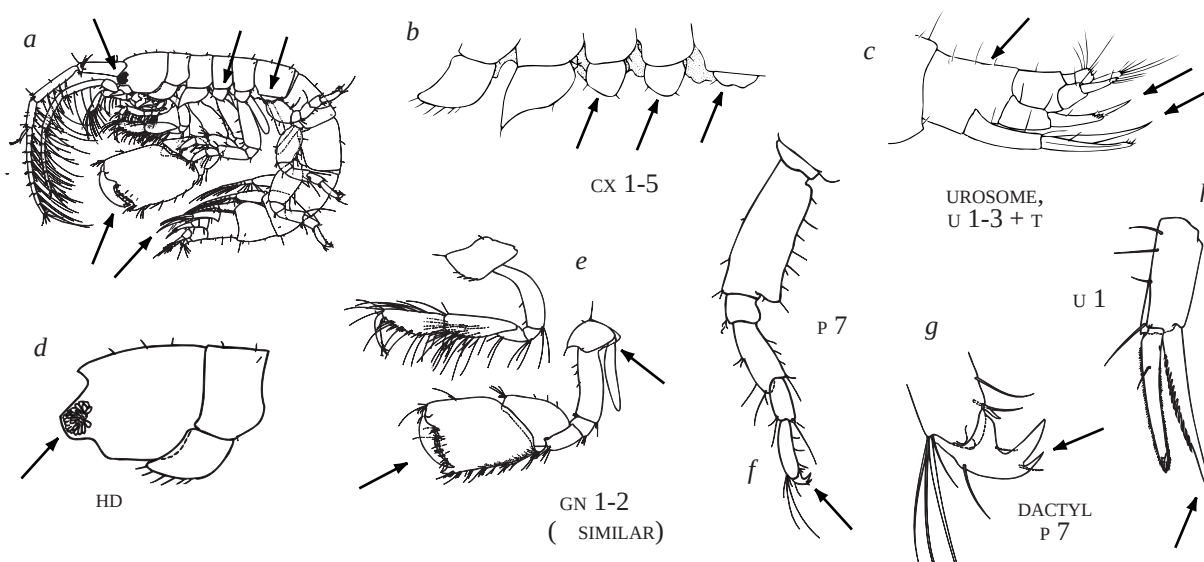


Figure 159.

< Head, ocular lobe acute, subacute or narrowly rounded anteriorly; coxae 3-4 not reduced, not much shorter than coxae 1-2 (may be slightly shorter); coxa 5 not greatly reduced, anterior lobe present; gnathopod 2 of male and female usually strongly sexually dimorphic, that of male enlarged (if not sexually dimorphic, then that of both sexes unenlarged); gnathopod 2 of female, oostegite present; peraeopods 5-7, dactyl simple or with small distal accessory claws on extensor margin; urosome segments 1-2 separate; uropods 1-2, inner ramus lanceolate, with terminal spines 2

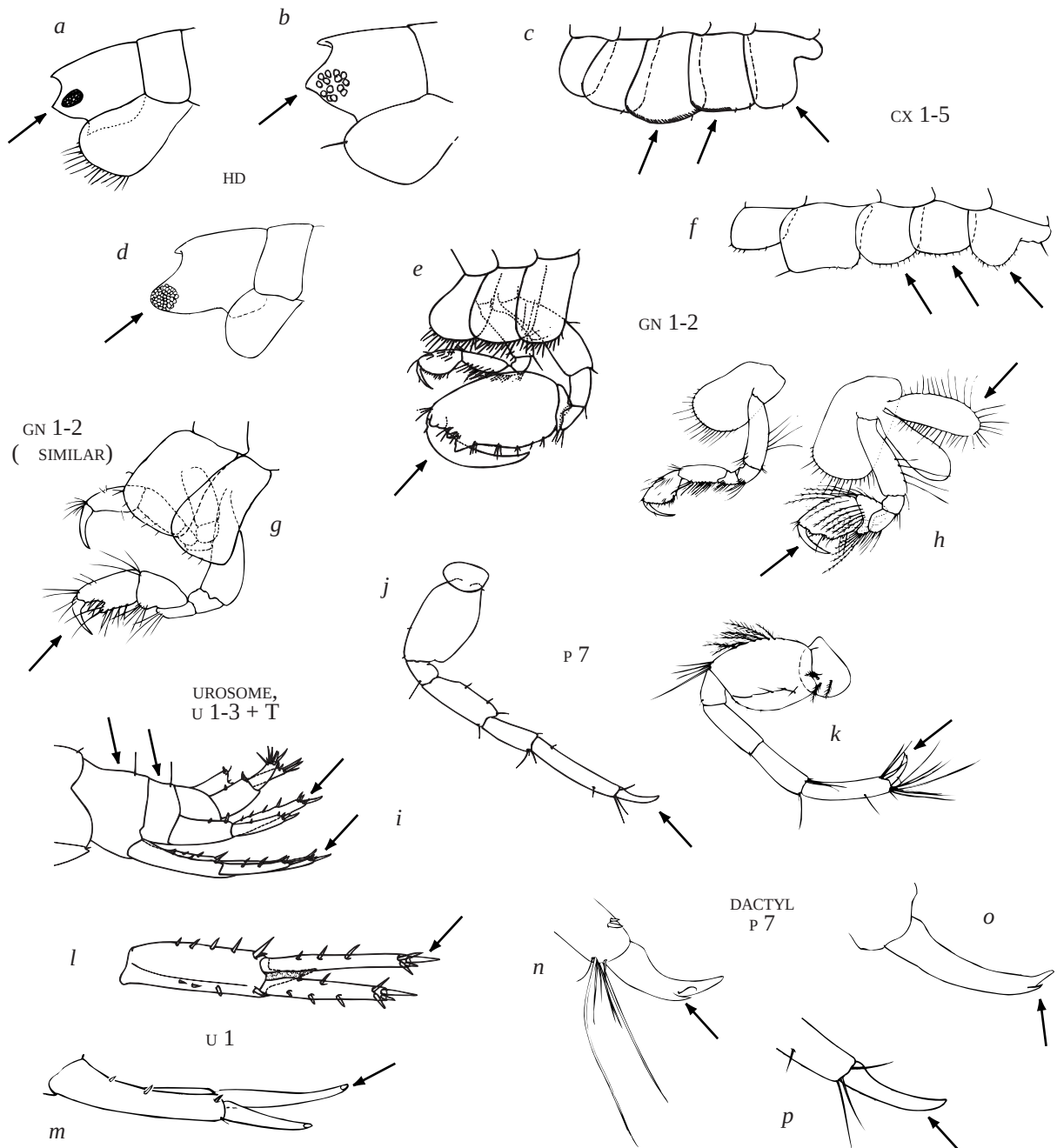


Figure 160.

2. < Mandible, palp article 3 strongly clavate; coxa 1 relatively short, extending less than one half length of corresponding basis; uropod 1, peduncle with distoventral process; uropod 3 equally biramous, rami subequal in length 3

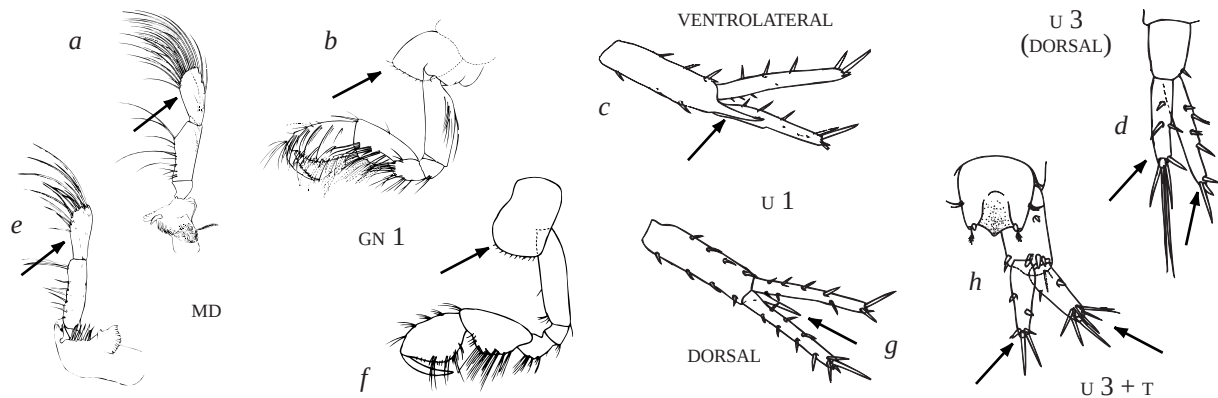


Figure 161.

- < Mandible, palp article 3 slender or weakly clavate; coxa 1 relatively long, extending more than one half length of corresponding basis; uropod 1, peduncle without distoventral process; uropod 3 uniramous or unequally biramous, inner ramus short, scale-like 4

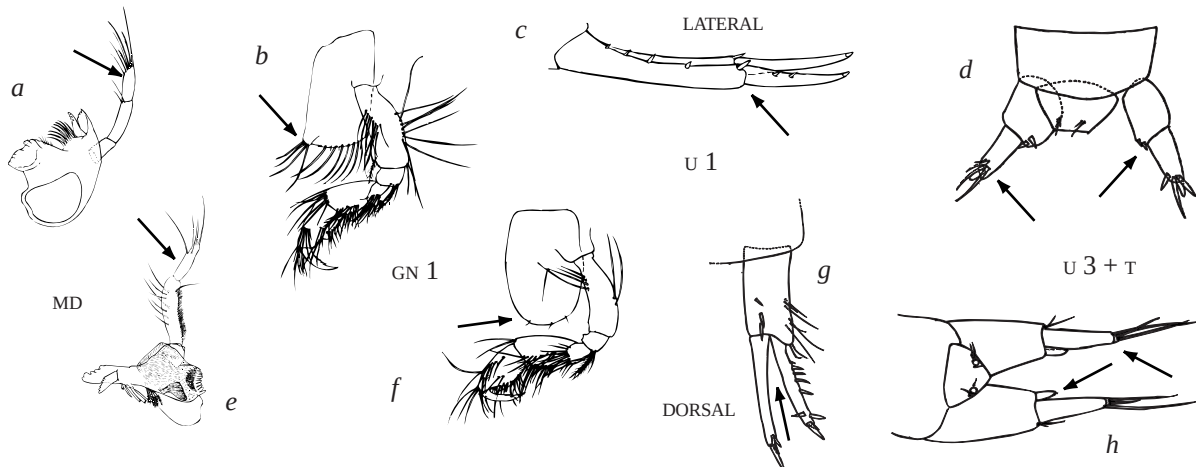


Figure 162.

3. < Antenna 2 of male, flagellum broad, flattened; gnathopod 2 of male weakly chelate, propodus subrectangular, palm transverse, palmar angle with short, stout “thumb”, dactyl stout; gnathopod 2 of female, propodus much larger than that of gnathopod 1, anterior margin densely setose *Audulla*

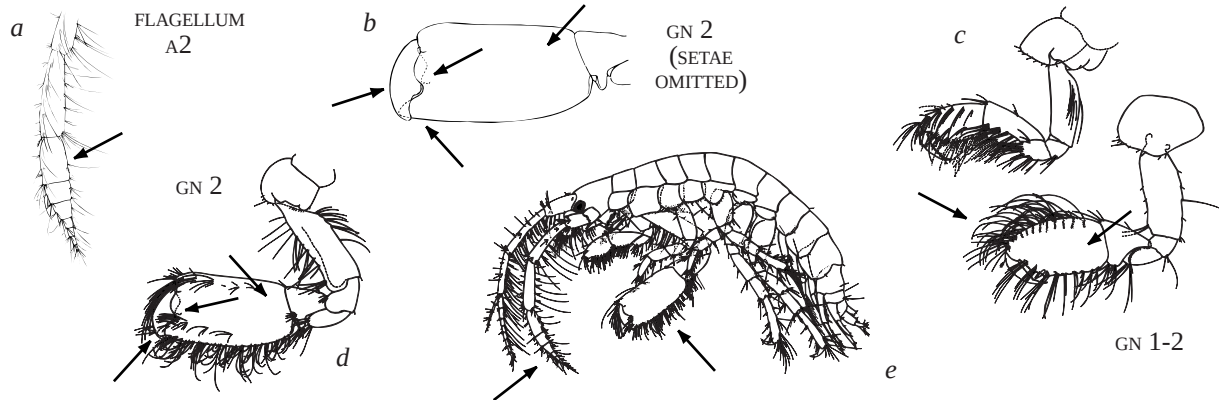


Figure 163.

- < Antenna 2 of male flagellum slender, not flattened; gnathopod 2 of male subchelate, propodus subovate, palm oblique, palmar angle without stout “thumb” (slender process may be present), dactyl slender; gnathopod 2 of female, propodus subequal to or slightly larger than that of gnathopod 1, anterior margin weakly to moderately setose *Gammaropsis*

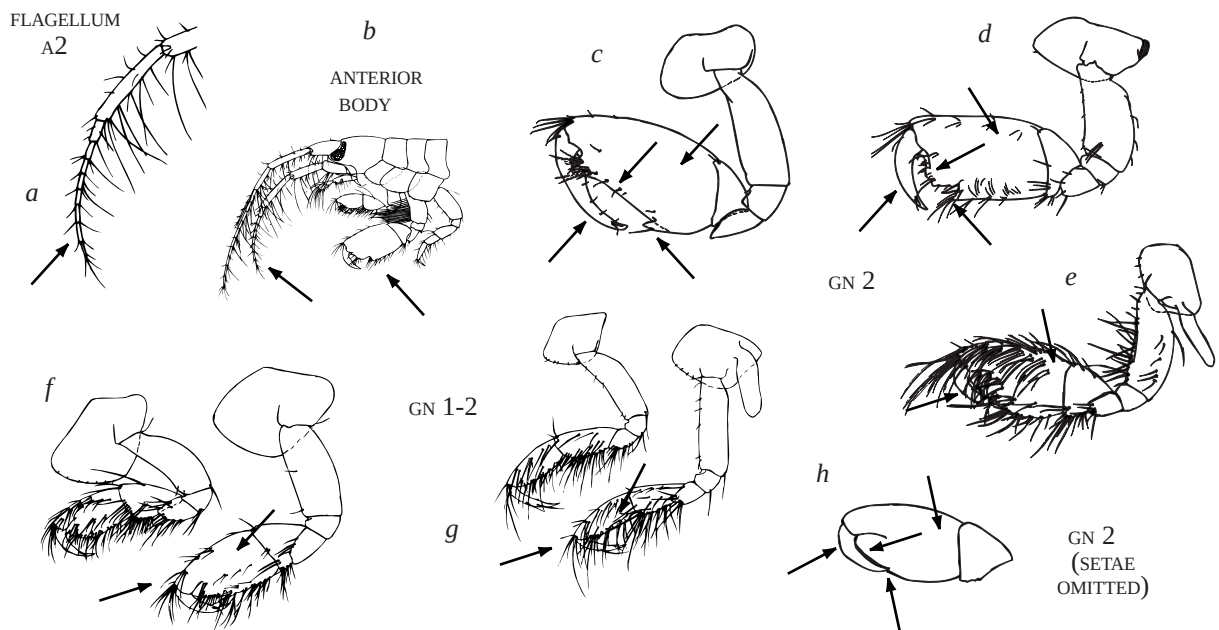


Figure 164.

4. < Antenna 1, peduncle article 3 shorter than article 1, accessory flagellum 2-4-articulate; head, inferior antennal sinus moderately recessed for insertion of antenna 2; maxilla 1, inner plate with 3-6 marginal setae; maxilla 2, inner plate without dense oblique row of facial setae; uropod 3 uniramous, peduncle subequal to or shorter than telson; telson apex truncate *Microprotopus*

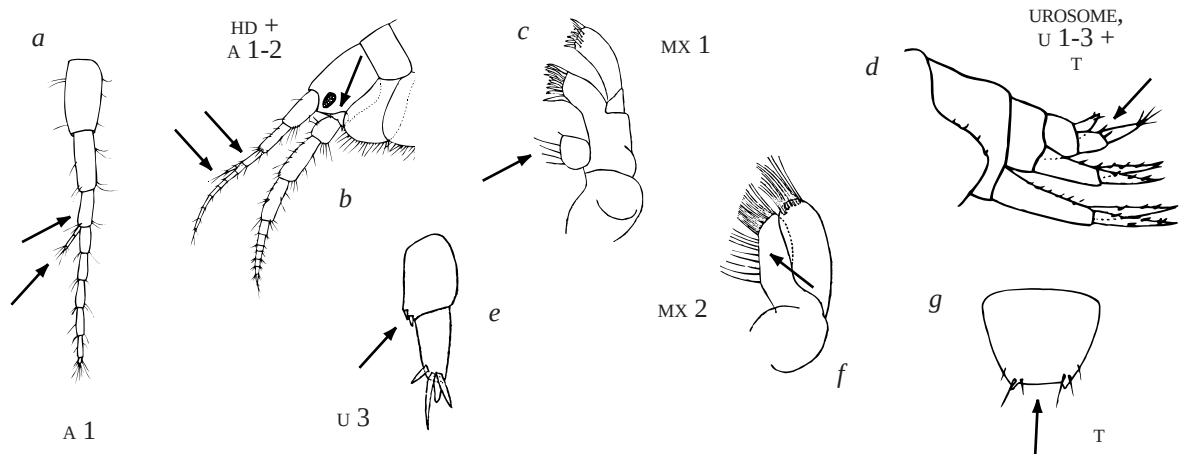


Figure 165.

- < Antenna 1, peduncle article 3 subequal to or longer than article 1, accessory flagellum vestigial or absent; head, inferior antennal sinus usually deeply recessed for insertion of antenna 2 (if moderately recessed, then eye poorly developed); maxilla 1, inner plate with 0-1 marginal setae; maxilla 2, inner plate with dense oblique row of facial setae; uropod 3 biramous, inner ramus minute, scale-like, peduncle longer than telson; telson apex subacute or narrowly rounded *Photis*

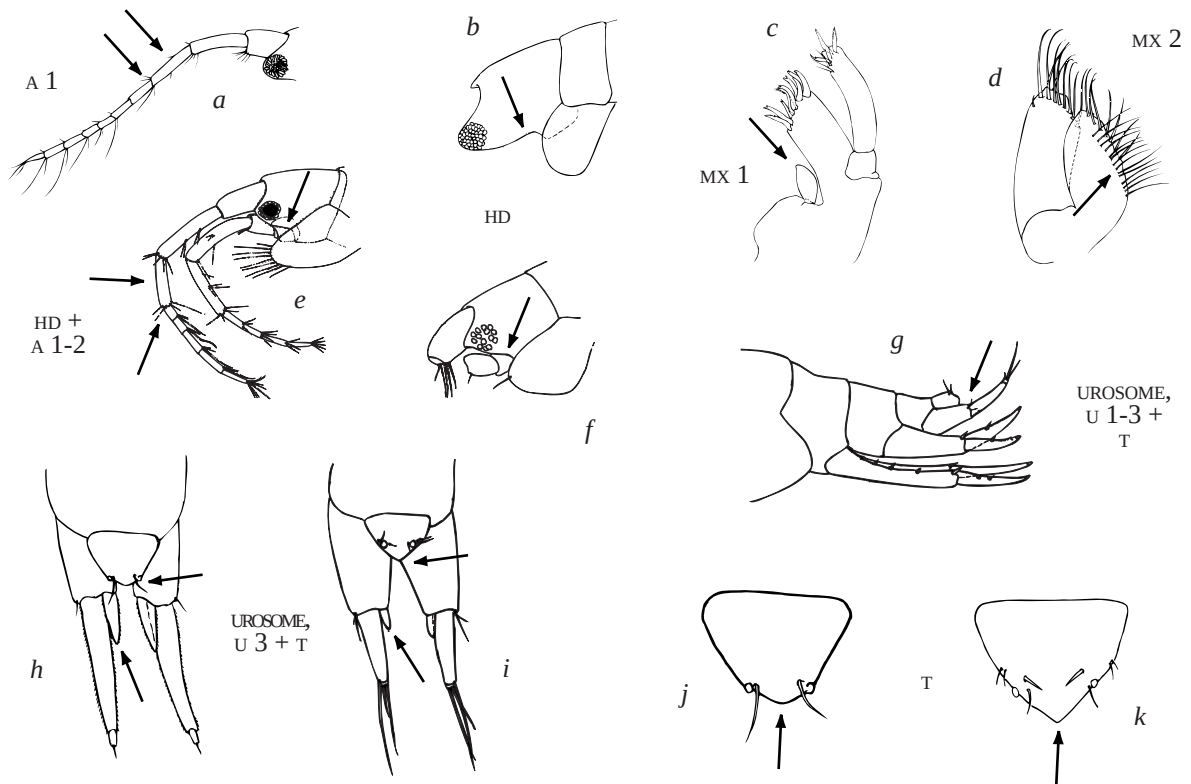


Figure 166.

Genus *Audulla* Chevreux, 1901

Regional diagnosis: Antenna 1, peduncle article 3 subequal to article 1 in length, accessory flagellum 5-6-articulate; antenna 2 of male, flagellum broad, flattened; head, ocular lobe narrowly rounded anteriorly, inferior antennal sinus deeply recessed for insertion of antenna 2; mandible, palp article 3 strongly clavate; maxilla 1, inner plate with 5-9 marginal setae; maxilla 2, inner plate with dense oblique row of facial setae; coxa 1 short, not extending much beyond proximal end of corresponding basis; coxae 3-4 not reduced, slightly shorter than coxa 2; coxa 5 not greatly reduced, anterior lobe present; gnathopod 2 of male and female strongly sexually dimorphic, that of male enlarged, weakly chelate, propodus subrectangular, palm transverse, palmar angle with short, stout “thumb”, dactyl stout; gnathopod 2 of female, propodus much larger than that of gnathopod 1, anterior margin densely setose, oostegite present; peraeopods 3-4 of female, oostegites broadly expanded, longer than corresponding basis; peraeopods 5-7, dactyl simple; urosome segments 1-2 separate; uropod 1, peduncle with distoventral process; uropods 1-2, inner ramus lanceolate, with terminal spines; uropod 3 biramous, rami subequal in length, peduncle longer than telson; telson apex truncate, with small median process.

Florida species: *A. chelifera*

Audulla chelifera Chevreux, 1901 (Figure 163)

Audulla chelifera: Chevreux, 1901, pp. 432-436, Figs. 56-65.

Eurystheus lina: Kunkel, 1910, pp. 81-83, Fig. 31.

Eurystheus semichelatus: K. H. Barnard, 1957, p. 8, Fig. 5.

Gammaropsis lina: Lazo-Wasem and Gable, 1987, pp. 331-335, Figs. 7-9.

Regional diagnosis: That of the genus.

Distribution: Bermuda (Kunkel, 1910); southern Florida Keys; Caribbean Sea (Barnard and Karaman, 1991); Belize (Thomas and Barnard, 1987); Yucatan, Mexico (McKinney, 1977); tropical Indo-Pacific (Chevreux, 1901; Ledoyer, 1982; Barnard and Karaman, 1991).

Ecology: *Audulla chelifera* is found in relatively shallow water (0-5m) among algae such as the brown alga, *Turbinaria turbinata* (Thomas and Barnard, 1987), often in somewhat high energy back reef or channel areas.

Remarks: This species is very similar to members of the genus *Gammaropsis*, from which it differs in the weakly chelate male gnathopod 2 and broad, flattened flagellum of the male antenna 2. The color of live material is generally brown and white, banded on the antennae and mottled on the body and peraeopods (Thomas and Barnard, 1987). *Audulla chelifera* is a small species, 4-5 mm in length. See Kunkel, 1910 (as *Eurystheus lina*); Lazo-Wasem and Gable, 1987 (as *Gammaropsis lina*); Thomas and Barnard, 1987.

Genus *Chevalia* Walker, 1904

Regional diagnosis: Antenna 1, peduncle article 3 shorter than article 1, accessory flagellum 2-3-articulate; antenna 2 of male, flagellum slender, not flattened; head, ocular lobe subquadrate anteriorly, inferior antennal sinus moderately recessed for insertion of antenna 2; mandible, palp article 3 slender or weakly clavate; maxilla 1, inner plate with 7-11 fine marginal setae; maxilla 2, inner plate with dense oblique row of facial setae; coxa 1 short, not extending much beyond proximal end of corresponding basis; coxae 3-4 reduced, much shorter than coxae 1-2; coxa 5 greatly reduced, anterior lobe absent; gnathopod 2 of male and female similar, not strongly sexually dimorphic, that of both sexes enlarged, subchelate, propodus subrectangular, palm nearly transverse, palmar angle with small, subtriangular process, dactyl stout; gnathopod 2 of female, oostegite present; pereopods 3-4 of female, oostegites narrowly strap-like, subequal to or shorter than corresponding basis; pereopods 5-7, dactyl bifurcate distally; urosome segments 1-2 fused; uropod 1, peduncle without distoventral process; uropods 1-2, inner ramus styliiform, without terminal spines; uropod 3 biramous, rami subequal in length, peduncle subequal to or shorter than telson; telson apex truncate, with small median process.

Florida species: *C. carpenteri*, *C. mexicana*, *Chevalia* sp. B

Remarks: Barnard and Thomas (1987b) indicate that western Atlantic material in the *Chevalia aviculae* Walker, 1904 complex is actually *C. mexicana*. Because of this and because of the description of *C. carpenteri* from this region, material previously reported as *C. aviculae* from the Caribbean and western Atlantic needs to be reexamined to determine its status. None of the material seen from Florida appears to belong to this species, based on the keys and diagnoses given in Barnard and Thomas (1987b).

KEY TO FLORIDA SPECIES OF *CHEVALIA*

1. < Antenna 1 more than twice the length of the head and first four peraeon segments combined; mandible, palp elongate, more than 3 times length of body of mandible; coxa 2, anteroventral angle slightly produced; gnathopod 2, basis slender, length approximately three times width; peraeopod 7, basis subrectangular or broadest distally, posteroventral angle subquadrate or slightly produced *Chevalia mexicana*

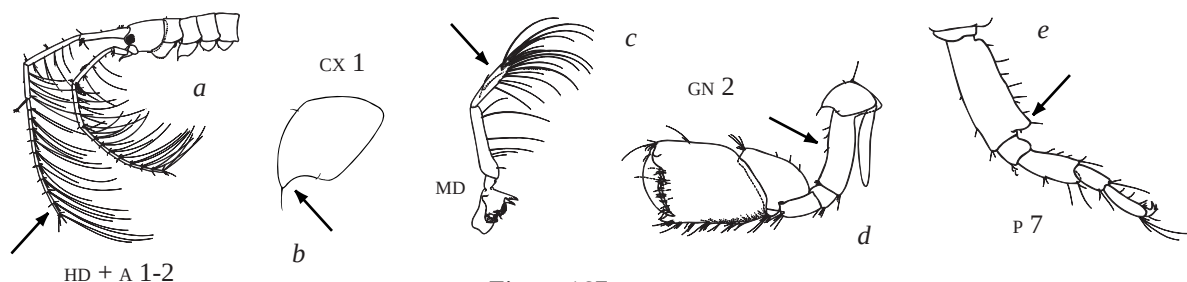


Figure 167.

- < Antenna 1 approximately one and one half times the length of the head and first four peraeon segments combined; mandible, palp not elongate, approximately twice length of body of mandible; coxa 2, anteroventral angle strongly produced; gnathopod 2, basis stout, length approximately twice width; peraeopod 7, basis subovate, posteroventral angle rounded, unproduced 2

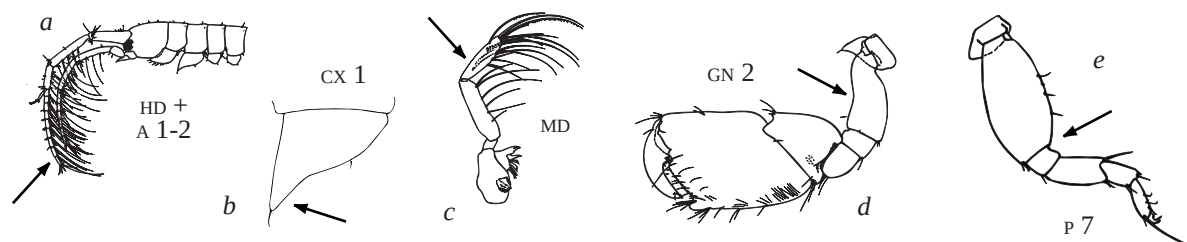


Figure 168.

2. < Gnathopod 2, coxal gill short, approximately one half length of basis; peraeopod 3 of female, oostegite absent; epimera 1-3, posteroventral angle with notch and small process *Chevalia carpenteri*

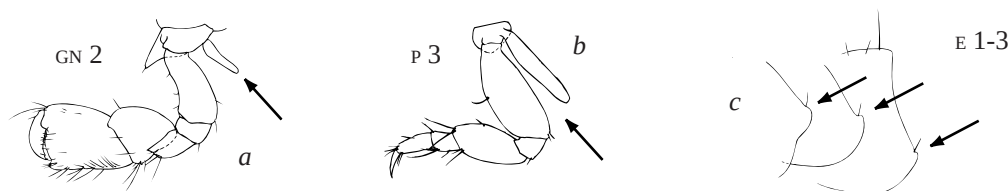


Figure 169.

- < Gnathopod 2, coxal gill long, slightly shorter than basis; peraeopod 3 of female, oostegite present; epimera 1-3, posteroventral angle subquadrate, without notch or small process *Chevalia* sp. B

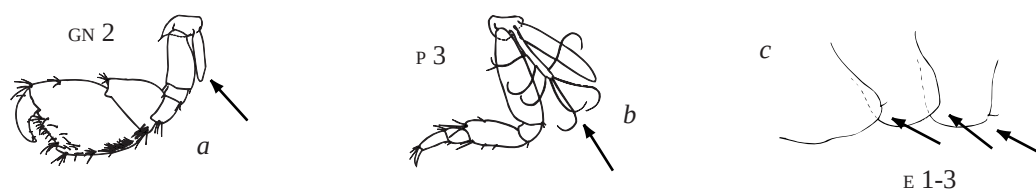


Figure 170.

***Chevalia carpenteri* Barnard and Thomas, 1987
(Figure 169)**

Chevalia carpenteri: Barnard and Thomas, 1987b, p. 541, figs. 4-6.

Regional diagnosis: Antenna 1 approximately one and one half times length of the head and first four peraeon segments combined; mandible, palp not elongate, approximately twice length of mandible; coxa 2, anteroventral angle strongly produced; gnathopod 2, coxal gill short, approximately one half length of basis, basis stout, length approximately twice width; peraeopod 3 of female, oostegite absent; peraeopod 7, basis ovate, posteroventral angle rounded, unproduced; epimera 1-3, posteroventral angle with notch and small process.

Distribution: Florida Keys (Looe Key Reef); Belize (Barnard and Thomas, 1987b).

Ecology: *Chevalia carpenteri* occurs in shallow (1-5 m) coral rubble habitats with associated algae (Barnard and Thomas, 1987b).

