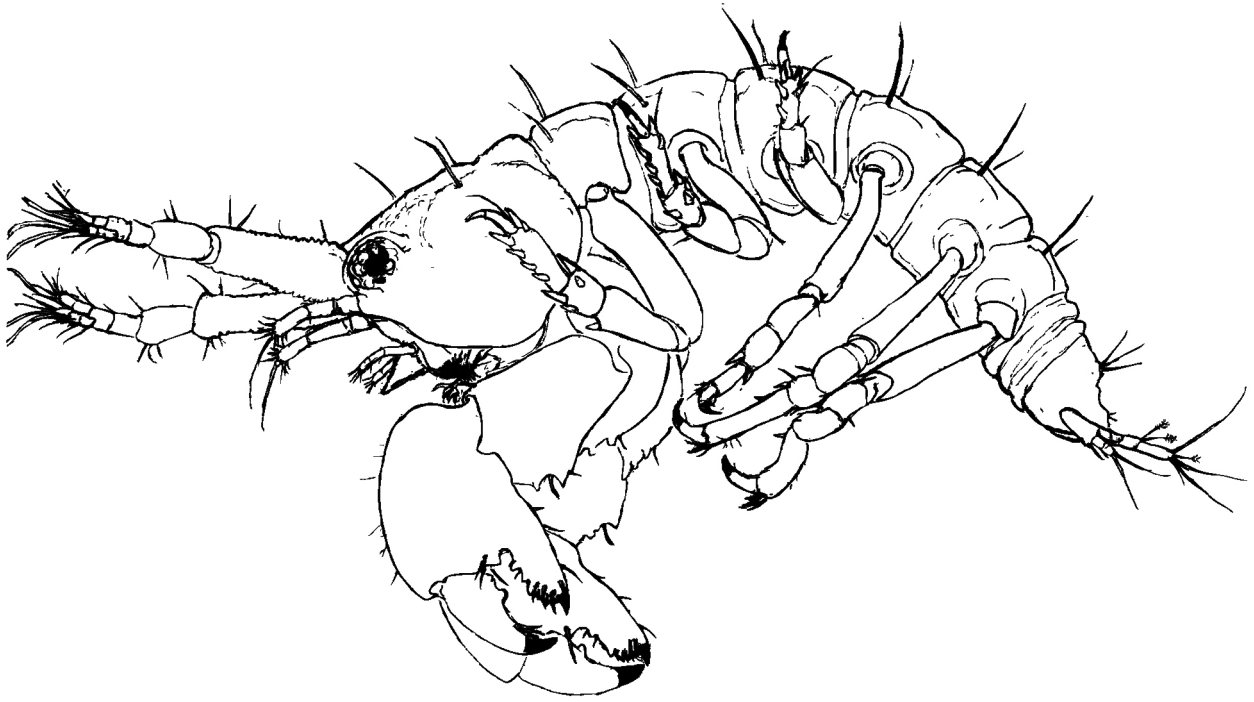


**AN ILLUSTRATED IDENTIFICATION GUIDE TO FLORIDA
TANAIDACEA (CRUSTACEA: PERACARIDA)
OCCURRING IN DEPTHS OF LESS THAN 200 M.**



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GUIDE TO THE TANAIIDACEA (CRUSTACEA: PERACARIDA) OF FLORIDA WATERS

Richard W. Heard, Tom Hansknecht, and Kim Larsen

INTRODUCTION

Presently about 750 species comprise the Tanaidacea Dana, 1849, a relatively small order of malacostracan Crustacea, which occur in brackish and marine habitats throughout the world (Gu~~ti~~ & Sieg 1999, Tanaidacea web site: <http://tidepool.st.usm.edu/tanaids/>). Tanaidaceans are relatively small benthic crustaceans belonging to the malacostracan superorder Peracarida. The adult body length is generally 2-3 mm, but it can vary from less than 0.5 mm (e.g., males of *Pseudotanaïs* G. O. Sars, 1882) to 120 mm (*Gigantapseudes maximus* Gamô, 1984). Members of the order are known from “fresh water” coastal habitats (Tanaidae, Leptocheliidae, Nototanaidae) to hadal depths (Neotanaidae), however, the vast majority are known from marine environments in depths exceeding 300 m (Sieg 1983a, 1986c).

Generally, Tanaidacea are considered free living forms; however, one species (*Exspina typica* Lang, 1968), which is often found associated with deepwater holothurians, may be parasitic (Thurston et al. 1986, Kudinova-Pasternak 1987). Tanaidaceans have also been reported in direct association with sessile invertebrates (Sieg & Zibrowius 1988).

Symbionts reported from tanaidaceans include acanthocephalan larvae (Escobar-Briones et al. 1999), nematodes (Gardiner 1975b), bivalve mollusks (Sieg 1993, Warren & Corrozza 1994), nicothoid copepods (Bradford 1975), and tantulocarids (Boxall & Lincoln 1987).

Trophically, the members of the order have been divided into five groups: detritophages (majority), sesteonophages, phytophages, euryphages, and predators (Kudinova-Pasternak 1991). As part of the marine food web they serve as prey for marine fishes (Bright 1970).

Most tanaidaceans are distinctly sexually dimorphic; in some tanaidomorph families (e.g., Leptocheliidae, Paratanaidae, Pseudotanaidae) sexual dimorphism is extreme and it is often difficult to match the sexes of particular species. The males show the greatest degree of change.

Tanaidaceans can occur in large numbers with population densities for a single species often in the thousands per m². Barnard (1970) found densities of the relatively large apseudomorph species *Kalliapseudes crassus* Menzies, 1953 to be over 10,000/m². The highest published density reported was for the tube dwelling tanaidomorph, *Allotanaïs hirsutus* (Beddard, 1886) (Tanaidae), which occurred in numbers exceeding 140,000 individuals/m² (Delille et al. 1985). The abundance of tanaidaceans is an indicator of their ecological importance. They appear to be an important dietary component for fishes, especially in nursery environments. Notwithstanding, this peracarid group has been neglected in most ecological surveys largely due to the problems associated with the identification of its members.

Status of our knowledge of Tanaidacea from Florida coastal waters

Currently there are no illustrated manuals or guides for the Tanaidacea occurring in the coastal habitats and shelf waters of Florida, or for that matter the southeastern United States in general. In this guide we follow the general format of LeCroy (2000, 2002) in her illustrated identification manuals (Volumes 1-3) for the identification of the estuarine and marine Amphipoda from Florida waters. We have attempted to produce a well-illustrated “user friendly” vehicle for the identification of the presently known Tanaidacea of Florida waters from the intertidal to a depth of 200 m. It is designed for use by non-specialists, as well as those with taxonomic training, for the accurate identification of the members of this arcane group of crustaceans. We should also emphasize that this guide is essentially a work in progress and we anticipate that as more sampling occurs, especially in live bottom habitats of the southern part of the state, many additional species will be discovered.

Because of its many diverse estuarine and marine habitats, Florida may have more species of Tanaidacea than any other state or region in the continental United States. Within depths of 0-200 m, these habitats range from temperate to tropical, oligohaline to polyhaline, soft bottom to hard bottom. They include tidal marshes, mangroves, muddy bay bottoms, oyster reefs, sand and silty substrata, grass beds, floating and submerged algal mats, man-made hard substrates such as piers, bridges and sea walls, coral rubble, coral reefs, and deep water carbonate outcroppings.

The tanaidacean fauna of Florida has remained poorly known. The published information available is based largely on individual records. The report of *Hoplomachus* (= *Apseudes*) *propinquus* (Richardson, 1903) appears to be the first published record of a tanaidacean from the state (Richardson 1903, 1905). Nearly 63 years later Miller (1968) reported *Leptochelia dubia* Krøyer, 1842 from buoys at the Florida Middle Ground and the Florida Keys. In 1973, Lang reported *Hargeria* (= *Leptochelia*) *rapax* (Harger, 1879) from the Apalachicola Bay system. This species has also been reported from Florida coastal waters by Subrahmanyam et al. (1976), Livingston et al. (1977), and White et al. (1979). Records for *Leptochelia* sp. (spp.) in Florida waters include those of Odum & Held (1972), Camp et al. (1977), Henwood et al. (1978), Cooley (1978), and Rakocinski et al. (1996, 2000). In addition to their record of “*Leptochelia* sp.” Camp et al. (1977) tentatively identified *Heterotanais* sp. from shallow waters off the east coast of Florida (Hutchinson Island). Gardiner (1973a) described *Cirratodactylus floridana*, which he designated as the type for the monotypic family Cirratodactylidae, from southeastern Florida. Based on south Florida records given in an unpublished MS thesis by McSweeney (1968), Gardiner (1975b) reported the tanaid *Tanais stanfordi* Richardson, 1900, a species known to tolerate fresh water conditions. Based in part on his excellent MS thesis, McSweeney (1982) published a description of *Pagurapseudes largoensis* from the Florida Keys. Sieg (1980b), in a comprehensive monograph on the family Tanaidae, established records for *Zeuxo* (*Parazeuxo*) *coralensis* Sieg, 1980b and *Zeuxo* (*Parazeuxo*) *maldivensis* Sieg, 1980b from southern Florida. Sieg et al. (1982) reported and presented a fully illustrated supplemental description for *Halmyrapseudes bahamensis* Băcescu & Gu, 1974 based on specimens collected from a tidal marsh near St. Marks and Wakulla, Florida. In an earlier publication by Subrahmanyam et al. (1976) this material

had been referred to as “*Apseudes alicii*”, a *nomen nudum*. “*Apseudes alicii*” refers to an undescribed species of *Kalliapseudes* (Ogle et al. 1982, Sieg et al. 1982), which is conspecific with *Kalliapseudes* sp. A *sensu* Rakocinski et al. (1996, 2000) reported from shallow water sand habitats in or adjacent to Pensacola Bay. In their review and annotated bibliography of the Tanaidacea known from the Gulf of Mexico, Ogle et al. (1982) also referred to some of the gray literature (unpublished checklist and abstract) that list tanaidaceans from Florida Gulf waters. As part of a series of papers dealing with Tanaidacea of the Gulf of Mexico, Sieg and Heard (1983a,b, 1985, 1988, 1989) reported *Teleotanais gerlachi* Lang, 1956 (Sieg & Heard 1983a), *Nototanoides trifucatus* Sieg & Heard, 1985, *Iungentitanais primitivus* Sieg, 1976 (Sieg & Heard 1988), *Pseudotanais mortenseni* Sieg, 1976 (Sieg & Heard 1988), and *Mesotanais vadicola* Sieg & Heard, 1989 from Florida coastal and shelf waters. Based on specimens collected from the east coast of Florida off Hutchison Island, Sieg and Dojiri (1989) described *Araphura higginsi* from the midshelf. In his checklist to the higher Crustacea reported from Florida waters, Camp (1998) listed 17 species of Tanaidacea representing 8 families and 11 genera. This list excluded the deep water leptocheliid *Mesotanais vadicola*, which was reported in depths of less than 200 m off Miami (Sieg & Heard 1989). Since Camp’s publication, three additional species have been reported or described from Florida coastal waters. Hansknecht and Heard (2001) reported several records for *Apseudes olimpie* Gu•u, 1986, a species previously reported from Bermuda, at several sites off the Florida Gulf Coast. Two new species of the metapseudid genus *Calozodion* Gardiner, 1973b, *C. heardi* Gu•u, 2003 and *C. singularis* Gu•u 2003, were described from the west coast of Florida off Tampa. Most recently *Kalliapseudes macsweenyi* and *Protanissus floridensis* were described from southeast Florida waters by Drumm (2003) and Larsen and Heard (2004), respectively.

There have been several changes in the scientific names of Tanaidacea previously reported from Florida, especially at the generic level. A listing of the 19 species previously reported from Florida waters indicating any changes in their original taxonomic designations are presented in Table 1.

Historical

(modified from Ogle et al. 1982; Heard 2002)

Members of the order were originally considered aberrant amphipods (Leach 1814), isopods (“tribe Chelifera” of Sars 1882), or an independent order sharing characters with the Isopoda and Cumacea (Anisopoda of Claus 1887). The ordinal name Tanaidacea was established by Hansen (1895); however, Dana (1849) who was the first to place the group into a higher taxon (family Tanaidae) is now given credit for the order (see Martin and Davis 2001). In his revision of the order, Lang (1956) designated the two suborders Monokonophora and Dikonophora based on the presence of a single or bilobed genital cone in the males. Sieg (1980a) reevaluated the higher groups of the order, designating four suborders; Anthracocaridomorpha [extinct], Apseudomorpha, Neotanaidomorpha, and Tanaidomorpha. This scheme is the one generally accepted, but these groups have also been referred to as infraorders (Schram et al. 1986). Schram (1981, 1986) grouped the Tanaidacea with the Cumacea and Spelaeogriphacea, considering them suborders of the new order Hemicaridea Schram, 1981. This systematic concept has not been followed by other specialists including Bird & Holdich (1986, 1988), Sieg (1986a,b,c; 1988a), Gu•u (1996b,

2001), Gu•u & Sieg (1999), Larsen & Wilson (1998, 2002), and Gu•u & Heard (2003a). As a group, the Apseudomorpha appear to be less highly derived than the other two extant suborders, Neotanaidomorpha and Tanaidomorpha (Sieg 1988a). Table 2 presents a taxonomic listing of the generally recognized higher taxonomic groups within the order.

Present taxonomic and systematic status of the order Tanaidacea

Identifying tanaidaceans can often be quite difficult, especially for members of the suborder Tanaidomorpha. While this is partly due to their small size and lack of relevant regional literature, identification can be confounded by the high degree of sexual and ontogenetic variation displayed, especially within the superfamily Parataniodea (e.g., families Leptocheliidae Lang, 1973; Paratanaidae Lang, 1949; Pseudotanaidae Sieg, 1977). This polymorphism is a consequence of a peculiar reproductive strategy involving protogynous hermaphroditism. To further complicate matters, the systematics of Tanaidacea have been in a state of flux, especially for the superfamily Paratanoidea. The most recent systematic treatment of this superfamily by Larsen and Wilson (2002) is tentatively followed here. In their preliminary attempt to revise the systematics of the superfamily Paratanoidea, these authors established two new families (Colletteidae, and Tanaellidae), reestablished the families Agathotanaididae Lang, 1971 and Leptognathiidae Sieg, 1976, and synonymized the family Typhlotanaidae Sieg, 1986 with the family Nototanaidae. There have also been several important taxonomic changes at the family level within the Apseudomorpha. The families Anuropodidae B•cescu, 1980a and Tanapseudidae B•cescu, 1978, respectively, were recently synonymized with the families Parapseudidae Gu•u, 1981 and Kalliapseudidae Lang, 1956 (Gu•u 2002, Hansknecht et. al. 2002) and Gu•u and Heard (2003) described the new family Numbakullidae from Australian waters.

Table 1. Alphabetical listing of the original scientific names for the 19 species of Tanaidacea previously reported from Florida waters (0-200 m). Nomenclature changes since the original published Florida records are listed in Column 2. Species reported only to the generic level (e.g., *Leptochelia* sp.) or as “cf” are not listed.

Original designation	Present designation or status
1. <i>Apseudes propinquus</i> Richardson, 1903	<i>Hoplomachus propinquus</i> (Richardson, 1903)
2. <i>Calozodion heardi</i> Gu•n, 2003	unchanged
3. <i>Calozodion singularis</i> Gu•n, 2003	unchanged
4. <i>Cirratodactylus floridensis</i> Gardiner, 1973	<i>Psammokalliapseudes granulosus</i> Siva Brum, 1973
5. <i>Halmyrapseudes bahamensis</i> B•cescu & Gu•n, 1974	unchanged
6. <i>Hargeria rapax</i> (Harger, 1879)*	unchanged
7. <i>Iungentitanais primitivus</i> Sieg, 1976	unchanged
8. <i>Kalliapseudes bahamaensis</i> Sieg, 1982	unchanged
9. <i>Kalliapseudes</i> sp. A	<i>Kalliapseudes macsweenyi</i> Drumm, 2003
10. <i>Leptochelia dubia</i> Krøyer, 1842	unchanged
11. <i>Mesotanaïs vadicola</i> Sieg & Heard, 1989	unchanged
12. <i>Nototanoides trifurcatus</i> Sieg & Heard, 1985	unchanged
13. <i>Pagurapseudes largoensis</i> McSweeney, 1984	<i>Pagurotanais largoensis</i> (McSweeney, 1984)
14. <i>Protanaissus flordensis</i> Larsen and Heard, 2004	unchanged
15. <i>Pseudotanais mortenseni</i> Sieg, 1976	unchanged
16. <i>Tanaïs stanfordi</i> Richardson, 1900	<i>Sinelobus stanfordi</i> (Richardson, 1900)
17. <i>Teleotanais gerlachi</i> Lang, 1956	unchanged
18. <i>Zeuxo (Parazeuxo) coralensis</i> Sieg, 1980	unchanged
19. <i>Zeuxo (Parazeuxo) maldivensis</i> Sieg, 1980	<i>Zeuxo kurilensis</i> Kussakin & Tzareva, 1974
* Prior to 1973 this species was assigned to the genus <i>Leptochelia</i>	

Table 2. Taxonomic list of the 23 currently recognized extant families of the order Tanaidacea (Gu•u 2001, Gu•u & Sieg 1999, Gu•u & Heard 2003, Hansknecht et al. 2002, Larsen & Wilson 2002).

Order Tanaidacea Hansen, 1885

Suborder Apseudomorpha Sieg, 1980

Superfamily Apseudoidea Schram et al., 1986

Family Apseudellidae Gu•u, 1972

Family Apseudidae Leach, 1814

Family Gigantapseudidae Kudinova-Pasternak, 1978

Family Kalliapseudidae Lang, 1956

Synonyms: Cirratodactylidae Gardiner, 1973

Tanapseudidae Bácescu, 1978

Family Metapseudidae Lang, 1970

Synonyms: Cycloapseudidae Sieg, 1983

Synapseudidae Gu•u, 1972

Family Numbakullidae Gu•u and Heard, 2003

Family Pagurapseudidae Lang, 1970

Family Parapseudidae Gu•u, 1981

Synonyms: Anuropodidae Bácescu, 1980a

Family Sphyrapidae Gu•u, 1980

Family Tanzanapseudidae Bácescu, 1975

Family Whiteleggiidae Gu•u, 1972

Suborder Neotanaidomorpha Sieg, 1980

Family Neotanaidae Lang, 1956

Suborder Tanaidomorpha Sieg, 1980

Superfamily Tanaoidea Dana, 1849

Family Tanaidae Dana, 1849

Superfamily Paratanaoidea Lang, 1949*

Family Agathotanaidae Lang, 1971

Family Anarthruridae Lang, 1971

Family Colletteidae Larsen & Wilson, 2002

Family Leptocheliidae Lang, 1973

Family Leptognathiidae Sieg, 1976

Family Nototanaidae Sieg, 1973

Synonym: Typhlotanaidae Sieg, 1986

Family Paratanaidae Lang, 1949

Family Pseudotanaidae Sieg, 1973

Family Pseudozeuxidae Sieg, 1982

Family Tanaellidae Larsen & Wilson, 2002

*Larsen and Wilson (2002) proposed changing the spelling of the family and superfamily names with suffix "...tanais." by using the genitive stem "tanaid" the spelling of these family and superfamily names become: Neotanaididae, Tanaidoidea, Tanaididae, Paratanaidoidea, Agathotanaididae, Nototanaididae, Paratanaididae, Pseudotanaididae.