Remarks: This is the only species of *Chevalia* known to date that has only two pairs of oostegites in the female (on the coxae of peraeopods 4-5; the pair on coxa 3 is absent). The adult size of *C. carpenteri* ranges from 3-5 mm.

See Barnard and Thomas, 1987b; Lazo-Wasem, 1999.

***Chevalia mexicana* Pearse, 1912
(Figure 167)**

Chevalia mexicana: Pearse, 1912, pp. 374-376, fig. 5.

Regional diagnosis: Antenna 1 more than twice length of head and first four peraeon segments combined; mandible, palp elongate, more than three times length of mandible; coxa 2, anteroventral angle slightly produced; gnathopod 2, coxal gill long, slightly shorter than basis, basis slender, length approximately three times width; peraeopod 3 of female, oostegite present; peraeopod 7, basis subrectangular or broadest distally, posteroventral angle subquadrate or slightly produced; epimera 1-3, posteroventral angle rounded, with obsolescent notch, without process.

Distribution: Northern Gulf of Mexico to the Lesser Antilles, Barbados; Belize (Barnard and Thomas, 1987b); Biscayne Bay; Florida Bay.

Ecology: This species is found over a wide range of depths (0-50 m) in coral rubble or live bottom habitats.

Remarks: There is some variation in the width of basis of peraeopod 7 in *C. mexicana*; in some individuals this article is stouter and the posteroventral angle is slightly more produced than is indicated by either Pearse (1912) or Barnard and Thomas (1987b). The adult size of this species ranges from 4-6 mm.

See Pearse, 1912; Barnard and Thomas, 1987b; Lazo-Wasem, 1999.

***Chevalia* sp. B**
(Figure 170)

Regional diagnosis: Antenna 1 approximately one and one half times length of the head and first four peraeon segments combined; mandible, palp not elongate, approximately twice length of mandible; coxa 2, anteroventral angle strongly produced; gnathopod 2, coxal gill long, slightly shorter than basis, basis stout, length approximately twice width; peraeopod 3 of female, oostegite present; peraeopod 7, basis ovate, posteroventral angle rounded, unproduced; epimera 1-3, posteroventral angle subquadrate, without notch or small process.

Distribution: Southeastern Gulf of Mexico between Cape Romano and the lower Florida Keys.

Ecology: The specific habitat preferred by this species is unknown, but is probably similar to that of other species of *Chevalia* (coral rubble with algae, live bottom).

Remarks: *Chevalia* sp. B is very close to *C. carpenteri*, differing mainly in the longer gill on gnathopod 2, the presence of an oostegite on peraeopod 3 in the female (lacking in *C. carpenteri*) and the subquadrate epimera 1-3 (slightly produced and notched in *C. carpenteri*). It is a very variable species as well and there appear to be at least two different co-occurring morphs based on antennal and oostegite characters. In some individuals, the antennae are relatively long (approximately 1.5 times the length of the head and peraeon segments 1-4 combined) and bear many long setae on the posterior margin. In these specimens, the oostegite on peraeopod 3 in the female is very reduced. It does not appear to be an oostegite bud because it is laminar and has marginal setae, but it is much shorter than usual, barely reaching beyond the proximal end of the basis. In other similarly-sized individuals, the antennae are shorter and have very few, if any, long setae on the posterior margin. The oostegite on peraeopod 3 in females of this type is longer (at least one half the length of the basis). In addition, increasing the morphological variation still further, many specimens appear to be hermaphroditic, possessing both penes and fully developed oostegites; in these individuals, the second gnathopods are much larger relative to the size of the body than in non-hermaphrodites and the oostegite on peraeopod 3 is even longer (as long as the basis). Given the wide range of variation exhibited within populations of *Chevalia* sp. B, and, in particular, the variation in the size of oostegite 3, it would be interesting to examine a large series of specimens of *C. carpenteri* for similar variations. It is even possible that *Chevalia* sp. B and *C. carpenteri* represent the same species, especially if oostegite 3 is found to be absent on some individuals of *C. carpenteri*, but not on others.

Genus *Gammaropsis* Liljeberg, 1955

Regional diagnosis: Antenna 1, peduncle article 3 subequal to article 1 in length, accessory flagellum 2-7-articulate; antenna 2 of male, flagellum slender, not flattened; head, ocular lobe narrowly rounded anteriorly, inferior antennal sinus deeply recessed for insertion of antenna 2; mandible, palp article 3 strongly clavate; maxilla 1, inner plate with 2-8 marginal setae; maxilla 2, inner plate with dense oblique row of facial setae; coxa 1 relatively short, extending less than one half length of corresponding basis; coxae 3-4 not reduced, not much shorter than coxae 1-2 (may be slightly shorter); coxa 5 not greatly reduced, anterior lobe present; gnathopod 2 of male and female strongly sexually dimorphic, that of male enlarged, subchelate, propodus subovate, palm oblique, palmar angle without stout "thumb" (slender process may be present), dactyl slender; gnathopod 2 of female, propodus subequal to or slightly larger than that of gnathopod 1, anterior margin weakly to moderately setose, oostegite present; pereopods 3-4 of female, oostegites broadly expanded, longer than corresponding basis; pereopods 5-7, dactyl simple; urosome segments 1-2 separate; uropod 1, peduncle with distoventral process; uropods 1-2, inner ramus lanceolate, with terminal spines; uropod 3 biramous, rami subequal in length, peduncle longer than telson; telson apex truncate or emarginate, usually with small median process.

Florida species: *G. atlantica*, *G. sutherlandi*, *G. togoensis*, *Gammaropsis* sp. A, *Gammaropsis* sp. B, *Gammaropsis* sp. C

KEY TO FLORIDA SPECIES OF *GAMMAROPSIS*

1. < Pereopods 3-4, carpus subrectangular, shorter and more slender than merus, propodus stout, narrowing distally, much longer than carpus; pereopod 5, basis broad, length subequal to or slightly greater than width; uropod 3, rami (or longest ramus, if rami unequal in length) subequal to peduncle in length, inner ramus with single terminal spine, without setae 2

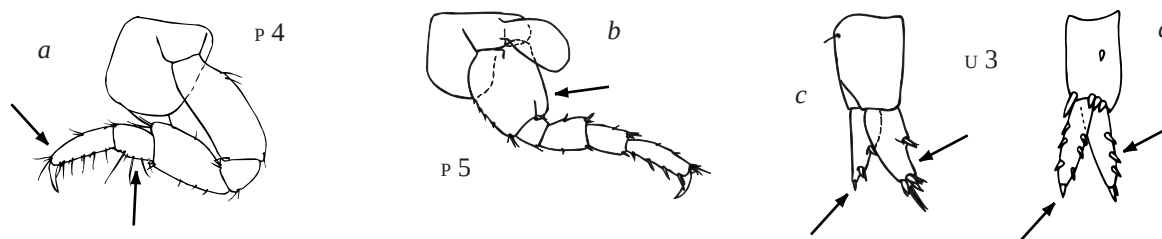


Figure 171.

- < Pereopods 3-4, carpus subovate, subequal to merus in length and width, propodus linear, subequal to or slightly longer than carpus; pereopod 5, basis narrow, length approximately twice width; uropod 3, rami (or longest ramus, if rami unequal in length) twice length of peduncle, inner ramus with 2+ terminal spines interspersed with long setae 4

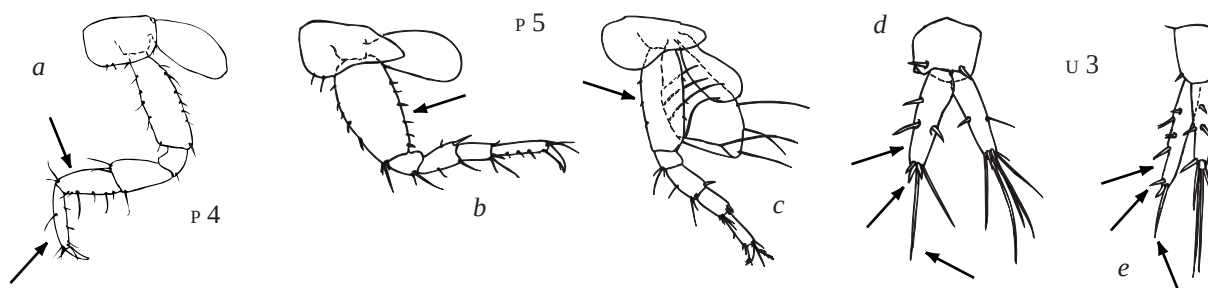


Figure 172.

2. < Antenna 1, accessory flagellum short, stout, 2-4-articulate; gnathopod 2 of male, propodus greatly enlarged, palmar angle defined by small, anteriorly directed, thumb-like process, process extending beyond palmar margin; uropod 2, peduncle with distoventral process.....
*Gammaropsis togoensis*

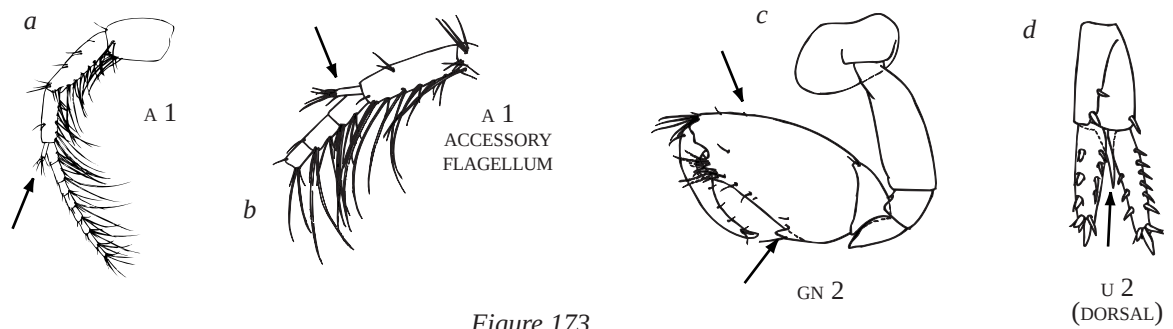


Figure 173.

- < Antenna 1, accessory flagellum long, slender, 5-7-articulate; gnathopod 2 of male, propodus moderately enlarged, palmar angle without or with very small, anteriorly directed thumb-like process, process not extending beyond palmar margin; uropod 2, peduncle without distoventral process 3

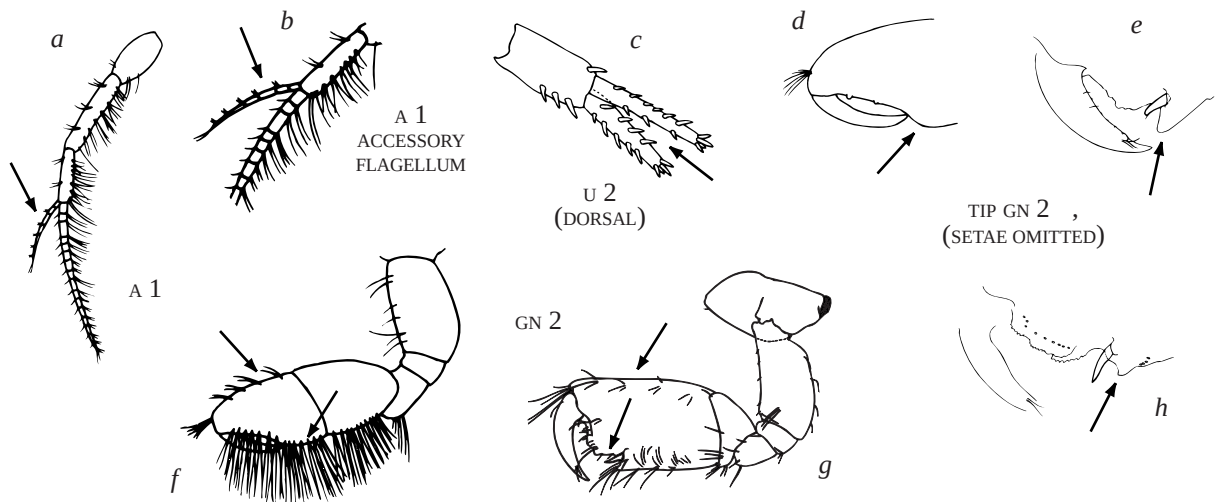


Figure 174.

3. < Gnathopod 2 of male, carpus subequal to propodus in length, posterior margin of both articles lined with dense fringe of long setae, propodus, palmar margin concave, palmar angle without spine; gnathopod 2 of female, propodus, palmar margin straight or concave, with groups of long setae; coxae 3-4 subrectangular, depth greater than width; epimera 2-3, posteroventral angle with small tooth *Gammaropsis sutherlandi*

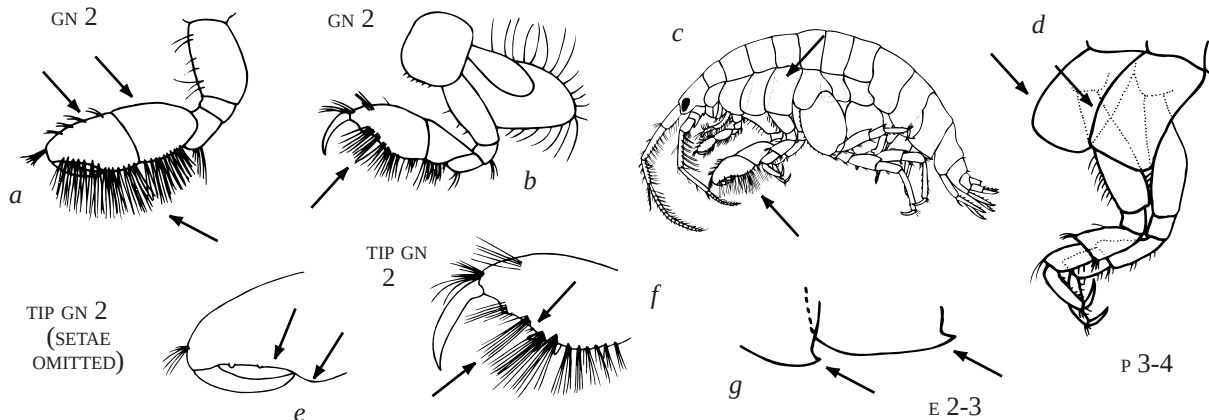


Figure 175.

- < Gnathopod 2 of male, carpus much shorter than propodus, posterior margin of both articles not densely setose, propodus, palmar margin sinuous, palmar angle with stout spine; gnathopod 2 of female, propodus, palmar margin convex, without groups of long setae (may have a few single long setae); coxae 3-4 subquadrate, depth subequal to width; epimera 2-3, posteroventral angle rounded, weakly notched, without tooth *Gammaropsis atlantica*

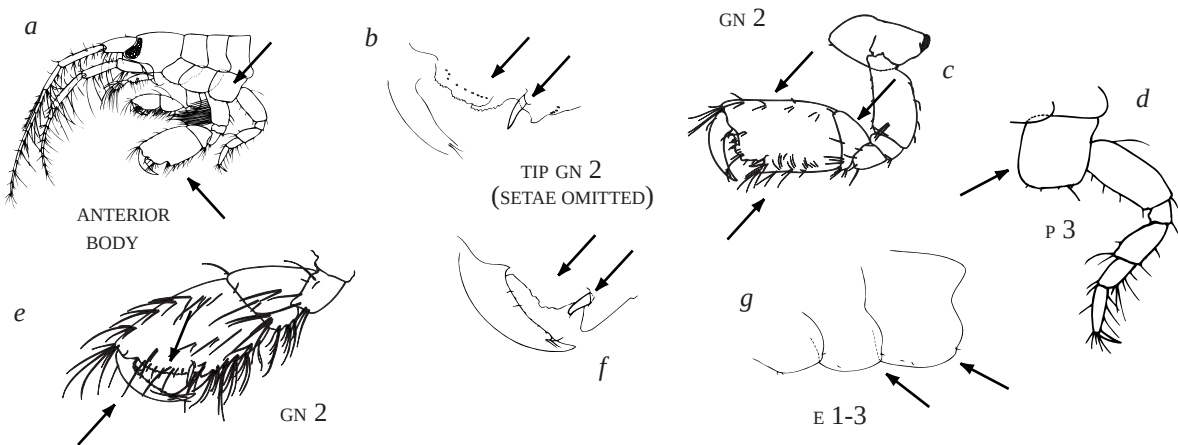


Figure 176.

4. < Gnathopod 1 weakly subchelate, propodus very slender, posterior margin without spines, dactyl subequal to propodus in length; gnathopod 2 of male poorly setose, basis, carpus and propodus without dense marginal fringe of long setae, dactyl, extensor margin with 1-3 setae; gnathopod 2 of female, propodus without spines on posterior margin..... *Gammaropsis* sp. C

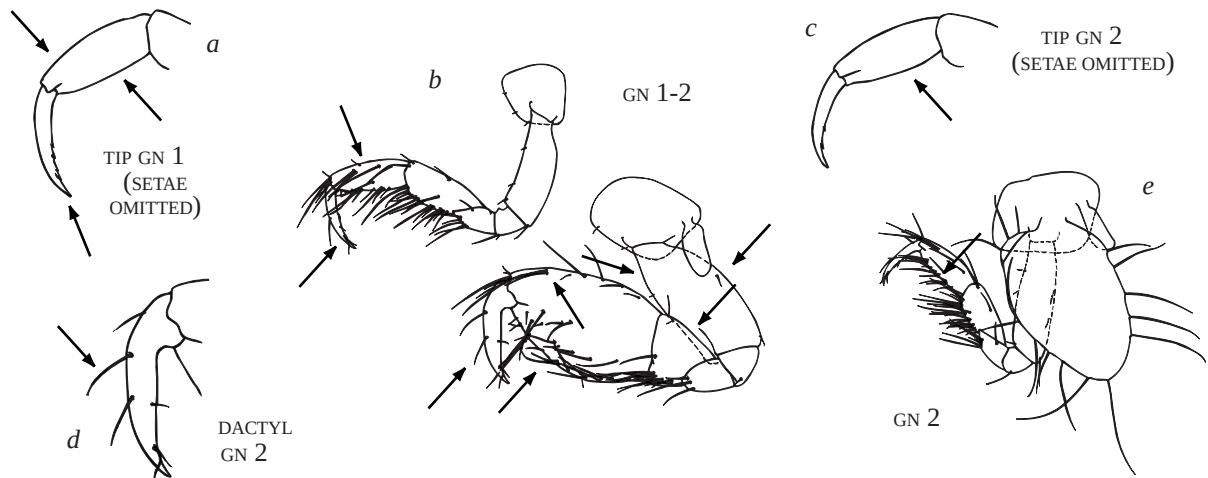


Figure 177.

- < Gnathopod 1 subchelate, propodus moderately slender or relatively stout, posterior margin with spines, dactyl approximately two thirds length of propodus; gnathopod 2 of male densely setose, basis, carpus and propodus with dense marginal fringe of long setae, dactyl, extensor margin with 4+ setae; gnathopod 2 of female, propodus with spines on posterior margin 5

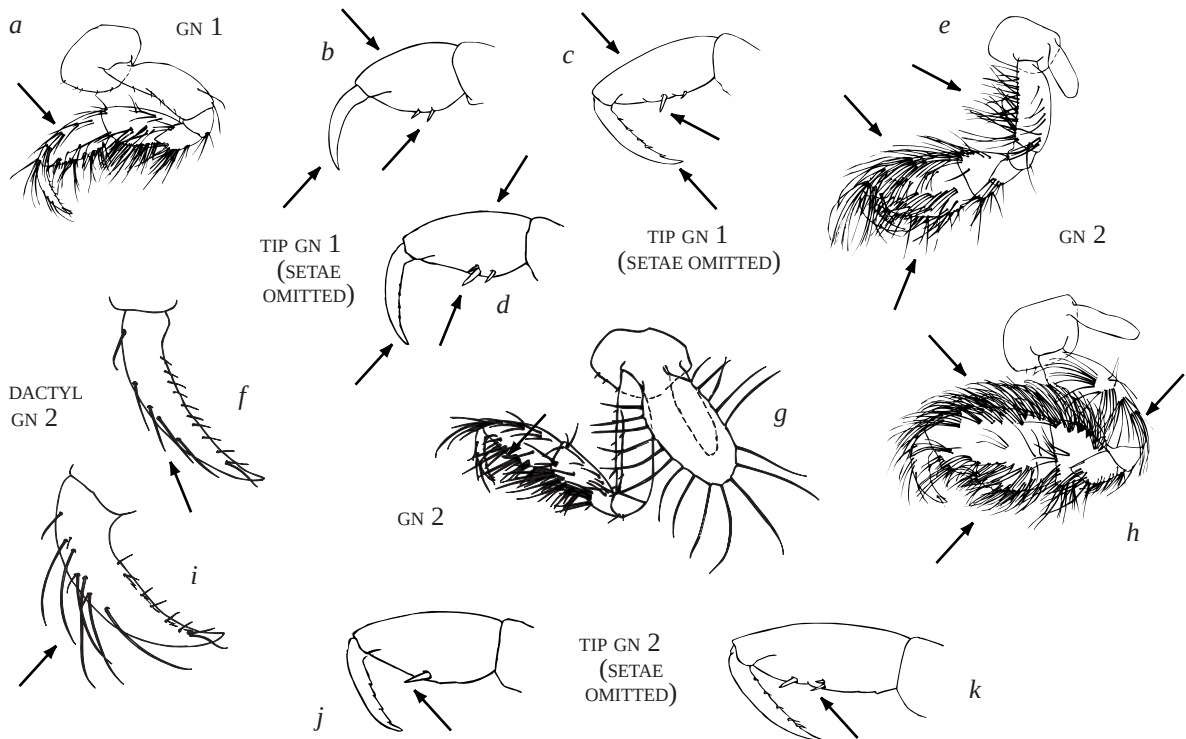


Figure 178.

5. < Mandible, palp article 2 relatively stout, slightly longer than article 3; gnathopod 1 of male subequal to gnathopod 2 in size, propodus broadly subovate; gnathopod 2 of male, propodus with palmar angle undefined, evenly rounded, dactyl less than one half length of propodus, extensor margin with 4-5 setae; gnathopod 2 of female, propodus with 2-3 spines on posterior margin, smallest at palmar angle, larger distally; peraeopod 3, propodus subequal to carpus in length, length 3-4 times width; uropod 3, inner ramus longer than outer ramus *Gammaropsis* sp. A

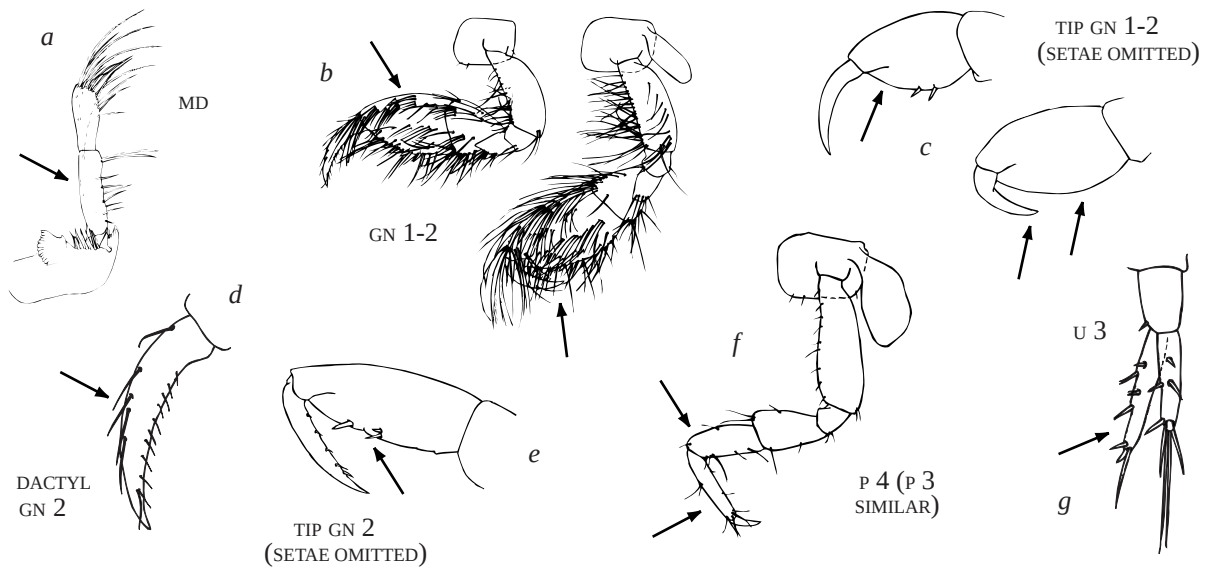


Figure 179.

- < Mandible, palp article 2 relatively slender, much longer than article 3; gnathopod 1 of male much smaller than gnathopod 2, propodus narrowly subovate; gnathopod 2 of male, propodus with palmar angle defined by small cusp, dactyl approximately one half length of propodus, extensor margin with 6-8 setae; gnathopod 2 of female, propodus with 1 spine on posterior margin, at palmar angle; peraeopod 3, propodus longer than carpus, length 5-6 times width; uropod 3, inner ramus subequal to outer ramus in length *Gammaropsis* sp. B

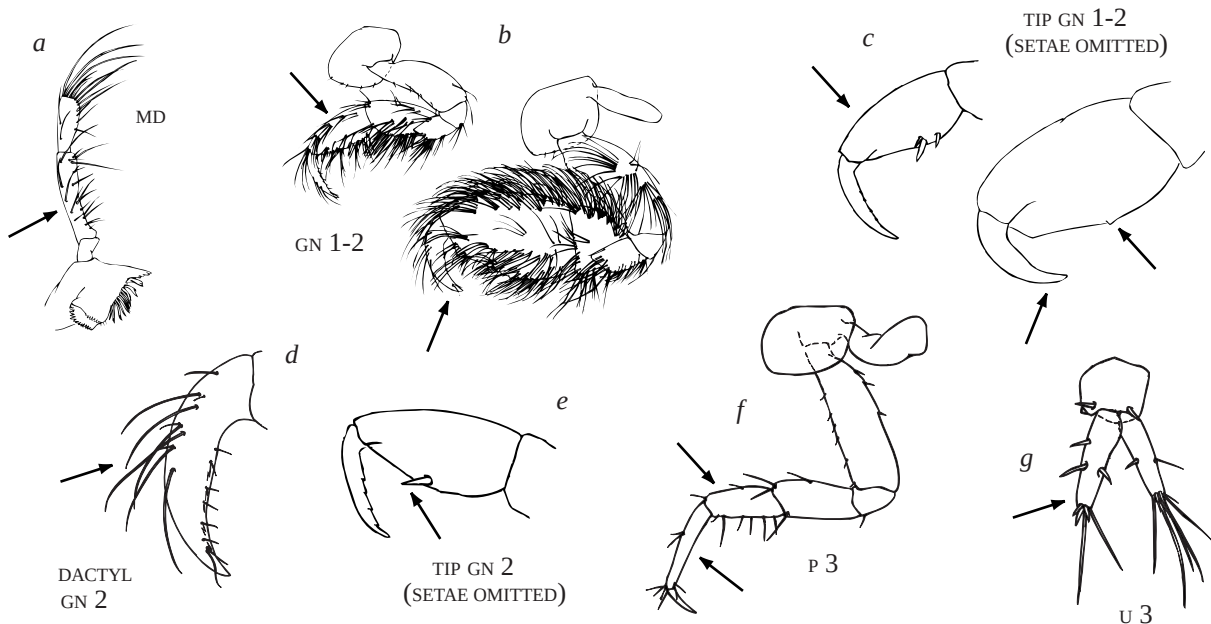


Figure 180.

***Gammaropsis atlantica* Stebbing, 1888
(Figure 176)**

Gammaropsis atlantica: Stebbing, 1888, p. 1101, pl. 114.

Gammaropsis zeylanicus: Walker, 1904, pp. 282-283, fig. 41, pl. 6.

Gammaropsis Gardineri: Walker, 1905, pp. 929-930, figs. 11-14, 16-17, pl. 88.

Eurystheus atlanticus: Stebbing, 1906, p. 611.

Regional diagnosis: Antenna 1, accessory flagellum long, slender, 5-6-articulate; mandible, palp article 2 relatively stout, slightly longer than article 3; coxae 3-4 subquadrate, depth subequal to width; gnathopod 1 subchelate, propodus relatively stout, broadly subovate, with 1 spine on posterior margin, at palmar angle, dactyl approximately two thirds length of propodus; gnathopod 1 of male smaller than gnathopod 2; gnathopod 2 of male moderately setose, basis with or without dense anterior marginal fringe of long setae, carpus much shorter than propodus, margins of both articles not densely setose, propodus moderately enlarged, palmar margin sinuous, without process near dactylar hinge, palmar angle defined by stout spine adjacent to small cusp or very small anteriorly directed process, process not extending beyond palmar margin, dactyl approximately one half length of propodus, extensor margin with 1-2 setae; gnathopod 2 of female, propodus, palmar margin convex, without groups of long setae (may have a few single long setae), posterior margin with 1 spine, at palmar angle; peraeopods 3-4, carpus subrectangular, shorter and more slender than merus, propodus stout, narrowing distally, much longer than carpus, length approximately 3 times width; peraeopod 5, basis broad, length subequal to or slightly greater than width; epimera 2-3, posteroventral angle rounded, weakly notched, without tooth; uropod 2, peduncle without distoventral process; uropod 3, outer ramus longer than inner, subequal to peduncle in length, inner ramus with single terminal spine, without setae.

Distribution: Circumtropical: tropical Florida; Belize (Thomas, 1993); eastern Atlantic (Stebbing, 1888); Indian Ocean (Walker, 1904); Japan (subspecies *G. a. varius*, Hirayama, 1984); Fiji (Myers, 1985); Hawaii (Barnard, 1970).

Ecology: *Gammaropsis atlantica* is found in coral rubble habitats (Thomas, 1993; Myers, 1985) and also with the coral *Acropora* and the calcareous alga *Halimeda* (Myers, 1985) at depths of 2-12 m.

Remarks: There is quite a bit of variation in this species and Barnard (1970) even describes two forms of the male from Hawaii. It is possible that this variation reflects the presence of a number of closely related species, rather than a single species. The eyes in hyperadults of *G. atlantica* are lagenform, or narrowly extended dorsally and, as mentioned by Thomas (1993), the stout spine adjacent to a small cusp on the propodus of gnathopod 2 is diagnostic, especially in males. In females, the spine is present, but the tooth is not always there. In living material, the head and antennae are purplish and the rest of the body is brownish (Thomas, 1993). The adult size ranges from 4-7 mm in this species.

See Barnard, 1970; Myers, 1985; Thomas, 1993.

***Gammaropsis sutherlandi* Nelson, 1980**
(Figure 175)

Gammaropsis sutherlandi: Nelson, 1980, pp. 1223-1228, figs. 1-3.

Regional diagnosis: Antenna 1, accessory flagellum long, slender, 7-articulate; mandible, palp article 2 relatively stout, slightly longer than article 3; coxae 3-4 subrectangular, depth greater than width; gnathopod 1 subchelate, propodus relatively stout, broadly subovate, without spines on posterior margin, dactyl approximately two thirds length of propodus; gnathopod 1 of male smaller than gnathopod 2; gnathopod 2 of male moderately setose, basis, carpus and propodus, anterior margins poorly setose, carpus subequal to propodus in length, posterior margin of both articles lined with dense fringe of long setae, propodus moderately enlarged, palmar margin concave, without process near dactylar hinge, palmar angle poorly defined, without cusp, spine or anteriorly directed, thumb-like process, dactyl approximately one half length of propodus, extensor margin without setae; gnathopod 2 of female, propodus, palmar margin straight or concave, with groups of long setae, posterior margin with 1 spine, at palmar angle; peraeopods 3-4, carpus subrectangular, shorter and more slender than merus, propodus stout, narrowing distally, much longer than carpus, length approximately 3 times width; peraeopod 5, basis broad, length subequal to or slightly greater than width; epimera 2-3, posteroventral angle with small tooth; uropod 2, peduncle without distoventral process; uropod 3, rami subequal in length, subequal to peduncle in length, inner ramus with single terminal spine, without setae.

Distribution: Cape Hatteras, North Carolina to Dry Tortugas, Florida (Nelson, 1980).

Ecology: *Gammaropsis sutherlandi* is an epifaunal species and is most common on hard substrates (eg. rock jetties, fouling plates, stones, spider crab carapaces, artificial reefs) at depths ranging from shallow subtidal to 300 m. It also occasionally occurs in eelgrass (*Zostera marina*) beds and it was found by Pearse and Williams (1951) on the fossil reefs off of North and South Carolina (listed as *Eurystheus maculatus* and *E. erythrophthalmus*) (Nelson, 1980).

Remarks: Nelson (1980) found reproductive individuals in the population at Beaufort, North Carolina, from January through July and indicates that the species may actually reproduce year round. This is even more likely in populations from more southern or tropical areas. Adult size in this species ranges from 6-9 mm.

See Nelson, 1980.

***Gammaropsis togoensis* (Schellenberg, 1925)
(Figure 173)**

Eurystheus togoensis: Schellenberg, 1925, p. 177. fig. 23.

Gammaropsis togoensis: Krapp-Schickel and Myers, 1979, p. 459, figs. 12-13.

?*Gammaropsis* cf *kaumaka*: Charvat, et al., 1990, p. 448.

Regional diagnosis: Antenna 1, accessory flagellum short, stout, 2-4-articulate; mandible, palp article 2 relatively stout, slightly longer than article 3; coxae 3-4 subrectangular, depth slightly greater than width; gnathopod 1 subchelate, propodus subovate, with 1 spine on posterior margin, at palmar angle, dactyl approximately two thirds length of propodus; gnathopod 1 of male smaller than gnathopod 2; gnathopod 2 of male poorly setose, basis, carpus and propodus without long, dense marginal setae, carpus much shorter than propodus, propodus greatly enlarged, palmar margin excavate, with subtruncate process near dactylar hinge, palmar angle defined by small, anteriorly directed, thumb-like process, process extending beyond palmar margin, dactyl one half to two thirds length of propodus, extensor margin without setae; gnathopod 2 of female, propodus, palmar margin sinuous, without groups of long setae (may have a few single long setae), with stout spine at palmar angle; pereopods 3-4, carpus subrectangular, shorter and more slender than merus, propodus stout, narrowing distally, much longer than carpus, length approximately 3 times width; pereopod 5, basis broad, length subequal to or slightly greater than width; epimera 2-3, posteroventral angle rounded or subquadrate, weakly notched, without tooth; uropod 2, peduncle with distoventral process; uropod 3, outer ramus longer than inner, subequal to peduncle in length, inner ramus with single terminal spine, without setae.

Distribution: East coast of Florida from Sebastian Inlet (?) to St. Lucie Inlet; south Texas from Port Aransas to Port Isabel (McKinney, 1977); Terminos Lagoon, Yucatan, Mexico (Ledoyer, 1986); Togo, West Africa (Schellenberg, 1925); Israel, Mediterranean Sea (Krapp-Schickel and Myers, 1979); India (Sivaprakasam, 1968); Fiji (Myers, 1985).

Ecology: This species appears to prefer shallow (0-2 m) hard substrate or grassbed habitats, occurring in coral, coral rubble or *Syringodium* beds in Fiji (Myers, 1985), *Thalassia* beds in Mexico (Ledoyer, 1986) and on sabellariid ("worm rock") reefs off the east coast of Florida.

Remarks: *Gammaropsis togoensis* is probably the species referred to by Charvat, et al. (1990) as *G. cf kaumaka* Barnard, 1970 from the area just south of Sebastian Inlet, Florida. Although *G. kaumaka* was originally described from the Hawaiian Islands, it shares one distinctive feature with *G. togoensis*; both species possess a distoventral process on the peduncle of uropod 2. No other species known to date from Hawaiian or Florida waters has this process. There is some developmental variation in the morphology of gnathopod 2 in the males of *G. togoensis*. In subadult males, the propodus is smaller than in adults and the process at the palmar angle is absent or obsolescent, whereas in adult males the propodus is greatly enlarged and the palmar process is quite well-developed. Adults of *G. togoensis* range from 3-6 mm in length.

See McKinney, 1977 (as *Gammaropsis* sp. A); Krapp-Schickel and Myers, 1979; Myers, 1985, 1989; Ledoyer, 1986.

***Gammaropsis* sp. A**
(Figure 179)

Regional diagnosis: Antenna 1, accessory flagellum short, slender, 2-articulate; mandible, palp article 2 relatively stout, slightly longer than article 3; coxae 3-4 subrectangular, depth slightly less than width; gnathopod 1 subchelate, propodus with spines on posterior margin, dactyl approximately two thirds length of propodus; gnathopod 1 of male subequal to gnathopod 2 in size, propodus relatively stout, broadly subovate; gnathopod 1 of female, propodus moderately slender, narrowly subovate; gnathopod 2 of male densely setose, basis, carpus and propodus with dense marginal fringe of long setae, carpus much shorter than propodus, propodus moderately enlarged, palmar margin weakly sinuous, without process near dactylar hinge, palmar angle undefined, evenly rounded, without cusp, spine or anteriorly directed thumb-like process, dactyl less than one half length of propodus, extensor margin with 4-5 setae; gnathopod 2 of female, propodus, palmar margin straight to slightly convex, with groups of long setae, posterior margin with 2-3 spines, smallest at palmar angle, larger distally; pereopods 3-4, carpus subovate, subequal to merus in length and width, propodus linear, subequal to carpus in length, length 3-4 times width; pereopod 5, basis narrow, length approximately twice width; epimera 2-3, posteroventral angle evenly rounded, without notch or tooth; uropod 2, peduncle without distoventral process; uropod 3, inner ramus longer than outer, twice length of peduncle, with 2+ terminal spines interspersed with long setae.

Distribution: Biscayne Bay, Florida; Southeastern Gulf of Mexico between Cape Romano, Florida, and the lower Florida Keys.

Ecology: Unknown.

Remarks: As is often the case for members of this genus, the majority of specimens available for study were missing both antennae and many were missing other appendages as well. Antenna 1 was present on only one specimen (an ovigerous female) and, for this reason, the size of the accessory flagellum mentioned in the diagnosis should be treated with caution until more complete material can be examined. Also, very few male specimens were available and it is possible that the male second gnathopod illustrated for this species is not that of a terminal adult. Adults range in size from 3-6 mm.

***Gammaropsis* sp. B**
(Figure 180)

Regional diagnosis: Antenna 1, accessory flagellum short, slender, 3-articulate; mandible, palp article 2 relatively slender, much longer than article 3; coxae 3-4 subrectangular, depth slightly less than width; gnathopod 1 subchelate, propodus moderately slender, narrowly subovate, with spines on posterior margin, dactyl approximately two thirds length of propodus; gnathopod 1 of male much smaller than gnathopod 2; gnathopod 2 of male densely setose, basis, carpus and propodus with dense marginal fringe of long setae, carpus much shorter than propodus, propodus moderately enlarged, palmar margin slightly concave, with low, broad process near dactylar hinge, palmar angle defined by small cusp, dactyl approximately one half length of propodus, extensor margin with 6-8 setae; gnathopod 2 of female, propodus, palmar margin straight, with groups of long setae, posterior margin with 1 spine, at palmar angle; peraeopods 3-4, carpus subovate, subequal to merus in length and width, propodus linear, longer than carpus, length 5-6 times width; peraeopod 5, basis narrow, length approximately twice width; epimera 2-3, posteroventral angle evenly rounded, without notch or tooth; uropod 2, peduncle without distoventral process; uropod 3, rami subequal in length, twice length of peduncle, inner ramus with 2+ terminal spines interspersed with long setae.

Distribution: Southeastern Gulf of Mexico between Cape Romano, Florida, and the lower Florida Keys.

Ecology: Unknown.

Remarks: As is the case for *Gammaropsis* sp. A, only 1 specimen (a male) was encountered that had not lost antenna 1; thus, the number of articles in the accessory flagellum may be more variable than is indicated in the diagnosis. In this species also, the number of males available was very small and it is possible that the morphology shown for the male second gnathopod may not be that of the terminal adult. Adults of *Gammaropsis* sp. B range in size from 3-7 mm.

***Gammaropsis* sp. C**
(Figure 177)

Regional diagnosis: Antenna 1, accessory flagellum unknown; mandible, palp article 2 relatively stout, slightly longer than article 3; coxae 3-4 subrectangular, depth slightly less than width; gnathopod 1 weakly subchelate, propodus very slender, very narrowly subovate, without spines on posterior margin, dactyl subequal to propodus in length; gnathopod 1 of male smaller than gnathopod 2; gnathopod 2 of male poorly setose, basis, carpus and propodus without dense marginal fringe of long setae, carpus much shorter than propodus, propodus moderately enlarged, palmar margin very weakly sinuous, without process near dactylar hinge, palmar angle undefined, evenly rounded, without cusp, spine or anteriorly directed thumb-like process, dactyl approximately one half length of propodus, extensor margin with 1-3 setae; gnathopod 2 of female, propodus, palmar margin weakly convex, with 1 group of long setae, posterior margin without spines; peraeopods 3-4, carpus subovate, subequal to merus in length and width, propodus linear, subequal to or slightly longer than carpus, length 4-5 times width; peraeopod 5, basis narrow, length approximately twice width; epimera 2-3, posteroventral angle evenly rounded, without notch or tooth; uropod 2, peduncle without distoventral process; uropod 3, inner ramus longer than outer, twice length of peduncle, inner ramus with 2+ terminal spines interspersed with long setae.

Distribution: Biscayne Bay, Florida.

Ecology: Unknown.

Remarks: Females of this species, although very similar to those of *Gammaropsis* sp. A and B, can be distinguished by the very slender gnathopods and by the absence of spines on the propodus of the gnathopods. Adult size in this species ranges from 3-5 mm.

Genus *Microprotopus* Norman, 1867

Regional diagnosis: Antenna 1, peduncle article 3 shorter than article 1, accessory flagellum 2-4-articulate; antenna 2 of male, flagellum slender, not flattened; head, ocular lobe acute or subacute anteriorly, inferior antennal sinus moderately recessed for insertion of antenna 2; mandible, palp article 3 slender or weakly clavate; maxilla 1, inner plate with 3-6 marginal setae; maxilla 2, inner plate without dense oblique row of facial setae; coxa 1 relatively long, extending more than one half length of corresponding basis; coxae 3-4 not reduced, subequal to coxae 1-2 in length; coxa 5 not reduced, anterior lobe present; gnathopod 2 of male and female strongly sexually dimorphic, that of male enlarged, subchelate, propodus subovate, palm oblique, palmar angle with small process, dactyl slender; gnathopod 2 of female, propodus larger than that of gnathopod 1, anterior margin weakly setose, oostegite present; peraeopods 3-4 of female, oostegites broadly strap-like or weakly expanded, longer than corresponding basis; peraeopods 5-7, dactyl simple; urosome segments 1-2 separate; uropod 1, peduncle without distoventral process; uropods 1-2, inner ramus lanceolate, with terminal spines; uropod 3 uniramous, peduncle subequal to or shorter than telson; telson apex truncate, without median process.

Florida species: *M. raneyi*, *M. shoemakeri*

KEY TO FLORIDA SPECIES OF *MICROPROTOPUS*

1. < Antenna 1 of male subequal to antenna 2; coxa 5 of male, anterior lobe with ventral margin having at most a few short setae; gnathopod 2 of male, palm extending full length of propodus, palmar angle with broad process extending posteromedially, dactyl elongate, sickle-shaped, reaching merus when closed; gnathopod 2 of female, propodus with dorsal and ventral margins subparallel, ventral margin nearly straight; pereaeopods 3-4 of male, basis and merus, anterior margins without long plumose setae *Microprotopus raneyi*

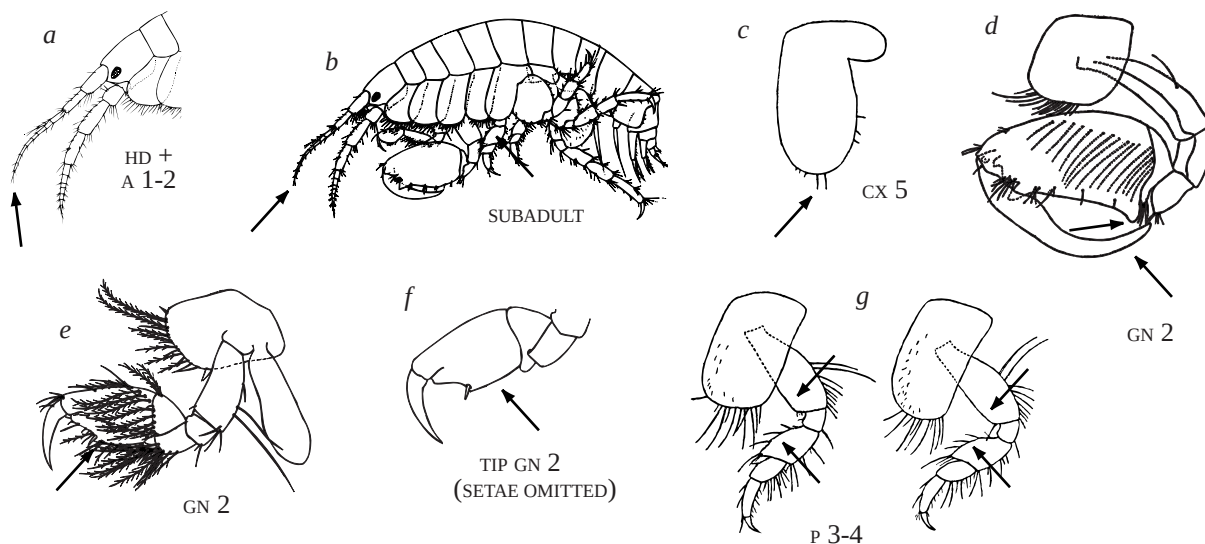


Figure 181.

- < Antenna 1 of male two thirds to three fourths length of antenna 2; coxa 5 of male, anterior lobe with ventral margin lined with long setae; gnathopod 2 of male, palm extending three fourths length of propodus, palmar angle with narrow process extending anteromedially, dactyl not elongate, normally curved, reaching only as far as palmar angle when closed; gnathopod 2 of female, propodus with dorsal and ventral margins not subparallel, ventral margin slightly convex; pereaeopods 3-4 of male, basis and merus, anterior margins lined with long plumose setae *Microprotopus shoemakeri*

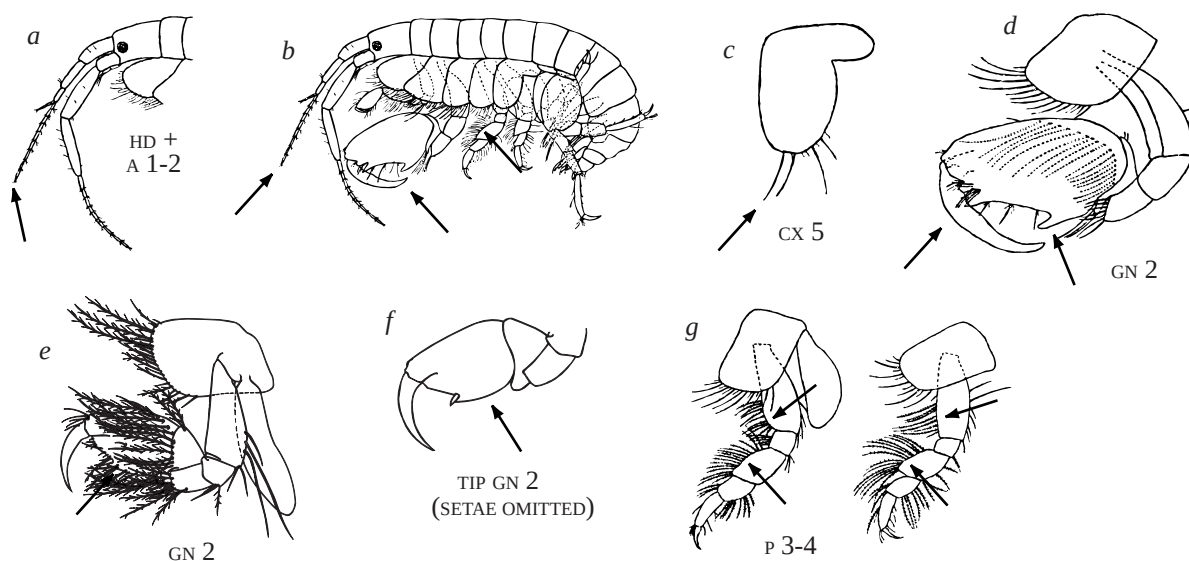


Figure 182.

***Microprotopus raneyi* Wigley, 1966**
(Figure 181)

Microprotopus raneyi: Wigley, 1966, pp. 260-266, figs. 1-4, 7.

Regional diagnosis: Antenna 1 of male subequal to antenna 2; coxa 5 of male, anterior lobe with ventral margin having at most a few short setae; gnathopod 2 of male, palm extending full length of propodus, palmar angle with broad process extending posteromedially; dactyl elongate, sickle-shaped, reaching merus when closed; gnathopod 2 of female, propodus with dorsal and ventral margins subparallel, ventral margin nearly straight; peraeopods 3-4 of male, basis and merus, anterior margins without long plumose setae; peraeopod 6 of male, basis, posterodistal marginal setae relatively short, only reaching midpoint of posterior margin of merus; uropod 1, inner ramus with 2-3 marginal spines.

Distribution: Cape Cod, Massachusetts south to Biscayne Bay, Florida; Gulf of Mexico from Florida to southern Texas (Bousfield, 1973; pers.obs.).

Ecology: *Microprotopus raneyi* occurs in relatively high salinity waters on shallow (intertidal-6 m) mud, sand or gravel bottoms, usually in areas with some vegetation, detritus or silt (Wigley, 1966; Lowry, 1972; Bousfield, 1973). It may also be found on *Dipodatra* (Polychaeta) tubes which project above the sediment surface.

Remarks: The male second gnathopod of *M. raneyi* shown by both Wigley (1966) and Bousfield (1973) (see Figure 181*b*) is actually that of a subadult male. Lowry (1972) illustrates a developmental series for this appendage in the male. The females of this species are virtually indistinguishable from those of *M. shoemakeri*, although the males appear to be clearly distinct. The use of the length of the plumose setae on the ischium of gnathopod 1 in the female, referred to by Lowry (1972), is not very dependable and the spination of the inner ramus of uropod 1, used by Bousfield (1973), also appears to be variable. Unlike the males, the relative lengths of antennae 1 and 2 are the same in the females of *M. raneyi* and *M. shoemakeri*. The propodus of gnathopod 2 is slightly stouter and more subovate in *M. shoemakeri* than it is in *M. raneyi*, but this is difficult to see if both species are not available for comparison. The best method of distinguishing females of the two species is by their association with males, which can be easily identified. Fortunately, they do not usually co-occur and *M. raneyi* is by far the most common of the two. The size of adult *M. raneyi* ranges from 2-4 mm.

See Wigley, 1966; Lowry, 1972; Bousfield, 1973

***Microprotopus shoemakeri* Lowry, 1972
(Figure 182)**

Microprotopus shoemakeri: Lowry, 1972, pp.282-286, figs. 4-6, 7.

Regional diagnosis: Antenna 1 of male two thirds to three fourths length of antenna 2; coxa 5 of male, ventral margin of anterior lobe lined with long setae; gnathopod 2 of male, palm extending three fourths length of propodus, process at palmar angle narrow, extending anteromedially; dactyl not elongate, normally curved, reaching only as far as palmar angle when closed; gnathopod 2 of female, propodus with dorsal and ventral margins not subparallel, ventral margin slightly convex; peraeopods 3-4 of male, basis and merus, anterior margins lined with long plumose setae; peraeopod 6 of male, basis, posterodistal marginal setae very elongate, often reaching distal margin of merus; uropod 1, inner ramus with 0-2 marginal spines.

Distribution: Rockville, South Carolina; Fernandina Beach, Florida (Lowry, 1972); northern Gulf of Mexico along the Mississippi and Louisiana (Thomas, 1976) coasts; Boca Chica Beach, Texas.

Ecology: The preferred habitat for this species is not well known. It has been found clinging to woody debris and other organic matter between the ripple marks in the surf zone of Louisiana beaches, presumably washed in by the passage of Hurricane Carmen (Thomas, 1976). Thomas (1976) also reports that *M. shoemakeri* constructs tubes in muddy, wave-exposed bottoms. In addition, it has been found in floating *Sargassum* in Mississippi Sound and along open sandy beaches when large quantities of *Sargassum* are present (pers. obs.).

Remarks: Peraeopods 3-4 of male Gulf of Mexico individuals appear even more setose than those of east coast specimens and the setae are often clogged with fine detritus. See **Remarks** for *M. raneyi* for comments on separating females of the two species of *Microprotopus*. The adult size for *M. shoemakeri* ranges from 3-4 mm.

See Lowry, 1972; Thomas, 1976; McKinney, 1977

Genus *Photis* Krøyer, 1842

Regional diagnosis: Antenna 1, peduncle article 3 subequal to or longer than article 1, accessory flagellum vestigial or absent; antenna 2 of male, flagellum slender, not flattened; head, ocular lobe acute, subacute or narrowly rounded anteriorly, inferior antennal sinus usually deeply recessed for insertion of antenna 2 (rarely moderately recessed); mandible, palp article 3 slender or weakly clavate; maxilla 1, inner plate with 0-1 marginal setae; maxilla 2, inner plate with dense oblique row of facial setae; coxa 1 relatively long, extending more than one half length of corresponding basis; coxae 3-4 not reduced, subequal to coxae 1-2 in length; coxa 5 not reduced, anterior lobe present; gnathopod 2 of male and female usually strongly sexually dimorphic (rarely similar), that of male enlarged, subchelate, palm oblique or excavate, palmar angle usually with process or tooth, dactyl slender; gnathopod 2 of female, propodus larger than that of gnathopod 1, anterior margin weakly to moderately setose, oostegite present; pereopods 3-4 of female, oostegites broadly expanded, longer than corresponding basis; pereopods 5-7, dactyl simple or with small distal accessory claws on extensor margin; urosome segments 1-2 separate; uropod 1, peduncle without distoventral process; uropods 1-2, inner ramus lanceolate, with terminal spines; uropod 3 unequally biramous, inner ramus short, scale-like, peduncle longer than telson; telson apex subacute.

Florida species: *P. longicaudata*, *P. macromana*, , *P. melanica*, *P. pugnator*, *P. trapherus*, *Photis* sp. C, *Photis* sp. D, *Photis* sp. E, *Photis* sp. F

Remarks: In *Photis* species, there is a tendency for the longer outer ramus of uropod 3 to be directed upwards, rather than posteriorly. This feature can often be used as a quick way to separate *Photis* individuals from those of other isaeid species, particularly *Microprotopus*, in which the single ramus of uropod 3 is nearly always directed posteriorly.

KEY TO FLORIDA SPECIES OF *PHOTIS*

1. < Coxae 1-4, ventral margins lined with long setae (sparser in very large males); pereopod 3, merus, posterior margin lined with long plumose setae 2

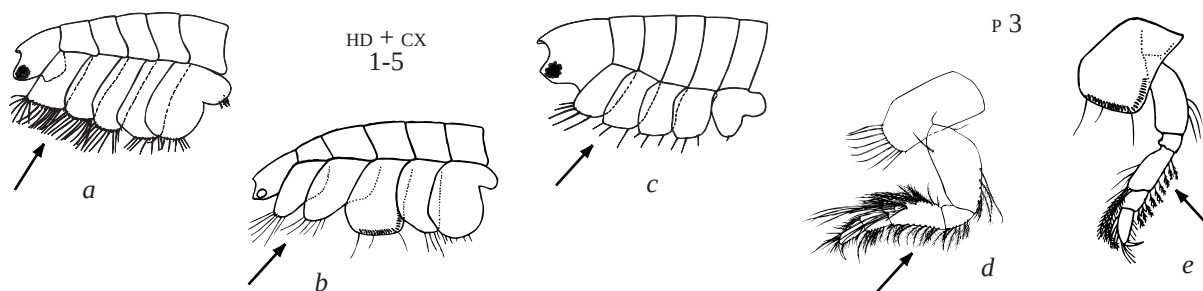


Figure 183.

- < Coxae 1-4, ventral margins not lined with long setae; pereopod 3, merus, posterior margin not lined with long plumose setae (a few short-medium simple setae may be present) 5

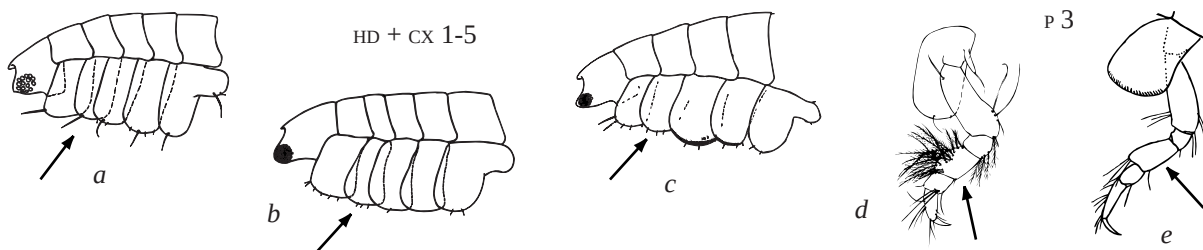


Figure 184.

2. < Head, ocular lobe rounded distally; coxa 1, anteroventral angle produced, forming blunt process, ventral margin with anterior gap in row of marginal setae; gnathopod 1 of male, carpus subequal to propodus in length, anterior margin subquadrate proximally; gnathopod 2 of male, propodus with stout spine at palmar angle, dactyl, flexor margin with 4-5 serrations; peraeopods 6-7, propodus with posterodistal cluster of very long setae, setae much longer than dactyl; uropod 2, peduncle with large distomedial spine, larger in males; uropod 3, inner ramus without terminal spine or seta (minute spinule may be present) *Photis* sp. C

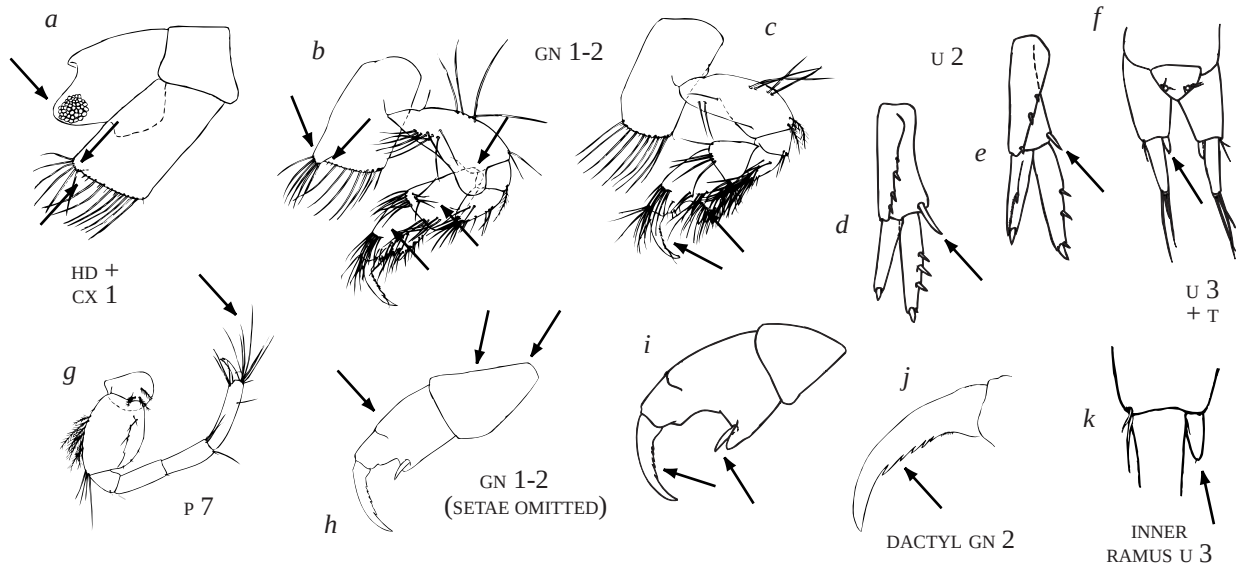


Figure 185.

- < Head, ocular lobe subacute distally; coxa 1, anteroventral angle evenly rounded, not produced, ventral margin without gap in row of marginal setae; gnathopod 1 of male, carpus shorter than propodus, anterior margin evenly convex, not subquadrate proximally, gnathopod 2 of male, propodus without spine at palmar angle, dactyl, flexor margin with 1 serration; peraeopods 6-7, propodus without posterodistal cluster of very long setae, setae, if present, no longer than dactyl; uropod 2, peduncle with small distomedial spine, similar in males and females; uropod 3, inner ramus with terminal spine or seta 3

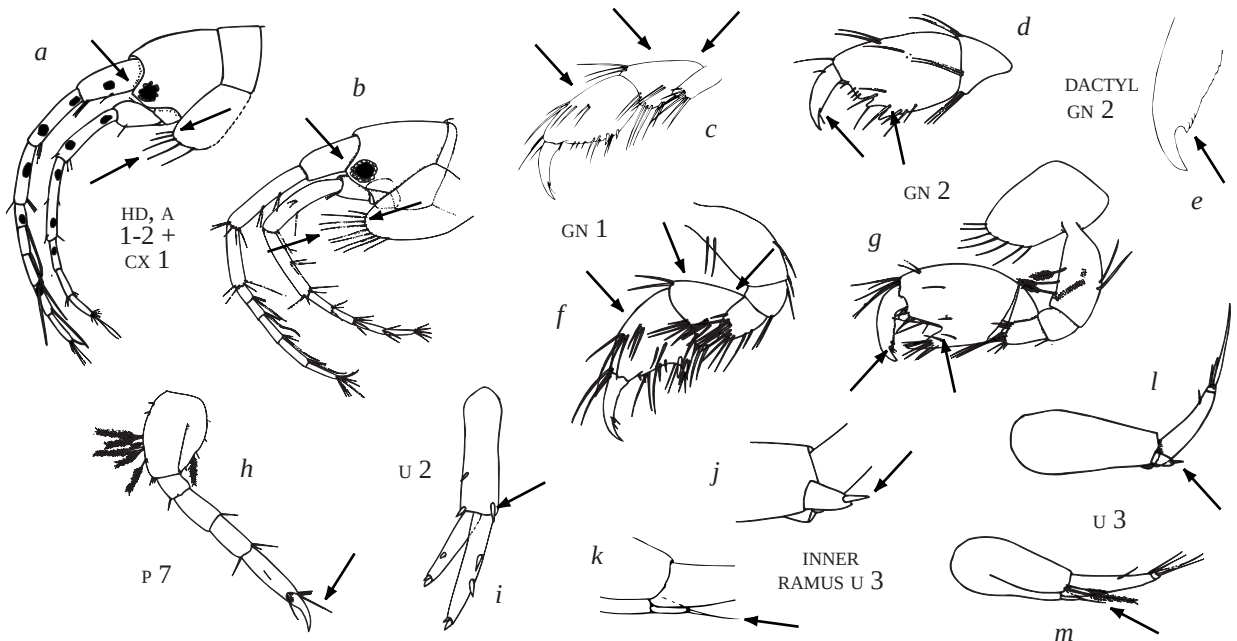


Figure 186.