Tanaidacean Morphology

The morphology of tanaidaceans follows the basic malacostracan crustacean plan with a carapace covering the head and the first two thoracic segments (somites), six free thoracic segments and five free abdominal segments (pleonites). The last or sixth abdominal segment, which bears the uropods, is fused with the telson to form a pleotelson. Members of some families (e.g., Metapseudidae, Tanaidae, Collettidae) can have two more segments fused with the telson.

Unfortunately, there is not a consensus for the terminology used in describing Tanaidacea. Some authors count the head or cephalon and first fused segment as one unit (cephalothorax), the second fused segment as distinct (peraeonite 1) and the subsequent thoracic segments as peraeonites 2-6. Following these authors, the cheliped becomes the first thoracic appendage (pereopod 1) and the subsequent legs peraeopods 2-7. Other authors have counted the maxilliped as the first pereopod, the cheliped as the second pereopod and the subsequent legs as peraeopods 3-8. Most recent literature follows the terminology of Sieg (1977) and consider the head and the first two fused thoracic segments as one unit and the following thoracic segments as peraeonites 1-6. These authors use the terms cheliped and pereopods 1-6 for the thoracic appendages. Larsen (2003a) has attempted to formally standardize the morphological terms used in Tanaidacea and his terminology is largely followed in this guide.

A generalized tanaidacean with the terminology and numbering used herein, is presented in Fig. 1. The terminology of the external appendages is given in Fig. 1, the articles of the thoracic appendages in Fig. 2, and of the mouthparts in Figs. 3 and 4.

There are two pairs of antennae in Tanaidacea. These vary in structure between the suborders. Members of the Apseudomorpha usually have a biramous antennule (antenna 1) (Figs. 1, 3a) and an antenna (antenna 2) having a uniarticulate squama (or appendix) attached to the last peduncular article (Figs. 1, 3b). The Neotanaidomorpha and Tanaidomorpha both have uniramous antennae (Figs. 1, 3c,d), although the number of antennular and antennal articles vary in number between sexes and species. There is often no clear division into a peduncle and flagellum, especially for members of the Tanaidomorpha.

The mouthparts (Fig. 4) follow the general malacostracan crustacean plan. In anterior to posterior direction these are as follows: (1) labrum (upper lip), with (Fig. 4) or without processes and setae; (2) mandibles, usually with palp in Apseudomorpha (Fig. 3e) and always lacking a palp in the Neotanaidomorpha and Tanaidomorpha (Fig. 3f); (3) labium (lower lip), appearing articulated in Apseudomorpha and Neotanaidomorpha, but not in Tanaidomorpha (Fig. 4); (4) maxillule (maxilla 1), with two endites and palp in Apseudomorpha (Fig. 3g) (except lacking palp in the Kalliapseudidae), with two endites and no palp in the Neotanaidomorpha, and with one endite and palp in the Tanaidomorpha (Fig. 3h); (5) maxilla (maxilla 2), with dense specialized setation and distal endites in Apseudomorpha and Neotanaidomorpha (Fig. 3i) and reduced to a knob-like smooth structure in Tanaidomorpha (Fig. 3j); (6) maxilliped (first thoracic appendage), with coxa and unfused basis in Apseudomorpha and Neotanaidomorpha, and with different degrees of fusion within Tanaidomorpha, palp having four articles in all known tanaidaceans (Fig. 4)

The thoracic appendages 2-8 are as follows in anterior to posterior direction: (1) cheliped (second thoracic appendage) typically chelate; (2) pereopod 1 (third thoracic appendage) specialized for digging in Apseudomorpha (Fig. 2c), walking in Neotanaidomorpha, and for tube dwelling in Tanaidomorpha (Fig. 2d); (3) pereopods 2-6 with relatively little variation among the suborders.

Pleopods are usually present in Apseudomorpha and always present in Neotanaidomorpha. In the Tanaidomorpha, nearly all shallow water species have pleopods, but in many deep water species, the females have lost these appendages. The uropods are usually biramous in Apseudomorpha and always biramous in Neotanaidomorpha. In Tanaidomorpha several families have members with uniramous uropods.

The marsupium is formed by four or five pairs of oostegites in Apseudomorpha, four pairs in Neotanaidomorpha. In Tanaidomorpha there are normally four pairs, but in Pseudotanaididae the marsupium is formed by one pair and in Tanaididae it consists of a pair of ovisacs instead of oostegites.

TANAIDOMORPHA

APSEUDOMORPHA

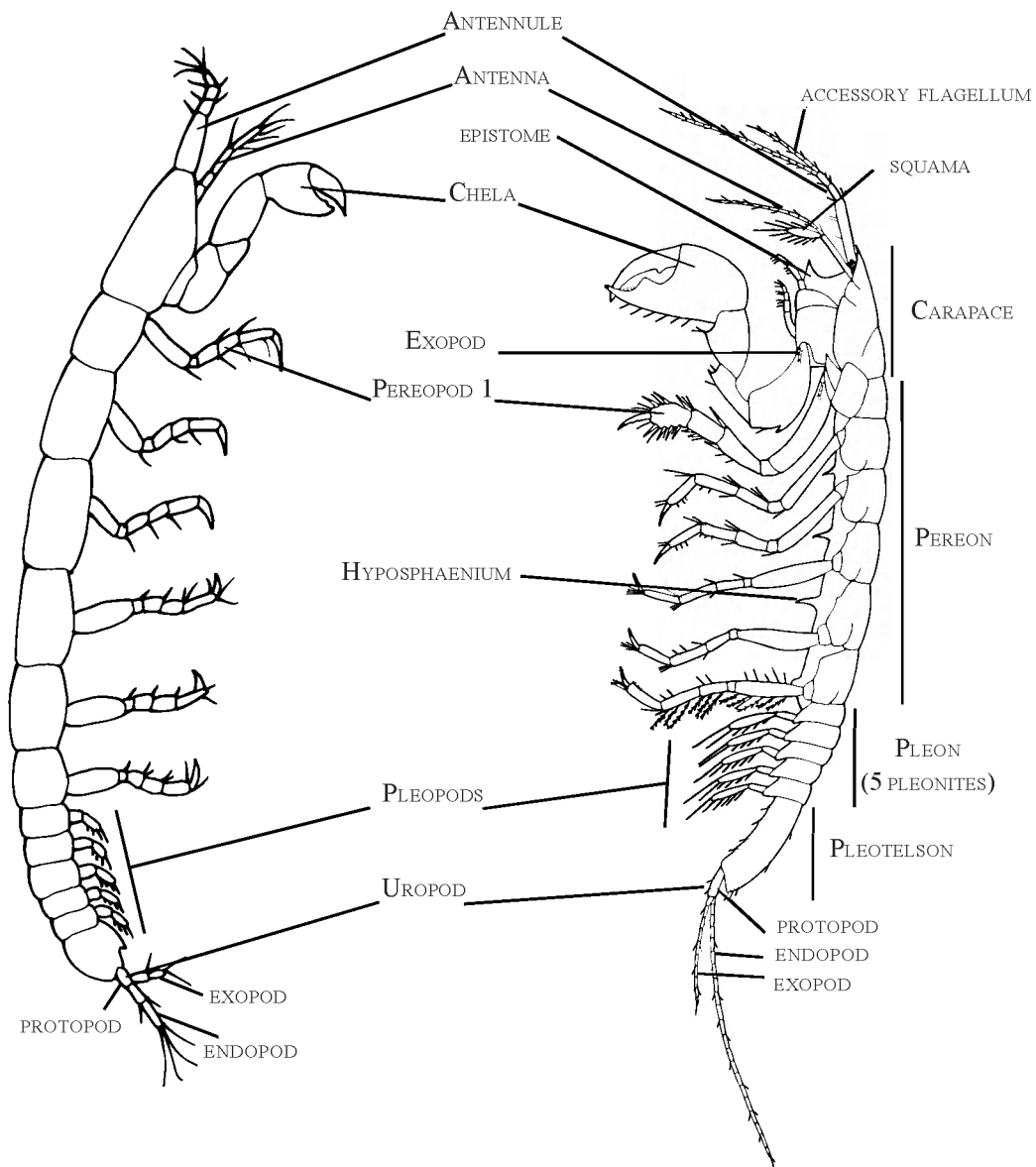


FIGURE 1. EXTERNAL MORPHOLOGY OF GENERALIZED APSEUDOMORPH AND TANAIDOMORPH BODY FORMS.

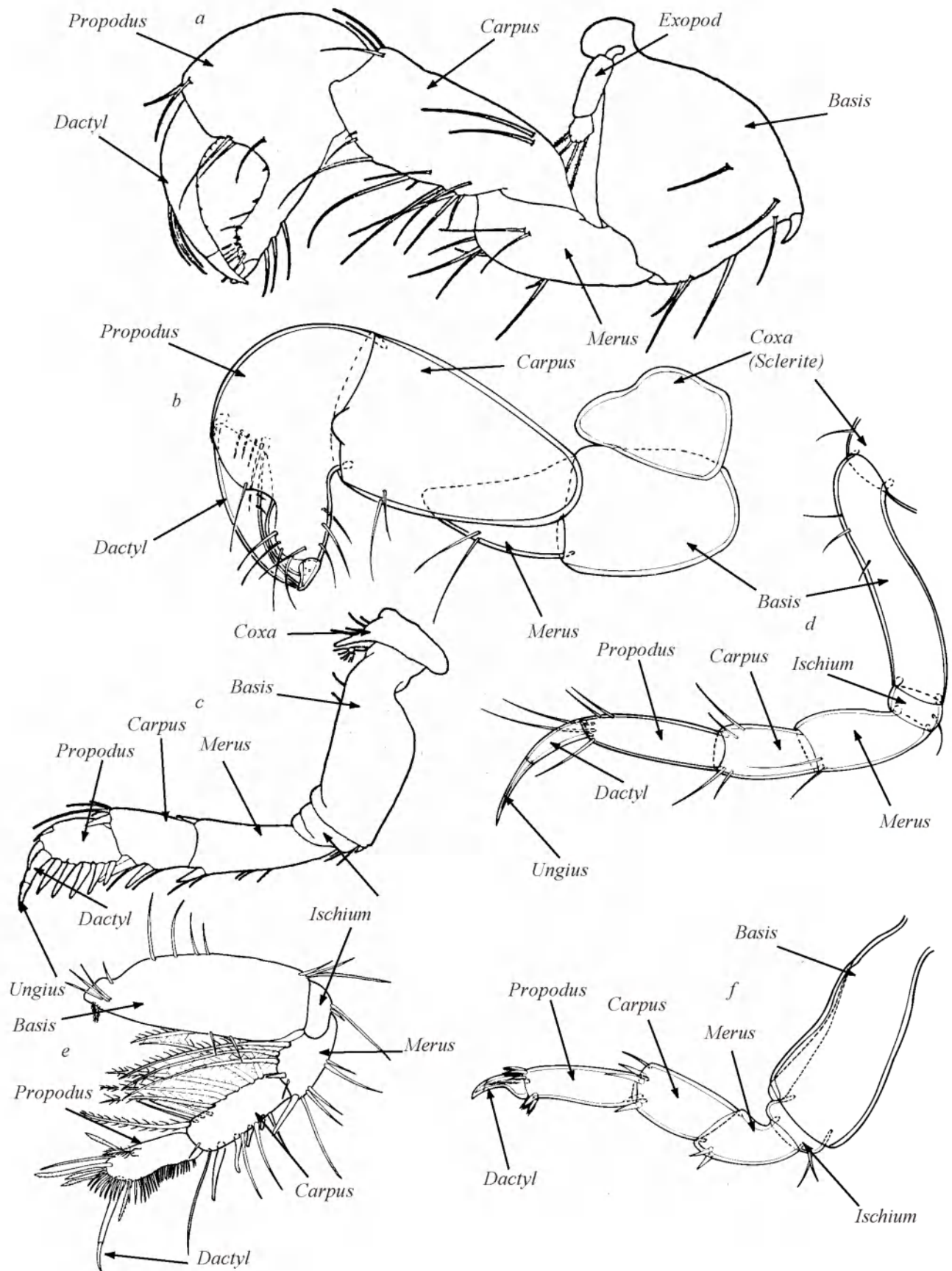


FIGURE 2. MORPHOLOGY OF TANAIDACEAN THORACIC APPENDAGES. *a*. APSEUDOMORPH CHELIPED; *b*. TANAIDOMORPH CHELIPED; *c*. APSEUDOMORPH FIRST PEREOPOD; *d*. TANAIDOMORPH FIRST PEREOPOD; *e*. APSEUDOMORPH SIXTH PEREOPOD; *f*. TANAIDOMORPH SIXTH PEREOPOD.

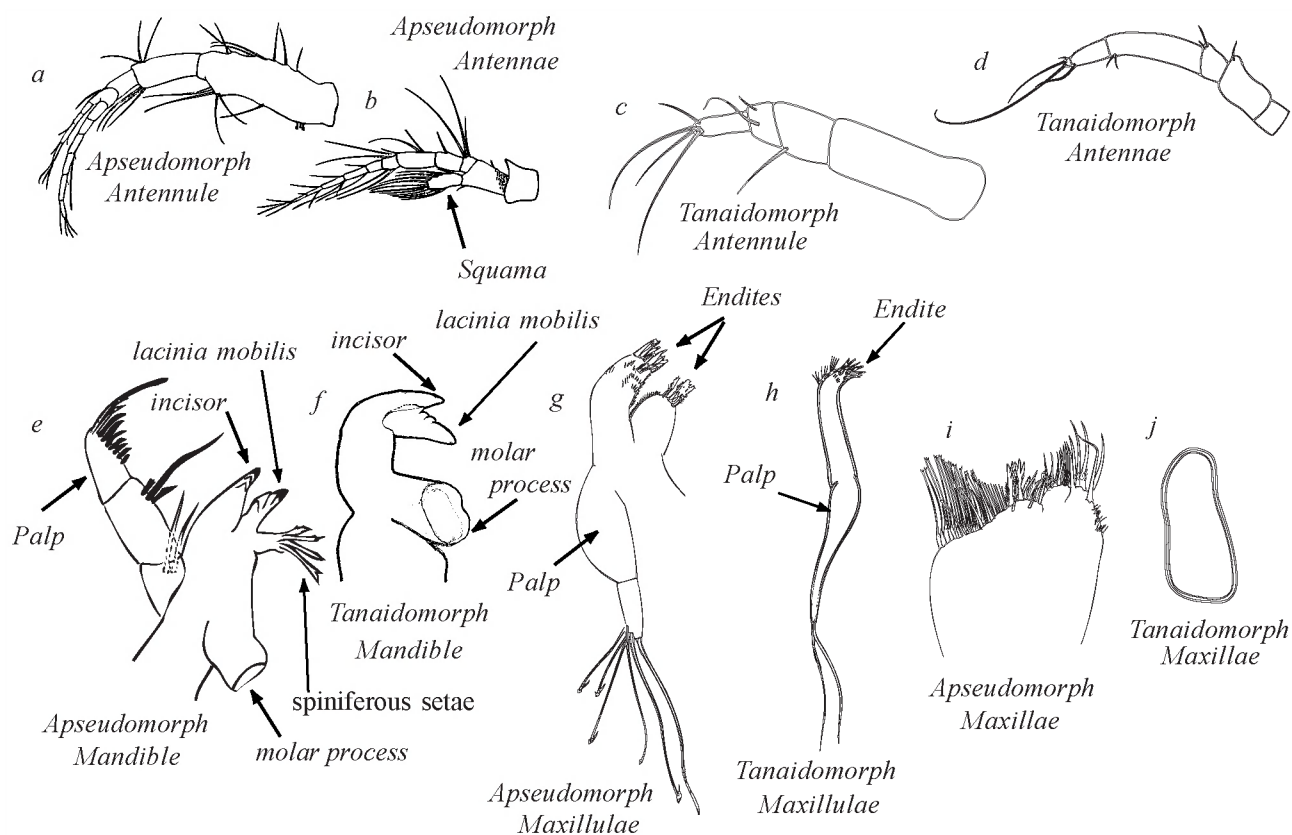


FIGURE 3. MORPHOLOGY OF HEAD APPENDAGES FOR APSEUDOMORPH AND TANAIDOMORPH TANAIDACEANS.

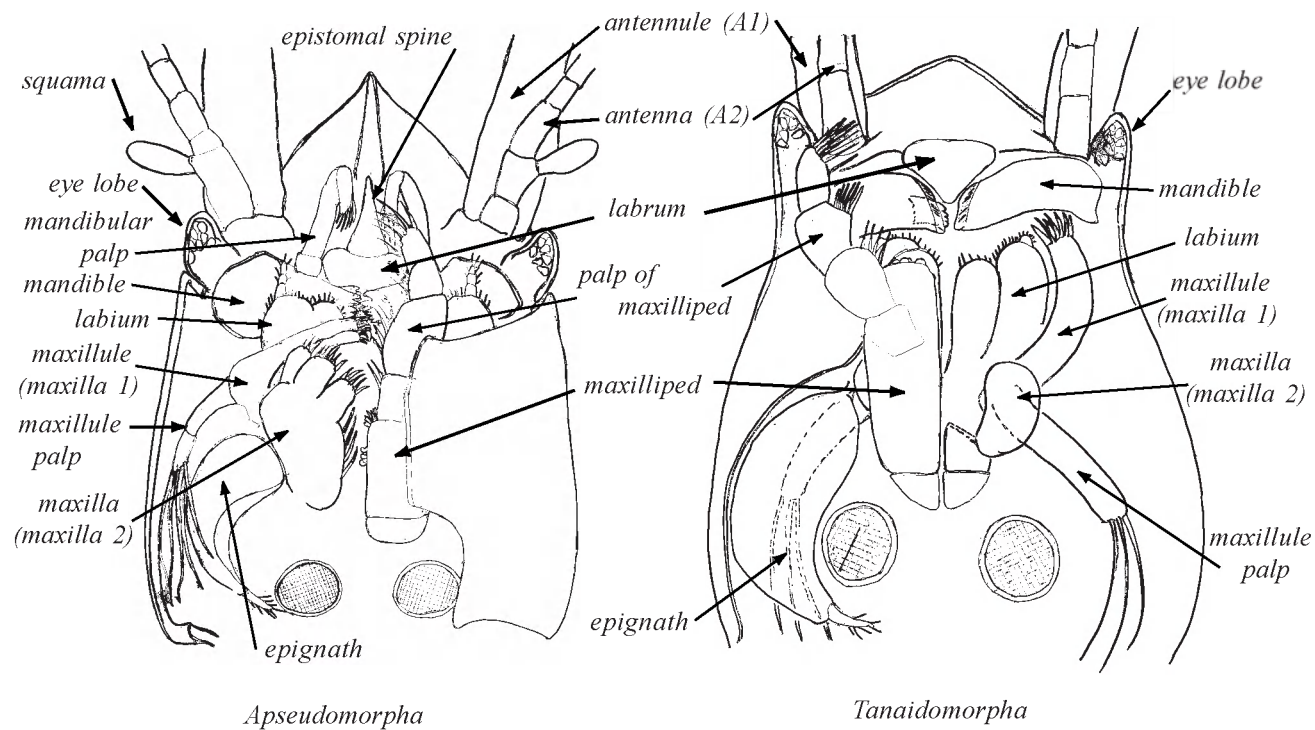


FIGURE 4. GENERALIZED ARRANGEMENT OF TANAIDACEAN MOUTHPARTS AFTER DOMEL (1925) AND SIEG (1977).

Material

Much of the material used in the preparation of this guide came from the authors' collections or made available to the authors through museums, environmental consulting firms (e.g., Barry A. Vittor & Associates), and government agencies (i.e., National Oceanographic & Atmospheric Administration (NOAA), the US Environmental Protection Agency). Representatives of the species constituting new distribution records or new taxa will be deposited in the National Museum of Natural History (Smithsonian Institution) or the Museum of the Gulf Coast Research Laboratory, Ocean Springs, MS.

Taxonomic Identification of Florida Tanaidacea

In this guide we present illustrated keys for the identification of 49 tanaidacean species representing two suborders, 12 families, and at least 34 genera. We have identified more than 30 additional species of Tanaidacea previously unknown from Florida coastal waters. Many of these appear to represent undescribed species and in several instances new genera (e.g., *Apseudomorpha*-like sp. A, *Parapseudid*-like sp. A, *Nototanaid* spp. A,B). Since this work is primarily for identification of specific taxa and not a formal taxonomic or systematic treatment of the group, we have generally followed currently recognized characters for keying out the members of the various families. This has lead us in several cases to include some problem genera in families to which systematically they may not belong.

KEY TO THE SUBORDERS OF TANAIACEA KNOWN FROM FLORIDA WATERS

1. ••Accessory flagellum present (occasionally vestigial) on the antennule (antenna 1); base of antenna (antenna 2) with scale or squama, except reduced to single setae or absent in some Sphyrapidae; mandible with palp; first pereopod (third thoracopod) nearly always more strongly developed than pereopods 2-6, usually modified for digging or rasping, propodus and carpus usually inflated with strong marginal spiniform setae; maxillule with 2 endites, palp present, except in family Kalliapseudidae; [maxilla, well-developed, complexly setose; uropod biramous] Apseudomorpha

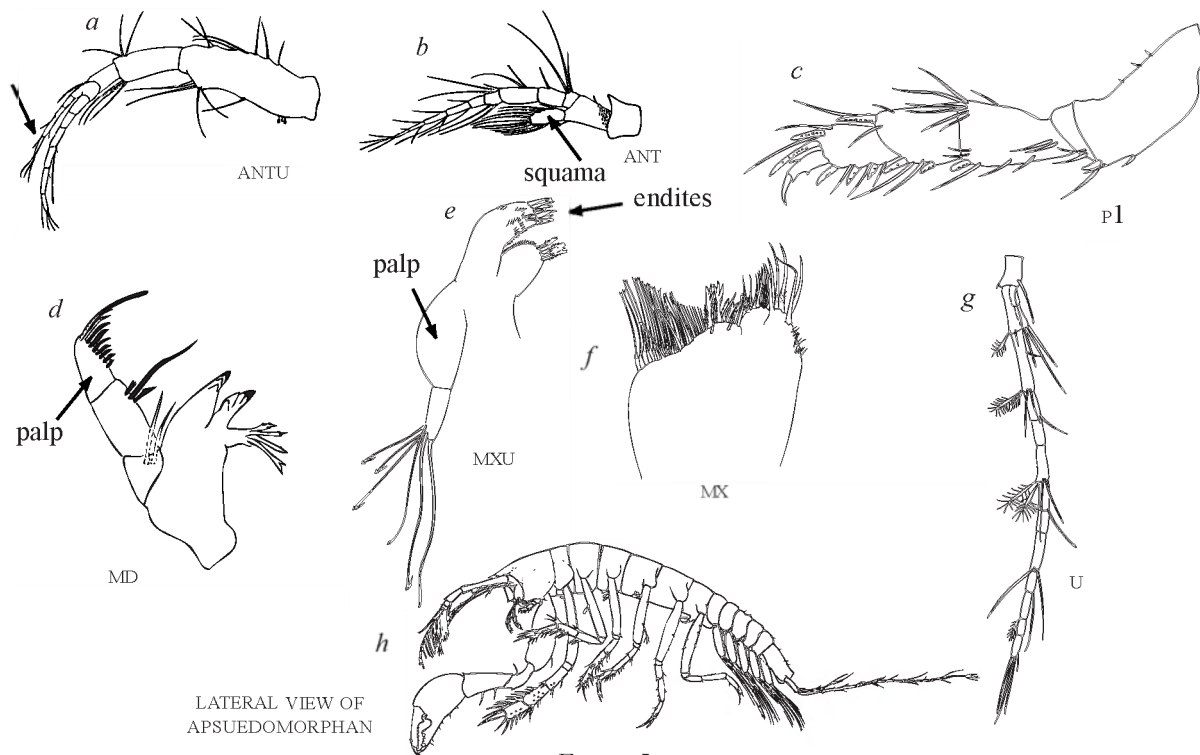


Figure 5

- Antennule lacking accessory flagellum; antenna lacking squama; mandible without palp; [maxillule with 1 or 2 endites and with or without palp; maxilla well developed or vestigial; uropods uniramous or biramous] 2

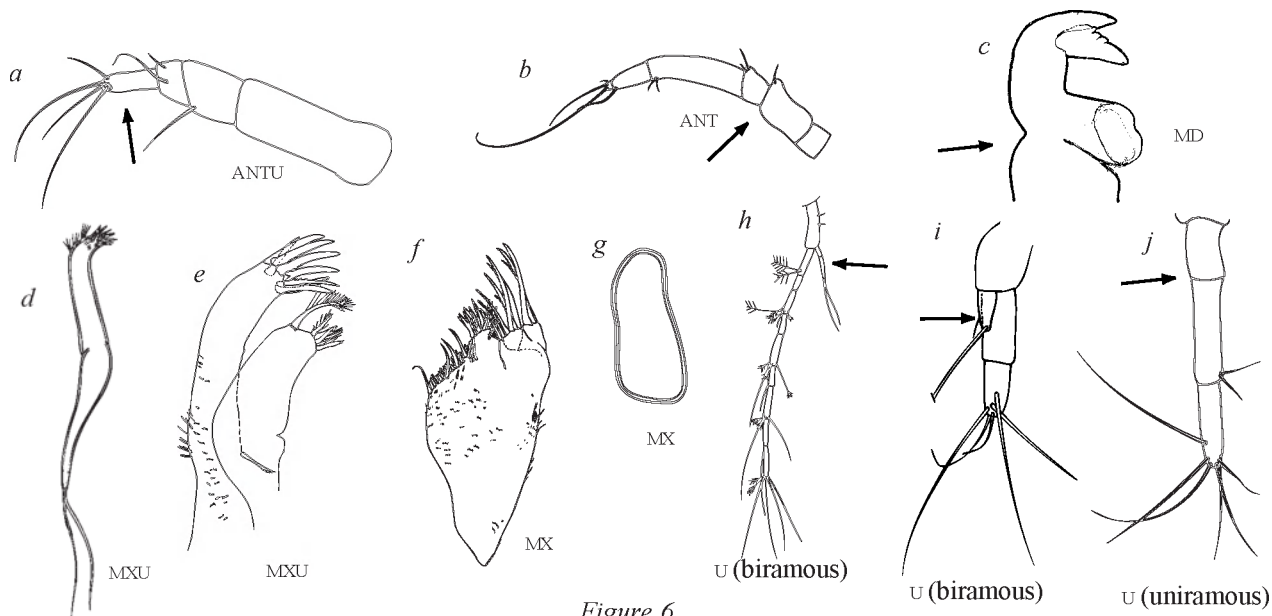


Figure 6

2. ••Antennule of both genders with 7 articles; Antenna of both genders with 9 articles; maxillule with 2 endites, lacking a palp; maxilla well-developed, setose; uropodal endopod with more than 6 articles, frequently as long or longer than pleon; occurring in depths greater than 200 m ... Neotanaidomorpha

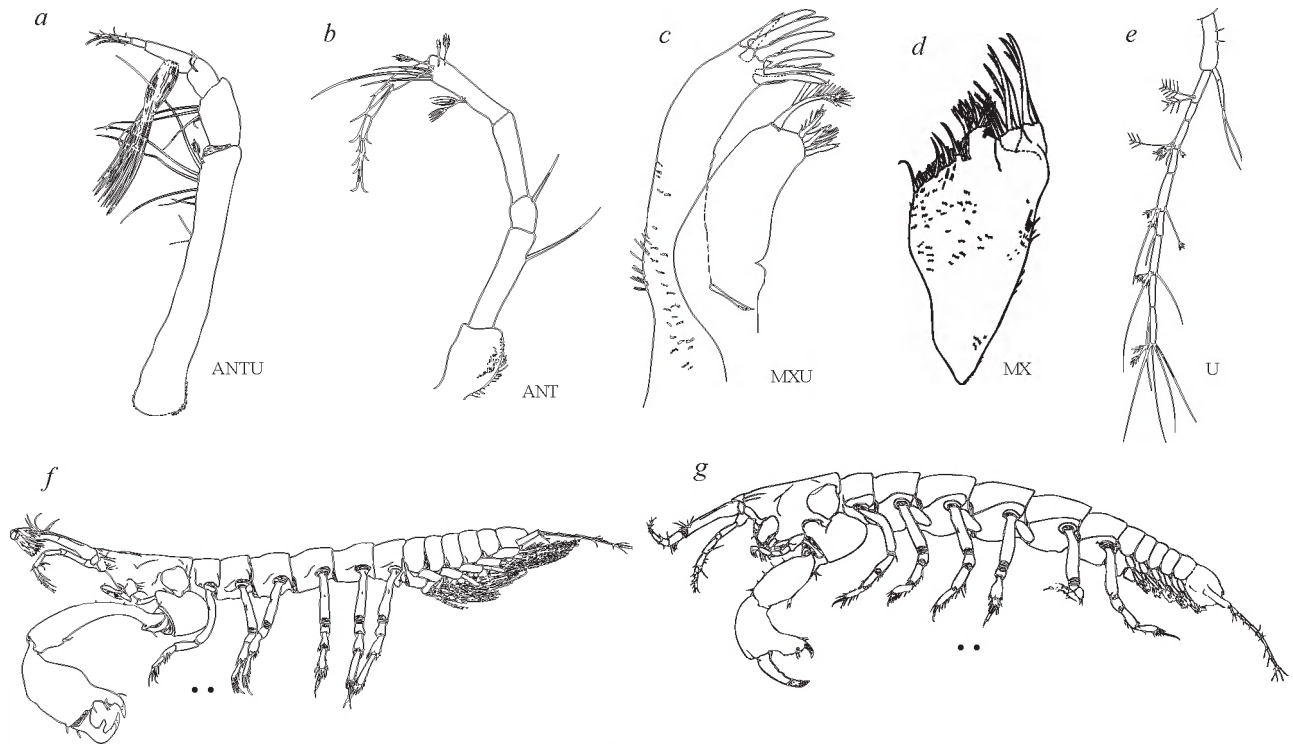


Figure 7

- Antennule of female never with more than 5 articles; Antenna of both genders never with more than 7 articles; Maxillule with 1 endite, palp present; maxilla vestigial, usually aseptose; uropods uniramous or biramous, endopod never with more than 6 articles and not as long as pleon; most species small, tube dwellers Tanaidomorpha

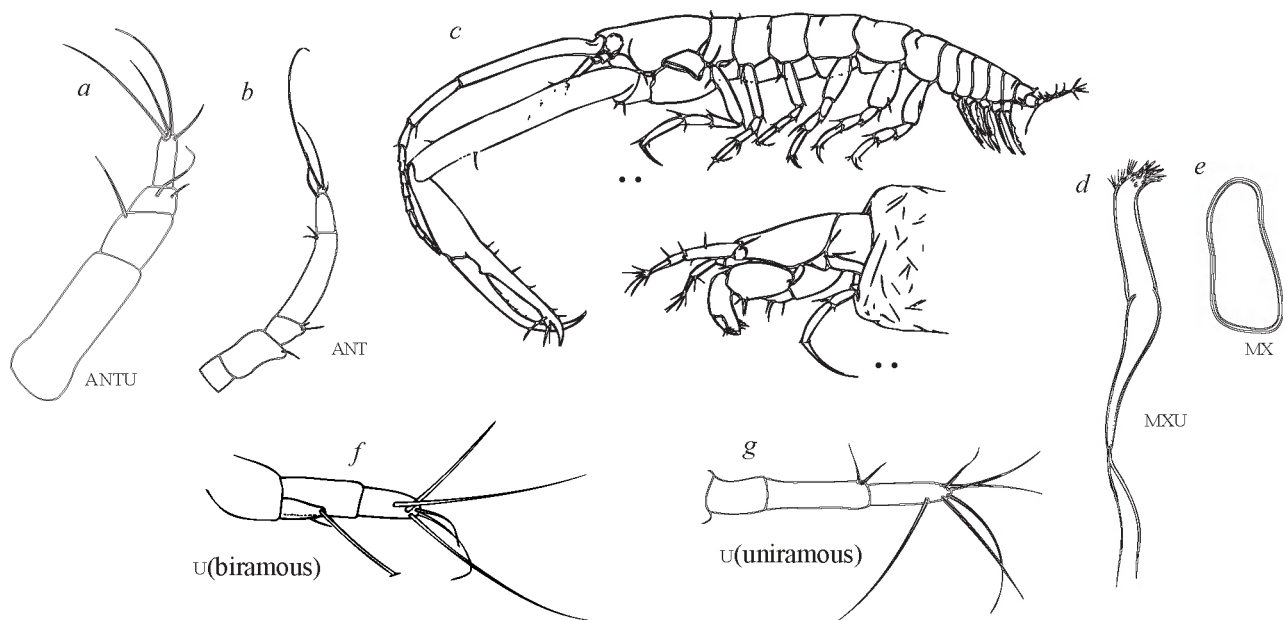


Figure 8

KEY TO THE FAMILIES OF APSEUDOMORPHA KNOWN FROM FLORIDA WATERS

- 1 • Body asymmetrical. Posterior pereopods with specialized suction setae. Chela with exopod having penultimate article inflated with serrate margin. Inquilinous in gastropod shells [Chelipeds unequal. Rostrum short, denticulate. Eyes present. Mandibular palp composed of 3 articles. Pereopod 1 with coxal spine](Pagurapseudidae) *Pagurotanais largoensis* (McSweeney 1982)

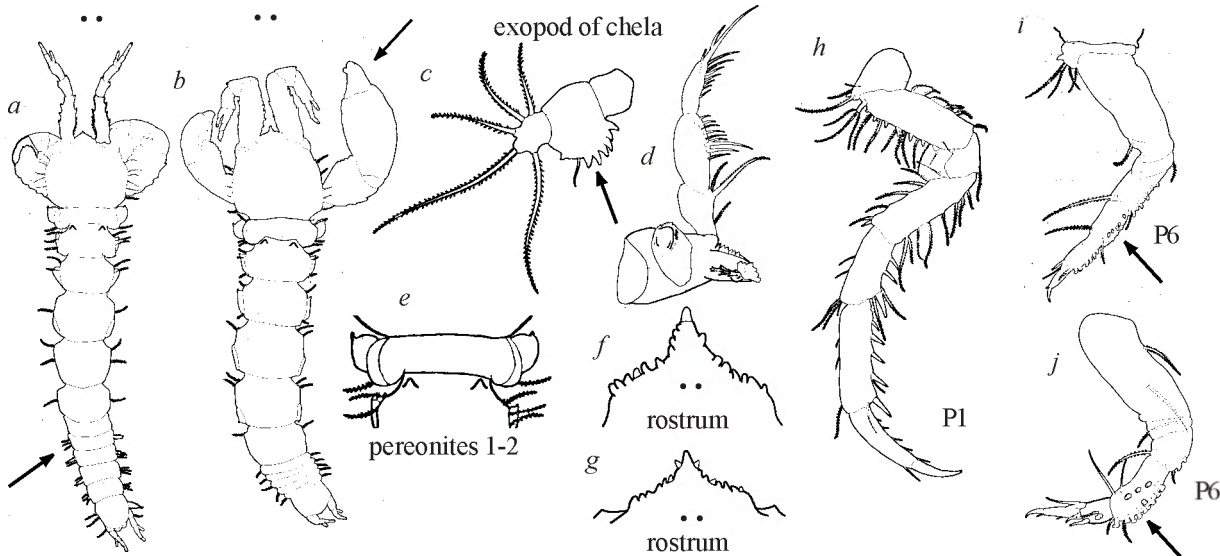


Figure 9

- Body symmetrical. Chelipeds usually equal. Posterior pereopods lacking specialized suction setae. Exopod on chela with penultimate article not noticeably inflated, lacking serrate margin. Fossorial, epibenthic, or tubiculous [Rostrum triangular or otherwise. Eyes present or absent. Mandibular palp with 1 to 3 articles. Pereopod 1 with or without coxal spine] 2