3. < Coxa 1 not narrowing distally, tip subquadrate or broadly rounded; coxa 3 of male without stridulating ridges on ventral margin; gnathopod 2 of male, propodus, palm not excavate, process at palmar angle small; peraeopod 5, basis, anterior margin without long marginal or submarginal plumose setae; peraeopods 6-7, dactyl with accessory claws on extensor margin; uropod 3, peduncle with 1-2 plumose distoventral setae, inner ramus with terminal seta, seta subequal to ramus in length *Photis melanica*

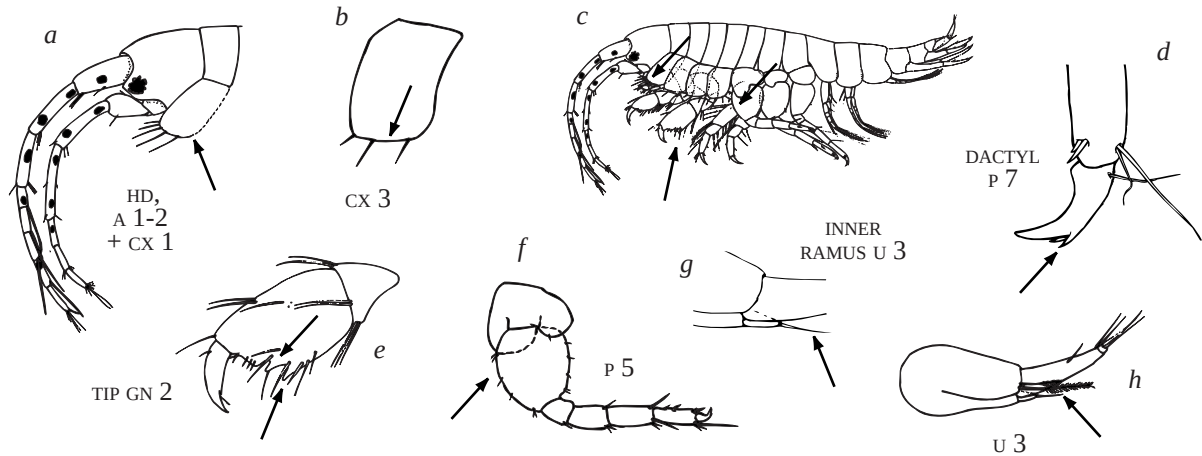


Figure 187.

- < Coxa 1 narrowing distally, tip narrowly rounded; coxa 3 of male with stridulating ridges on ventral margin; gnathopod 2 of male, propodus, palm deeply excavate, process at palmar angle large; peraeopod 5, basis, anterior margin with long marginal or submarginal plumose setae; peraeopods 6-7, dactyl without accessory claws on extensor margin; uropod 3, peduncle without distoventral setae, inner ramus with terminal spine, spine one third to one half length of ramus 4

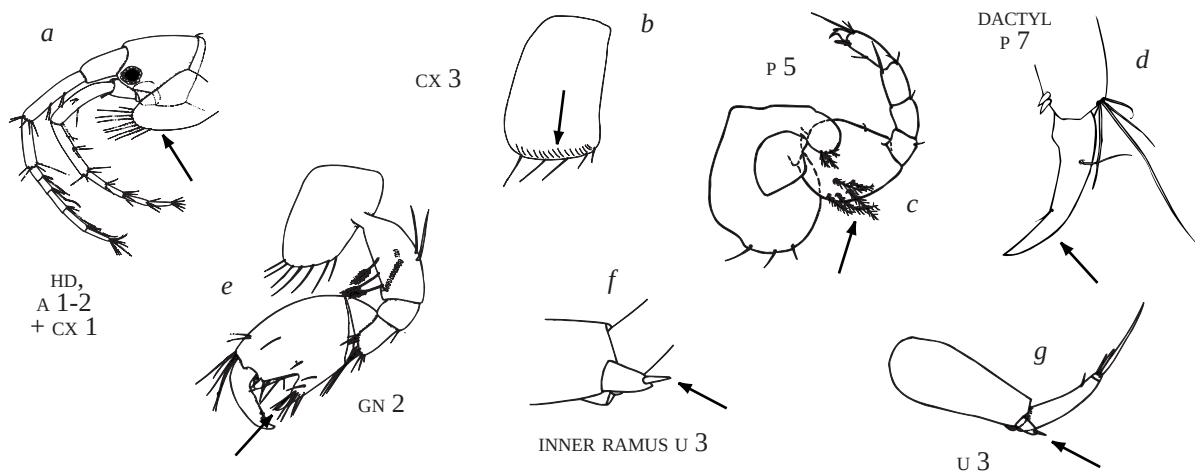


Figure 188.

4. < Coxa 3-5 of adult male, anteroventral margin beveled or slightly excavate; uropod 3, inner ramus with margins constricted, weakly hourglass-shaped, outer ramus subequal to or slightly longer than peduncle *Photis pugnator*

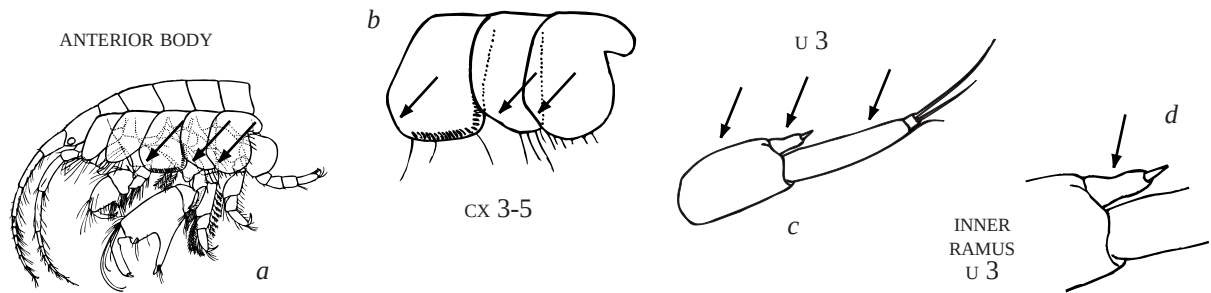


Figure 189.

- < Coxa 3-5 of adult male, anteroventral margin evenly rounded; uropod 3, inner ramus with margins unconstricted, subtriangular, outer ramus shorter than peduncle ... *Photis macromana*

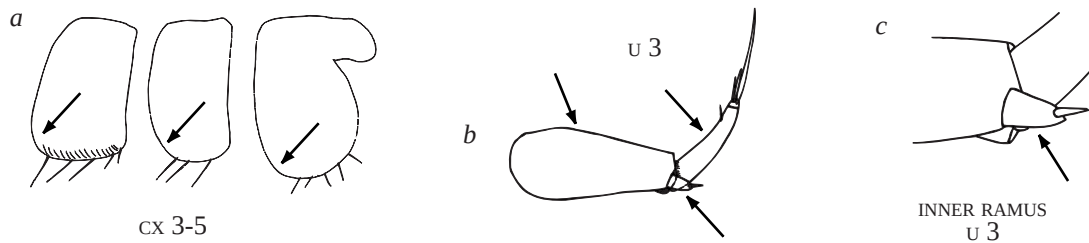


Figure 190.

5. < Antenna 2 with at least a few long setae on posterior margin; coxa 3 of male with stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 2 sexually dimorphic; gnathopod 2 of male slightly to much larger than that of female, basis, anterodistal margin expanded, margin or lateral surface with stridulating ridges; peraeopod 6 of male not extremely stout or elongate, much shorter than body in length, merus normal, not greatly enlarged; uropod 3, outer ramus, article 1 without long setae on distal margin..... 6

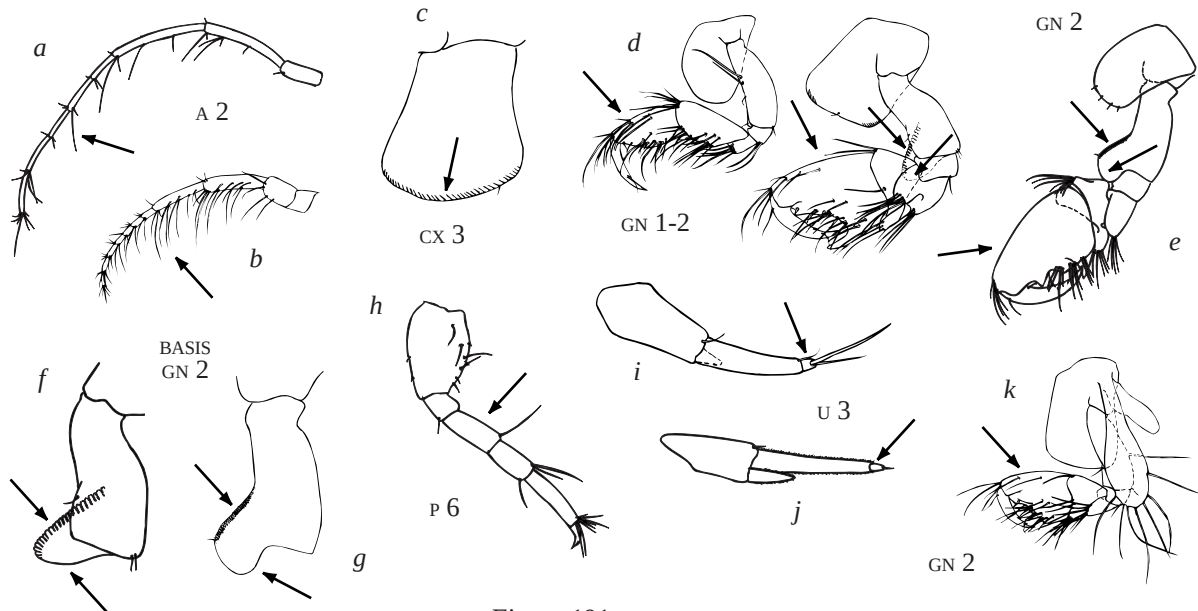


Figure 191.

- < Antenna 2 without long setae on posterior margin; coxa 3 of male without stridulating ridges on ventral margin; gnathopods 1-2 feeble, not sexually dimorphic; gnathopod 2 of male, basis, anterodistal margin unexpanded, margin and lateral surface without stridulating ridges; peraeopod 6 of male stout, extremely elongate, approximately as long as body, merus greatly enlarged; uropod 3, outer ramus, article 1 with long setae on distal margin 8

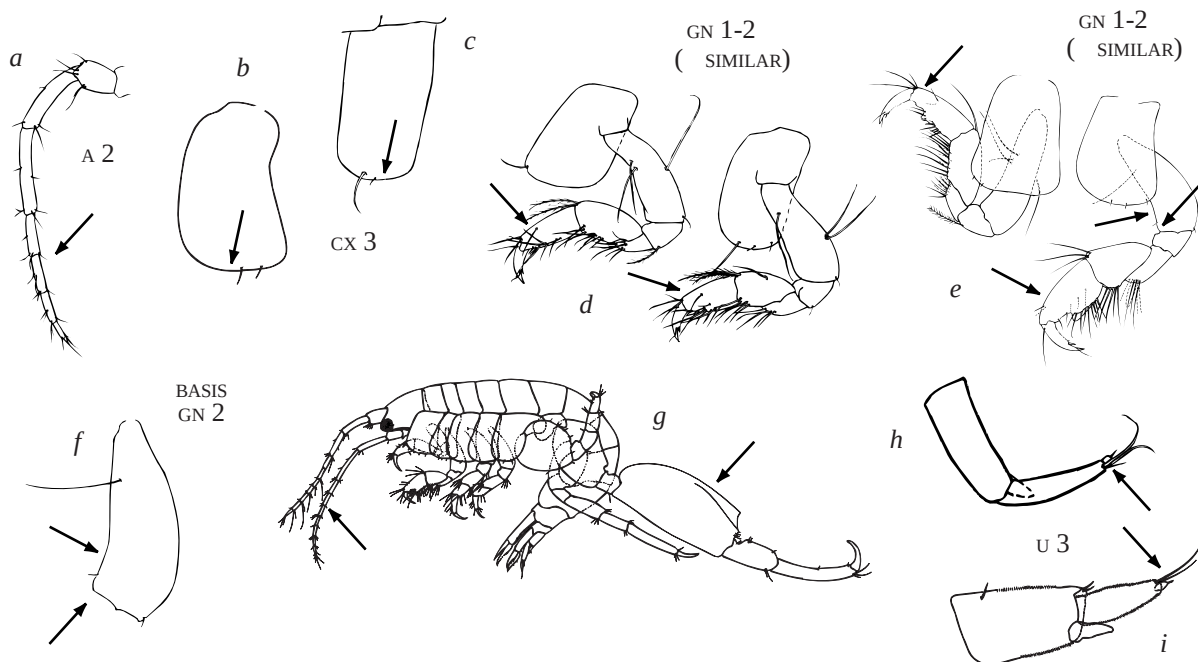


Figure 192.

6. < Coxa 1, anteroventral angle without setae; gnathopod 2 of male, propodus, process at palmar angle long, slender, curved; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; uropods 1-2, outer ramus without marginal spines; uropod 3, inner ramus lanceolate, long, approximately one third length of outer ramus, outer ramus, article 2 with 1 very small terminal setule; telson, tip narrowly rounded *Photis* sp. D

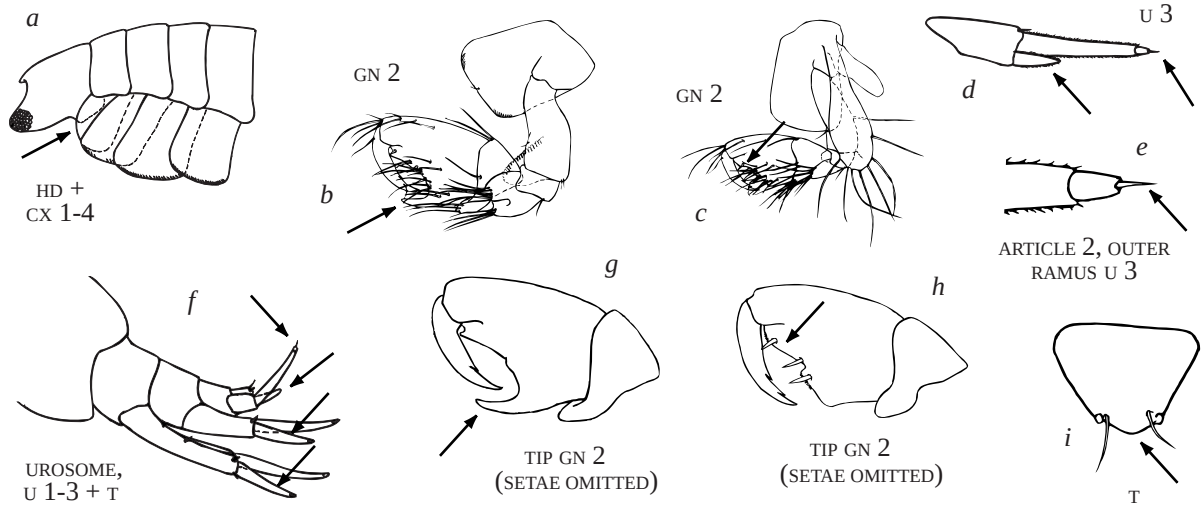


Figure 193.

- < Coxa 1, anteroventral angle with 1-3 setae; gnathopod 2 of male, propodus, process at palmar angle short-medium in length, broad, straight; gnathopod 2 of female, propodus, palmar margin with small process near dactylar articulation; uropods 1-2, outer ramus with 1-2 marginal spines; uropod 3, inner ramus subtriangular, very short, no more than one fourth length of outer ramus, outer ramus, article 2 with 2 long terminal setae; telson, tip subacute . 7

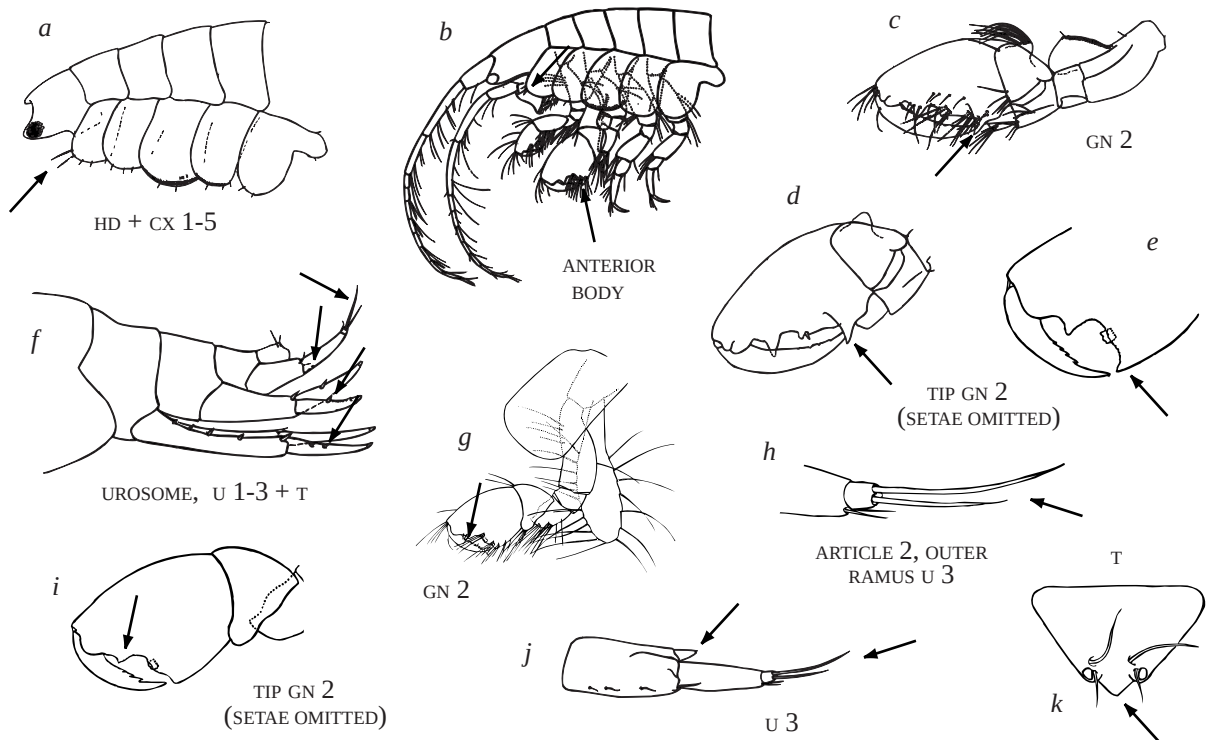


Figure 194.

7. < Coxa 4 of male without stridulating ridges on ventral margin; gnathopod 2 of male, ischium, anteromedial margin without linguiform laminar process, carpus without anterodistal setose process, propodus, palm excavate, palmar margin with 2 processes, including process at palmar angle; peraeopod 7, dactyl without accessory claw; uropods 1-2, outer ramus much shorter than inner ramus; uropod 2, inner ramus without marginal spines *Photis longicaudata*

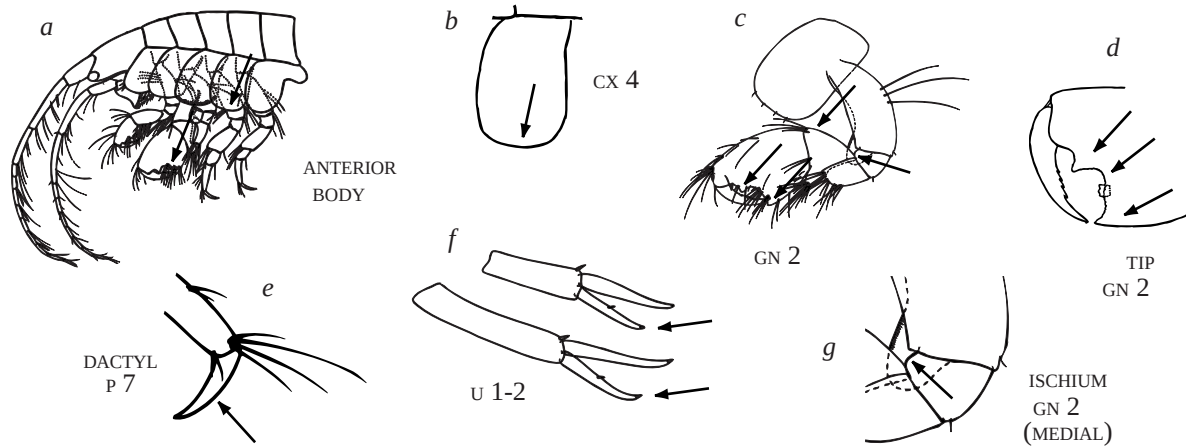


Figure 195.

- < Coxa 4 of male with stridulating ridges on ventral margin; gnathopod 2 of male, ischium, anteromedial margin with linguiform laminar process, carpus with anterodistal setose process, propodus, palm not excavate, palmar margin with 3 processes, including process at palmar angle; peraeopod 7, dactyl with accessory claw; uropods 1-2, outer ramus slightly shorter than or subequal to inner ramus; uropod 2, inner ramus with 1 marginal spine *Photis* sp. F

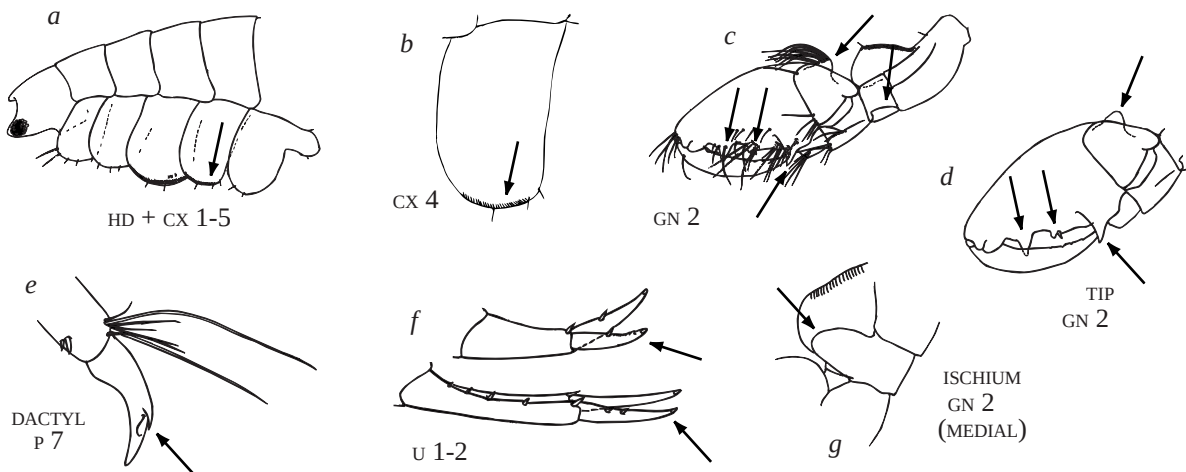


Figure 196.

8. < Head, ocular lobe rounded distally, inferior antennal sinus very deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins with short setae only; gnathopods 1-2, propodus, palm very weakly excavate, defined by small process at palmar angle; peraeopod 6 of adult male, merus without posterodistal process; uropod 3, inner ramus approximately one third length of outer ramus *Photis trapherus*

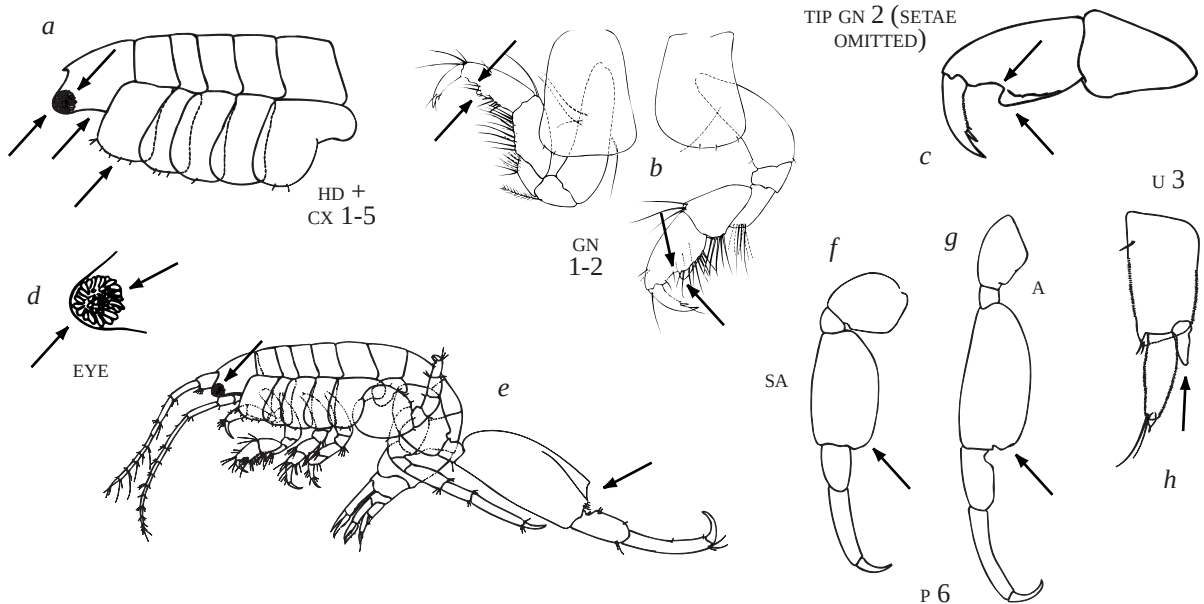


Figure 197.

- < Head, ocular lobe subacute distally, inferior antennal sinus moderately recessed for insertion of antenna 2, eye poorly developed, with few ommatidia, ommatidia widely separated; coxae 1-4, ventral margins with 1 long seta in addition to short setae; gnathopods 1-2, propodus, palm weakly convex, without defining process at palmar angle; peraeopod 6 of adult male, merus with posterodistal process; uropod 3, inner ramus approximately one fourth length of outer ramus *Photis* sp. E

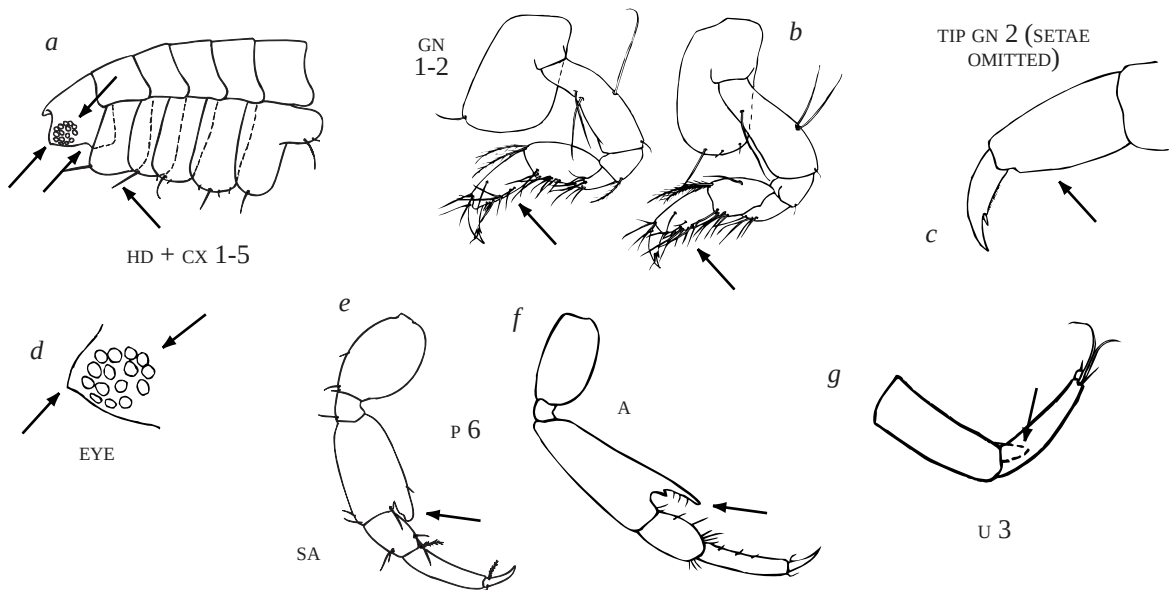


Figure 198.

***Photis longicaudata* (Bate and Westwood, 1863)
(Figure 195)**

Eiscladus longicaudatus: Bate and Westwood, 1862, p. 412, Fig.

Heiscladus longicaudatus: Norman, 1869, p. 255.

Photis longicaudata: Meinert, 1877, p. 142.

Regional diagnosis: Antenna 2, posterior margin with scattered long setae; head, ocular lobe rounded distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins without setae or with a few short setae; coxa 1 not narrowing distally, tip broadly rounded, anteroventral angle evenly rounded, unproduced, with 1-3 short setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxa 3 of male with stridulating ridges on ventral margin; coxa 4 of male without stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus subequal to propodus in length, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin expanded, margin with stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palm weakly excavate, palmar angle without spine, with process, process short, broad, straight, dactyl, flexor margin with 3-4 serrations; gnathopod 2 of female, propodus, palmar margin with small process near dactylar articulation; pereopod 3, merus, posterior margin without setae; pereopod 5, basis, anterior margin without long marginal or submarginal setae; pereopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; pereopods 6-7, propodus with posterodistal cluster of long setae, setae slightly longer than dactyl; pereopod 6, dactyl with accessory claw on extensor margin; pereopod 7, dactyl without accessory claw on extensor margin; uropods 1-2, outer ramus much shorter than inner ramus, with 1-2 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females, inner ramus without marginal spines; uropod 3, peduncle without distoventral setae, inner ramus very short, less than one fourth length of outer ramus, subtriangular, margins unconstricted, without terminal spine or seta, outer ramus slightly longer than peduncle, article 1 with short seta on distal margin, article 2 with 2 long terminal setae; telson, tip subacute.