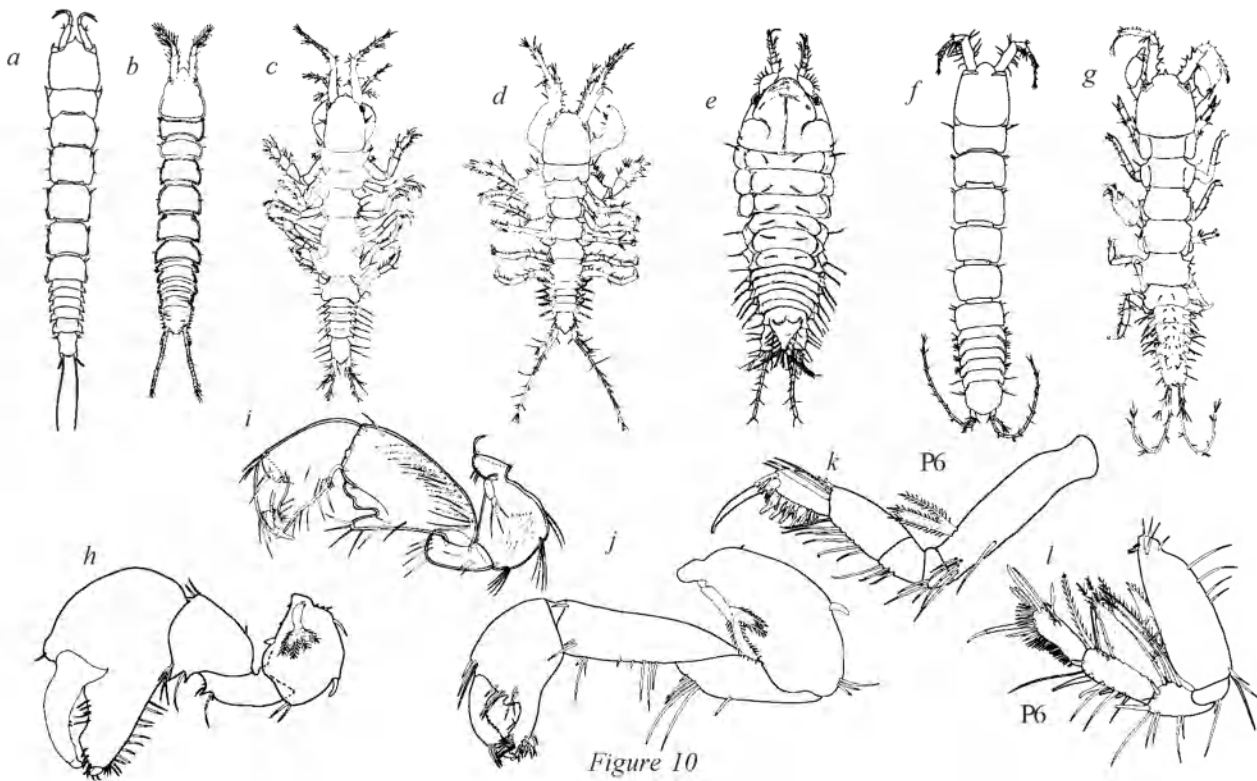


Figure 10

- 2 •Mandibular palp uniarticulate or triarticulate. Maxillule without palp. Dactylus of pereopod 1 with sensory organ or specialized sensory setae, sometimes reduced to small sensory seta. Pereonites and pleotelson with glands, tubiculous [Rostrum rounded. Eyes absent. Coxal spine absent] Kalliapseudidae

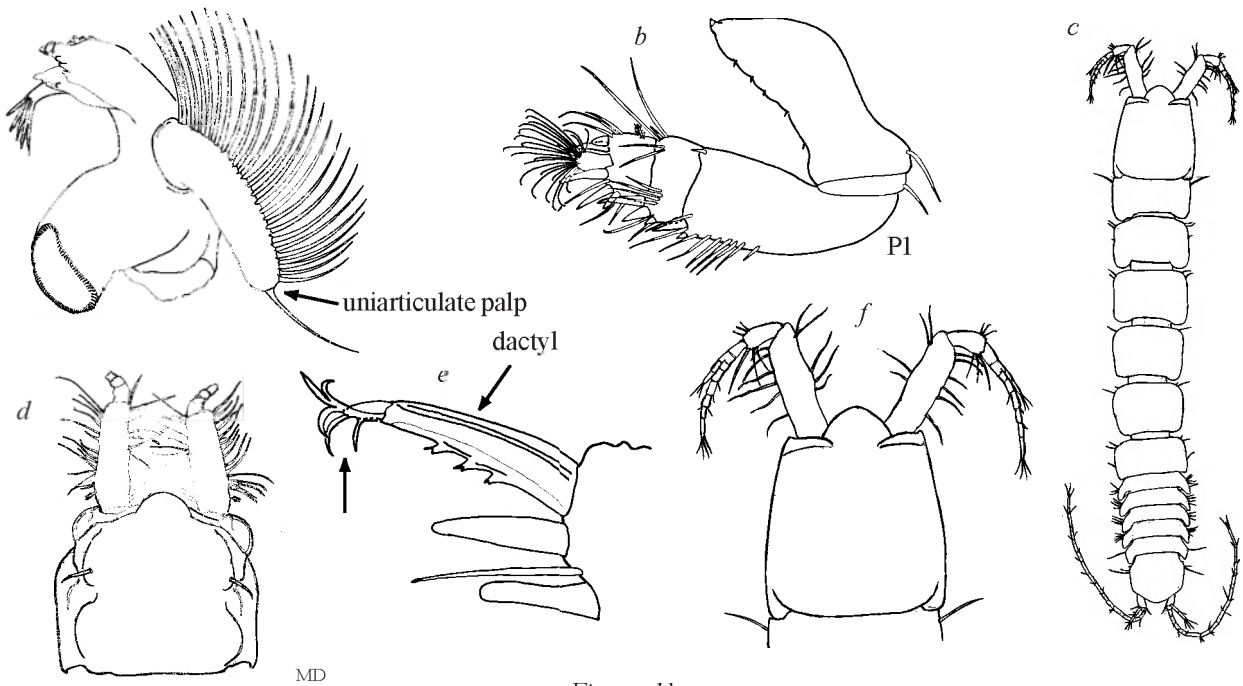


Figure 11

- Dactylus of pereopod 1 without sensory organ or specialized sensory setae. Maxillule with palp. Mandible with 3 articulate palp. [Coxal spine present or absent. Pereonites and pleotelson without glands. Rostrum triangular, rounded or otherwise. Eyes present or absent. Epibenthic or fossorial]

3

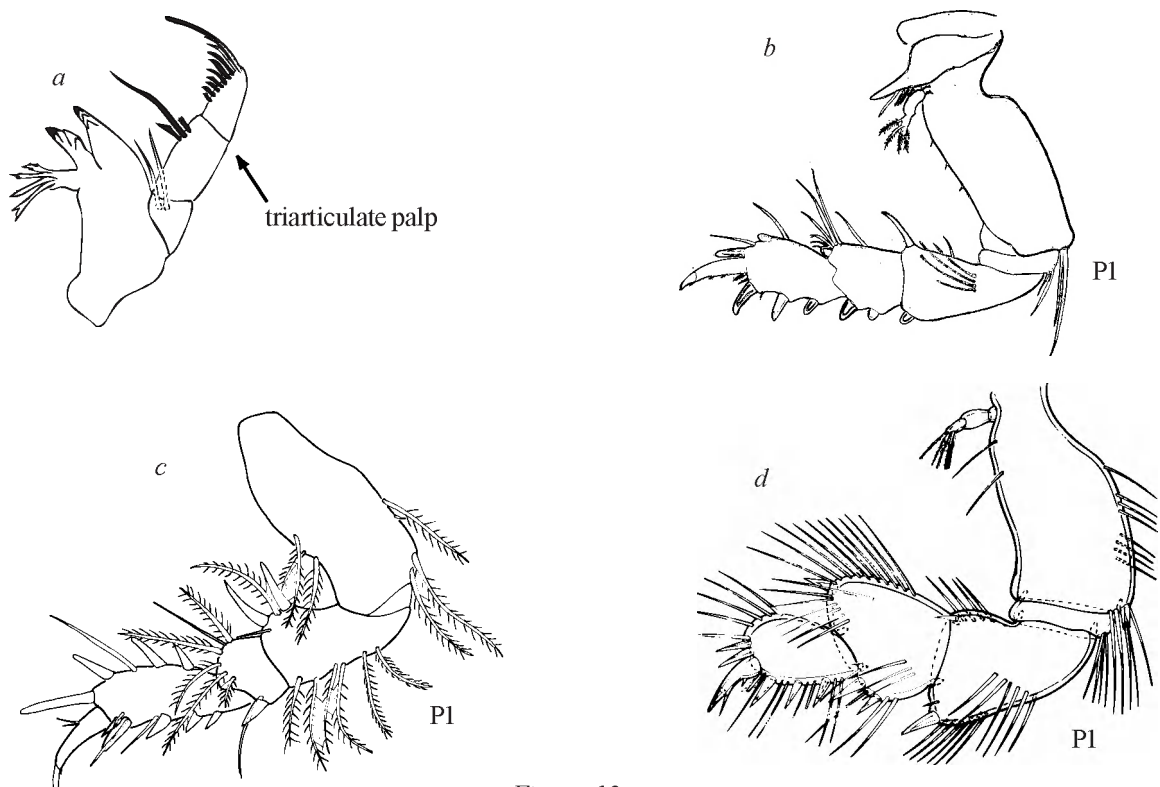


Figure 12

3. • Rostrum attenuated with tips slightly expanded distally, terminating in five denticles. Antenna with squama absent. Pereopod 1 very elongate, about 3/4 of total body length in adult female and equal to body length in adult male. Eye lobe without spines or visual elements. (Sphyrapidae) *Pseudosphyrapus* sp. A

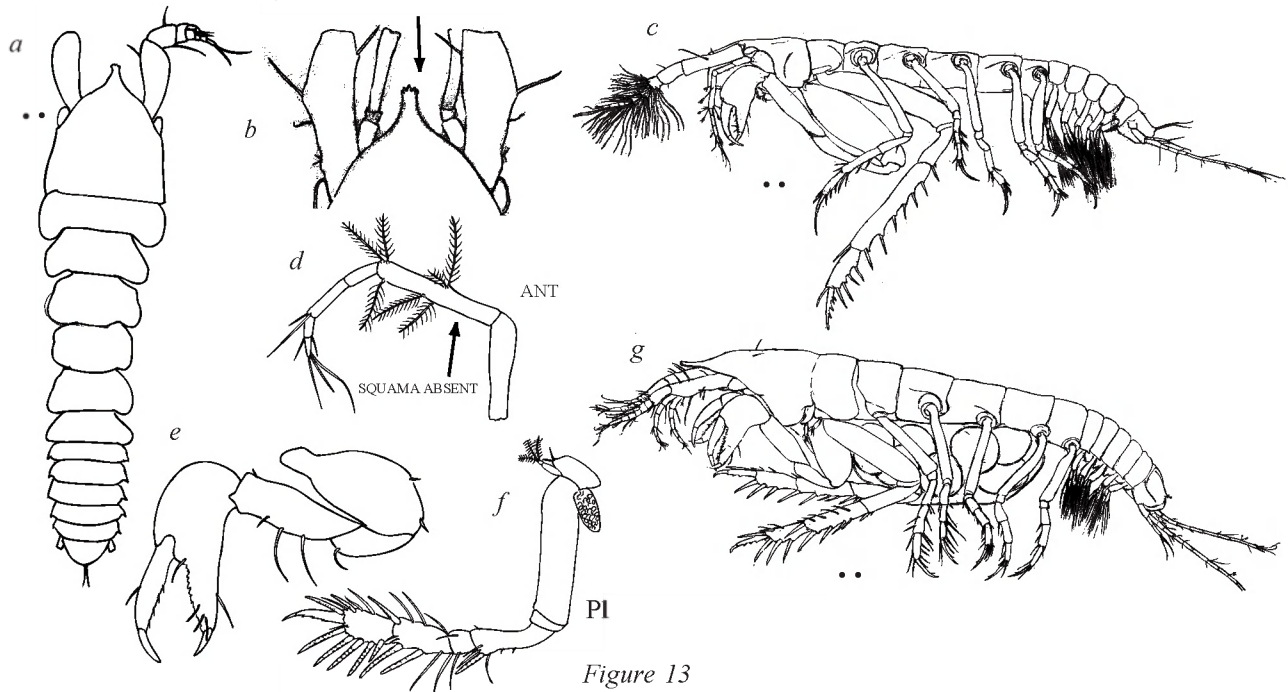


Figure 13

- Rostrum triangular or otherwise, lacking distal denticles. Antennae with squama present or absent. Pereopod 1 no more than 2/3 of total body length, coxal spine present or absent. Eyes with or without spines. 4

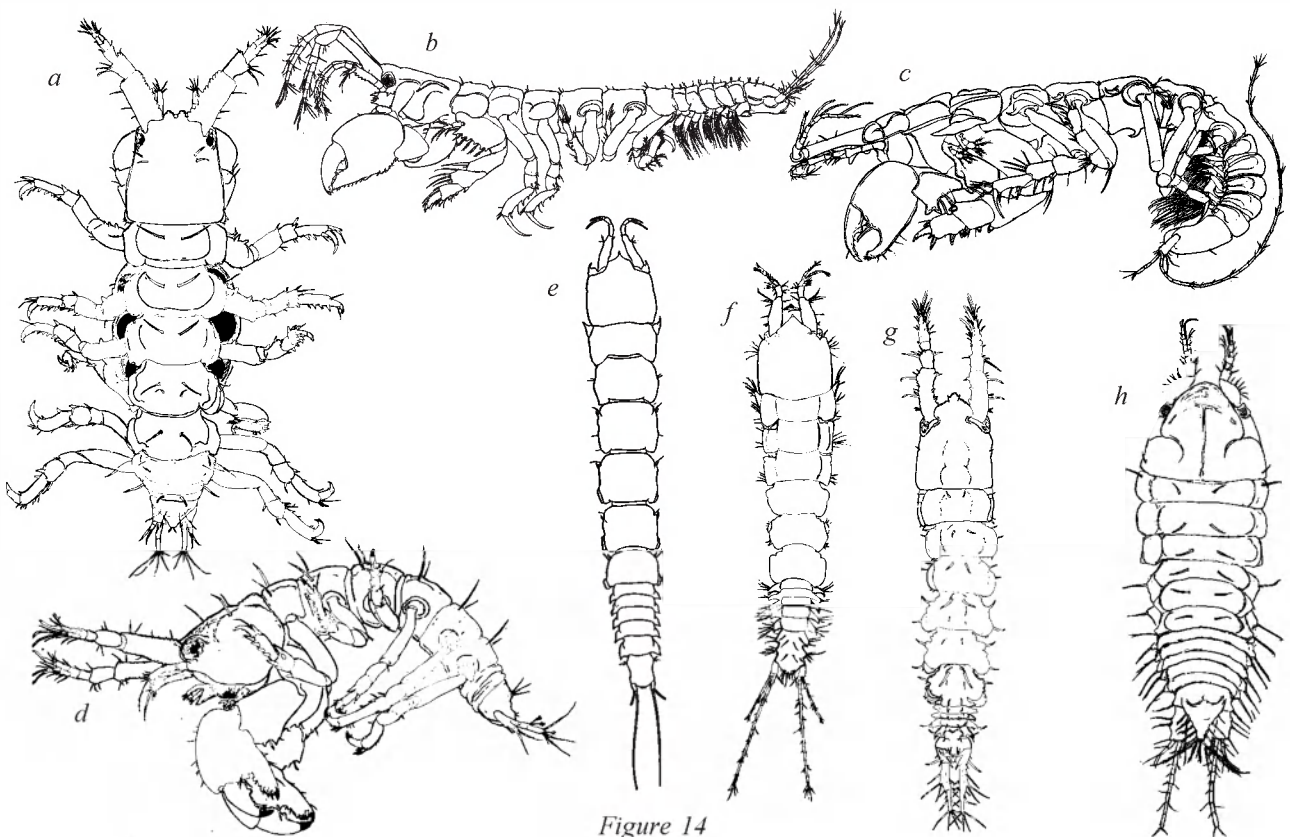


Figure 14

4. •Pereopod 1 with coxal spine present. Apseudidae

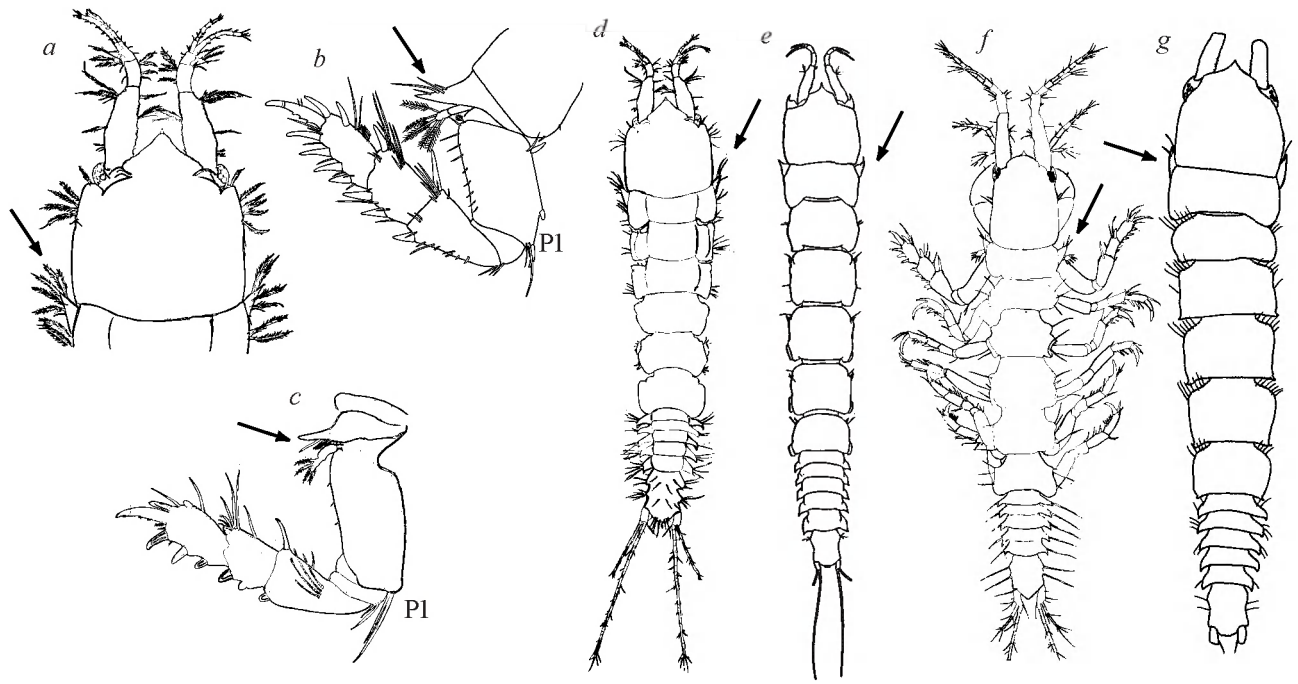


Figure 15

- Pereopod 1 with coxal spine absent. 5

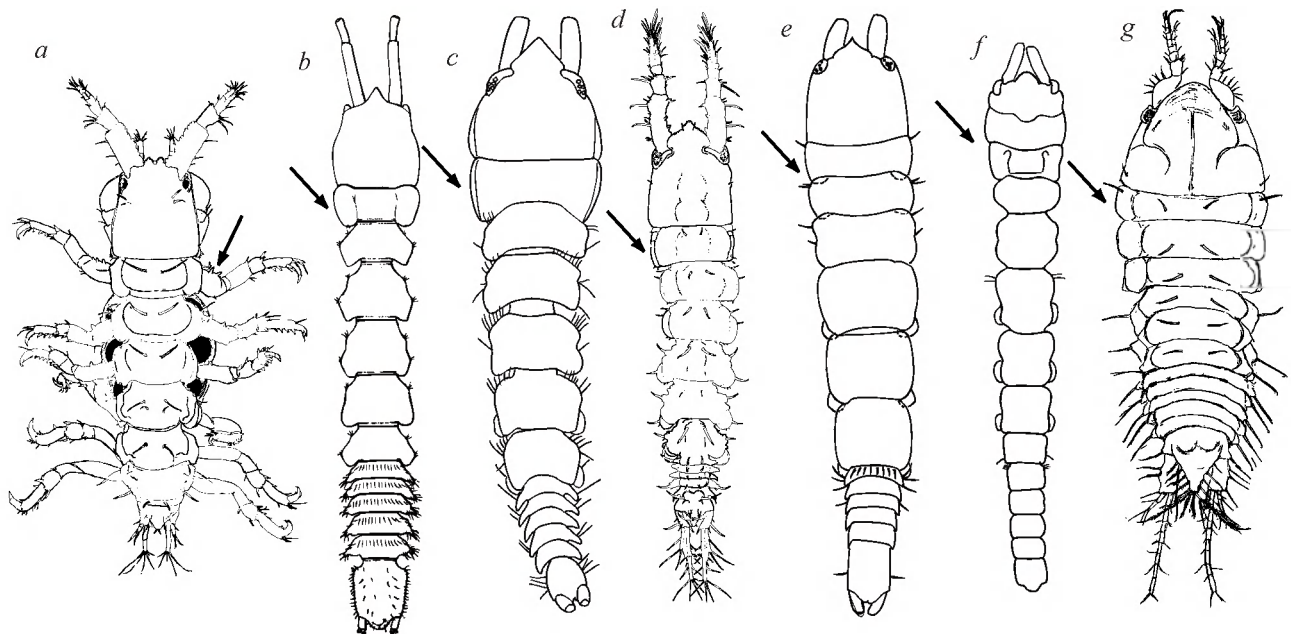


Figure 16

5. • Pereopod 1 with propodus and carpus usually cylindrical, without numerous setae. Antennae with squama reduced or absent. Pereopods 4-6 not inflated. Pleon with very short pleonites, often fused or partially fused. Pleopods reduced, uniramus, biramus or absent. Metapseudidae

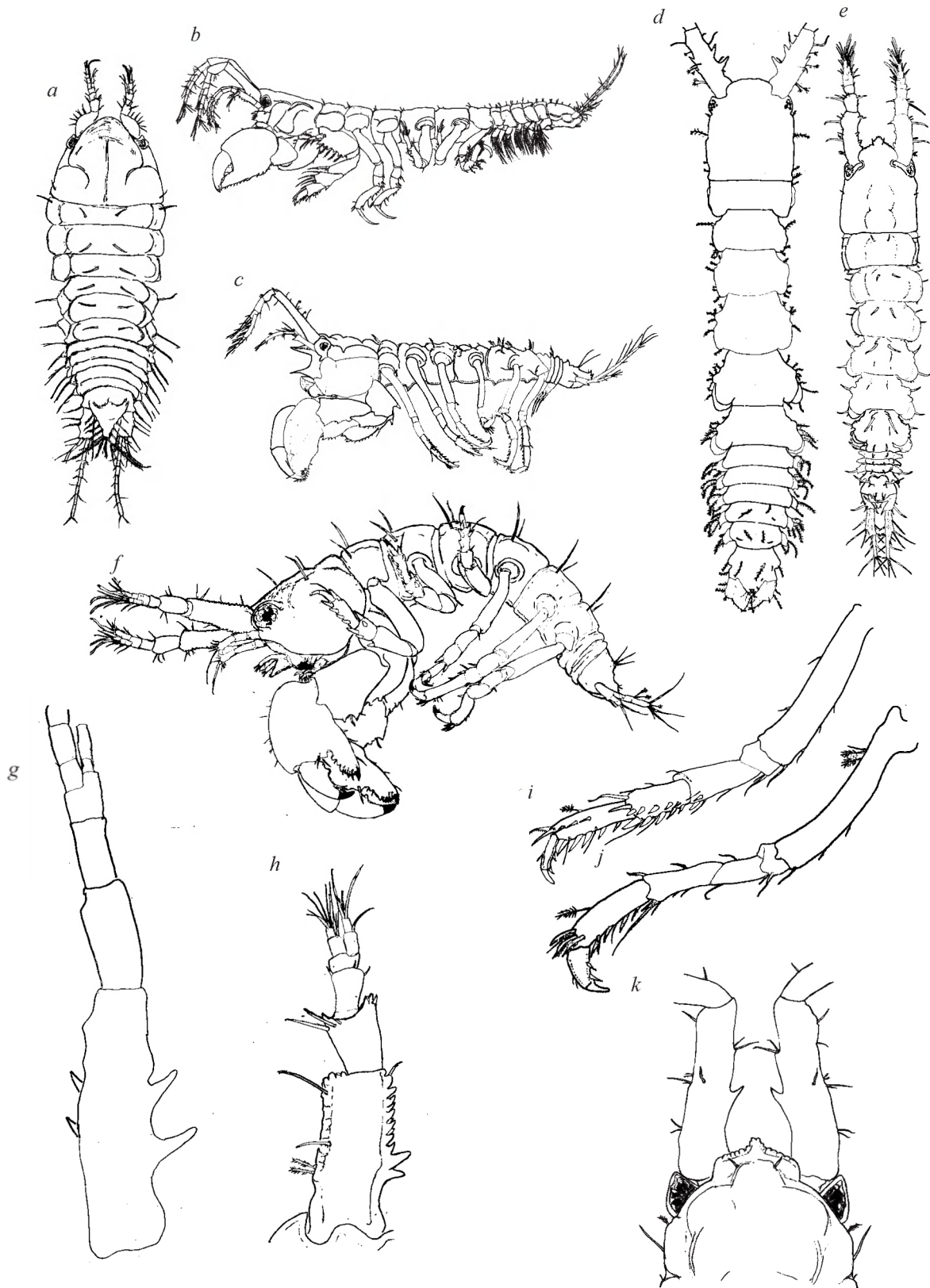


Figure 17

- Pereopod 1 with propodus and carpus wide and having numerous long setae. Antennae with well developed squama. Pereopods 4-6 inflated. Pleon with pleonites unfused, not noticeably compressed. Pleopods well developed, biramus with numerous plumous setae. Parapseudidae

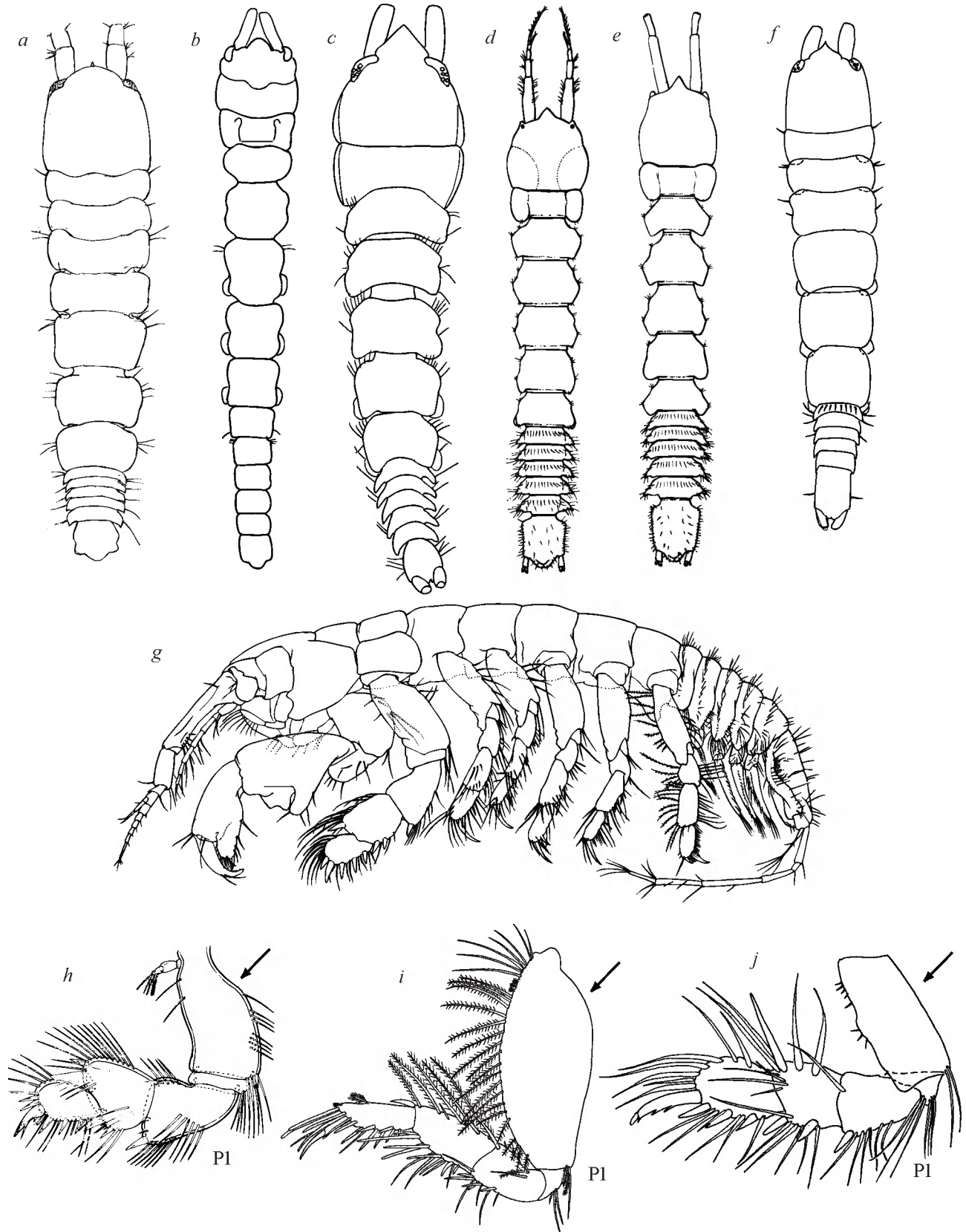


Figure 18

Family Pagurapseudidae Lang, 1970

Members of the Pagurapseudidae are generally characterized by having pereopod one thin, cylindrical, elongate and with nearly uniform width. There are 28 species accommodated within two subfamilies, the Hodometricinae Gu•, 1981 and Pagurapseudinae Lang, 1970, which contain six and three genera, respectively (Gu• 1996b).

The only representatives of the family known from the northwestern Atlantic belong to the more highly derived subfamily Pagurapseudinae, which have its members adapted to occupying the shells of small gastropods. The subfamily is characterized by having pereopods 2-6 armed with specialize sucker-like structures on the surface of the merus, carpus, and propodus, and by displaying asymmetry of the body and some of the appendages.

The three species known from the warm subtropical and tropical waters of the American Mediterranean belong to the genus *Pagurotanais* Bouvier, 1918. Two of the species, *P. bouryi* Bouvier, 1918 (type species) and *P. guitarti* (Gu• and Gomez, 1975), were described from Cuba, and the third species, *P. largoensis* (McSweeney, 1982), which is treated in this guide, was described from South Florida (Florida Keys). A fourth species of the genus, *P. laevis* (Menzies, 1953) occurs in the warm waters of the Pacific coasts of California and Mexico (see Menzies 1973, Gu• 1996c). For reasons of taxonomic nomenclatural, Gu• (1996b,c) proposed changing Bouvier's original generic name to *Paguirolangis*. Based on the *International Rules of Zoological Nomenclature*, however, unless preoccupied, the original generic name, regardless of its taxonomic inference, stands and can not be altered unless there is a formal ruling by the International Commission of Zoological Nomenclature to do so. For some relevant references see Bouvier (1918), Menzies (1953), Lang (1956), McSweeney (1982), Gu• (1981, 1996b, c).

Pagurotanais largoensis (McSweeney, 1982)

Synonyms.—*Pagurapseudes largoensis* McSweeney, 1982

Recognition characters.—Pagurapseudinae. Cheliped with 3 articulate exopod. Pereopod 1 with exopod present, but reduced and uniarticulate. Uropod having exopod with 2 articles.

Distribution/ Ecology.— At present *Pagurotanais largoensis* is known only from inshore and inner shelf waters of South Florida and inshore waters. Like many other members of the subfamily Pagurapseudinae, it occupies a variety of small micro and juvenile gastropod shells.

Remarks.—*Pagurotanais largoensis* appears to an Atlantic geminate of the eastern Pacific species *P. laevis* (Menzies, 1953), both of which are characterized having biarticulate uropodal exopods. The two species differ primarily on the number of articles in the exopod on the chela; *P. largoensis* has 3 articles and *P. laevis* only has one. Since the two other known northwestern Atlantic species, *P. bouryi* and *P. guitarti* presently known from the northwestern Atlantic were described from nearby Cuba and might eventually be discovered in Florida waters, we present a key to separate them and *P. largoensis*.

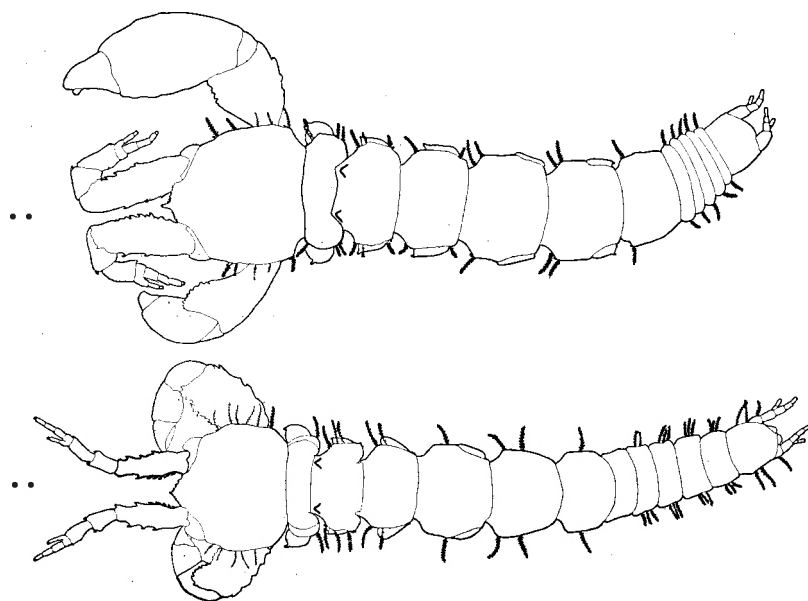


Figure 19

KEY TO THE SPECIES OF *PAGUROTANAIS* KNOWN FROM THE TROPICAL NORTHWEST ATLANTIC (MODIFIED FROM GU•U 1996).

1. Uropod lacking exopod *Pagurotanais guitarti* (Gu•u and Gomez, 1975)
 Uropod having exopod 2
2. Uropod with uniarticulate exopod *Pagurotanais bouryi* Bouvier, 1918
 Uropod with biauriculate exopod *Pagurotanais largoensis* (McSweeney, 1983)

Family Sphyrapidae Guᳵ, 1980

The family Sphyrapidae, which is characterized the reduction or loss of the antennal squama and the large size of pereopod 1, represents a small group of distinctive apseudomorphs, which is mostly confined to deep water (continental slope and deeper). Currently the family is represented by 14 species contained within six genera (Guᳵ and Iliffe 1998, Guᳵ 2001). At present we have records of one species belonging to the genus *Pseudosphyrapus* Guᳵ, 1980 from the continental shelf off South Florida. This genus is characterized by the having an antenna lacking a squama.

Only one sphyrapid genus, *Sphyrapoides* Guᳵ and Iliffe, 1998, is endemic to shallow tropical waters. Two species are known, *S. bicornis* Guᳵ and Iliffe, 1998 from Bermuda and *S. tubrifrons* Guᳵ and Heard, 2003 from Grand Cayman Island. Recently an unidentified species of *Sphyrapoides* was reported from the coral reef areas on the Caribbean coasts of Costa Rica (Heard, *et al.*, in press). It is likely that a representative of this genus will be found in the shallow reef habitats of southern Florida.

Kudinopasternakia siegi Viskup and Heard, 1989, a species known from the upper and mid continental slope of the Gulf of Mexico, is the only other member of the family known from the coastal waters of the southeastern United States (Viskup & Heard 1989).

Pseudosphyrapus sp. A

Recognition Characters.— Rostrum attenuated with tip slightly expanded to 5 denticles. Antenna lacking squama. Eye lobes well developed, visual elements absent. Chela, propodus and dactyl similar in both sexes; fixed finger with row of 6-8 teeth, movable finger of terminal male with small proximal tooth; carpus and merus elongate (especially in male where merus as long as carpus). Chela and pereopod 1 with exopods. Pereopod 1 of adult male and female about 2/3 and 4/5, receptively, of body length (excluding antennae and uropods). All 5 pairs of pleopods with relatively narrow rami; inner ramous biarticulate having proximal article over 1/2 length of distal article, with single large, long distal seta; setae on distal article confined to distal half of article.

Distribution/Ecology.— Deep shelf and upper slope off Texas, South Florida, South Carolina.

Pseudosphyrapus sp. A appears to be widely distributed on soft bottoms in depths greater than 100 m (outer continental shelf and probably upper continental slope). Other than its occurrence in soft sediments of the deep shelf and upper slope, nothing is know of the ecology of this species.

Remarks.— This undescribed species is relatively small compared to the other deep water members of its family. It is the only sphyrapid known to occur on the continental shelf along the coast of Florida.