Distribution: Northeastern Gulf of Mexico, Dry Tortugas, Florida (Shoemaker, 1945); eastern Atlantic Ocean from Norway to South Africa, Mediterranean Sea, Indian Ocean, southern Japan (Hirayama, 1984; Myers, 1989); Arctic Ocean (Lincoln, 1979).

Ecology: *Photis longicaudata* has been reported from a very broad range of depths (0-400 m) and, in the shallower areas at least, it lives among algae.

Remarks: It seems very likely that the distribution mentioned above includes records for more than one species, especially considering the exceptionally broad depth range. As mentioned by Shoemaker (1945), there is considerable morphological variation reported for *P. longicaudata*, particularly in the structure of the gnathopods, and his material from Florida and the Gulf of Mexico differs from descriptions of European material. Part of this may be due to developmental variation; however, it is also possible that Shoemaker's specimens represent an undescribed species. It is even remotely possible that Shoemaker's material is the same as *Photis* sp. F, which it strongly resembles in many ways (see **Remarks** section for *Photis* sp. F). However, this seems unlikely in view of the striking differences between the two species in the morphology of the male second gnathopod and the lack of stridulating ridges on coxa 4 of Shoemaker's male *P. longicaudata*. It is possible that Shoemaker's male specimens were subadult and his material needs to be reexamined to determine its status. The adult size of *P. longicaudata* ranges from 4-7 mm.

See Shoemaker, 1945; Lincoln, 1979; Myers, 1989.

***Photis macromana* McKinney, Kalke & Holland, 1978
(Figure 190)**

Photis macromanus: McKinney, et al., 1978, pp.144-147, figs. 7-10.

Photis macromana: Barnard and Karaman, 1991, p. 226.

Regional diagnosis: Antenna 2, posterior margin with scattered long setae; head, ocular lobe sub-acute distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins lined with long setae; coxa 1 narrowing distally, tip narrowly rounded, anteroventral angle evenly rounded, unproduced, with 1-6 long setae, ventral margin without gap in row of marginal setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxa 3 of male with stridulating ridges on ventral margin; coxa 4 of male without stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus shorter than propodus, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin unexpanded, lateral surface with stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palm deeply excavate, palmar angle without spine, with process, process long, slender, straight, dactyl, flexor margin with 1 serration; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; peraeopod 3, merus, posterior margin lined with long plumose setae; peraeopod 5, basis, anterior margin with long marginal or submarginal plumose setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus without posterodistal cluster of very long setae, setae no longer than dactyl, dactyl without accessory claws on extensor margin; uropod 1, rami subequal in length, outer ramus with 2-4 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females, outer ramus much shorter than inner, with 1 marginal spine, inner ramus with 2 marginal spines; uropod 3, peduncle without distoventral setae, inner ramus short, approximately one fourth length of outer ramus, subtriangular, margins unconstricted, terminal spine present, one third to one half length of ramus, outer ramus shorter than peduncle, article 1 with short seta on distal margin, article 2 with 2 long terminal setae; telson, tip subacute.

Distribution: Gulf of Mexico from Texas (McKinney, et al., 1978) to Florida Bay; Biscayne Bay, Florida.

Ecology: *Photis macromana* is usually found on sandy bottoms in relatively high salinity waters (McKinney, et al., 1978). It has been found at depths of 3-42 m.

Remarks: *Photis macromana* is very difficult to distinguish from *P. pugnator* and may actually be synonymous with that species. Except for the few, possibly developmental, differences noted in the key, the adult male *P. macromanna* described by McKinney, et al. (1978) are virtually identical to subadult male *P. pugnator* in the same size range (2-3 mm). The distinguishing characters for the two species mentioned by McKinney (1980a) in his key to the Texas species of *Photis* do not work consistently because of developmental variability. In that key, McKinney states that male *P. macromanna* can be distinguished by having the dactyl of gnathopod 2 overlapping the palm and by the absence of a process on the inner margin of the dactyl. However, the dactyl of the male second gnathopod also overlaps the palm in all but the largest specimens of *P. pugnator* and, likewise, only very large males have the distinct process on the inner margin of the dactyl shown by Shoemaker (1945). In fact, Shoemaker's (1945) illustrations of gnathopods 1-2 of a subadult male *P. pugnator* from the Dry Tortugas are extremely similar to the gnathopods illustrated for *P. macromanna* by McKinney, et al. (1978). The dactyl of the female gnathopod 2, contrary to McKinney's (1980a) indication in his key, has teeth on the flexor margin in both species; these are clearly shown in both McKinney, et al.'s (1978) illustrations of *P. macromanna* and in Shoemaker's (1945) illustrations of *P. pugnator*. A comparison of the type material of both of these species, as well as the examination

of a developmental series of males of *P. macromana* from the type locality, is necessary to determine whether or not the two species should be synonymized. The adult size range for *P. macromanna* is 2-3 mm and females are usually somewhat larger than males.

See McKinney, 1977 (as *Photis* sp. A); McKinney, et al., 1978; McKinney, 1980a.

***Photis melanica* McKinney, 1980
(Figure 187)**

Photis melanica: McKinney, 1980a, pp.57-60, fig. 1.

Photis melanica: Barnard & Karaman, 1991, p. 226.

Regional diagnosis: Antenna 2, posterior margin without long setae; head, ocular lobe subacute distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins lined with long setae; coxa 1 not narrowing distally, tip broadly rounded or subquadrate, anteroventral angle evenly rounded, unproduced, with 2-4 long setae, ventral margin without gap in row of marginal setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxae 3-4 of male without stridulating ridges on ventral margin; gnathopods 1-2 well-developed, propodus, palmar margin not excavate; gnathopod 1 of male, carpus slightly shorter than propodus, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male larger than that of female, basis, anterodistal margin unexpanded, margin and lateral surface without stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palmar angle without spine, with process, process short, broad, straight, dactyl, flexor margin with 1 serration; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; peraeopod 3, merus, posterior margin lined with long plumose setae; peraeopod 5, basis, anterior margin without long marginal or submarginal setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus without posterodistal cluster of very long setae, setae no longer than dactyl, dactyl with accessory claws on extensor margin; uropod 1, outer ramus much shorter than inner, with 2-3 marginal spines, inner ramus with 1-2 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females, rami with 1-2 marginal spines, outer ramus much shorter than inner; uropod 3, peduncle with 1-2 plumose distoventral setae, inner ramus short, approximately one fourth length of outer ramus, subtriangular, margins unconstricted, terminal seta present, seta subequal to ramus in length, outer ramus shorter than peduncle, article 1 with 1-2 long setae on distal margin, article 2 with 2 long terminal setae; telson, tip narrowly rounded.

Distribution: Florida Bay; Tampa Bay; Texas coast south of Galveston (28°00' N to 28°30' N and 95°00' W to 95°30' W) (McKinney, 1980a).

Ecology: In Florida Bay and Tampa Bay, *P. melanica* occurs at depths of 2-6 m on fine sand or sandy mud bottoms with some shell hash present.

Remarks: *Photis melanica* has dark pigment spots on the antennae which are sometimes, but not always, visible in preserved material. It is a relatively small species, with adult sizes ranging from 1.4-3 mm.

See McKinney, 1977 (as *Photis* sp. B); McKinney, 1980a.

***Photis pugnator* Shoemaker, 1945
(Figure 189)**

Photis pugnator: Shoemaker, 1945, pp. 8-11, fig. 4

Regional diagnosis: Antenna 2, posterior margin with scattered long setae; head, ocular lobe sub-acute distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins lined with long setae; coxa 1 narrowing distally, tip narrowly rounded, anteroventral angle evenly rounded, unproduced, with 1-6 long setae, ventral margin without gap in row of marginal setae; coxa 3 of male with stridulating ridges on ventral margin; coxa 4 of male without stridulating ridges on ventral margin; coxae 3-5 of adult male, anteroventral margin beveled or slightly excavate; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus shorter than propodus, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin unexpanded, lateral surface with stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palm deeply excavate, palmar angle without spine, with process, process long, slender, straight, dactyl, flexor margin with 1 serration; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; peraeopod 3, merus, posterior margin lined with long plumose setae; peraeopod 5, basis, anterior margin with long marginal or submarginal plumose setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus without posterodistal cluster of very long setae, setae no longer than dactyl, dactyl without accessory claws on extensor margin; uropod 1, rami subequal in length, outer ramus with 2-4 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females, outer ramus much shorter than inner, with 1 marginal spine, inner ramus with 2 marginal spines; uropod 3, peduncle without distoventral setae, inner ramus short, approximately one fourth length of outer ramus, weakly hourglass-shaped, margins constricted, terminal spine present, one third to one half length of ramus, outer ramus subequal to or slightly longer than peduncle, article 1 with short seta on distal margin, article 2 with 2 long terminal setae; telson, tip subacute.

Distribution: Chesapeake Bay to Beaufort, South Carolina (Shoemaker, 1945); Gulf of Mexico from Texas (McKinney, 1977; 1980a) to the Dry Tortugas, Florida (Shoemaker, 1945).

Ecology: McKinney (1980a) reports that this species is primarily associated with hard-bottom habitats such as 7.5 Fathom Reef in Texas. Although this type of habitat is available in the Dry Tortugas as well, it is not present in a number of other areas where Shoemaker (1945) found *P. pugnator* (eg. Chesapeake, Bay, Tampa Bay, Cedar Key). It is possible that *P. pugnator* inhabits other types of hard substrates in these areas (eg. oyster reefs); however, this species has also been found in large numbers in floating *Sargassum* mats and in shallow, fine sand habitats (pers. obs.). *Photis pugnator* occurs at depths of 0 m (floating at the surface) and 3-16 m.

Remarks: In preserved specimens of *P. pugnator*, coxa 5 often has a circular spot of pigment at the base of the anterior lobe and, in addition, there is sometimes a faint dark band across the body at peraeonite 5. See the **Remarks** section under *P. macromana* for a discussion of the similarities between that species and *P. pugnator*. Adult size in this species ranges from 2.5-4 mm.

See Shoemaker, 1945; McKinney, 1977; McKinney, 1980a.

***Photis trapherus* Thomas and Barnard, 1991**
(Figure 197)

Photis trapherus: Thomas and Barnard, 1991b, pp. 96-100, figs. 1-3.

Regional diagnosis: Antenna 2, posterior margin without long setae; head, ocular lobe rounded distally, inferior antennal sinus very deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins with scattered short, sparse setae; coxa 1 not narrowing distally, tip subquadrate, anteroventral angle evenly rounded, unproduced, with 1-2 short setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxae 3-4 of male without stridulating ridges on ventral margin; gnathopods 1-2 feeble, not sexually dimorphic, propodus, palm very weakly excavate, defined by small process at palmar angle; gnathopod 1, carpus subequal to propodus in length, anterior margin evenly convex, not subquadrate proximally; gnathopod 2, basis, anterodistal margin unexpanded, margin and lateral surface without stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palmar margin without process near dactylar articulation, palmar angle without spine, with process, process short, stout, straight, dactyl, flexor margin with 1-2 spines; peraeopod 3, merus, posterior margin without setae; peraeopod 5, basis, anterior margin without long marginal or submarginal setae; peraeopod 6, propodus without posterodistal cluster of setae; peraeopod 6 of male stout, extremely elongate, approximately as long as body, merus greatly enlarged, without posterodistal process; peraeopod 7, propodus without posterodistal cluster of very long setae, setae shorter than dactyl; peraeopods 6-7, dactyl without accessory claws on extensor margin; uropods 1-2, outer ramus slightly shorter than inner, inner ramus with 2-3 marginal spines, outer ramus with 2 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females; uropod 3, peduncle without distoventral setae, inner ramus long, approximately one third length of outer ramus, lanceolate, margins unconstricted, without terminal spine or seta, outer ramus shorter than peduncle, article 1 with long setae on distal margin, article 2 with minute terminal spinule; telson, tip subacute.

Distribution: Dominica; Dominican Republic; Turks and Caicos Islands; Jamaica; Key Largo, Florida (Thomas and Barnard, 1991b).

Ecology: *Photis trapherus* occurs in relatively shallow water (1-7 m) on algae-covered coarse sand or coral rubble bottoms. It has also been found in muddy sand among mangroves (Thomas and Barnard, 1991b).

Remarks: According to Thomas and Barnard (1991b), the typical male of *P. trapherus* has both gnathopods resembling those of the female; however, they did find that in unusually well-developed males, gnathopod 2 was somewhat larger and of a slightly different morphology than in the typical males. Also, the size and morphology of peraeopod 6 change developmentally in males, from a form that is similar to that of the female in small subadults, through an intermediate form in larger subadults to the final, extremely enlarged form of the adult male (Barnard and Thomas, 1991b). Adult size in *P. trapherus* ranges from 2.5-5 mm.

See Thomas and Barnard, 1991b.

***Photis* sp. C**
(Figure 185)

Regional diagnosis: Antenna 2, posterior margin with scattered long setae; head, ocular lobe rounded distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins lined with long setae; coxa 1 not narrowing distally, tip subquadrate, anteroventral angle produced, forming blunt process, with 4-6 long setae, ventral margin with anterior gap in row of marginal setae; coxae 2-4 of adult male, anteroventral margin beveled; coxae 3-4 of male without stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus subequal to propodus in length, anterior margin subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin unexpanded, margin and lateral surface without stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palm excavate, palmar angle with stout spine, with process, process moderately long, broad, straight, dactyl, flexor margin with 4-5 serrations; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; peraeopod 3, merus, posterior margin lined with long plumose setae; peraeopod 5, basis, anterior margin with submarginal row of long plumose setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus with posterodistal cluster of very long setae, setae much longer than dactyl, dactyl with accessory claws on extensor margin; uropod 1, rami subequal in length, outer ramus with 3-4 marginal spines; uropod 2, peduncle with large distomedial spine, larger in males, outer ramus shorter than inner, with 0-1 marginal spines, inner ramus with 2-3 marginal spines; uropod 3, peduncle without distoventral setae, inner ramus short, approximately one fourth length of outer ramus, lanceolate, margins unconstricted, without terminal spine or seta (minute spinule may be present), outer ramus shorter than peduncle, article 1 with long seta on distal margin, article 2 with 2 long terminal setae; telson, tip subacute.

Distribution: East coast of Florida from Hutchinson Island south to the Florida Keys; Gulf of Mexico from Florida Bay to Perdido Key, Florida.

Ecology: *Photis* sp. C is a fairly widespread species, occurring in both moderately fine, well sorted sand habitats and in grassbeds at depths of 1-8 m.

Remarks: This species is very closely related to *P. spinicarpa* Shoemaker, 1942, from Magdalena Bay, Baja California. The unusual shape of the carpus of the male gnathopod 1 is the same for both species, although *Photis* sp. C lacks the diagnostic spines of *P. spinicarpa* on the anteroproximal margin. In addition, the gnathopods, coxae, peraeopods and uropod 3 are very similar; however, the anterodistal processes on the basis and carpus of the male gnathopod 2 in *P. spinicarpa* are lacking in *Photis* sp. C, the merus of peraeopod 3 is not as broadly expanded in *Photis* sp. C as it is in *P. spinicarpa* and there are differences between the two species in the setation of the peraeopods. In addition, the specimens of *P. spinicarpa* collected by Shoemaker(1942) were found in relatively deep water (10-15 fathoms), while *Photis* sp. C is usually found in shallower waters.

Photis sp. C is a relatively large species, with adult sizes ranging from 4-7 mm, and its size combined with the gap in the long setae lining the ventral margin of coxa 1 and the large distomedial spine on the peduncle of uropod 2 make it fairly easy to separate from other *Photis* species in the region.

***Photis* sp. D**
(Figure 193)

Regional diagnosis: Antenna 2, posterior margin with scattered long setae; head, ocular lobe rounded distally, inferior antennal sinus very deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxae 1-4, ventral margins without setae; coxa 1 not narrowing distally, tip rounded, anteroventral angle unproduced, without setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxae 3-4 of male with stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus subequal to propodus in length, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin expanded, margin with stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palm excavate, palmar angle without spine, with process, process long, slender, curved, dactyl, flexor margin with 1 serration; gnathopod 2 of female, propodus, palmar margin without process near dactylar articulation; peraeopod 3, merus, posterior margin without setae; peraeopod 5, basis, anterior margin without long marginal or submarginal setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus without posterodistal cluster of very long setae, setae no longer than dactyl, dactyl with accessory claws on extensor margin; uropods 1-2, rami without marginal spines, outer ramus much shorter than inner; uropod 2, peduncle with small distomedial spine, similar in males and females; uropod 3, peduncle without distoventral setae, inner ramus long, approximately one third length of outer ramus, lanceolate, margins unconstricted, without terminal spine or seta, outer ramus longer than peduncle, article 1 without setae on distal margin, article 2 with very small terminal setule; telson, tip narrowly rounded.

Distribution: Biscayne Bay; Florida Bay, Florida.

Ecology: *Photis* sp. D occurs in shallow (1-4 m) waters on shelly or muddy sand bottoms in the vicinity of grassbeds.

Remarks: *Photis* sp. D is a very small species (adult size 1-2.5 mm) with relatively poorly setose coxae, peraeopods and uropods. It is the only Florida species other than *Photis* sp. F in which coxa 4 of the adult male has stridulating ridges along the ventral margin and it can be easily distinguished from that species by its much smaller size, the complete lack of setae on coxa 1, the unmodified ischium and carpus on gnathopod 2 of the male and the lack of marginal spines on the rami of uropods 1-2. In addition, the rami of uropod 3 are more elongate than in other regional species of *Photis*. In large males, coxa 2 may also have weak stridulating ridges on ventral margin.

***Photis* sp. E**
(Figure 198)

Regional diagnosis: Antenna 2, posterior margin without long setae; head, ocular lobe subacute distally, inferior antennal sinus moderately recessed for insertion of antenna 2, eye poorly developed, with few ommatidia, ommatidia widely separated; coxae 1-4, ventral margins with single long seta, scattered short setae; coxa 1 not narrowing distally, tip broadly rounded or subquadrate, anteroventral angle evenly rounded, unproduced, with 1 long seta; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxa 3-4 of male without stridulating ridges on ventral margin; gnathopods 1-2 feeble, not sexually dimorphic, propodus, palm weakly convex, palmar angle without defining process; gnathopod 1, carpus subequal to propodus in length, anterior margin evenly convex, not subquadrate proximally; gnathopod 2, basis, anterodistal margin unexpanded, margin and lateral surface without stridulating ridges, ischium, anteromedial margin without linguiform, laminar process, carpus without anterodistal setose process, propodus, palmar margin without process near dactylar articulation, palmar angle without spine or process, dactyl, flexor margin with 1 spine; peraeopod 3, merus, posterior margin without setae; peraeopod 5, basis, anterior margin with scattered, moderately long simple setae; peraeopod 6 of female, propodus without posterodistal cluster of long setae, setae no longer than dactyl; peraeopod 6 of male stout, extremely elongate, approximately as long as body, merus greatly enlarged, with posterodistal process, propodus without posterodistal cluster of setae; peraeopod 7, propodus without posterodistal cluster of very long setae, setae no longer than dactyl; peraeopods 6-7, dactyl without accessory claws on extensor margin; uropods 1-2, outer ramus slightly shorter than inner, rami with 0-1 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females; uropod 3, peduncle without distoventral setae, inner ramus short, approximately one fourth length of outer ramus, subtriangular, margins unconstricted, without terminal spine or seta, outer ramus shorter than peduncle, article 1 with long setae on distal margin, article 2 with minute terminal spinule; telson, tip subacute.

Distribution: Biscayne Bay; Florida Bay; Florida Keys.

Ecology: Specific habitat information for this species is unknown.

Remarks: In *Photis* sp. E, the buccal mass appears larger relative to the size of the head than in other *Photis* species. In addition, as in *Photis trapherus*, which this species strongly resembles, peraeopod 6 of the male changes developmentally in both size and morphology. It is similar to that of the female in small subadult males, the merus is enlarged, but peraeopod 6 is not greatly increased in length in larger subadults, while in adult males, the merus has a bifurcate process on the posterodistal margin and the length of peraeopod six is approximately as long as the body. These changes are gradual, occurring over several molts, and many intermediate forms of peraeopod 6 may be found. *Photis* sp. E can be readily distinguished from *P. trapherus* by the subacute ocular lobe, the relatively poorly developed eye, the presence of a long seta on the ventral margin of coxae 1-4, the lack of a defining process at the palmar angle on gnathopods 1-2, the presence of a posterodistal process on the merus of peraeopod 6 in the adult male and the longer inner ramus of uropod 3. *Photis* sp. E also seems to be a somewhat smaller species than *P. trapherus*, with adults ranging in size from 1-2.5 mm.

***Photis* sp. F**
(Figure 196)

Regional diagnosis: Antenna 2, posterior margin lined with long setae; head, ocular lobe rounded distally, inferior antennal sinus deeply recessed for insertion of antenna 2, eye well-developed, with many ommatidia, ommatidia closely appressed; coxa 1 not narrowing distally, tip broadly rounded, anteroventral angle unproduced, with 1-2 long setae, ventral margin with sparse short setae; coxae 2-4, ventral margins without long setae, with sparse short setae; coxae 2-5 of adult male, anteroventral margin evenly rounded; coxa 3-4 of male with stridulating ridges on ventral margin; gnathopods 1-2 well-developed; gnathopod 1 of male, carpus subequal to propodus in length, anterior margin evenly convex, not subquadrate proximally; gnathopod 2 sexually dimorphic; gnathopod 2 of male much larger than that of female, basis, anterodistal margin expanded, margin with stridulating ridges, ischium, anteromedial margin with linguiform, laminar process, carpus with anterodistal setose process, propodus, palm not excavate, palmar angle without spine, with process, process of medium length, broad, straight, medially directed, dactyl, flexor margin with 1 serration, 3-4 very small subtriangular spines; gnathopod 2 of female, propodus, palmar margin with small process near dactylar articulation; peraeopod 3, merus, posterior margin with 1-2 short simple setae; peraeopod 5, basis, anterior margin without long marginal or submarginal setae; peraeopod 6 of male not extremely stout or elongate, much shorter than body, merus normal, not greatly enlarged, without posterodistal process; peraeopods 6-7, propodus with posterodistal cluster of long setae, setae slightly longer than dactyl, dactyl with accessory claws on extensor margin; uropods 1-2, outer ramus slightly shorter than or subequal to inner ramus, with 1-2 marginal spines; uropod 2, peduncle with small distomedial spine, similar in males and females, inner ramus with 1 marginal spine; uropod 3, peduncle without distoventral setae, inner ramus short, approximately one fourth length of outer ramus, subtriangular, margins unconstricted, without terminal spine or seta, outer ramus subequal to peduncle in length, article 1 with short seta on distal margin, article 2 with 2 long terminal setae; telson, tip subacute.

Distribution: Biscayne Bay, Florida.

Ecology: Specific habitat information for this species is unknown.

Remarks: *Photis* sp. F resembles *P. longicaudata* in the deeply recessed inferior antennal sinus, the poorly setose coxae 1-4, the morphology of gnathopod 1, the morphology of the female gnathopod 2, the size and shape of the anterodistal expansion of the basis of the male second gnathopod, the multiple serrations on the flexor margin of the dactyl of gnathopod 2, and the lack of spines on the inner ramus of uropod 1. However, unlike *P. longicaudata*, *Photis* sp. F has 1-2 long setae on the anteroventral angle of coxa 1, stridulating ridges on coxa 4 of the male as well as on coxa 3, an accessory claw on the dactyl of peraeopod 7, and the form of the ischium, carpus and propodus of the male second gnathopod is quite different. In fact, the second gnathopod of adult male *Photis* sp. F is unique and much more sculptured in its ornamentation than that of any other regional *Photis* species. Additionally, as mentioned for *Photis* sp. D, that species and *Photis* sp. F are the only two Florida members of the genus to have stridulating ridges on the ventral margin of coxa 4 in the male (see the **Remarks** section under *Photis* sp. D for characters useful in separating these two species). Adult size in *Photis* sp. F ranges from 2-4 mm.

Family Oedicerotidae Liljeborg, 1865

Regional diagnosis: Antenna 1 well-developed, reaching well beyond peduncle article 4 of antenna 2; antenna 2 at least one half length of antenna 1; head normal, not globular, rostrum strong, downcurved; eyes dorsolateral, closely approximated or fused dorsally, without 4 paired peripheral facets; mandible with both palp and molar, molar may be reduced; maxilliped, palp article 4 normally developed, not vestigial; coxae 1-3 subequal in depth or becoming longer posteriorly; coxae 1-2 not reduced, not hidden by following coxae; gnathopod 1 well-developed, subchelate, with 7 articles; gnathopod 2, article 3 not elongate, less than twice as long as wide; pereopod 7 much longer and more slender than pereopod 6, attenuate distally; urosome segments 1-3 separate, segment 1 not elongate; uropod 3 biramous; telson entire.

Florida genera: *Americhelidium*, *Ameroculodes*, *Deflexilodes*?, *Hartmanodes*, *Perioculodes*

KEY TO FLORIDA GENERA OF OEDICEROTIDAE

1. < Antennae 1 of female subequal to antenna 2 in length; mandible, molar reduced, with 1-2 apical spines; gnathopod 1, carpal lobe very slender, extending well beyond palmar angle of propodus; pereopod 7, dactyl with posterior margin lacking fringe of long setae 2

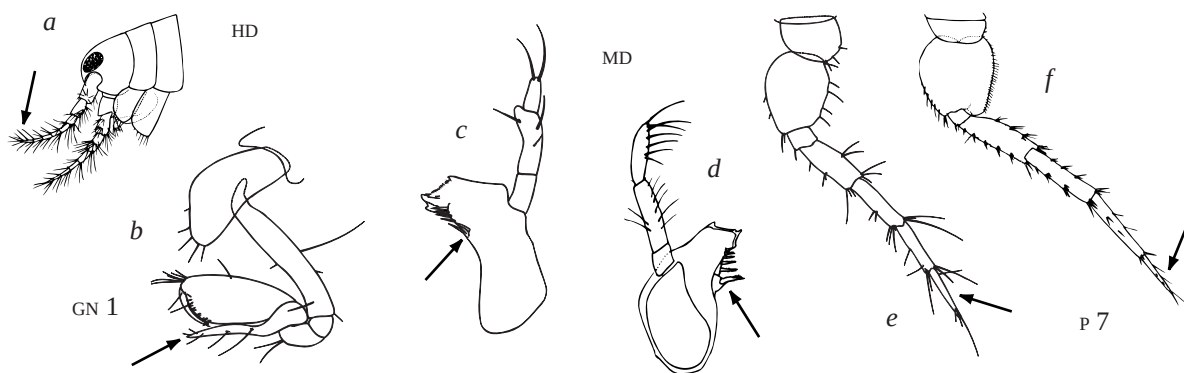


Figure 199.

- < Antennae 1 of female shorter than antenna 2; mandible, molar usually well-developed, if reduced then lacking apical spines; gnathopod 1, carpal lobe relatively broad, not extending well beyond palmar angle of propodus (may extend slightly beyond angle); pereopod 7, dactyl with posterior margin having fringe of long setae 3

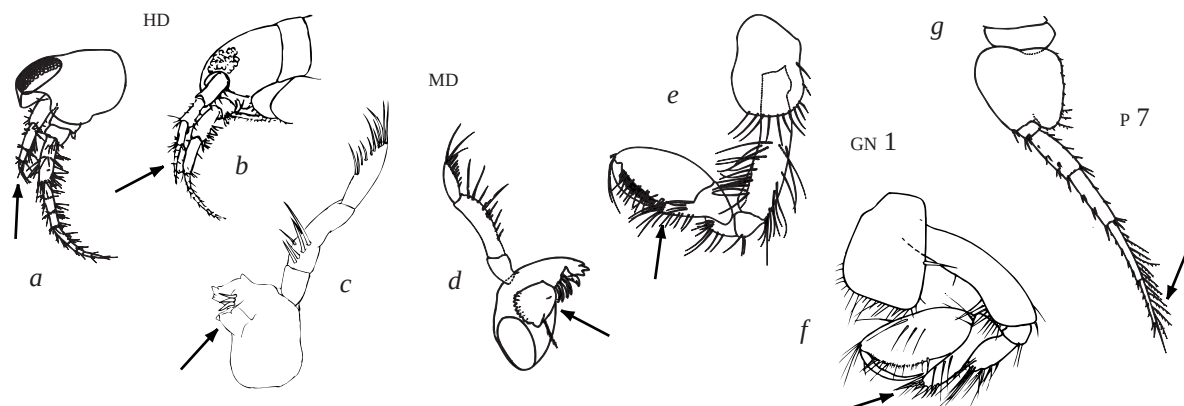


Figure 200.

2. < Antenna 2 of male much longer than that of female, flagellum nearly as long as body;
gnathopod 2 chelate; peraeopods 3-4, propodus subovate, dactyl short, stubby, less than one
quarter length of propodus; peraeopod 7, basis, posterior margin lined with fringe of short
setae, carpus and propodus, posterior margin with several spine groups; telson subtruncate
.....*Americhelidium*

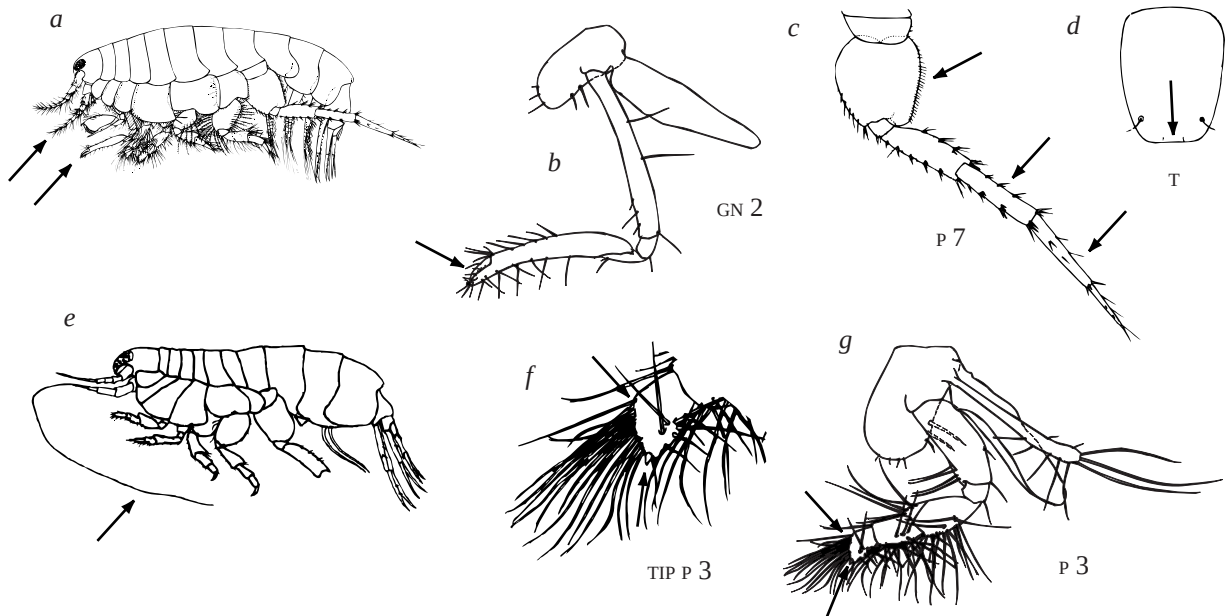


Figure 201.