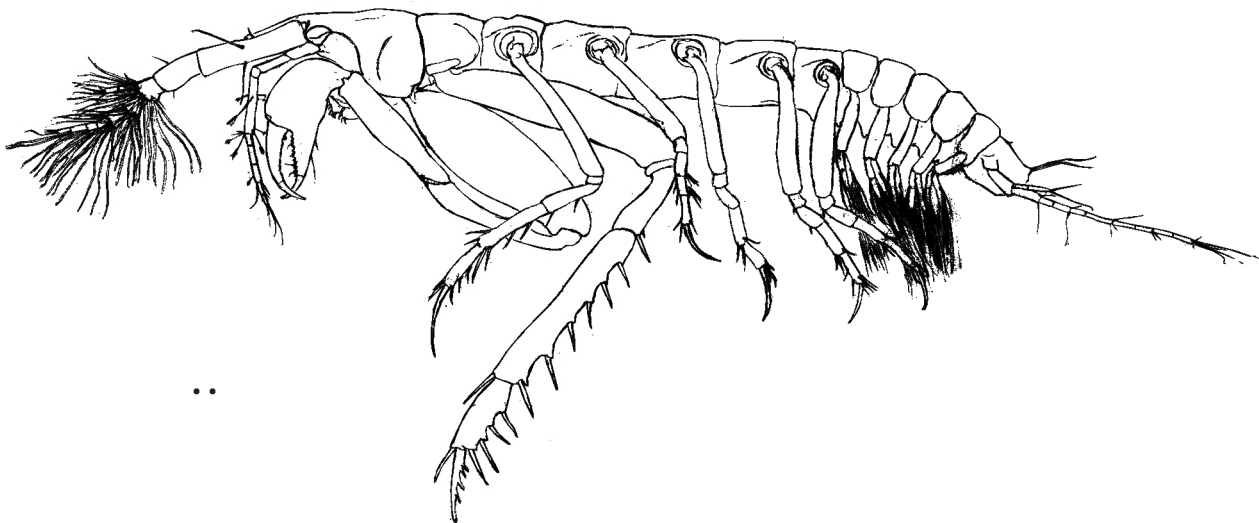


Figure 20

Family Apseudidae Leach, 1814

The Apseudidae is the largest and most widely distributed of the eleven families comprising the suborder Apseudomorpha. The members of the family are known from Arctic, Antarctic, boreal, temperate, and tropical environments and occur from the intertidal zone to depths of over 8000m. At present the family is composed of 16 genera and over 125 recognized species. Of these, the genus *Apseudes sensu lato* alone represents over 50% of the described species within the family. Apseudids are generally characterized by having (1) a symmetrical body, (2) a mandibular palp composed of three articles, (3) a well-developed coxal spine on the first pereopod, (4) exopods on the cheliped and first pereopod (exceptions include *Atlantapseudes* Băcescu, 1978), the first pereopod ("stab leg") fossorial (i.e., adapted for digging and burrowing), and (5) pereopods 4-6 with basis not greatly enlarged. In Florida coastal and shelf waters six species representing the genera *Apseudes* Leach, 1814; *Bunakenia* Gutu, 1995; and *Hoplomachus* Guñu, 2003 are now known. A fourth apparently new and atypical genus ("Parapseudid? sp. A") having affinities with *Bunakenia* occurs in Florida waters, but it lacks a coxal spine, or acute process, on the first pereopod. Because of this condition we have temporarily placed it within the family Parapseudidae. When this new genus is described and if it is truly referable to the Apseudidae, the diagnosis of the family will have to be emended to accommodate it (Hansknecht and Heard, research in progress).

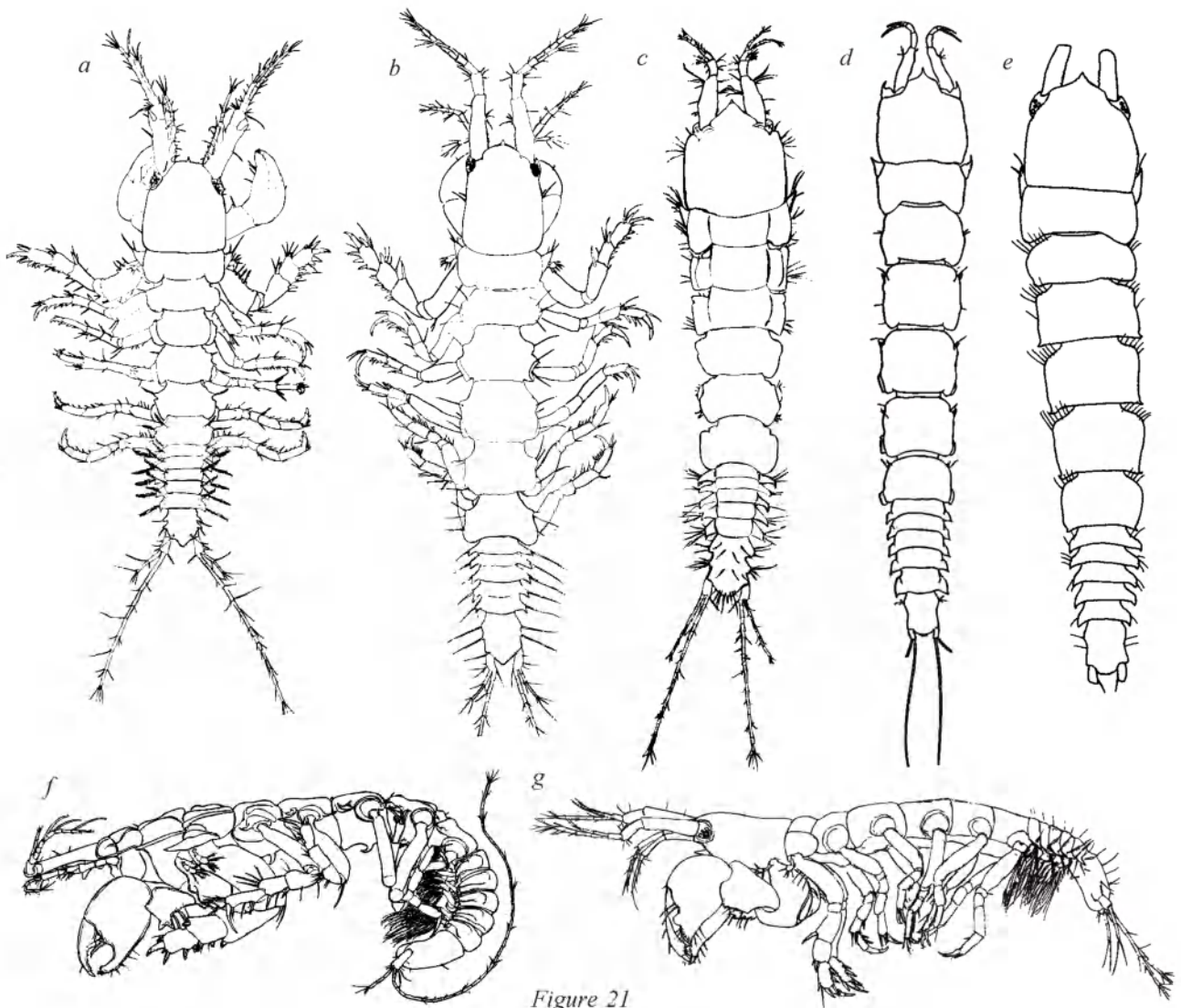


Figure 21

KEY TO THE SPECIES OF APSEUDIDAE KNOWN FROM FLORIDA WATERS

1. • Antennule with peduncle having 2-3 well-developed spines or spinose process on inner margin and 1 anteriorly directed spinose process on distal outer margin. Pereopod 1, coxal spine with 1 or 2 simple setae distally; basis usually with 3 to 4 prominent blunt spines or tubercles along frontal margin. Pleotelson, with 2 pairs of subacute lateral processes, nearly as wide as long.
..... *Hoplomachus propinquus* (Richardson, 1903)

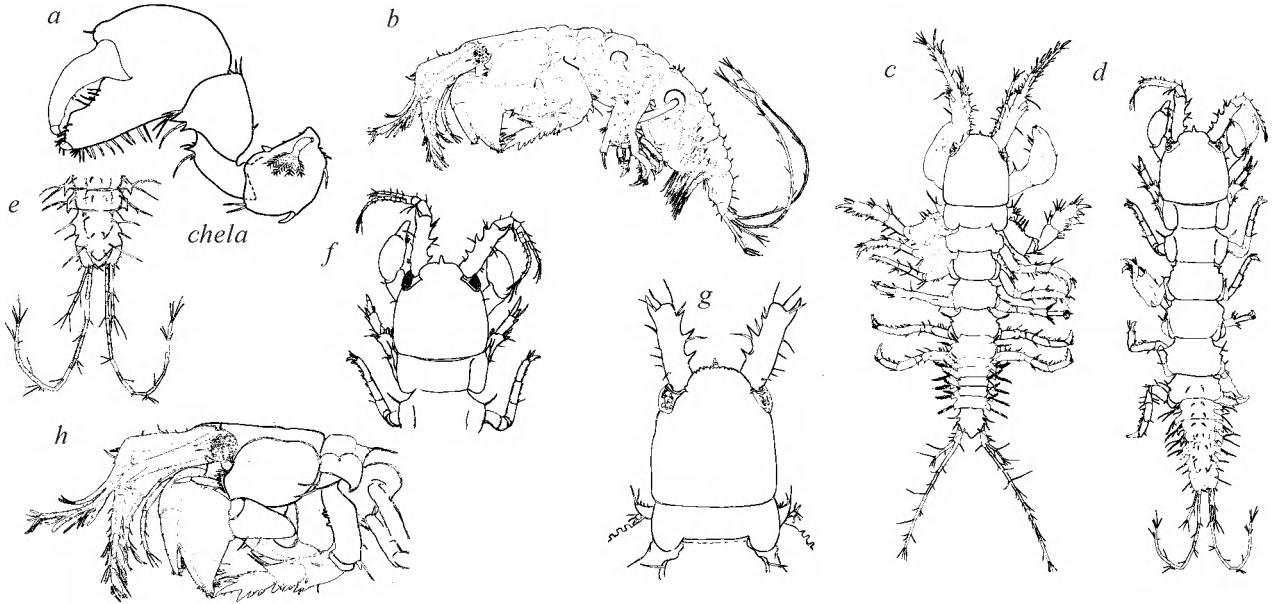


Figure 22

- Antennule with peduncle lacking well-developed spines. Pereopod 1 with coxal spine having 2 or more, usually setulate setae; basis lacking prominent blunt spines or tubercles along frontal margin. Pleotelson distinctly longer (1.4 times or more times) than wide [with or without lateral lobes] 2

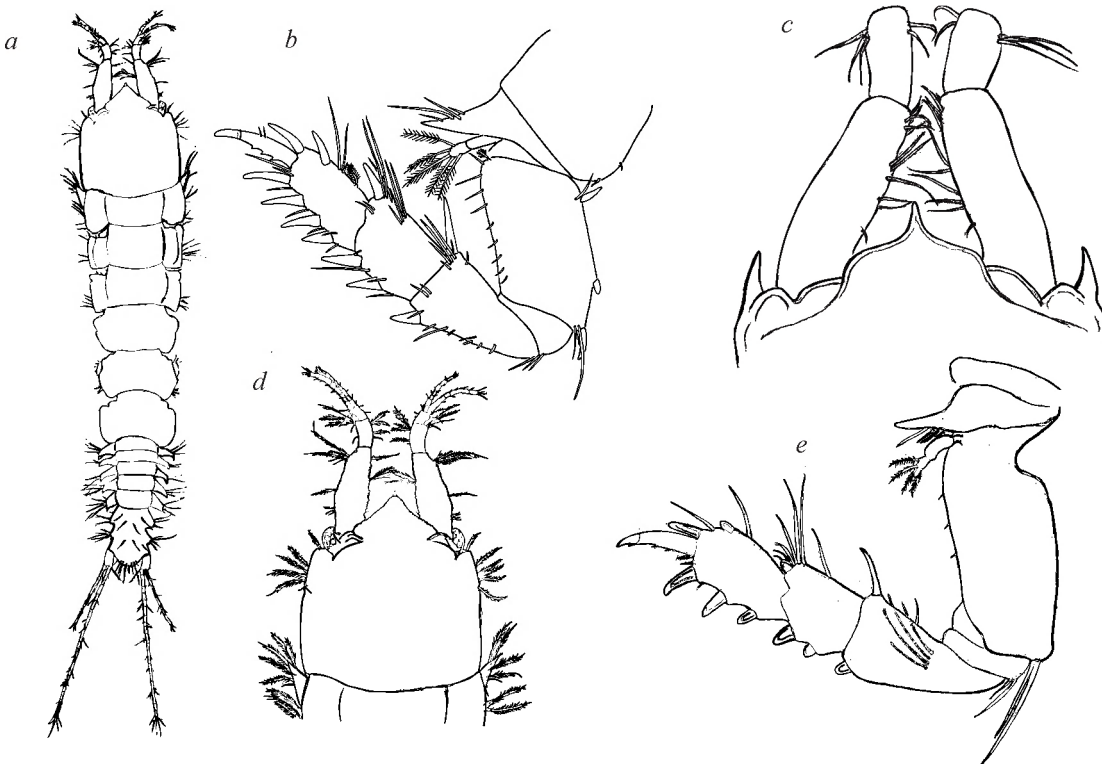


Figure 23

2. •Peraeonites 3-5 with anterolateral margin bearing anteriorly directed hook-like spiniform process. Chela of male with tooth on fixed finger and movable finger (dactyl); adult male with tooth located distally on fixed finger, movable finger with well-developed tooth on mid-margin; chela of subadult male with tooth on mid-margin of fixed finger. Anteriorly directed coxal spine on peraeopod 1 [Inner antennular margin not distinctly denticulate or serrate] *Apseudes olimpia* Guana, 1988

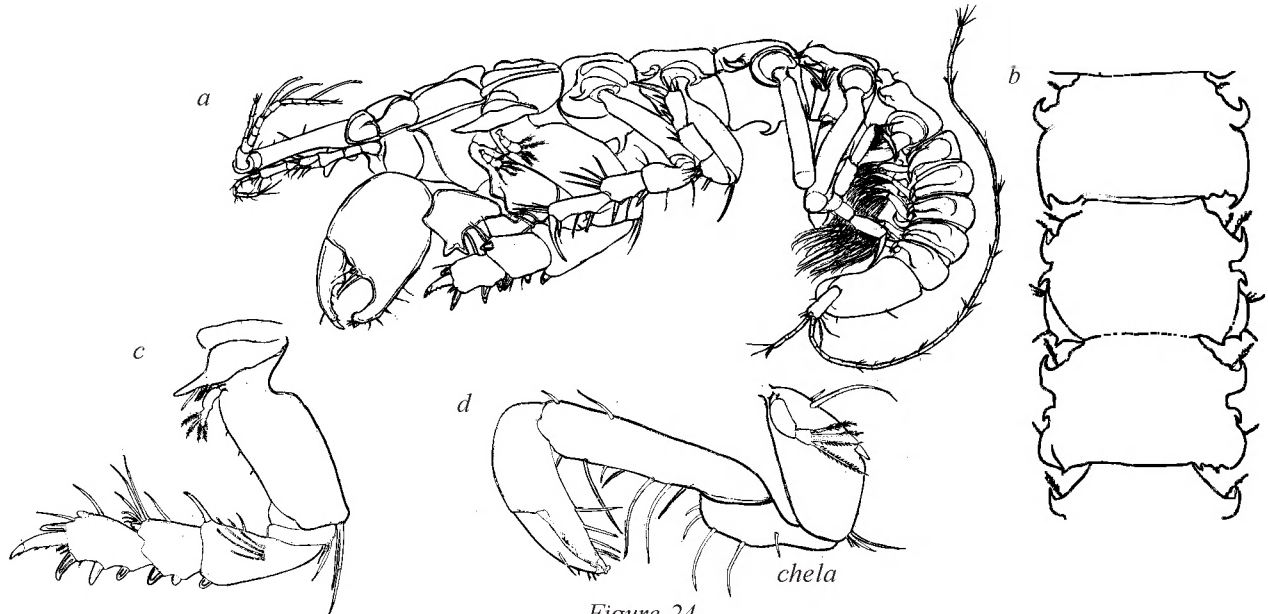


Figure 24

- Peraeonites 3-5 with anterolateral dorsal margin without anterior hook-like process 3

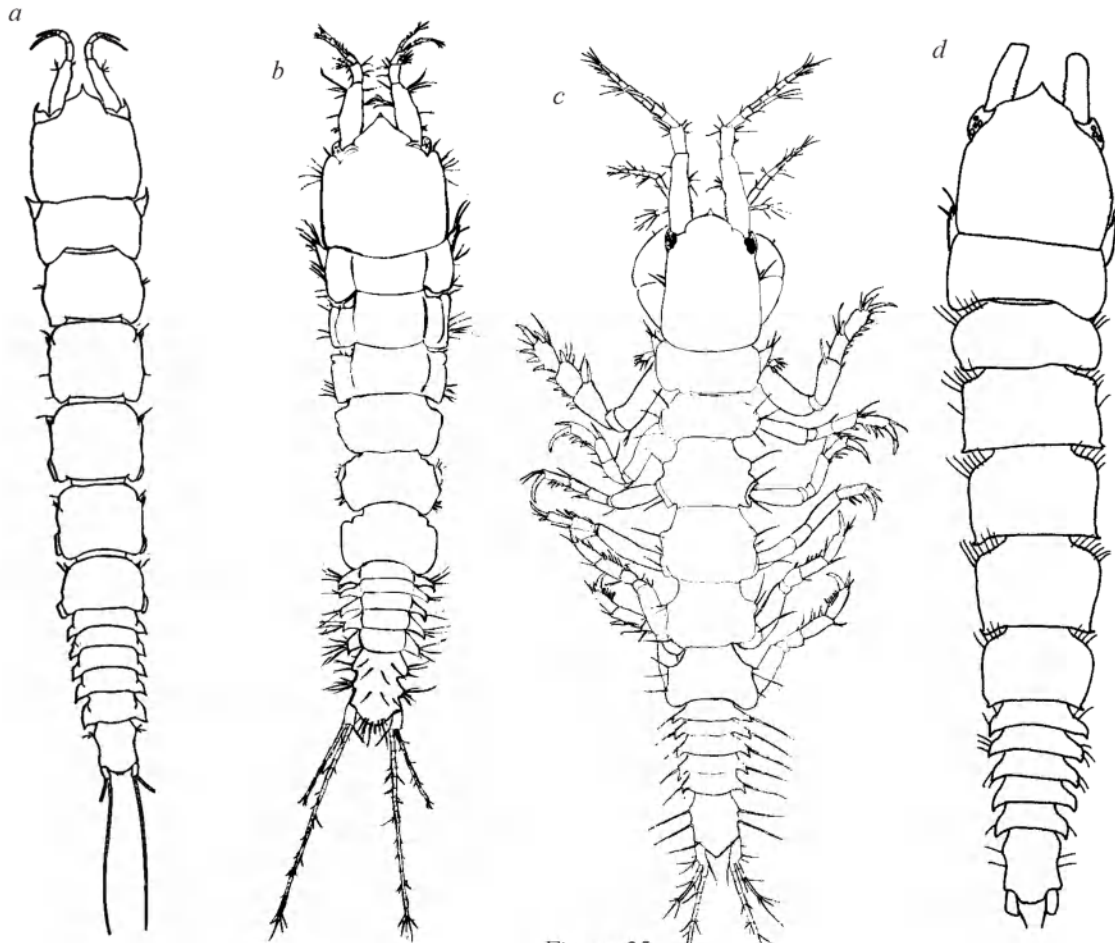


Figure 25

3. • Chelae of males with large gap medially between fingers. Peraeonites 3-5 with anterior margins quadrate, relatively straight, not lobate. Pleotelson subrectangular, sparsely setose dorsally, without distinct lateral lobes Uropodal peduncle without lateral setae (4 distal setae present) 4

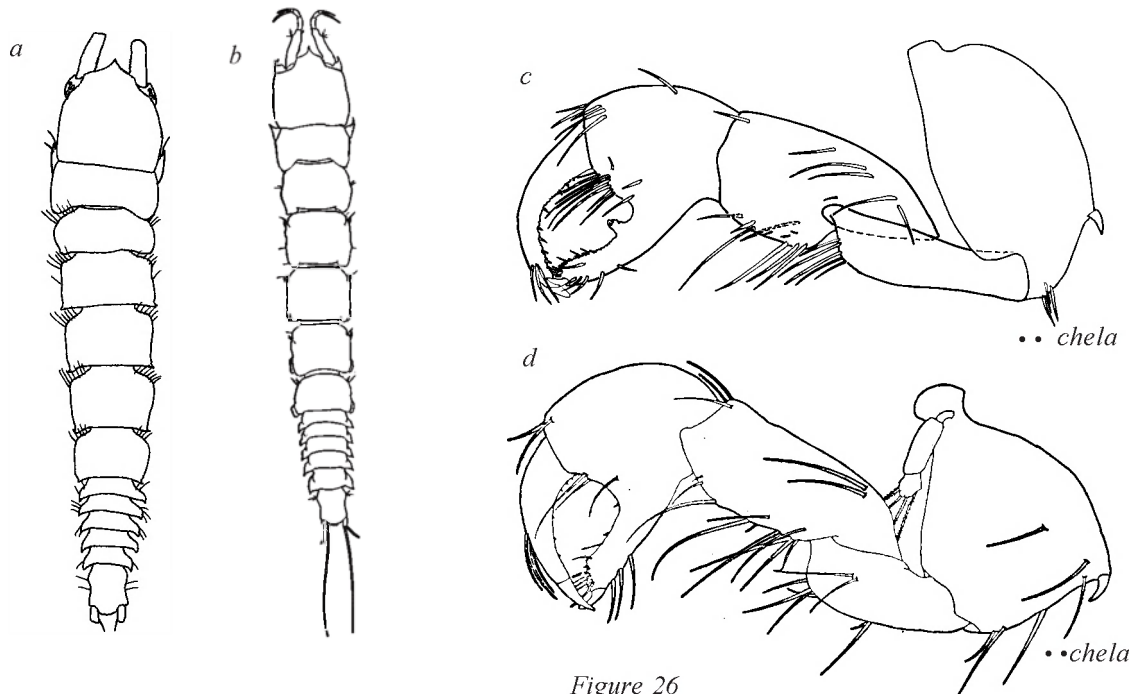


Figure 26

- Males unknown (species hermaphroditic?) Peraeonites 3-5 with anterior margins lobate. Pleotelson setose dorsally, with distinct lateral lobe or lobes. Uropods with 1 or more lateral setae 5

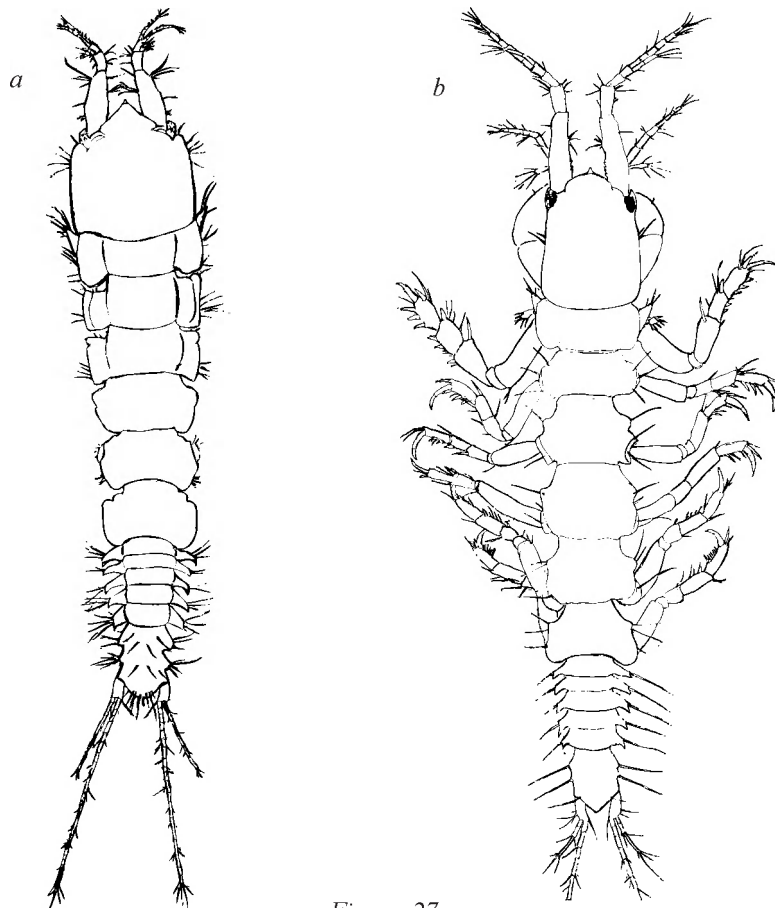


Figure 27

4. • Antennule with inner margin of peduncle article 1 entire (not distinctly serrate or denticulate). Chela of male with large gap between fingers, no teeth on fixed or movable finger. Chela of female with small, but distinct gap medially between fingers. Peraeonites 3-5 with small ventrolateral spine on anterior margin, lacking small posterolateral spines *Apseudes* sp. A

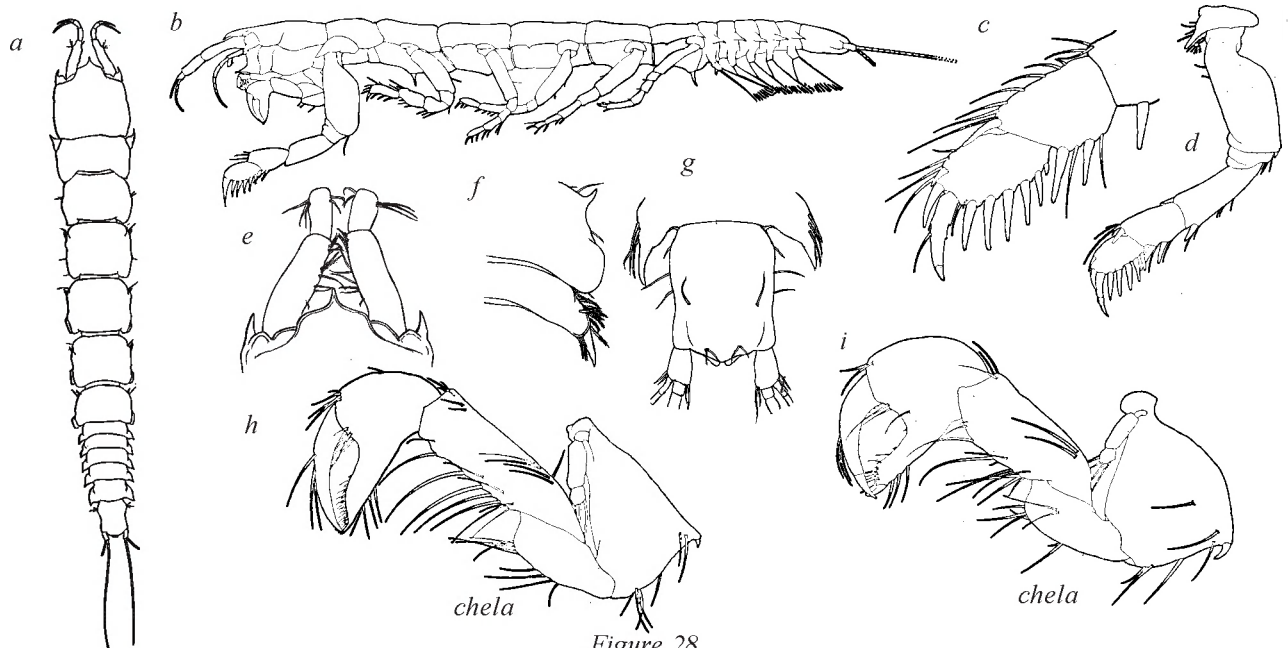


Figure 28

- Antennule with inner margin of peduncle article 1 with row of small denticles. Prominent bidentate hyposphenal spine present on peraeonite 1 of adult male and preincubatory females (lacking fully developed oostegites). Peraeonites 3-5 with margins entire, lacking small ventrolateral spine on anterior margin, but with small distolateral spines. Male chela with wide gap, single tooth on dactyl; female chela without gap *Bunakenia* sp. A

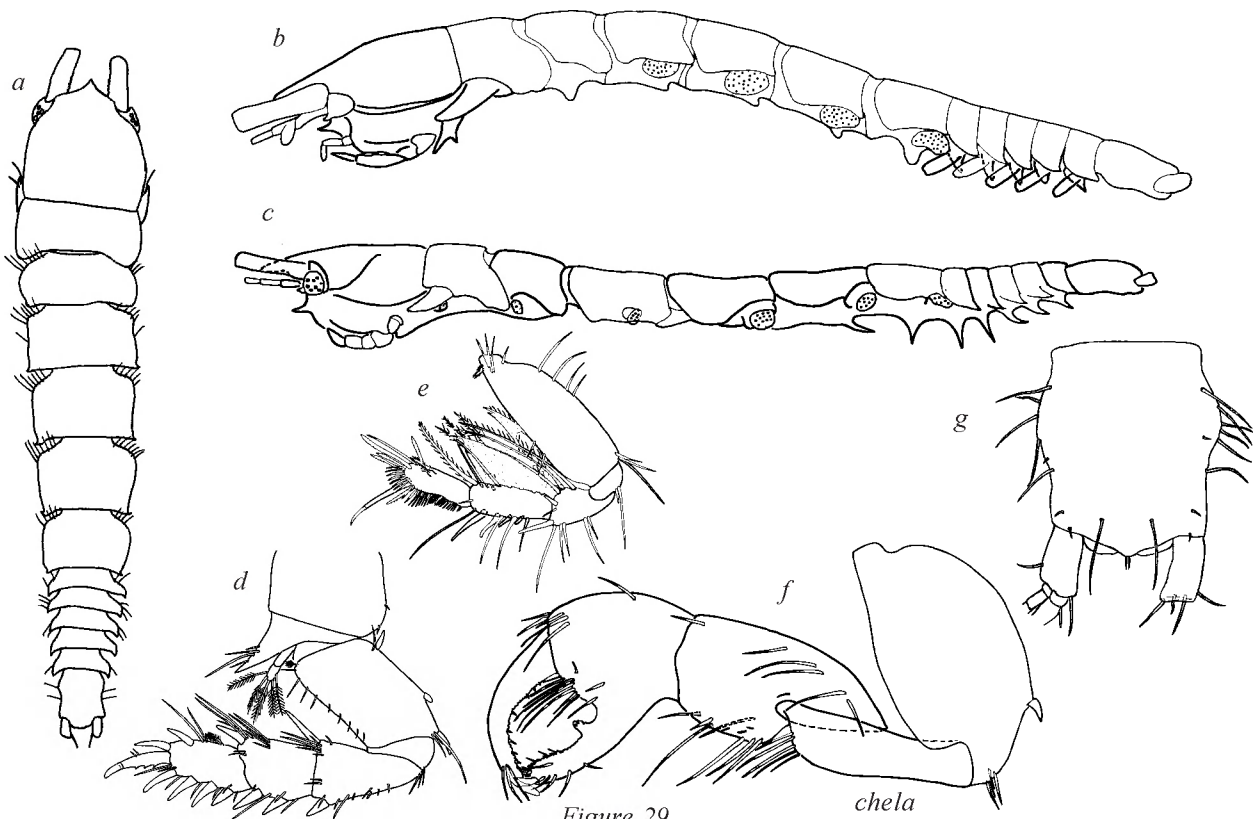


Figure 29

5. • Antennule with peduncle having small tubercles on inner margin [Small species: adults less than 1.5 mm in length] *Apseudes bermudeus* Borescu, 1980



Figure 30

- Antennule with inner margin lacking small tubercles [Relatively large species: adults more than 2.5 mm in length] *Apseudes orghidani* Guille, 1989

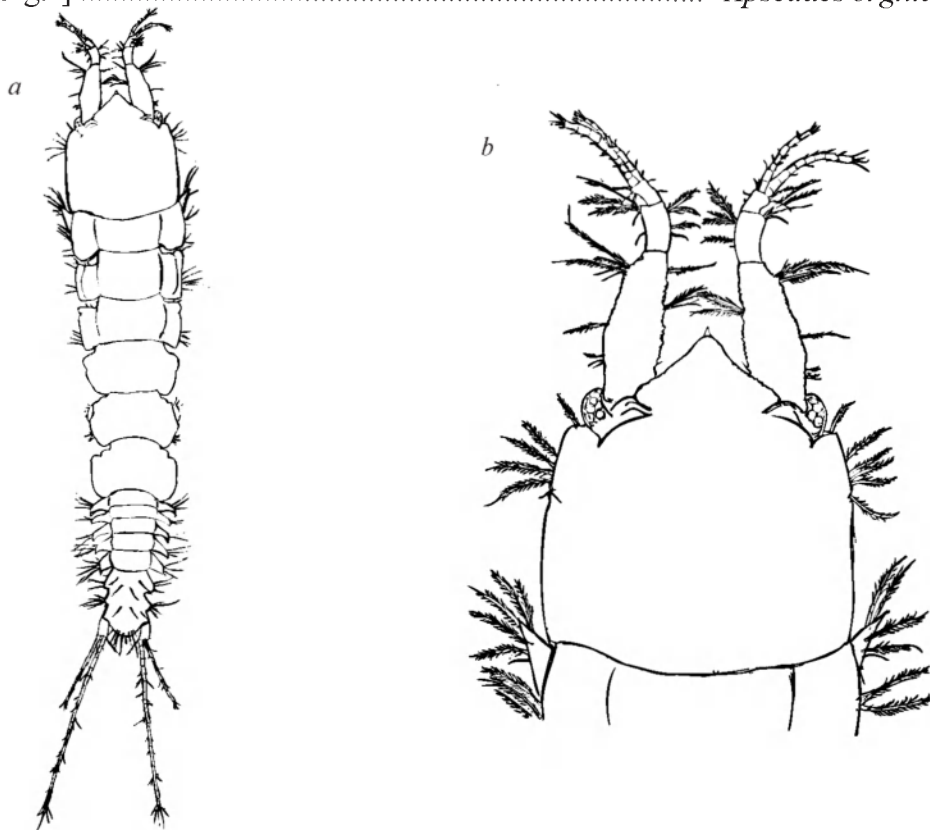


Figure 31

Family Apseudidae Leach, 1814

Apseudes bermudeus Băcescu, 1980

Recognition characters.— Small species, 1-1.2 mm in length. Pereonites 3-5 with anterolateral lobes lacking hook-like spines. Pereopod 2 lacking distinct coxal spine. Male form not currently recognized (hermaphroditic species?). 2 types of chelae, large and small occur, both lacking distinct gap between fingers. Antennule with inner proximal margin with cluster of 4-6 small uneven sized tubercles or teeth. Pereonites 3-6 with well developed lateral lobes. Pereopod 1 (stab leg) with spiniform setal formula: = merus 1/1: carpus 1/2: propodus 2/4. Pleotelson distinctly trilobate. Uropodal peduncle with lateral setae.

Distribution and Ecology.— Bermuda, East coast of United States (South Carolina and Florida) and Caribbean. This species is widely distributed, usually on “live bottom” substrata in depths of 1 to 50 m.

Remarks.— This small species of *Apseudes* appears to be the most common and numerous apseudomorph in Florida waters. *Apseudes bermudeus* was described from marine cave and shallow water habitats in Bermuda. This small (2-2.3 mm) apseudid belongs to *A. intermedius* complex sensu Băcescu (1980), which is composed of species, subspecies, or forms reported from the eastern and western Atlantic and the eastern Pacific (Băcescu 1961, 1980; Sieg 1983a). There still, however, remains the possibility that the Florida species may be a clinal variant of *Apseudes intermedius brasiliensis* Băcescu, 1980. *A. intermedius* was originally described from St. Vincent Island off the northeastern coast of Africa (Hansen 1895). It and its subspecies also have been reported from Brazilian (*A. i. brasiliensis* Băcescu, 1980) and Mediterranean (*A. i. mediterraneus* Băcescu, 1980) waters (see Sieg 1983:60). *Apseudes intermedius* appears to have affinities with *Apseudes tropicalis* Miller, 1940 known from the Hawaiian Islands, and especially to *Apseudes garthi* Menzies, 1953 an eastern Pacific species known from the Gulf of California, Mexico (Menzies 1953). Băcescu (1961) designated *A. garthi* as a subspecies of *A. intermedius*, but later he recognized it as a distinct species (Băcescu 1980). Sieg (1983:60) considered *A. garthi* a junior synonym of *A. intermedius*.

We have tentatively assigned the Florida species of this complex, as well as those we have examined from the northern Caribbean (Turks and Caicos, Cayman Islands, and southeastern Mexico), to *A. bermudeus sensu lato*, but there is variation in the setation and spination between the Florida and Caribbean specimens and those described from Bermuda. Further study utilizing DNA sequencing will probably be needed to properly understand the specific status of these and other members of the “*intermedius* complex”, especially that for the New World populations.

Apseudes bermudeus was thought to be an hermaphroditic species by Băcescu (1980), and our observations tend to support his conjecture. Based on our observations there appear to be two distinct morphotypes. The first form having a relatively short body and strongly developed chela, and the second form having an elongate body and smaller chela. Our preliminary observations indicate that the large clawed short-bodied form represents a protandric hermaphrodite, and that the small clawed, elongate-bodied form is a primary female.