- < Antenna 2 of male similar to that of female, flagellum not elongate; gnathopod 2 subchelate;
peraeopods 3-4, propodus subrectangular, dactyl elongate, at least one half length of
propodus; peraeopod 7, basis, posterior margin with scattered, moderately long setae, carpus
and propodus, posterior margin without spine groups; telson subovate *Periocolodes*

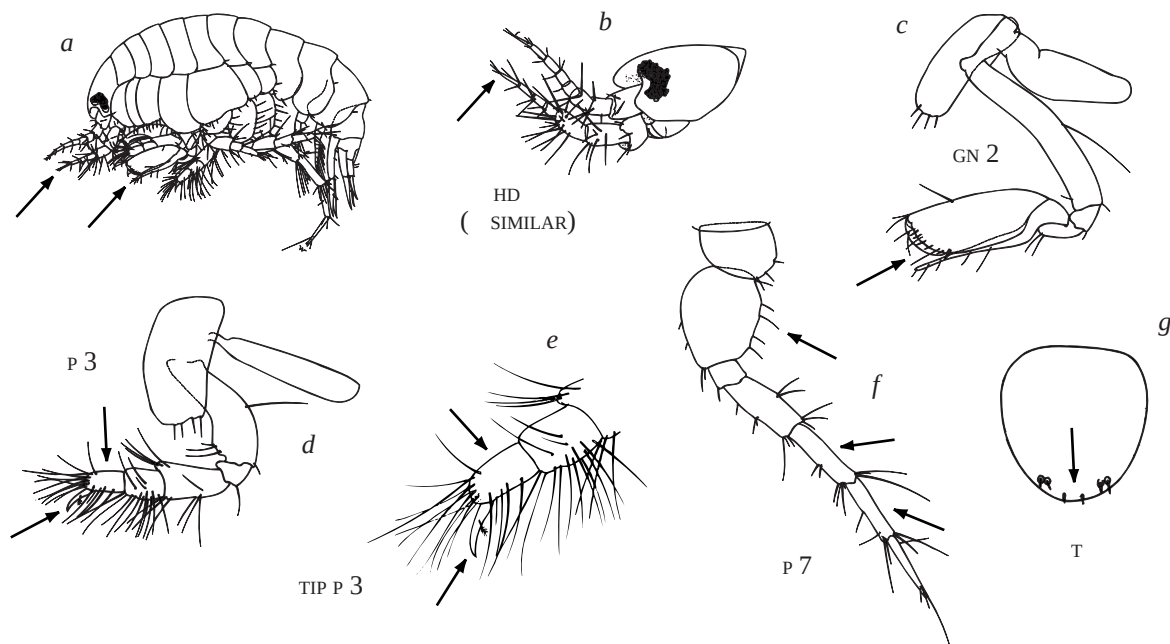


Figure 202.

3. < Antenna 1 of female longer than peduncle of antenna 2; antenna 2 weakly sexually dimorphic, flagellum of male slightly longer than that of female; maxilliped, palp article 2 subtruncate distally, distomedial angle expanded, subquadrate; pereopods 3-4, propodus subovate, dactyl short, stout, no more than one third length of propodus; pereopods 5-6, dactyl short, no more than one half length of propodus; pereopod 7, basis with medial, submarginal row of long, dense setae *Ameroculodes*

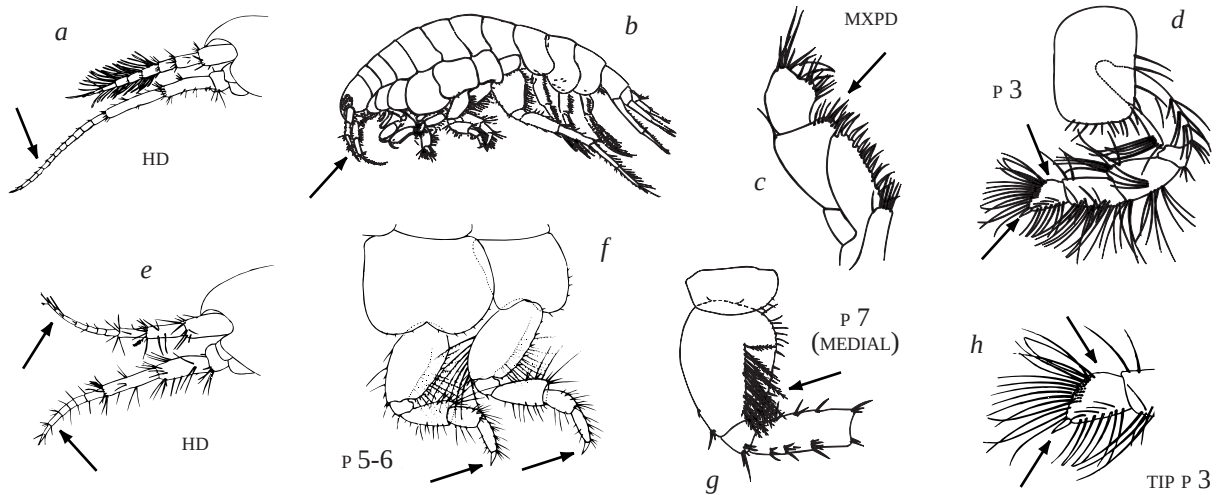


Figure 203.

- < Antenna 1 of female subequal to or shorter than peduncle of antenna 2; antenna 2 strongly sexually dimorphic, flagellum of male much longer than that of female; maxilliped, palp article 2 not subtruncate distally, distomedial angle flattened or rounded, not expanded; pereopods 3-4, propodus subrectangular, dactyl elongate, slender, at least one half length of propodus; pereopods 5-6, dactyl elongate, subequal to propodus in length; pereopod 7, basis without medial, submarginal row of long setae (may have several long medial setae at posterodistal angle) 4

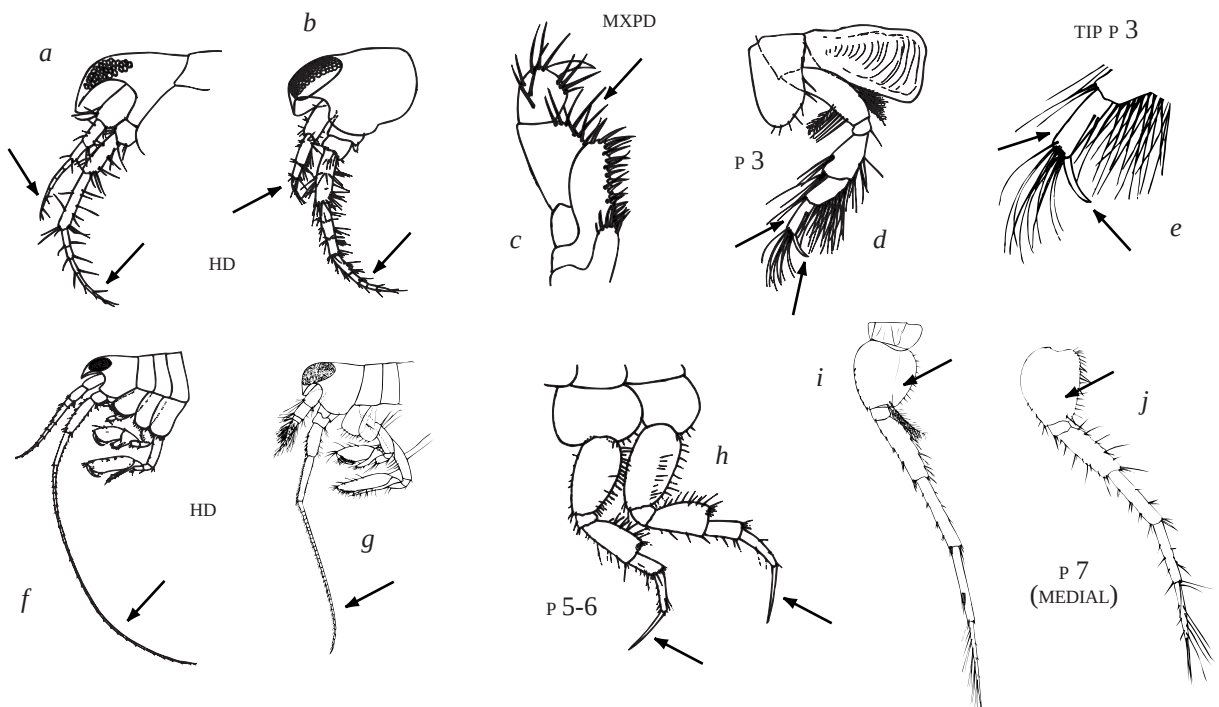


Figure 204.

4. < Head, anterodorsal angle broadly subquadrate, anterior margin vertical or slightly recurved; maxilla 1, inner plate with 1 apical seta; coxae 1-3 of female somewhat reduced, coxa 3 much shorter than coxa 4, narrowly rounded distally, posteroventral angle beveled; gnathopod 1, carpus with anterior margin short, shorter than posterior margin of merus, carpal lobe extending slightly beyond palmar angle of propodus; pereopods 3-4, dactyl shorter than setae on anterodistal angle of propodus *Hartmanodes*

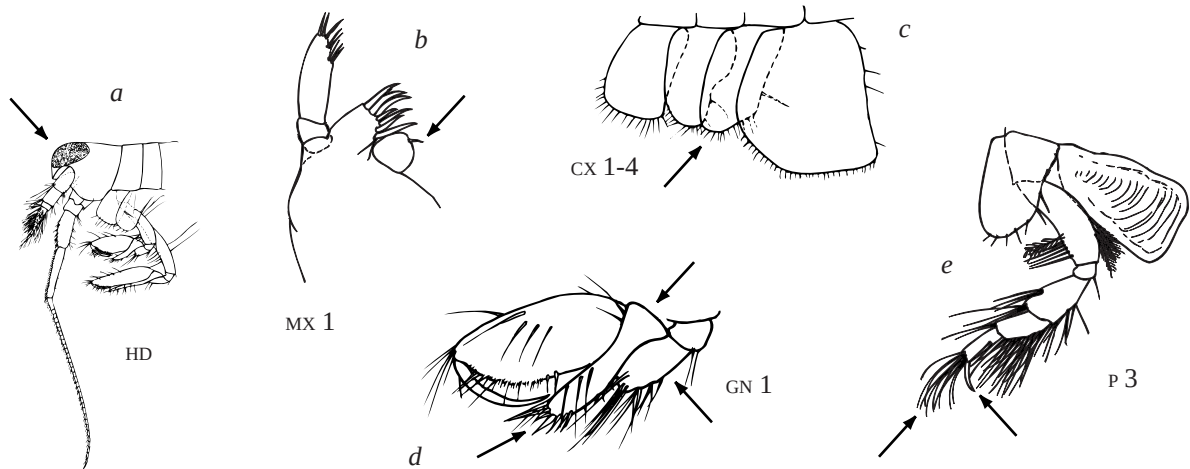


Figure 205.

- < Head, anterodorsal angle broadly rounded, anterior margin not vertical or recurved; maxilla 1, inner plate with 2 apical setae; coxae 1-3 of female not reduced, coxa 3 subequal to coxa 4 in length, broadly rounded distally, posteroventral angle convex; gnathopod 1, carpus with anterior margin long, longer than posterior margin of merus, carpal lobe not extending beyond palmar angle of propodus; pereopods 3-4, dactyl longer than setae on anterodistal angle of propodus *Deflexilodes*?

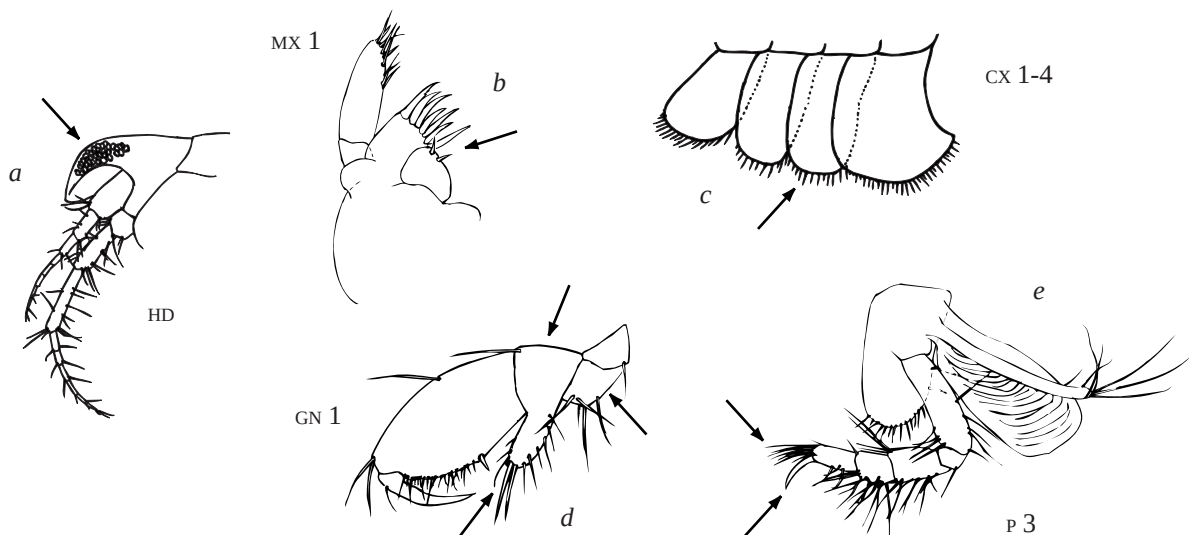


Figure 206.

Genus *Americhelidium* (Sars, 1892)

Regional diagnosis: Antenna 1 of female subequal to antenna 2 in length; antenna 2 strongly sexually dimorphic, that of male much longer than that of female, nearly as long as body; head, anterodorsal angle broadly rounded, anterior margin vertical or slightly recurved; mandible, molar reduced, with 1-2 apical spines; maxilla 1, inner plate with 1 apical seta; maxilliped, palp article 2 not subtruncate distally, distomedial angle rounded, not expanded; coxae 1-3 of female not reduced, coxa 3 slightly shorter than coxa 4, broadly rounded distally, posteroventral angle convex; gnathopod 1, carpus with anterior margin short, shorter than posterior margin of merus, carpal lobe very slender, extending well beyond palmar angle of propodus; gnathopod 2 chelate; pereaeopods 3-4, propodus subovate, dactyl short, stubby, less than one quarter length of propodus, much shorter than setae on anterodistal angle of propodus; pereaeopods 5-6, dactyl short, no more than one half length of propodus; pereaeopod 7, basis, posterior margin with medial, submarginal row of long setae, carpus and propodus, posterior margin with several spine groups, dactyl, posterior margin without fringe of long setae; telson subtruncate.

Florida species: *A. americanum*, *Americhelidium* sp. A

Remarks: The slender, chelate second gnathopod sets members of this genus apart from all other oedicerotids in the area.

KEY TO FLORIDA SPECIES OF *AMERICHELIDIUM*

1. < Gnathopod 2, propodus very elongate, 6-7 times length of dactyl; pereaeopod 3, propodus with anteroproximal margin subequal to anterodistal margin, dactyl very short, stubby; coxa 4, posteroventral angle moderately produced; coxa 6, posteroventral angle broadly rounded; pereaeopod 7, merus with spines on posterior margin short, shorter than width of article; epimeron 3, anteroventral margin broadly produced in females ..*Americhelidium americanum*

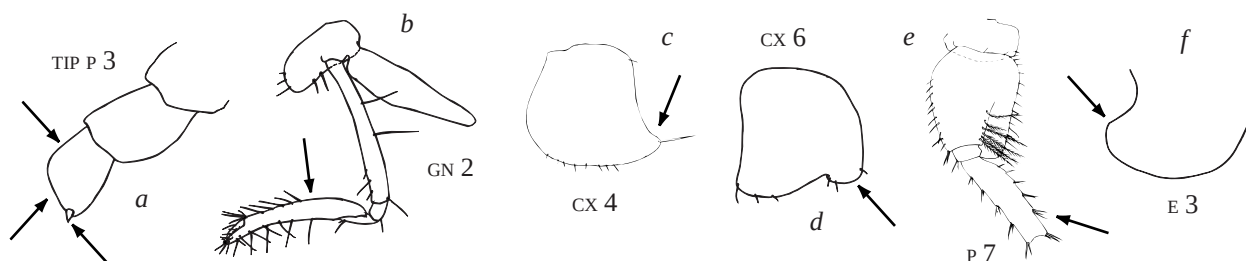


Figure 207.

- < Gnathopod 2, propodus elongate, 4-5 times length of dactyl; pereaeopod 3, propodus with anteroproximal margin longer than anterodistal margin, dactyl short, slender; coxa 4, posteroventral angle very slightly produced; coxa 6, posteroventral angle narrowly rounded; pereaeopod 7, merus with spines on posterior margin long, subequal to width of article; epimeron 3, anteroventral margin narrowly produced in females *Americhelidium* sp. A

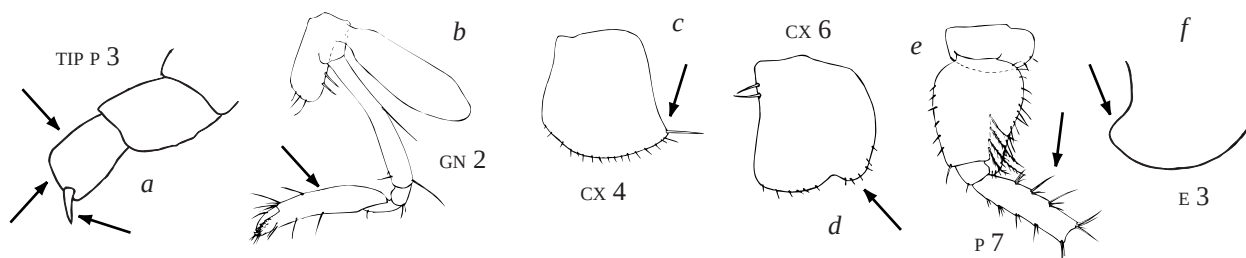


Figure 208.

***Americhelidium americanum* (Bousfield, 1973)
(Figure 207)**

Synchelidium americanum: Bousfield, 1973, pp. 98-99, pl. XX.1.

Americhelidium americanum: Bousfield and Chevrier, 1996, p. 128.

Regional diagnosis: Gnathopod 2, propodus very elongate, 6-7 times length of dactyl; coxa 4, posteroventral angle moderately produced; coxa 6 broad, only slightly deeper than wide, posteroventral angle broadly rounded; peraeopod 3, propodus with anteroproximal margin subequal to anterodistal margin in length, dactyl very short, stubby; peraeopod 7, merus with spines on posterior margin short, shorter than width of article; epimeron 3, anteroventral margin broadly produced in both males and females.

Distribution: Atlantic coast of the U.S. from central Maine south to the Florida Keys (Bousfield, 1973; Thomas, 1993); Gulf of Mexico (McKinney, 1977; Rakocinski, et al., 1993); Belize (Thomas, 1993).

Ecology: This common burrowing species prefers well-sorted sand sediments and can occur on open or semiprotected beaches (Bousfield, 1973), as well as in forereef, lagoon and rubble habitats in tropical areas (Thomas, 1993). *Americhelidium americanum* is usually found in fairly shallow water, at depths of 1-7 m (Thomas, 1993).

Remarks: *Americhelidium americanum* is the only species of the genus described to date from the northwestern Atlantic. However, there appears to be a considerable amount of variation in several key characters (eg. the elongation of gnathopod 2, the shape of the propodus and the size of the dactyl of peraeopod 3) for material from this region and there is at least one additional undescribed species (*Americhelidium* sp. A) occurring in South Florida. A careful examination of material from the east coast of the United States, the Caribbean and the Gulf of Mexico is needed to determine if there are just one or two widespread species present or a complex of a number of very similar species. Adult size for *A. americanum* ranges from 4-6 mm.

See Bousfield, 1973 (as *Synchelidium americanum*); Thomas, 1993 (as *Synchelidium americanum*); Bousfield and Chevrier, 1996.

***Americhelidium* sp. A
(Figure 208)**

Regional diagnosis: Gnathopod 2, propodus elongate, 4-5 times length of dactyl; coxa 4, posteroventral angle very slightly produced; coxa 6 narrow, distinctly deeper than wide, posteroventral angle narrowly rounded; peraeopod 3, propodus with anteroproximal margin longer than anterodistal margin, dactyl short, slender; peraeopod 7, merus with spines on posterior margin long, longer than width of article; epimeron 3, anteroventral margin narrowly produced in females, broadly produced in males.

Distribution: South Florida from Biscayne Bay and Florida Bay through the Florida Keys.

Ecology: *Americhelidium* sp. A occurs in shallow (4-10 m) fine sand or sandy shell habitats.

Remarks: *Americhelidium* sp. A has probably often been confused with *A. americanum* in the past and, because of this, the distributions of both species need to be reexamined. This species tends to be somewhat smaller than *A. americanum*, with adult sizes ranging from 3-4 mm.

Genus *Ameroculodes* Stimpson, 1853

Regional diagnosis: Antenna 1 of female shorter than antenna 2, longer than peduncle of antenna 2; antenna 2 weakly sexually dimorphic, that of male longer than that of female, approximately one half length of body; head, anterodorsal angle broadly rounded, anterior margin vertical or angled forward, not recurved; mandible, molar well-developed, without apical spines; maxilla 1, inner plate with 2-3 apical setae; maxilliped, palp article 2 subtruncate distally, distomedial angle expanded, subquadrate; coxae 1-3 of female not reduced, coxa 3 slightly shorter than coxa 4, subtruncate distally, posteroventral angle subquadrate; gnathopod 1, carpus with anterior margin long, subequal to or longer than posterior margin of merus, carpal lobe relatively broad, not extending well beyond palmar angle of propodus; gnathopod 2 subchelate; pereopods 3-4, propodus subovate, dactyl short, stout, no more than one third length of propodus, much shorter than setae on anterodistal angle of propodus; pereopods 5-6, dactyl short, no more than one half length of propodus; pereopod 7, basis, posterior margin with medial, submarginal row of long dense setae, carpus, posterior margin with several spine groups, propodus, posterior margin with fringe of long setae distally, dactyl, posterior margin with fringe of long setae; telson subtruncate or subovate.

Florida species: *Ameroculodes* sp. A

Ameroculodes sp. A (Figure 203)

Monoculodes n. sp.: Saloman, 1976, p. 49.

?*Monoculodes edwardsi*: Nelson, 1995, p. 147.

Monoculodes sp. A: Rakocinski, et al., 1996, p. 350.

Ameroculodes edwardsi: Camp, 1998, p. 130.

Regional diagnosis: Head, rostrum strongly deflexed, anterior margin nearly vertical, eye large; mandible, palp article 3 one half length of article 2; pereopods 3-4, dactyl short, approximately one third length of propodus; pereopod 7, basis with posterodistal lobe reduced; epimeron 2-3, posteroventral angle rounded; telson subovate, tip rounded.

Distribution: Atlantic coast of the U.S. from New Jersey (Foster and Heard, in prep.) south to northeast Florida; Gulf of Mexico from St. Petersburg, Florida (pers. obs.) to Lake Pontchartrain, Louisiana (Foster and Heard, in prep.).

Ecology: *Ameroculodes* sp. A occurs in relatively shallow (just below swash zone - 4 m) coastal and estuarine habitats in medium to fine sand or silty sand (Foster and Heard, in prep.). It is a common species and at times is quite abundant, especially during the winter months.

Remarks: According to Bousfield and Chevrier (1996) there are at least 5 species of this genus occurring in coastal North American Atlantic waters. These include *A. edwardsi* Holmes, 1905 and *Ameroculodes* species (= *Monoculodes edwardsi* of Bousfield, 1973) from the northeastern coast of the U.S., as well as 3 additional undescribed species from the southeastern coast. One of these species is undoubtedly *Ameroculodes* sp. A and it is possible that the remaining 2 may occur in Florida as well. *Ameroculodes* sp. A can be distinguished from *A. edwardsi* and *Ameroculodes* species by the following: (1) the rounded posteroventral angle of epimera 2-3 (subquadrate in *A. edwardsi*, subquadrate or subacute in *Ameroculodes* species), (2) the large eye (small in *A. edwardsi*, large in *Ameroculodes* species), (3) the more strongly deflexed rostrum (only moderately deflexed in *A. edwardsi* and *Ameroculodes* species), (4) the length of article 3 of the mandibular palp (three fourths length of article 2 in *A. edwardsi*, one half length of article 2 in *Ameroculodes* species), (5) the reduced posterodistal lobe of the basis of pereopod 7 (developed into a distinct lobe in *A. edwardsi* and *Ameroculodes* species), and (6) the rounded telson tip (subquadrate in *A. edwardsi* and *Ameroculodes* species). Adult size for *Ameroculodes* sp. A ranges from 4-7 mm.

See Bousfield and Chevrier, 1996.

Genus *Deflexilodes*? Stimpson, 1853

Regional diagnosis: Antenna 1 of female shorter than antenna 2, subequal to or shorter than peduncle of antenna 2; antenna 2 strongly sexually dimorphic, that of male much longer than that of female, nearly as long as body; head, anterodorsal angle broadly rounded, anterior margin angled forward, not vertical or recurved; mandible, molar somewhat reduced, without apical spines; maxilla 1, inner plate with 2 apical setae; maxilliped, palp article 2 not subtruncate distally, distomedial angle flattened or rounded, not expanded; coxae 1-3 of female not reduced, coxa 3 subequal to coxa 4 in length, broadly rounded distally, posteroventral angle convex; gnathopod 1, carpus with anterior margin long, longer than posterior margin of merus, carpal lobe relatively broad, not extending beyond palmar angle of propodus; gnathopod 2 subchelate; pereopods 3-4, propodus subrectangular, dactyl elongate, slender, at least one half length of propodus, longer than setae on anterodistal angle of propodus; pereopods 5-6, dactyl elongate, subequal to propodus in length; pereopod 7, basis, posterior margin without medial, submarginal row of long setae, carpus, posterior margin with several spine groups, propodus and dactyl, posterior margin with fringe of long setae, somewhat denser in male than in female, telson subtruncate.

Florida species: *Deflexilodes*? sp. A

Remarks: Although P7 doesn't have a row of long submarginal setae on the posterior margin of the basis, several long medial setae may be present at the posteroventral angle. No male specimens were available, so male characters mentioned in the generic diagnosis pertain to other members of the genus. Differs from the diagnosis of the genus given by Bousfield and Chevrier (1996) in having only 6 instead of 9 terminal spines on the outer plate of maxilla 1.

Deflexilodes? sp. A (Figure 206)

?*Monoculodes* cf. *M. intermedius*: Camp, et al., 1977, p. 19.

?*Monoculodes* cf. *intermedius*: Ortiz, 1979, p. 20.

?*Deflexoides intermedius*: Camp, 1998, p. 130.

Regional diagnosis: Head, anterior margin of rostrum angled forward slightly; coxa 5 broader than deep; gnathopod 1, carpal lobe extending slightly beyond palmar angle; gnathopod 2, carpal lobe diverging slightly from posterior margin of propodus, propodus with anterior and posterior margins subparallel; pereopods 3-4, dactyl subequal to propodus in length; pereopod 5, propodus relatively stout, subequal to carpus in length, dactyl slightly longer than propodus; pereopod 7, basis longer than wide; telson slightly longer than wide, subrectangular.

Distribution: Hutchinson Island, Florida? (Camp, et al., 1977), South Florida.

Ecology: The specific habitat remains unknown for this species, but probably consists of relatively fine sand. Specimens of ?*Monoculodes* cf. *intermedius*, which may prove to be *Deflexilodes*? sp. A, were found in fine-very fine sand at a depth of approximately 8.5 m (Camp, et al., 1977).

Remarks: The only other known western Atlantic species of *Deflexilodes* is *D. intermedius*, a North Atlantic - Boreal species that occurs as far south as Cape Cod (Bousfield, 1973; Bousfield and Chevrier, 1996). *Deflexilodes*? sp. A differs from *D. intermedius* in having the anterior margin of the rostrum slightly more vertical, 6 terminal spines on the outer plate of maxilla 1 (9 in *D. intermedius*), gnathopod 1 with the carpal lobe extending slightly beyond the palmar angle (not quite reaching palmar angle in *D. intermedius*), gnathopod 2 with the carpal lobe diverging slightly from the posterior margin of the propodus (diverging strongly in *D. intermedius*), pereopods 3-4 with the dactyl subequal to the propodus in length (longer than propodus in *D. intermedius*), pereopod 5 with a

stout propodus that is subequal to the carpus in length (slender and longer than carpus in *D. intermedius*), and the telson slightly longer than wide and subrectangular (distinctly longer than wide and subovate with a slightly flattened tip in *D. intermedius*). In addition, ovigerous females of *Deflexilodes?* sp. A reach a size of only 3 mm (males unknown), as opposed to a size range of 6-8 mm for *D. intermedius*.

See Camp, et al., 1977 (as *Monoculodes cf intermedius*); Bousfield and Chevrier, 1996.

Genus *Hartmanodes* Bousfield and Chevrier, 1996

Regional diagnosis: Antenna 1 of female shorter than antenna 2, subequal to or shorter than peduncle of antenna 2; antenna 2 strongly sexually dimorphic, that of male much longer than that of female, approximately three fourths length of body; head, anterodorsal angle broadly subquadrate, anterior margin vertical or slightly recurved; mandible, molar well-developed, without apical spines; maxilla 1, inner plate with 1 apical seta; maxilliped, palp article 2 not subtruncate distally, distomedial angle rounded, not expanded; coxae 1-3 of female somewhat reduced, coxa 3 much shorter than coxa 4, narrowly rounded distally, posteroventral angle flattened; gnathopod 1, carpus with anterior margin short, shorter than posterior margin of merus; carpal lobe relatively broad, extending slightly beyond palmar angle of propodus; gnathopod 2 subchelate; pereopods 3-4, propodus subrectangular, dactyl elongate, slender, at least one half length of propodus, shorter than setae on anterodistal angle of propodus; pereopods 5-6, dactyl elongate, subequal to propodus in length; pereopod 7, basis, posterior margin without medial, submarginal row of long setae, carpus and propodus, posterior margin with several spine groups, dactyl, posterior margin with fringe of long setae, denser in male than in female; telson subtruncate.

Florida species: *H. nyei*

Remarks: As in the genus *Deflexilodes?*, there may be several long medial, submarginal setae on the posteroventral angle of the basis of pereopod 7; however, the dense submarginal row of long setae present in *Americhelidium* and *Ameroculodes* is lacking in *Hartmanodes*.

Hartmanodes nyei (Shoemaker, 1933) (Figure 205)

Monoculodes nyei: Shoemaker, 1933b, p.9, fig. 5.

Hartmanodes nyei: Bousfield and Chevrier, 1996, p. 92.

Regional diagnosis: That of the genus.

Distribution: Biscayne Bay, Florida; Florida Keys; Gulf of Mexico from Florida to southern Texas; Belize; Brazil (Shoemaker, 1933b; Rakocinski, et al., 1993, 1996; Thomas, 1993). This species has also been reported from the Gulf of California on the Pacific coast of North America (Barnard, 1962).

Ecology: *Hartmanodes nyei* occurs in fine to medium sand in back reef, lagoon or open beach habitats at depths of 1-7 m (Thomas, 1993; Rakocinski, et al., 1993, 1996).

Remarks: This species is most easily recognized by the subquadrate anterodorsal margin of the head, the elongate propodus of gnathopod 2 and the subrectangular propodus and elongate dactyl on pereopod 3. Adult size ranges from 4-6 mm.

See Shoemaker, 1933b (as *Monoculodes nyei*); Bousfield and Chevrier, 1996.

Genus *Periiculodes* Sars, 1895

Regional diagnosis: Antenna 1 of female subequal to antenna 2 in length; antenna 2 not sexually dimorphic, that of male similar to that of female, not elongate; head, anterodorsal angle moderately curved, anterior margin angled forward, not vertical or recurved; mandible, molar reduced, with 1-2 apical spines; maxilla 1, inner plate with 1 apical seta; maxilliped, palp article 2 not subtruncate distally, distomedial angle rounded, not expanded; coxae 1-3 of female somewhat reduced, coxa 3 shorter than coxa 4, subtruncate distally, posteroventral angle subquadrate; gnathopod 1, carpus with anterior margin short, shorter than posterior margin of merus, carpal lobe very slender, extending well beyond palmar angle of propodus; gnathopod 2 subchelate; peraeopods 3-4, propodus subrectangular, dactyl elongate, at least one half length of propodus, shorter than setae on anterodistal angle of propodus; peraeopods 5-6, dactyl moderately long, slightly shorter than propodus in length; peraeopod 7, basis, posterior margin without medial, submarginal row of long setae, carpus and propodus, posterior margin with distal spines only, dactyl, posterior margin without fringe of long setae; telson subovate.

Florida species: *P. cerasinus*

Periiculodes cerasinus Thomas and Barnard, 1985 (Figure 202)

Periiculodes cerasinus: Thomas and Barnard, 1985a, pp. 99-105, figs. 1-3.

Regional diagnosis: That of the genus.

Distribution: Biscayne Bay, Florida; Florida Keys; Tobago; Belize (Thomas and Barnard, 1985a); Southwestern Gulf of Mexico.

Ecology: *Periiculodes cerasinus* is a cryptic infaunal species occurring on coral or coral rubble bottoms, possibly living in small patches of fine sediment (Thomas and Barnard, 1985a; Thomas, 1993). It may also be found on algae-covered sand bottoms and occurs at depths of 1-8 m (Thomas and Barnard, 1985a).

Remarks: This is a small, compact species, with adult sizes ranging from 1.5-3 mm. In life, the color is white or ivory with bright red, crescent-shaped eyes and the red eye color is retained in fresh, formalin preserved material (Thomas and Barnard, 1985a). However, this color fades over time in alcohol and the eyes become very difficult to see.

See Thomas and Barnard, 1985a; Thomas, 1993.

GLOSSARY

- Abdomen** - the posterior six body segments, consisting of three anterior pleon segments and three posterior urosome segments.
- Accessory claw** - small curved subapical process on the extensor margin of the dactyl.
- Accessory eye** - small cluster of one to several ommatidia located adjacent to the primary eye.
- Accessory flagellum** - small secondary ramus of antenna 1, attached to the distomedial margin of peduncle article 3; may be vestigial or lacking, rarely as long as the primary flagellum.
- Acuminate** - produced into a sharp point; acute.
- Acute** - sharply pointed.
- Antenna** - one of two paired, multi-articulate appendages attached to the anterodorsal margin of the head, anterior to the mouthparts. In amphipods, these appendages are referred to as antenna 1 (anterior pair) and antenna 2 (posterior pair). In most other crustacean groups, however, the term antenna refers only to the second, or posterior, pair of these appendages, with the first being referred to as the antennule.
- Antennal sinus** - one of two emarginations of the anterior margin of the head, separated by the cephalic or ocular lobe, that allow the sideways rotation of the antennae. The superior antennal sinus lies at the base of antenna 1; the inferior antennal sinus lies at the base of antenna 2.
- Anterior** - front end; towards the front.
- Apical** - at the apex, tip or distal end; terminal.
- Article** - individual unit or subdivision of an appendage.
- Attenuate** - very slender, weak.
- Basis** - article 2 of a gnathopod or peraeopod.
- Basofacial spine** - stout spine located on the proximolateral surface of the peduncle of uropod 1 in some amphipod groups.
- Beveled** - diagonally truncated; oblique.
- Biarticulate** - composed of two articles.
- Bifurcate** - divided into two non-articulating branches; forked.
- Biramous** - having two articulating branches (rami).
- Brood plate** - see **oostegite**.
- Brood pouch** - see **marsupium**.
- Buccal mass** - conical, subquadrate or styliform bundle made up of closely appressed mouthparts, located on the ventral surface of the head.
- Calceoli** - small disk-like, rounded or oblong articulated sensory structures attached to the segments of the antennal peduncle and flagellum.
- Carapace** - cuticular layer attached to the posterior margin of the head and extending anteriorly and posteriorly, often covering the entire head and thorax; present in many crustaceans, but not found in amphipods.
- Carinate** - having at least one laterally compressed, acute ridge, carina, or keel; usually dorsal.
- Carpal lobe** - expansion or elongation of the posterior margin of the carpus, often extending distally along the posterior margin of the propodus.
- Carpochelate** - condition of a prehensile appendage, usually a gnathopod, in which it is formed by the closure of the dactylus (article 7) on a fixed projection of the carpus (article 5).
- Carpus** - article 5 of a gnathopod or peraeopod.

Castellate - lined with short, closely-set, distally truncate processes.

Castelloserrate - lined with short, closely-set blunt serrations or teeth.

Cephalic lobe - forward expansion of the anterolateral margin of the head between the bases of the peduncles of antennae 1-2; often bearing the eyes and referred to as the ocular lobe.

Chelate - condition of a prehensile appendage, usually a gnathopod, in which it is formed by the closure of the dactylus (article 7) on a subequal, parallel, fixed, distally directed subterminal projection of the propodus (article 6); pincer-like. Propodus usually linear.

Clavate - club-shaped; broadened distally.

Cleft - split or divided; often used to describe a telson that is separated into two lobes by a narrow incision or gap.

Complexly subchelate - see **subchelate**.

Couplet - numbered section of a dichotomous key, consisting of a pair of contrasting descriptions.

Comb row - a row of short, stiff, straight or slightly curved setae resembling the teeth of a comb.

Comb setae - the setae making up a comb row.

Cotype - syntype; each specimen of a type series for which no holotype has been designated.

Coxa - article 1 of a gnathopod or peraeopod.

Coxal gill - a respiratory structure attached to the posteromedial surface of the coxa of gnathopod 2 and peraeopods 3-6 or 7.

Coxal plate - a flattened lateral expansion of the coxa of a peraeon appendage, often forming a shield for the gills and oostegites and providing a chamber through which the respiratory current can be drawn by the beating of the pleopods.

Crenulate - lined with small bumps, tubercles or rounded teeth.

Cryptic - hidden, camouflaged.

Cusp - small tooth or process.

Dactyl - terminal article of a gnathopod or peraeopod (article 7), or of the maxillipedal palp (article 3 or 4).

Dactylar hinge tooth - process on palmar margin of propodus adjacent to articulation with dactyl.

Dendritic - branching.

Dentate - toothed.

Dichotomous - divided into two parts; used to describe a taxonomic key made up of pairs of contrasting descriptions, each of which serves to divide the larger group of organisms being identified into two, mutually exclusive smaller groups.

Distal - located away from the body or point of attachment.

Dorsal - pertaining to the back; in amphipods refers to the upper or top surface or margin.

Emarginate - having a shallow marginal depression, slightly concave, hollowed out or indented.

Entire - complete; having a simple, smooth, unmodified margin; not cleft (telson), serrate, crenulate, or incised.

Epimeral plate - see **epimeron**.

Epimeron (epimera) - ventrolateral, laminar extension(s) of pleonal segments 1-3 enclosing the peduncles of the pleopods.

Excavate - having a deep marginal depression, strongly emarginate, deeply concave.

Extensor margin - the margin of an article on the side away from the direction of flexion ("on the outside of the bend"), the side on which the extensor muscles are located.

Facial - on a flat surface; not marginal.

Flagellum - the multiarticulate distal part of the antenna, exclusive of the peduncle; begins distal to peduncle article 3 for antenna 1 and distal to peduncle article 5 for antenna 2.

Falcate - strongly curved and tapering distally; sickle-shaped.

Flexor margin - the margin of an article on the side towards the direction of flexion (“on the inside of the bend”), the side on which the flexor muscles are located.

Foliaceous - broad and flat, leaf-like, often with marginal setae.

Geniculate - bent and fixed at a right angle, knee-like.

Globular - round, bulbous, globe-like.

Gnathopod - a paired uniramous appendage attached to one of the first 2 peraeon segments; usually subchelate or otherwise dissimilar to the remaining 5 paired peraeonal appendages (peraeopods).

Hyperadult - unusually large and well-developed adult individual.

Incisor - the distal, often toothed, cutting edge of the mandible.

Ischium - article 3 of a gnathopod or peraeopod.

Labium - see **lower lip**.

Labrum - see **upper lip**.

Lacinia mobilis - small articulated plate located on the mandible at the base of the incisor, just distal to the spine row.

Laminar - thin, flat, plate-like.

Lanceolate - tapering distally to an acute or subacute tip; lance-shaped.

Lateral - outer; towards the outside.

Laterally compressed - flattened from side to side.

Linear - with parallel margins; slender, rod-shaped or subrectangular.

Linguiform - tongue-shaped.

Locking spine - large spine on the distal flexor margin of the peraeopod propodus.

Lower lip - a fleshy, bilobed plate located on the posterior margin of the mouth.

Mandible - one of the first, or most anterior, pair of articulated mouthparts, located on either side of the mouth; typically composed of a base or body, molar, incisor, spine row, lacinia mobilis and 3-articulate palp.

Marsupium - chamber for holding eggs or recently hatched juveniles; formed by overlapping oostegites and located ventrally, between the bases of the gnathopods and peraeopods; brood pouch.

Maxilla 1 - one of the second pair of articulated mouthparts; typically composed of a basal article, inner plate, outer plate, and 2-articulate palp.

Maxilla 2 - one of the third pair of articulated mouthparts, immediately posterior to maxilla 1; typically composed of a basal article, inner plate, and outer plate.

Maxilliped - most posterior pair of mouthparts, derived from the first thoracic segment which, in amphipods, is fused with the head; fused basally and typically composed of an inner plate, outer plate, and 4-articulate palp.

Medial - inner; towards the middle.

Median - central, on the mid-line or at the mid-point.

Merus - article 4 of a gnathopod or peraeopod.

Molar - medial process on the mandible, normally subcylindrical with a distally flattened grinding surface, but often reduced or modified.

Morphology - shape, form.

Mouthpart bundle - see **buccal mass**.

Multiarticulate - composed of many articles.

Oblique - angled; not perpendicular to the vertical axis of the article.

Ocular lobe - see **cephalic lobe**.

Ommatidia - individual facets of the subintegumentary compound eye.

Oostegite - thin, flat plate lined with setae, attached to the posteromedial margin of the coxa of gnathopod 2 and pereopods 3-5 in females, just proximal to the coxal gill. In adult females, these plates interlock and overlap, forming the marsupium for holding eggs and newly hatched juveniles; in subadult females, they are more sac-like and lack setae.

Oostegite bud - sac-like developing oostegite found in subadult female amphipods.

Ovate - oval-shaped.

Palm - portion of the posterior margin of the gnathopod upon which the dactyl closes for grasping. Usually delimited distally by the dactylar articulation and proximally by a change in the curvature of the margin or by the presence of spines or setae.

Palmar angle - proximal end of the palm where the curvature of the margin changes.

Palp - small, uniramous, articulated appendage found on the lateral margin of the mandible, maxilla 1, and maxilliped.

Parachelate - condition of a prehensile appendage, usually a gnathopod, occasionally a pereopod, in which it is formed by the closure of the dactylus (article 7) on a very short, parallel or subparallel, fixed, distally directed, subterminal projection of the propodus (article 6); dactyl may overlap tip of projection. Propodus usually linear.

Peduncle - combined, typically robust, proximal or basal articles of the antennae, pleopods and uropods; 3-articulate in antenna 1, 5-articulate in antenna 2, 1-2 (usually 1)-articulate in the pleopods, 1-articulate in the uropods.

Penes - small, paired genital processes located on the ventral surface of the peraeon just medial to the coxa of pereopod 7 in males, through which the sperm is released.

Peraeon - combined 7 free thoracic segments of the body, located immediately behind the head and bearing the gnathopods and pereopods.

Pereopod - a paired, uniramous thoracic appendage attached to each peraeon segment; typically 7-articulate. The anterior 2 pairs, called gnathopods, are usually modified and morphologically distinct from the posterior 5 pairs.

Pleon - combined anterior 3 abdominal segments, located just posterior to the peraeon, bearing the paired, biramous pleopods (occasionally used to refer to the entire 6 segments of the abdomen).

Pleopod - a paired, biramous appendage attached to each pleon segment; typically composed of a uniarticulate basal peduncle and marginally setose, multiarticulate rami. Used in swimming and in the creation of water currents for respiration.

Plumose - feather-like; lined with very fine microsetae.

Posterior - back end; towards the rear.

Produced - narrowly expanded.

Propodus - article 6 of a gnathopod or pereopod.

Proximal - located close to the body or point of attachment.

Pyriform - broadest at the base; pear-shaped.

Raker row - see **spine row**.

Ramus (rami) - branch(es) of an appendage.

Recurved - curved back on itself.

Reniform - kidney-shaped.

Rostrum - forward projection of the anterodorsal margin of the head between the peduncles of antenna 1.

Segment - individual unit or subdivision of the body.

Serrate - with a series of saw-like teeth or sharp processes.

Seta - bristle or hair; a slender, flexible chitinous extension of the cuticle, articulated with the surface of the body or appendage.

Setose - having setae.

Sexually dimorphic - having a different form or appearance in males and females.

Simple - condition of a prehensile appendage, usually a gnathopod, in which none of the articles are expanded to meet the dactylus (article 7) when closed (articles usually linear).

Sinuuous - s-shaped, with both convex and concave portions.

Spine - a stout, inflexible seta.

Spine row (mandibular) - row of small spinules located on the mandible between the base of the incisor and the molar.

Spinose - having spines.

Splayed - flared or extended laterally.

Stridulating ridges - small ridges usually found in rows on the ventral margins of the coxae and the lateral or anterior margins of the gnathopod or peraeopod bases. These ridges function in sound production when two opposing rows are rubbed together.

Styliform - very slender, elongate and sharply pointed at the tip.

Subacute - nearly acute.

Subapical - nearly at the apex or tip.

Subchelate - condition of a prehensile appendage, usually a gnathopod, occasionally a peraeopod or palp, in which it is formed by the closure of the dactylus (article 7) on the oblique or transverse (non-parallel) expanded distal margin (palm) of the propodus (article 6). The term *complexly subchelate* is sometimes used to refer to a prehensile appendage formed by the closure of the dactylus on a non-parallel fixed process of any article other than the propodus (eg. carpochele, merochele).

Subconical - nearly conical.

Subcylindrical - nearly cylindrical.

Subequal - nearly equal.

Submarginal - nearly on the margin.

Subovate - nearly oval.

Subquadrate - nearly square.

Subrectangular - nearly rectangular.

Subround - nearly round.

Systematics - the study of the evolutionary relationships among organisms.

Taxonomy - the identification and classification of organisms.

Telson - a small flap attached to the posterior margin of urosome segment 3, just above the anus; may be cleft, entire, laminar, fleshy, emarginate or otherwise modified, but always present in amphipods.

Terminal - at the tip or distal end.

Terminal adult - an individual with fully adult morphology.

Tooth - an acute, non-articulated process.

Transverse - perpendicular to the long axis of an article.

Triturative - having a ridged surface used for grinding or crushing.

Truncate - with distal margin transverse, quadrate, cut-off.

Uniarticulate - composed of one article.

Uniramous - having one branch (ramus).

Upper lip - a fleshy plate or lobe located on the anterior margin of the mouth; distal margin may be entire, incised or emarginate, usually minutely setose or pilose.

Uropod - a paired, typically biramous, appendage attached to each urosome segment; usually composed of a peduncle and 2 uniarticulate rami, but may be uniramous, without rami or completely absent.

Urosome - combined posterior 3 abdominal segments (sometimes referred to as pleon segments 4-6), located just posterior to the pleon and bearing the paired, typically biramous uropods and the telson.

Ventral - pertaining to the abdomen; in amphipods refers to the lower or bottom surface or margin.

Vestigial - very reduced, degenerate, poorly developed.

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APPENDIX: FIGURE SOURCES

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Figure 1 from Bousfield, 1973, Figure 1.

Figure 2 from Bousfield, 1973, Figure 4.

Figure 3 from Bousfield, 1973, Figure 5

Figure 4 a from Shoemaker, 1947, Figure 2; b modified from Bousfield, 1973, Plate LXI 2; c modified from Barnard & Karaman, 1991, Figure 36.

Figure 5a modified from Bousfield, 1973, Plate XXXVII 2; b modified from McKinney, 1980b, Figure 1; c from LeCroy, 1995, Figure 28.

Figure 6a, c modified from Bousfield, 1973, Plates IV 1 and XLV 2, respectively ; b modified from Foster & LeCroy, 1991, Figure 1; d modified from Barnard & Thomas, 1987b, Figure 4.

Figure 7a, d modified from Bousfield, 1973, Plate LXIX 1; b, e from Thomas, 1979 (b from Figure 2; e modified from Figure 1); c modified from Barnard & Karaman, 1991, Figure 36.

Figure 8a-c from Bousfield, 1973 (a-b from Plate LXII 2; c modified from Plate LXII 2).

Figure 9a-d from Barnard & Thomas, 1989b (a modified from Figure 4; b from Figure 1; c-d from Figure 2).

Figure 10a, c modified from LeCroy, 1995, Figures 21 and 23, respectively; *b, d-g* from McKinney, 1980b (*b, g* modified from Figure 8; *d-e* modified from Figure 1; *f* from Figure 2); *h-i* from LeCroy, unpublished drawings; *j* modified from Barnard & Karaman, 1991, Figure 121.

Figure 11a, c-d modified from McKinney, 1980b (*a, d* from Figure 1; *c* from Figure 2); *b, e-f* from LeCroy, unpublished drawings; *g* from Barnard & Karaman, 1991, Figure 54.

Figure 12a, c modified from McKinney, 1980b, Figures 8 and 9, respectively; *b* from LeCroy, unpublished drawing; *d, f-h* from LeCroy, 1995 (*d* from Figure 48; *f* modified from Figure 21; *g* from Figure 23; *h* from Figure 24); *e* from Barnard & Karaman, 1991, Figure 121.

Figure 13a-c modified from McKinney, 1980b, Figure 8.

Figure 14a-d modified from LeCroy, 1995, Figure 21.

Figure 15a modified from Bousfield, 1973, Plate XLII 2; *b* from Thomas, 1997, Figure 4; *c-d* from Barnard & Karaman, 1991, Figures 114 and 105, respectively.

Figure 16a-b, d modified from Bousfield, 1973, Plates XLVI 1, XXXVII2, and LV1, respectively; *c* from Foster & LeCroy, 1991, Figure 3.

Figure 17a from LeCroy unpublished drawing; *b-c* modified from Barnard & Karaman, 1991, Figure 105.

Figure 18a from LeCroy, unpublished drawing; *b* modified from Thomas & Barnard, 1991a, Figure 4; *c* modified from Thomas, 1997, Figure 3; *d* modified from Thomas & Barnard, 1983, Figure 3; *e* modified from Bousfield, 1973, Plate XLIII 1.

Figure 19a modified from Thomas & Barnard, 1991a, Figure 4.

Figure 20a modified from Thomas, 1997, Figure 3; *b* modified from Thomas & Barnard, 1983, Figure 3; *c* modified from Bousfield, 1973, Plate XLIII 1.

Figure 21a-b, d from Thomas & Barnard, 1983 (*a* modified from Figure 3; *b, d* from Figures 4 and 6, respectively); *c* from Barnard & Karaman, 1991, Figure 114.

Figure 22a, c, i from Thomas, 1997 (*a, c* modified from Figure 3; *i* from Figure 4); *b, d, f-h* from Lowry & Stoddart, 1997 (*b, d* from Figure 38; *f* from figure 51; *g* from Figure 39; *h* from Figure 50); *e* modified from Bousfield, 1973, Plate XLIII 1.

Figure 23a-b modified from Bousfield, 1973, Plate XLIII 1; *c-f* from Lowry & Stoddart, 1997 (*c-d* from Figures 48 and 47, respectively; *e-f* modified from Figures 24 and 17, respectively).

Figure 24a-d from Thomas, 1997 (*a, c-d* modified from Figure 3; *b* from Figure 4).

Figure 25a-b from Bousfield, 1973 (*a* modified from Plate XIII; *b* from Plate XIII).

Figure 26a from LeCroy, unpublished drawing; *b* from Thomas, 1983, Figure 3; *c* from Myers, 1981, Figure 13; *d-e* from Bousfield, 1973, Plates X 2 and XLV 2, respectively.

Figure 27a-c modified from Bousfield, 1973, Plate XX 2.

Figure 28a-e modified from Bousfield, 1973 (*a* from Plate L 2, *b* from Plate XXIII 1, *c-d* from Plate III 1, *e* from Plate XVI 1); *f* modified from Foster & LeCroy, 1991, Figure 1.

Figure 29a modified from Bousfield, 1973, Plate XVI 1; *b* modified from McKinney, 1978, Figure 1; *c* modified from Shoemaker, 1956a, Figure 1.

Figure 30a modified from Bousfield, 1973, Plate III 1; *b* modified from Foster & LeCroy, 1991, Figure 1; *c* modified from Thomas, 1983, Figure 1; *d-e* modified from Myers, 1983, Figures 24 and 26, respectively).

Figure 31a-d from Shoemaker, 1956a (*a, c-d* from Figure 1; *b* modified from Figure 1).

Figure 32a, c modified from McKinney, 1978, Figure 1; *b* modified from Bousfield, 1973, Plate XVI 1; *d* modified from Shoemaker, 1933a, Figure 3.

Figure 33a-e from Bousfield, 1973 (*a* modified from Plate XVI 1; *b-d* modified from Plate XVII 2; *e* from Plate XVII 2).

Figure 34a modified from Shoemaker, 1933a, Figure 3; *b-d, f* from McKinney, 1978 (*b, d* modified from Figure 1; *c, f* from Figure 4); *e* from Thomas, 1997, Figure 4.

Figure 35a-e from Thomas, 1997 (*a, c-d* from Figure 18; *b* from Figure 3; *e* from Figure 4); *f* modified from Shoemaker, 1933a, Figure 3.

Figure 36a-e from McKinney, 1978 (*a* from Figure 2; *b-c* from Figure 3; *d* from Figure 4; *e* modified from Figure 1).

Figure 37a from Bousfield, 1973, Plate XLV 2; *b* from Thomas, 1983, Figure 3; *c* from Barnard, 1972, Figure 46; *d* from Thomas & Barnard, 1986a, Figure 10; *e-f* from Barnard & Thomas, 1989a, Figures 3 and 6, respectively; *g* from Foster & LeCroy, 1991, Figure 3.

Figure 38a from Ishimaru, 1996, Figure 2; *b, d* from Bousfield, 1973, Plates XX 1 and XLVI 1, respectively; *c* modified from Thomas & Barnard, 1992a, Figure 1; *e* from LeCroy, unpublished drawing; *f* from Shoemaker, 1948, Figure 2; *g-h* from Myers, 1981, Figures 13 and 25, respectively.

Figure 39a-c modified from Bousfield, 1973, Plate XXIII 1.

Figure 40a modified from Thomas, 1983, Figure 1; *b-c* modified from Barnard & Thomas, 1989a, Figure 1; *d* from McKinney, 1980b, Figure 6; *e, i* modified from Bousfield, 1973, Plate XLV 2; *f* from Thomas & Barnard, 1986a, Figure 9; *g-h* from Thomas & Barnard, 1984, Figures 1 and 3, respectively; *j* from LeCroy, unpublished drawing; *k* modified from Just, 1998, Figure 3.

Figure 41a, e from LeCroy, unpublished drawings; *b-d* from Just, 1998 (*b* modified from Figure 3; *c* from Figure 4; *d* modified from Figure 6).

Figure 42a, d modified from Bousfield, 1973, Plate XLV 2; *b, h* from McKinney, 1980b (*b* from Figure 6; *h* modified from Figure 7); *c* from Thomas & Barnard, 1984, Figure 3; *e-g* modified from Barnard & Thomas, 1989a, Figure 1; *i* modified from Thomas, 1983, Figure 1; *j* modified from Foster & LeCroy, 1991, Figure 1.

Figure 43a-b, d-e from Bousfield, 1973 (*a-b* modified from Plate XLV 2; *d* modified from Plate XLVI 1; *e* from Plate XLVI 1); *c* from Bousfield & Heard, 1986, Figure 1.

Figure 44a, h, k, m from Barnard & Thomas, 1989a (*a, k* modified from Figure 1; *h, m* from Figure 3); *b-c, j, n* from Thomas, 1983 (*b, j* modified from Figure 1; *c, n* from Figure 3); *d, g, l* from Foster & LeCroy, 1991 (*d* modified from Figure 3; *g* modified from Figure 1; *l* from Figure 4); *e, i* from McKinney, 1980b (*e* from Figure 7; *i* modified from Figure 7); *f* from Thomas & Barnard, 1986a, Figure 9.

Figure 45a-d from Thomas, 1983 (*a-b, d* modified from Figure 1; *c* from Figure 2).

Figure 46a, h from Thomas & Barnard, 1984, Figures 1 and 2, respectively; *b* modified from Foster & LeCroy, 1991, Figure 1; *c-d* from McKinney, 1980b (*c* from Figure 5; *d* modified from Figure 5); *e-g* from Barnard & Thomas, 1989a (*e-f* modified from Figure 1; *g* from Figure 2).

Figure 47a-d from McKinney, 1980b (*a-b, d* modified from Figures 5, 6 and 7, respectively; *c* from Figure 6).

Figure 48a, c, f from Barnard & Thomas, 1989a (*a, c* modified from Figures 2 and 1, respectively; *f* from Figure 3); *b* modified from Bousfield, 1973, Plate XXVI 1; *d* from Thomas & Barnard, 1984, Figure 3; *e* from Foster & LeCroy, 1991, Figure 4.

Figure 49a-c, g from Barnard & Thomas, 1989a (*a-c* modified from Figures 2, 5 and 1, respectively; *g* from Figure 3); *d-e* from Goeke, 1982 (*d* from Figure 2; *e* modified from Figure 1); *f, h-j* from Barnard, 1972 (*f, j* from Figure 46; *h-i* from Figure 45).

Figure 50a, d, f modified from Bousfield, 1973, Plates XXVI 1, XXX 1 and XXVII 2, respectively; *b-c, e* from Robertson & Shelton, 1978 (*b, e* from Figure 3; *c* from Figure 1); *g-h, k* from Foster & LeCroy, 1991, Figures 4, 3 and 1, respectively; *i-j* from Thomas & Barnard, 1984 (*i* from Figure 3; *j* modified from Figure 3).

- Figure 51a* modified from Barnard & Karaman, 1991, Figure 29; *b-d* from Ishimaru, 1996 (*b* from Figure 1; *c-d* from Figure 2).
- Figure 52a-b, d, j-k* modified from Bousfield, 1973 (*a* from Plate XLV 2; *b, d* from Plate XX 1; *j* from Plate III 1; *k* from Plate LVIII 2); *c, l* from Thomas & Barnard, 1991c (*c* modified from Figure 1; *l* from Figure 2); *e, h* from Myers, 1981, Figures 13 and 25, respectively; *f-g* from Bousfield and Heard, 1986, Figure 1; *i* modified from Thomas & Barnard, 1992a, Figure 1; *m* from Thomas & Barnard, 1985a, Figure 1; *n* from Shoemaker, 1948, Figure 2; *o* from LeCroy, unpublished drawing.
- Figure 53a* from Barnard, 1970, Figure 156; *b-d* from Thomas & Barnard, 1992b (*b-c* from Figure 3; *d* modified from Figure 3).
- Figure 54a-b, d-g* from Bousfield, 1973 (*a-b, f-g* modified from Plates XLV 2, LIV 2, IV 1 and XIII 1, respectively; *d-e* from Plates LIV 2 and LII 2, respectively); *c* from Myers, 1981, Figure 30; *h, j-k* from LeCroy, unpublished drawings; *i* from Bousfield & Heard, 1986, Figure 1.
- Figure 55a, c* from Bousfield, 1991 (*a* modified from Figure 5; *c* from Figure 3); *b, d* from Bousfield, 1973 (*b* modified from Plate XLV 2; *d* from Plate XLV 2); *e-f* from Bousfield & Heard, 1986, Figure 1.
- Figure 56a-b, d-g* from Bousfield, 1973 (*a-b, f-g* modified from Plates LVIII 2, III 1, XX 1 and XLIV 1, respectively; *d-e* from Plates X 2 and XVIII 1, respectively); *c* modified from Thomas & Barnard, 1991c, Figure 1; *h* from McKinney, 1980a, Figure 1; *i* from Watling & Maurer, 1973, Figure 2.
- Figure 57a, f* from Bousfield, 1973, Plates XLIV 1 and XII 2, respectively; *b* modified from Thomas & Heard, 1979, Figure 4; *c, e* from Shoemaker, 1948, Figures 1 and 2, respectively; *d* from Thomas & Barnard, 1991c, Figure 2; *g* from Zimmerman & Barnard, 1977, Figure 5; *h* from Thomas & Barnard, 1985b, Figure 3; *i* from Thomas & Barnard, 1986b, Figure 3; *j* from Shoemaker, 1933b, Figure 3; *k* from McKinney, 1980b, Figure 4; *l* from Thomas & Barnard, 1988, Figure 3.
- Figure 58a* from Watling & Maurer, 1973, Figure 2; *b, d-g, k-l* from Bousfield, 1973, Plates XX 1, XVIII 1, L 2, LIX 2, LVIII 2, LIV 2 and XLIII 2, respectively; *c* modified from Thomas & Barnard, 1989, Figure 3; *h* modified from Heard & Sikora, 1972, Figure 2; *i* from Barnard & Thomas, 1987a, Figure 3; *j* modified from Thomas & Barnard, 1985a, Figure 3; *m* modified from Thomas & Barnard, 1991b, Figure 2.
- Figure 59a-b, d-e, g-h* from Bousfield, 1973 (*a, h* modified from Plate XXXIV 2; *d-e* modified from Plate XXXIV 1; *b* from Plate XXXIV 1; *g* from Plate XXXIV 2); *c, f* from Shoemaker, 1933b, Figure 3.
- Figure 60a, i* modified from Thomas & Barnard, 1991c, Figure 1; *b* from McKinney & Barnard, 1977, Figure 1; *c-e* modified from Bousfield, 1973, Plates XLIV 1, X 2 and XII 2, respectively; *f* modified from Shoemaker, 1933a, Figure 6; *g* modified from McKinney, 1980b, Figure 3; *h* from LeCroy, unpublished drawing.
- Figure 61a, e* modified from Thomas & Barnard, 1986b, Figures 1 and 3, respectively; *b, i* modified from Shoemaker, 1948, Figure 1; *c, g* from Shoemaker, 1933a (*c* from Figure 6; *g* modified from Figure 6); *d, f, h* modified from McKinney, 1980b (*d, h* from Figure 4; *f* from Figures 3-4).
- Figure 62a, e, j* from Thomas & Heard, 1979 (*a, e* from Figure 3; *j* from Figure 4); *b, f, i* from Shoemaker, 1956b (*b, i* modified from Figures 1 and 4, respectively; *f* from Figure 1); *c-d, g-h* from Bousfield, 1973 (*c, h* modified from Plates X 2 and XII 2, respectively; *d, g* from Plates XII 2 and X 2, respectively); *k* from Thomas & Barnard, 1985b, Figure 3.
- Figure 63a-d, f, l* from McKinney, 1980b (*a-b* modified from Figure 3; *c-d, l* modified from Figure 4; *f* from Figure 4); *e, k* from Shoemaker, 1933a (*e* from Figure 6; *k* modified from Figure 7); *g-j, m* from Shoemaker, 1948 (*g, j* modified from Figure 1; *h-i, m* from Figure 1).

Figure 64a-h from Thomas & Barnard, 1986b (*a-c, e* modified from Figure 1; *d, f-g* from Figure 3; *h* modified from Figure 3).

Figure 65a, c-e, i from Bousfield, 1973 (*a, e* modified from Plate LX 1; *c* modified from Plate XLIV 1; *d, i* from Plates LX 1 and XLIV 1, respectively); *b, g* modified from Shoemaker, 1956b, Figure 4; *f, h* modified from Thomas & Heard, 1979, Figures 1 and 4, respectively; *j* from LeCroy, unpublished drawing.

Figure 66a modified from Thomas & Barnard, 1985c, Figure 1; *b, g, i* from Bousfield, 1973 (*b, i* modified from Plate III 1; *g* from Plate XII 2); *c, m-o* from Thomas & Barnard, 1985b (*c* from Figure 3; *m, o* modified from Figure 4; *n* modified from Figure 3); *d, l* from Shoemaker, 1948 (*d* from Figure 2; *l* modified from Figure 2); *e-f, p* modified from McKinney, 1979, Figures 1, 3 and 2, respectively; *h, j-k* from Zimmerman & Barnard, 1977 (*h, k* from Figures 5 and 1, respectively ; *j* modified from Figure 5).

Figure 67a, d from Thomas & Heard, 1979 (*a* modified from Figure 1; *d* from Figure 4); *b-c, e-f* from Bousfield, 1973 (*b-c, f* modified from Plate LX 1; *e* from Plate LX 1).

Figure 68a, c modified from Shoemaker, 1956b, Figure 4; *b, d-e* modified from Bousfield, 1973, Plate XLIV 1; *f* from LeCroy, unpublished drawing.

Figure 69a-b, d, g, i from Bousfield, 1973, Plates IX 2, X 2, IV 1, X 2 and III 1, respectively; *c, e, k* from Thomas & Barnard, 1985b (*c* modified from Figure 5; *e, k* from Figures 4 and 3, respectively); *f* from Thomas & Barnard, 1985c, Figure 1; *h* modified from Thomas & Barnard, 1991c, Figure 2; *j* from Zimmerman & Barnard, 1977, Figure 5.

Figure 70a from Bousfield, 1973, Plate XII 2; *b-d* modified from McKinney, 1979, Figures 1, 3 and 4, respectively.

Figure 71a, d from Shoemaker, 1933b, Figure 5; *b-c, g* from Bousfield, 1973 (*b* from Plate XX 1; *c, g* modified from Plate XX 1); *e-f, h-i* from Thomas & Barnard, 1985a (*e-f, h* from Figure 1; *i* modified from Figure 1).

Figure 72a-b, e, i, l modified from Bousfield, 1973, Plates LVIII 2, XVIII 1, LV 1, LVII 1 and XVIII1, respectively; *c, g-h, j* modified from Myers, 1981, Figures 20, 26, 30 and 20, respectively; *d* modified from Thomas & Barnard, 1991b, Figure 1; *f* modified from Watling & Maurer, 1973, Figure 1; *k* from Barnard & Thomas, 1987a, Figure 4.

Figure 73a from Bousfield, 1973, Plate XVIII 1; *b* from LeCroy, unpublished drawing; *c* from Thomas & Ortiz, 1995, Figure 2.

Figure 74a from Watling & Maurer, 1973, Figure 3; *b* from Barnard & Thomas, 1987a, Figure 2; *c* from McKinney, et al., 1978, Figure 8; *d* from Bousfield & Hoover, 1997, Figure 28; *e, j* from Myers, 1981 (*e* modified from Figure 13; *j* from Figure 25); *f-i* from Bousfield, 1973 (*f, h* from Plates XLIII 2 and LIX 2, respectively; *g, i* modified from Plates LVII 1 and XLIII 2, respectively); *k* modified from Shoemaker, 1935, Figure 4.

Figure 75a modified from Nelson, 1980, Figure 1; *b* modified from Thomas & Barnard, 1991b, Figure 1; *c* modified from Shoemaker, 1945, Figure 5; *d* modified from Shoemaker, 1933b, Figure 12; *e* modified from Bousfield, 1973, Plate LIV 2; *f* modified from Watling & Maurer, 1973, Figure 1.

Figure 76a-d modified from Bousfield, 1973, Plates L 1, LVIII 2, LVIX 2 and LXV 1, respectively; *e* modified from Barnard & Thomas, 1987b, Figure 4; *f-g* modified from Myers, 1981, Figures 20 and 30, respectively.

Figure 77a modified from Bousfield, 1973, Plate XLIII 2; *b* modified from Watling & Maurer, 1973, Figure 1.

Figure 78a modified from Thomas & Barnard, 1991b, Figure 1; *b* modified from Bousfield, 1973, Plate LIV 2; *c* modified from Nelson, 1980, Figure 1.

Figure 79a, c, e-g from Bousfield, 1973 (*a, c, e-f* from Plate XLIII 2; *g* modified from Plate XLIII 2); *b, h* modified from Shoemaker, 1933b, Figure 12; *d* from Barnard & Karaman, 1991, Figure 70.

Figure 80a-e from Watling & Maurer, 1973 (*a* from Figure 1, *b-c, e* from Figure 2, *d* from Figure 3).

Figure 81a-d from Bousfield, 1973 (*a-b* modified from Plates LIV 2 and LV 2, respectively; *c-d* from Plates LV 2 and LIII 2, respectively).

Figure 82a from Shoemaker, 1945, Figure 5; *b, e, i* from Barnard, 1970, Figure 111; *c, g* from McKinney, et al., 1978 (*c* modified from Figure 7; *g* from Figure 10); *d, j* from Bousfield, 1973 (*d* modified from Plate LVII 1; *j* from Plate LVII 1); *f, h* from Thomas & Barnard, 1991b, Figures 1 and 2, respectively.

Figure 83a from Barnard & Thomas, 1987a, Figure 2; *b, d, f-g, i* from Myers, 1981 (*b, i* from Figure 25; *g* from Figure 33; *d, f* modified from Figures 32 and 13, respectively); *c, e* from Bousfield, 1973, Plates LII 2 and L 2, respectively; *h* modified from Myers, 1970, Figures 1-2; *j* from Barnard, 1979, Figure 14.

Figure 84a from Bousfield & Hoover, 1997, Figure 28; *b* from Barnard & Thomas, 1987b, Figure 3; *c, f-h* from Bousfield, 1973 (*c* modified from Plate LIX 2; *g-h* modified from Plate LVIII 2; *f* from Plate LIX 2); *d-e* from Thomas & Barnard, 1987 (*d* from Figure 3; *e* modified from Figure 1).

Figure 85a modified from Myers, 1970, Figure 2; *b, f* modified from Myers, 1981, Figures 20 and 30, respectively; *c-e, g* from Bousfield, 1973 (*c* modified from Plate L 1; *d-e, g* from Plates L 1, LII 2 and LI 1, respectively).

Figure 86a, c from Barnard & Thomas, 1987a (*a* modified from Figure 1; *c* from Figure 2); *b, d* from Barnard, 1979, Figures 13 and 14, respectively).

Figure 87a-b, d from Heard & Sikora, 1972 (*a-b* from Figure 1; *d* from Figure 2); *c* from Bousfield & Hoover, 1997, Figure 28.

Figure 88a, d-f, n-o from Bousfield, 1973 (*a,e* modified from Plate LVIII 2; *f* modified from Plate LIX 2; *d, n* from Plate LIX 2; *o* from Plate LVIII 2); *b, h, j, l* from Thomas & Barnard, 1987 (*b, h* from Figures 1 and 3, respectively; *j, l* from Figure 4); *c, g, k, m* from Barnard & Thomas, 1987b (*c, g* from Figures 4 and 3, respectively; *k, m* from Figure 6); *i* from LeCroy, unpublished drawing.

Figure 89a, d, f, h from Thomas & Barnard, 1987 (*a, f* modified from Figure 1; *h* modified from Figure 4; *d* from Figure 3); *b-c, e, g* from Barnard & Thomas, 1987b (*b* from Figure 3; *c, e* modified from Figure 4; *g* modified from Figure 6).

Figure 90a-i from Bousfield, 1973 (*a-b, e, g* modified from Plate LVIII 2; *c, i* from Plate LIX 2; *d, f* modified from Plate LIX 2; *h* from Plate LVIII 2).

Figure 91a, c-e from Bousfield, 1973 (*a, c-d* modified from Plate IV 1; *e* from Plate IV 1); *b* modified from Cole & Bousfield, 1970).

Figure 92a from Bynum & Fox, 1977, Figure 4; *b, n* from Ruffo, et al., 2000 (*b* modified from Figure 7; *n* from Figure 8); *c, g* from LeCroy, unpublished drawing; *d, f* from Thomas & Barnard, 1985c (*d* modified from Figure 1; *f* from Figure 3); *e, i* from Zimmerman & Barnard, 1977 (*e* from Figure 4; *i* modified from Figure 1); *h, j, q* from McKinney & Barnard, 1977 (*h* modified from Figure 3; *j, q* from Figures 1 and 3, respectively); *k, s* modified from Thomas & Barnard, 1988, Figures 1 and 3, respectively; *l* modified from Bousfield, 1973, Plate IX 2; *m* modified from Lazo-Wasem & Gable, 1987, Figure 4; *o* from Shoemaker, 1948, Figure 2; *p* from Thomas & Barnard, 1991c, Figure 1; *r* from Thomas & Barnard, 1985b, Figure 7.

Figure 93a from Thomas & Barnard, 1991c, Figure 1; *b* from McKinney & Barnard, 1977, Figure 3; *c* from Zimmerman & Barnard, 1977, Figure 5; *d* modified from Barnard, 1970, Figure 101.

Figure 94a from Ruffo, et al., 2000, Figure 8; *b* from Shoemaker, 1948, Figure 2; *c* from Thomas & Barnard, 1985b, Figure 7; *d* from Bousfield, 1973, Plate X 2; *e* from Thomas and Barnard, 1985c, Figure 3.

Figure 95a-e from Barnard, 1970 (*a, d* from Figure 102; *b-c, e* modified from Figure 101).

Figure 96a, d, h, j from Zimmerman & Barnard, 1977 (*a, h, j* from Figures 1, 3 and 5, respectively; *d* modified from Figure 5); *b, i, l* from Thomas & Barnard, 1991c (*b, i* from Figure 2; *l* from Figure 3); *c, e* from McKinney & Barnard, 1977 (*c* modified from Figure 3; *e* from Figure 1); *f, k* from LeCroy, unpublished drawings; *g* from Sheridan, 1979, Figure 1.

Figure 97a, c from Thomas & Barnard, 1991c, Figure 1; *b* modified from Bousfield, 1973, Plate IX 2; *d* from LeCroy, unpublished drawing.

Figure 98a, c from Zimmerman & Barnard, 1977, Figures 3 and 5, respectively; *b, d* from Mckinney & Barnard, 1977 (*b* modified from Figure 1; *d* from Figure 3).

Figure 99a, d, f-g, j from Bousfield, 1973 (*a, d, f, j* modified from Plate IX 2; *g* from Plate IX 2); *b-c, e, i* from LeCroy, unpublished drawings; *h* modified from Lazo-Wasem & Gable, 1987, Figure 4.

Figure 100a-g from Thomas & Barnard, 1991c (*a, e, g* modified from Figure 1; *d, f* modified from Figure 3; *b* from Figure 2; *c* from Figure 3).

Figure 101a-e from Zimmerman & Barnard, 1977 (*a* from Figure 3; *b* from Figure 1; *c* modified from Figure 3; *d* from Figure 4; *e* from Figure 5).

Figure 102a-e from McKinney & Barnard, 1977 (*a-b* from Figure 1; *c, e* from Figure 2; *d* from Figure 3).

Figure 103a-c, f from Thomas & Barnard, 1988 (*a* modified from Figure 1; *b-c* from Figure 1; *f* from Figure 3); *d* from Thomas & Barnard, 1985b, Figure 1; *e* from Thomas & Barnard, 1985c, Figure 3.

Figure 104a, c, g from Ruffo, et al., 2000 (*a, g* from Figures 7 and 8, respectively; *c* modified from Figure 7); *b, d, k* from Fox, 1973 (*b, k* from Figures 1 and 2, respectively; *d* from modified from Figure 1); *e* from Shoemaker, 1948, Figure 2; *f* from LeCroy, unpublished drawing; *h* from Bynum & Fox, 1977, Figure 6; *i-j* from Thomas & Barnard, 1985b, Figures 4 and 6, respectively.

Figure 105a-e from Thomas & Barnard, 1985c (*a-c* modified from Figure 1; *d* modified from Figure 2; *e* from Figure 3).

Figure 106a-b, d, j from Thomas & Barnard, 1988 (*a, d* from Figure 1; *b* modified from Figure 1; *j* from Figure 3); *c, f-g, i* from Thomas & Barnard, 1985b (*c, i* from Figures 2 and 3, respectively; *f-g* modified from Figure 1); *e, h* from LeCroy, unpublished drawings.

Figure 107a-b from Thomas & Barnard, 1988 (*a* from Figure 1; *b* modified from Figure 1).

Figure 108a-c from Thomas & Barnard, 1985b (*a* from Figure 1; *b-c* modified from Figure 1).

Figure 109a-e from Shoemaker, 1948 (*a-b* modified from Figure 2; *c-e* from Figure 2).

Figure 110a-b from Bynum & Fox, 1977, Figure 6; *c, e-g, i* from Thomas & Barnard, 1985b (*c, i* from Figure 4; *e* from Figure 7; *f* modified from Figure 5; *g* from Figure 5); *d, k* from Ruffo, et al., 2000, Figures 7 and 8, respectively; *h, j* from LeCroy, unpublished drawings.

Figure 111a-e from LeCroy, unpublished drawings.

Figure 112a-b, i-j from Ruffo, et al., 2000 (*a* from Figure 7; *b* modified from Figure 7; *i* from Figure 12; *j* from Figure 8); *c, h* from Bynum & Fox, 1977 (*c* from Figure 6; *h* modified from Figure 7); *d-e, g, k* from Thomas & Barnard, 1985b (*d, g* from Figure 4; *e* modified from Figure 1; *k* from Figure 7); *f* from LeCroy, unpublished drawing.

Figure 113a-f, h, j, l-m from Bynum & Fox, 1977 (*a, m* from Figure 5; *b, f, j* from Figure 6; *c* modified from Figure 5; *d, h* modified from Figure 6; *e* modified from Figure 7; *l* from Figure 7); *g, i, k* from Ruffo, et al., 2000 (*g* modified from Figure 7; *i, k* from Figures 7 and 8, respectively).

Figure 114a-g from Thomas & Barnard, 1985b (*a-b* from Figure 5; *c* from Figure 7; *d, g* modified from Figure 5; *e-f* from Figure 6).

Figure 115a-d from Bousfield, 1973 (*a-b* modified from Plate IV 1; *c* from Plate III 2; *d* from Plate IV 1).

Figure 116a-b from Bousfield, 1973 (*a* modified from Plate III 1; *b* from Plate III 1); *c-d* from LeCroy, unpublished drawings.

Figure 117a-f from Bousfield, 1973 (*a-c, e-f* modified from Plate IV 1; *d* from Plate IV 1).

Figure 118a-g from Bousfield, 1973 (*a-e* modified from Plate III 2; *f-g* from Plate III 2).

Figure 119a, c-e, h from Bousfield, 1973 (*a, c-d* modified from Plate III 1; *e, h* from Plate III 1); *b, f-g* from LeCroy, unpublished drawings.

Figure 120a-b, d-g from LeCroy, unpublished drawings; *c* from Heard, 1982, Figure 41.

Figure 121a-e, h from Fox, 1973 (*a, d, h* from Figures 2, 3 and 4, respectively; *e* modified from Figure 2); *f-g* from LeCroy, unpublished drawings.

Figure 122a, c, e from Shoemaker, 1933b (*a, c* from Figure 2; *e* modified from Figure 2); *b, d, f-g* from LeCroy, unpublished drawings.

Figure 123a-g from LeCroy, unpublished drawings.

Figure 124a-b, d, g-h from LeCroy, unpublished drawings; *c, e-f* from Shoemaker, 1933b (*c* from Figure 2; *e-f* modified from Figure 2).

Figure 125a-c, f from Heard, unpublished drawing (*a, c, f* modified); *d-e, g* from LeCroy, unpublished drawings.

Figure 126a-f from LeCroy, unpublished drawings.

Figure 127a-d from LeCroy, unpublished drawings.

Figure 128a-b, e, h from Thomas & Barnard, 1988 (*a, e* from Figures 1 and 2, respectively; *b, h* modified from Figures 2 and 3, respectively); *c-d, g, i* from Barnard, 1970, Figures 74, 80, 73 and 79, respectively; *f* from LeCroy, unpublished drawing.

Figure 129a from Karaman, 1982, Figure 192; *b-g* from Barnard, 1970 (*b, e* modified from Figures 74 and 73, respectively; *c-d* from Figure 74, *f-g* from Figure 73).

Figure 130a-d, i from Thomas & Barnard, 1988 (*a, c* modified from Figures 1 and 2, respectively; *b* from Figure 2; *d, i* from Figure 3); *e, g, j* from Barnard, 1970 (*e, j* from Figures 78 and 79, respectively; *g* modified from Figure 77); *f, h* from LeCroy, unpublished drawings; *k* from Boudfield, 1973, Plate X 2.

Figure 131a-d from Thomas & Barnard, 1988 (*a-b, d* from Figure 3; *c* modified from Figure 3).

Figure 132a-b, d from Bousfield, 1973 (*a-b* modified from Plate X 2; *d* from Plate X 2); *c* from LeCroy, unpublished drawing; *e* from Barnard, 1970, Figure 79.

Figure 133a, c-f from Thomas & Barnard, 1988 (*a, d* modified from Figure 2; *c, e* from Figure 3; *f* from Figure 2).

Figure 134a-g from LeCroy, unpublished drawings.

Figure 135a, e from LeCroy, unpublished drawings; *b-d* from Barnard, 1970, Figure 79.

Figure 136a-c modified from Bousfield, 1973, Plate X 2; *d* modified from Barnard, 1970, Figure 78; *e-g* from LeCroy, unpublished drawings.

Figure 137a, c-d from Bousfield, 1973 (*a, c* from Plate X 2; *d* modified from Plate X 2); *b* from LeCroy, unpublished drawing.

Figure 138a-b from Barnard, 1970 (*a* from Figure 77; *b* modified from Figure 78); *c* from Karaman, 1982, Figure 193.

Figure 139a, d-g, j from Bynum & Fox, 1973 (*a, d, j* from Figures 4, 6 and 5, respectively; *e* modified from Figures 6; *f-g* modified from Figure 4); *b-c, h-i* from LeCroy, unpublished drawings.

Figure 140a, k from LeCroy, unpublished drawing; *b, d-e, j* from Ruffo, et al., 2000 (*b, j* from Figures 7 and 8, respectively; *d-e* modified from Figures 7 and 8, respectively); *c, f-h* from Bynum & Fox, 1973 (*c, f-g* modified from Figure 7; *h* from Figure from Figure 7); *i* modified from Barnard, 1970, Figure 93.

Figure 141a-g from Bynum & Fox, 1973 (*a, c* modified from Figures 6 and 4, respectively; *b, e* from Figure 6; *d, g* from Figure 5; *f* from Figure 4).

Figure 142a-f from LeCroy, unpublished drawings.

Figure 143a, c-d from Bynum & Fox, 1973 (*a, c* modified from Figures 6-7, respectively; *b* from LeCroy, unpublished drawing; *d* from Figure 7).

Figure 144a-c, g from Ruffo, et al., 2000 (*a, g* from Figures 7-8, respectively; *b-c* modified from Figure 7); *d-f* from LeCroy, unpublished drawings.

Figure 145a-e from LeCroy, unpublished drawings.

Figure 146a-f from Ruffo, et al., 2000 (*a* from Figure 7; *b, d* modified from Figure 7; *c, e* from Figure 8; *f* from Figure 1).

Figure 147a-d from Ruffo, et al., 2000 (*a, d* from Figure 1; *b-c* modified from Figure 1).

Figure 148a-d from Ruffo, et al., 2000 (*a, d* from Figures 7-8, respectively; *b-c* modified from Figure 7).

Figure 149a-b from LeCroy, unpublished drawings; *c* from Lazo-Wasem & Gable, 1987, Figure 4.

Figure 150a-e from LeCroy, unpublished drawings.

Figure 151a-e from LeCroy, unpublished drawings.

Figure 152a-g from LeCroy, unpublished drawings.

Figure 153a-f from LeCroy, unpublished drawings.

Figure 154a modified from Bousfield, 1973, Plate IX 2; *b-f* from LeCroy, unpublished drawings.

Figure 155a-g from LeCroy, unpublished drawings.

Figure 156a, c-h from LeCroy, unpublished drawings; *b* modified from Bousfield, 1973, Plate IX 2.

Figure 157a-d from LeCroy, unpublished drawings.

Figure 158a, c from Bousfield, 1973 (*a* modified from Plate IX 2; *c* from Plate IX 2); *b, d* from LeCroy, unpublished drawings.

Figure 159a-h from Barnard & Thomas, 1987b (*a* from Figure 4; *b-d* modified from Figure 4; *e* from Figure 5; *f, g, h* from Figures 2, 3 and 6, respectively).

Figure 160 a, e, h from Bousfield, 1973 (*a, e* modified from Plate LVII 1; *h* from Plate LVII 1); *b-d, k, m-o* from LeCroy, unpublished drawings; *f, i, l* from Thomas & Barnard, 1987 (*f, i* modified from Figures 1 and 4, respectively; *l* from Figure 4); *g, j, p* from Thomas & Barnard, 1991b (*g, p* modified from Figures 1-2, respectively; *j* from Figure 2).

Figure 161a-b, h from Thomas & Barnard, 1987, Figures 2, 3 and 4, respectively; *c-e, g* from LeCroy, unpublished drawings; *f* from Nelson, 1980, Figure 3.

Figure 162a from Bousfield, 1973, Plate LVII 1; *b-c, f, h* from LeCroy, unpublished drawings; *d, g* from Lowry, 1972, Figure 5; *e* from Thomas & Barnard, 1991b, Figure 3.

Figure 163a-e from Thomas & Barnard, 1987 (*a, e* from Figure 1; *b* modified from Figure 3; *c, d* from Figure 3).

Figure 164a-b, d from Barnard, 1970 (*a* modified from Figure 111; *b, d* from Figures 111 and 113, respectively); *c, e-h* from LeCroy, unpublished drawings.

Figure 165a from Wigley, 1966, Figure 2; *b, d, g* from Bousfield, 1973 (*b, d* modified from Plate LVII 1; *g* from Plate LVII 1); *c, e-f* from Lowry, 1972 (*c, f* from Figure 2; *e* modified from Figure 2).

Figure 166a, c-d, k from Thomas & Barnard, 1991b (*a, k* modified from Figures 1-2, respectively; *c-d* from Figure 3); *b, f-j* from LeCroy, unpublished drawings; *e* from McKinney, et al., 1978, Figure 9.

Figure 167a-e from Barnard & Thomas, 1987b (*a, e* from Figure 2; *b* modified from Figure 2; *c-d* from Figure 3).

Figure 168a-d from Barnard & Thomas, 1987b (*a* modified from Figure 4; *b-c* from Figure 4; *d* from Figure 5); *e* from LeCroy, unpublished drawing.

Figure 169a, c from Barnard & Thomas, 1987b (*a* from Figure 5; *c* modified from Figure 6); *b* from LeCroy, unpublished drawing.

Figure 170a-c from LeCroy, unpublished drawings.

Figure 171a-c from LeCroy, unpublished drawings; *d* from Nelson, 1980, Figure 2.

Figure 172a-e from LeCroy, unpublished drawings.

Figure 173a-d from LeCroy, unpublished drawings.

Figure 174a-d, f from Nelson, 1980 (*a, c-d* from Figure 2; *b* modified from Figure 2); *e, g-h* from Barnard, 1970, Figure 113.

Figure 175a-g from Nelson, 1980 (*a, e* from Figure 2; *b, f-g* from Figure 3; *c-d* modified from Figure 1).

Figure 176a-g from Barnard, 1970 (*a, g* from Figure 111; *b-c, f* from Figure 113; *d* modified from Figure 111; *e* from Figure 112).

Figure 177a-e from LeCroy, unpublished drawings.

Figure 178a-k from LeCroy, unpublished drawings.

Figure 179a-g from LeCroy, unpublished drawings.

Figure 180a-g from LeCroy, unpublished drawings.

Figure 181a-b modified from Bousfield, 1973, Plate LVII; *c-d, g* from Lowry, 1972 (*c* modified from Figure 1; *d, g* from Figure 1); *e-f* from LeCroy, unpublished drawings.

Figure 182a-d, g from Lowry, 1972 (*a, c* modified from Figure 4; *b, d, g* from Figure 4); *e-f* from LeCroy, unpublished drawings.

Figure 183a, d from LeCroy, unpublished drawings; *b, e* modified from Shoemaker, 1945, Figure 4; *c* modified from McKinney, 1980, Figure 1.

Figure 184a, c-d from LeCroy, unpublished drawings; *b* modified from Thomas & Barnard, 1991b, Figure 1; *e* modified from Shoemaker, 1945, Figure 5.

Figure 185a-k from LeCroy, unpublished drawings.

Figure 186a, c-d, k, m from McKinney, 1980 (*a, k, m* modified from Figure 1; *c-d* from Figure 1); *b, e-j, l* from McKinney, et al., 1978 (*b* from Figure 9; *e* modified from Figure 8; *f-g* from Figure 8; *h-i, l* from Figure 10; *j* modified from Figure 10).

Figure 187a-c, e, g-h from McKinney, 1980 (*a-b, g-h* modified from Figure 1; *c, e* from Figure 1); *d, f* from LeCroy, unpublished drawings.

Figure 188a-b, e-g from McKinney, et al., 1978 (*a* from Figure 9; *b, e* from Figure 8; *f* modified from Figure 10; *g* from Figure 10); *c-d* from LeCroy, unpublished drawings.

Figure 189a-b from Shoemaker, 1945 (*a* from Figure 4; *b* modified from Figure 4); *c-d* from LeCroy, unpublished drawings.

Figure 190a-c from McKinney, et al., 1978 (*a* modified from Figure 8; *b* from Figure 10; *c* modified from Figure 10).

Figure 191a-k from LeCroy, unpublished drawings.

Figure 192a, c-d, h from LeCroy, unpublished drawings; *b, e-g, i* from Thomas & Barnard, 1991b (*b, f, i* modified from Figure 2; *e* from Figure 2; *g* from Figure 1).

Figure 193a-i from LeCroy, unpublished drawings.

Figure 194a, c-d, f, h, j-k from LeCroy, unpublished drawings; *b, e, g, i* from Shoemaker, 1945 (*b, e, g* from Figure 5; *i* modified from Figure 5).

Figure 195a-b, d from Shoemaker, 1945 (*a, d* from Figure 5; *b* modified from Figure 5); *c, e-g* from Myers, 1989 (*c, e, g* modified from Figure 290; *f* from Figure 290).

Figure 196a-g from LeCroy, unpublished drawings.

Figure 197a-h from Thomas & Barnard, 1991b (*a, d* modified from Figure 1; *b* from Figure 2; *c, h* modified from Figure 2; *e* from Figure 1; *f-g* from Figure 3).

Figure 198a-g from LeCroy, unpublished drawings.

Figure 199a, d, f from Bousfield, 1973 (*a, f* modified from Plate XX 1; *d* from Plate XX 1); *b-c, e* from Thomas & Barnard, 1985a (*b* from Figure 2; *c* from Figure 1; *e* from Figure 3).

Figure 200a, f from Barnard, 1962, Figure 9; *b, e* from Foster & Heard, unpublished drawings; *c* from LeCroy, unpublished drawing; *d, g* from Bousfield, 1973 (*d* from Plate XIX 1; *g* modified from Plate XIX 1).

Figure 201a, c-d from Bousfield, 1973 (*a, c* modified from Plate XX 1; *d* from Plate XX 1); *b, f-g* from LeCroy, unpublished drawings; *e* modified from Bousfield & Chevrier, 1996, Figure 34.

Figure 202a-g from Thomas & Barnard, 1985a (*a* modified from Figure 1; *b* from Figure 1; *c-e* modified from Figure 2; *f* from Figure 3; *g* modified from Figure 3).

Figure 203a-b, d-e, h from Foster & Heard, unpublished drawings; *c, g* from LeCroy, unpublished drawings; *f* modified from Bousfield, 1973, Plate XIX 1.

Figure 204a, c, j from LeCroy, unpublished drawings; *b* from Barnard, 1962, Figure 9; *d-e, g, i* from Shoemaker, 1933b (*d, g, i* from Figure 5; *e* modified from Figure 5); *f, h* modified from Bousfield, 1973, Plate XIX 2.

Figure 205a, e from Shoemaker, 1933b, Figure 5; *b* from LeCroy, unpublished drawing; *c-d* modified from Barnard, 1962, Figure 9.

Figure 206a-b, d-e from LeCroy, unpublished drawings; *c* modified from Bousfield, 1973, Plate XIX 2.

Figure 207a-f from LeCroy, unpublished drawings.

Figure 208a-f from LeCroy, unpublished drawings.