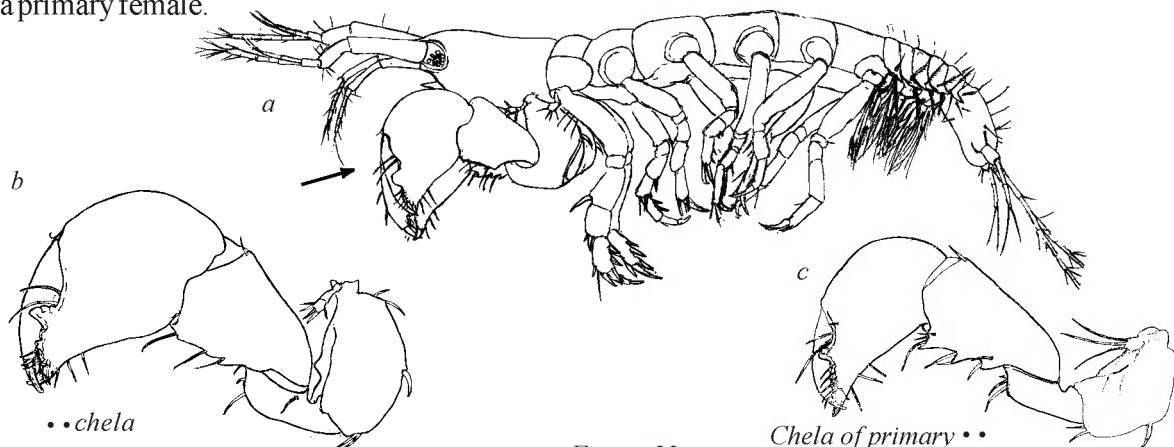


Figure 32

Apseudes olimpia Guñu, 1989

Recognition characters.— Body about 5.7 times longer than wide; length 5–6 mm. Rostrum triangular, sharply delimited at base. Ocular lobes triangular without visual elements. Antennule with inner peduncular margin not distinctly denticulate or serrate. Maxilliped inner endite with straight seta. Coxal spine narrow, sharply acuminate. Pereonites 3–5 with anterolateral lobes terminating in hook-like spines. Distinct, but small, anteriorly directed coxal spine present on pereopod 2. Chela of male with tooth on fixed finger and on mid-region of movable finger (dactyl); in terminal male with tooth located distally near tip of fixed finger, on sub-terminal male tooth located on mid-margin of fixed finger. Pereopod 1 with spiniform setal formula= merus 1/1: carpus 1/1: propodus 2/3. Pereopod 6 with plumose setae on anterior and ventral margin of basis along with plumose setae on dorsal margin of merus and carpus; propodus without transverse comb row and numerous ventral setae.

Distribution/Ecology.— Eastern Gulf of Mexico (Pensacola to Naples, Florida).— U.S. East Coast (Georgia and South Carolina).— Bermuda? (see Hansknecht and Heard 2001). This species is currently known in depths of 10–50 m on the inner and mid shelf where it generally occurs in carbonate and carbonate-sand substrata. It is often associated with live bottom habitats.

Remarks.— The type locality for this distinctive species was reportedly Bermuda (Guñu 1989), but Hansknecht and Heard (2001) present circumstantial evidence and suggest that the type material may have, in fact, come from the Gulf of Mexico. They review the distributional status of *A. olimpia* and report it from several localities in the eastern Gulf of Mexico and from Gray's Reef on the US Atlantic coast off Georgia.

Apseudes olimpia is distinctive by having inwardly curved “hook-like” spines on the anterolateral margins of pereonites 3–5 and by having the male chela with a tooth on both fixed and movable finger, characters which are not shared by any other known apseudid species from the shallow waters of the northwestern Atlantic.



Figure 33

Apseudes orghidani Guñ 1989

Recognition characters.— Relatively large species with adults reaching 6 mm in length. Rostrum triangular with acute tip. Eye lobe rounded. Eye with visual elements (ommatidia) present. Antennule relatively short, not longer than carapace (including rostrum), inner margin of peduncle granulate, lacking spines or tubercles. Pereopod 1 having spiniform setal formula: = merus 1/1 : carpus 1/2 : propodus 2/3. Pereonites 3-5 with anterior margins lobate, anterolateral margins without anterior hook-like process. Males unknown (species hermaphroditic?) Pleotelson setose dorsally, with distinct lateral lobe or lobes.

Distribution/Ecology.— Bermuda (type locality).— South Florida.— Caribbean? *Apseudes orghidani* appears to occur in live bottom habitats, but little else is known of its ecology and distribution.

Remarks.— This species, which was described from Bermuda by Guñ (1989), was recently collected in South Florida waters. We have also examined specimens taken from the living reef tank in the Marine Hall of the National Museum of Natural History (Smithsonian), before it was closed down in 1999. These specimens were apparently collected in the Caribbean with other reef organisms and placed in the living Reef Exhibit where they survived and reproduced. Our Florida, and apparent Caribbean, records constitute considerable southern range extensions for this poorly known apseudid.

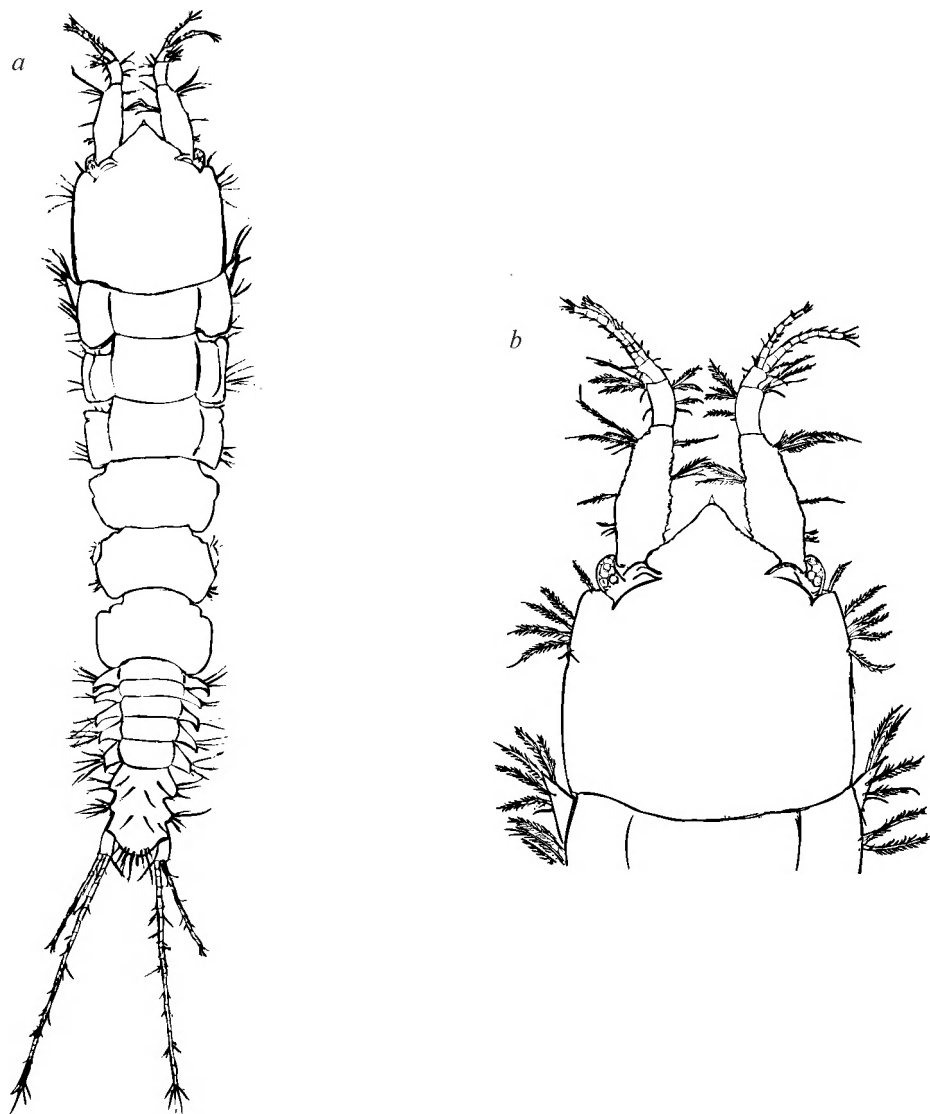


Figure 34

Apseudes sp. A

Synonym: *Apseudes spinosus* sensu Dawson 1966 (not M. Sars, 1858)

Recognition characters.—Eye lobe armed with small antero-ventral spine. Eyes present with distinct visual elements. Rostrum broad at base, becoming narrowly acuminate at apex. Antennule with inner margin of peduncular article 1 appearing entire, not denticulate, serrate, or coarsely granulate. Pereonites subquadrate with inconspicuous, ventrally directed spine on anterolateral margins; lacking small ventrally directed spine on the posterolateral margins. Hyposphenia present on pereonites 2-7. Chela of male with wide gap between fingers lacking teeth on both fixed and movable finger. Chela of female with small, but distinct gap between fingers. Pleotelson subrectangular, sparsely setose dorsally, all setae simple. Pereopod 1 with spiniform setal formula = merus 1/1: carpus 1/2: propodus 2/5 (sometimes 2/6 for the propodus of large males) Uropodal peduncle with 4 distal or subdistal simple seta, lateral setae not present.

Distribution/Ecology.— Gulf of Mexico: Louisiana to Florida Keys.— U.S. East Coast: Florida (Biscayne Bay) northward to South Carolina (off Port Royal Sound). This species (or species complex) is fossorial in sandy silt, mud, fine carbonate, or quartz substrata and occurs in coastal waters (bays and sounds) to the outer shelf in depths of 2-200 m.

Remarks -This species was well described and illustrated in an unpublished M.S. thesis by McSweeney (1968) as “*Apseudes* sp. A.” It also appears to be conspecific with “*Apseudes spinosus*” reported from Louisiana waters by Dawson (1966). Because of the wide geographic and bathymetric ranges, and the morphological variation exhibited by this “species,” it may actually represent two or more closely related cryptic taxa, or it may be a broadly adapted and distributed species with several ecophenotypic forms differing in the degree of spination on the pereonites and in the setation pattern of the fossorial leg (pereopod 1).

It is distinguished from other Florida apseudomorphs by a combination of characters including (1) the presence of functional eyes, (2) an anteroventrally directed spine on the outer margin of the eye lobe, (3) a gaping male and female cheliped lacking teeth, (4) and pereonites 1-5 being subquadrate.

Apseudes sp. A superficially resembles the genus *Bunakenia*, especially in the shape of the cheliped (gapping chela and greatly inflated basis) and pereonites. The presence of a relatively small but distinct spine on the anterolateral margins of the pereonites, however, leads us to tentatively place it in the genus *Apseudes sensu lato*; it may represent a transitional form between the two genera.

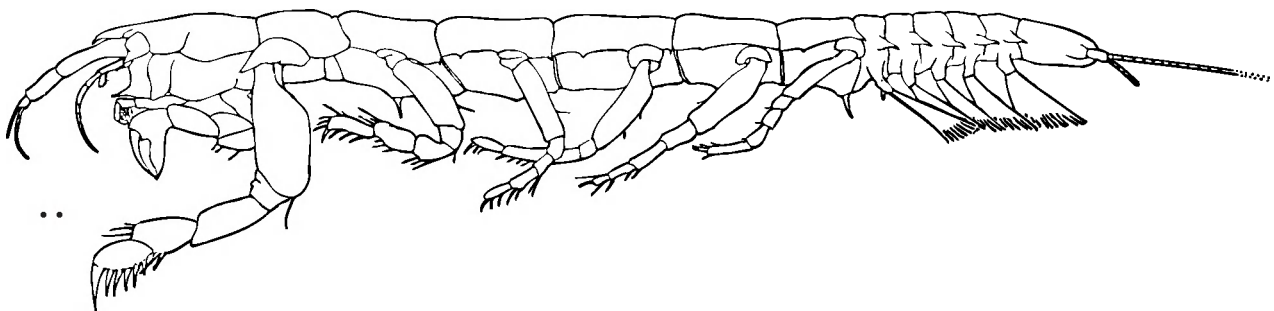


Figure 35

Bunakenia sp. A

Recognition characters.—Relatively large species, reaching lengths of greater than 6.0 mm. Rostrum broadly triangular. Eyes present; eye lobe with ventromedial spine. Antennule, peduncle with medial margin strongly granulate, without distinct spines. Pereonites 2-5 subquadrate, anterolateral margins lacking spines, posterolateral margin with small spines. Pleonites, with lateral cusps; lacking lateral plumose seta. Pereonite 1 of non-ovigerous females and males with bidentate hyposphenial process just posterior to base of maxilliped. Hyposphenia strongly developed on pereonites 5-6 and on pleonites 1-5. Pereonites and pleonites wider than long. Inner plate of maxilliped having inner margin with clavate seta. Cheliped of male with wide gap between fixed finger and base of dactyl, fixed finger armed with proximal tooth; female chela unarmed, without gap. Pereopod 1, coxal spine well-developed, broad at base; spiniform setal formula = merus 1/1: carpus 1/2: propodus 2/4. Pereopod 6, propodus with numerous comb setae on distal and most of ventral margin; merus and propodus with plumose seta along anterior margin.

Distribution/Ecology.—Gulf of Mexico: off Pensacola, Panama City, Apalachicola, Tampa.—Florida Keys: off Key West.—East Coast: off Port Everglades northward to South Carolina. *Bunakenia* sp. A is widely distributed along the continental shelf of the Florida Gulf coast. It is found on quartz sand or carbonate sand substrata in depths of 40 to nearly 200 m. In carbonate sediments in shallower South Florida waters it is often collected with *Psammokalliapseudes granulosus*, *Saltipedis* sp. A and Parapseudid genus A. It co-occurred with *Apseudes olimpieae* in Northwest Florida off Pensacola.

Remarks.—In some aspects, especially the presence of a spine on the eye lobe and the wide gap between the fingers of the male chela, *Bunakenia* sp. A somewhat resembles *Apseudes* sp. A but it differs by (1) lacking anterolateral spines on the margins of the pereonites 2-5, (2) having small posterior lateral spines on pereonites 2-5, (3) the placement of the ocular spine on eye lobe (ventromedial on *Bunakenia* sp. A), (4) having a bidentate hyposphenial process just posterior to the maxilliped on males and on preincubatory females, and (5) presence of a tooth on the posterior position of the movable finger of the male chela and lack of gape in the chela of the female.

Except for the presence of a well-developed coxal spine on pereopod 1 and a single spiniform seta on the merus of the first leg, *Bunakenia* sp. A shares many characters with Parapseudid sp A, which actually may be an aberrant apseudid.

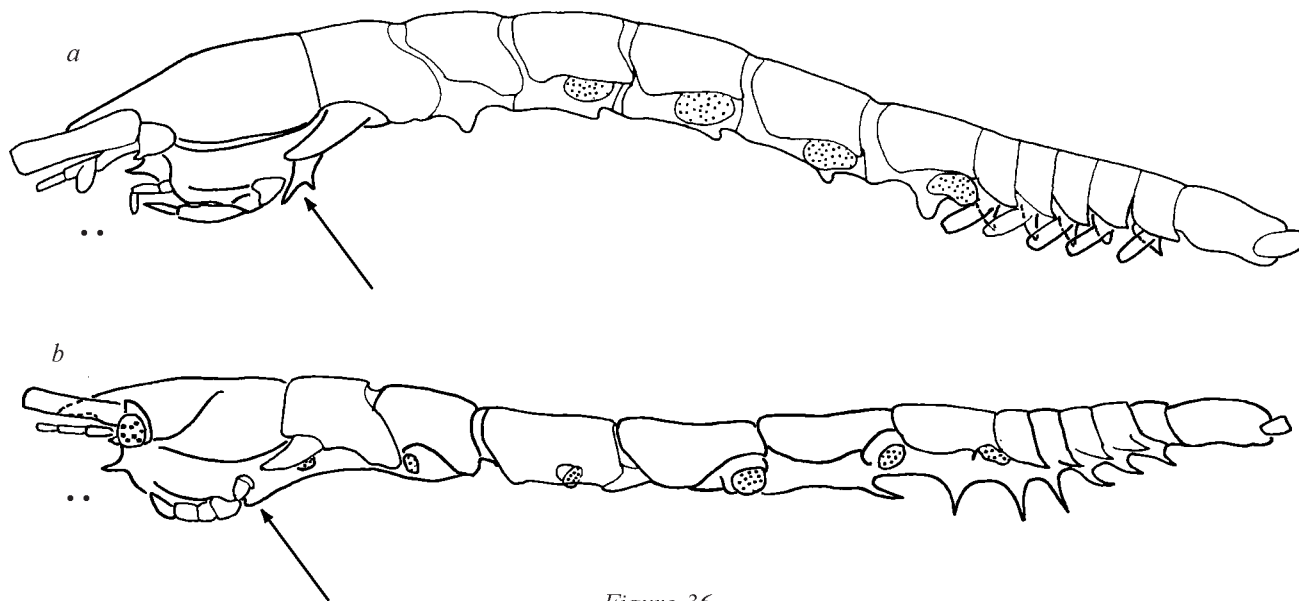


Figure 36

Hoplomachus propinquus (Richardson, 1902) *sensu lato*

Synonym.—*Apseudes propinquus* Richardson, 1902

Recognition characters.—Antennule, with 2-3 well developed spines on the inner margin and 1 anteriorly directed spine on distal outer margin. Maxilliped with 2 strong spines on second article of palp. Pereopod 1 with coxal spine possessing 1 or 2 simple setae distally; basis usually with 3 to 4 prominent blunt spines or tubercles along frontal margin with long plumose setae inserted between them; spiniform setal formula = merus 1/1: carpus 1/2: propodus 2/3. Pereopod 2 usually with a blunt spine or tubercle on frontal margin of basis. Pleotelson with 2 pairs of sub-acute lateral processes or lobes armed with simple, elongate stiff setae.

Distribution/Ecology.—Bermuda (type locality), Southeastern United States (East Coast from South Carolina to Florida Keys), Gulf of Mexico.—Turks and Caicos Islands.—North Caribbean (Mexico, Cayman Islands). This species, or possibly species complex, occurs in a variety habitats, including mangrove root communities and back reef rubble, shallow shelf, and mid shelf live bottom habitats. It is often found associated with sponges.

Remarks.—The spinal pattern on the antennular peduncle and the presence of tubercles and associated long plumose setae on the frontal margin of the basis on pereopod 1 immediately distinguishes *Hoplomachus propinquus* from all other known apseudids. The original description of this highly variable species was based on specimens from Bermuda (type locality) and Florida (Richardson 1902, 1905); it was the first tanaidacean reported from Florida waters. In their redescription of the species, Guo and Iliffe (1985) mentioned the similarity between *Apseudes propinquus* and the metapseudid genus *Calozodion* Gardiner, 1973(b). Later Guo (1996) transferred *A. propinquus* to *Calozodion*. Recently he (Guo 2003) created the monotypic genus *Hoplomachus* to receive this atypical species, and, based on the presence of a well-developed coxal spine on pereopod 1, he transferred it back into the family Apsseudidae.

Several size morphs of this species have been observed depending on habitat and depth. The most striking difference we observed was between shallow water reef populations and populations found on sponges in South Florida waters. The specimens found on sponges associated with mangrove roots in deep channels in the Florida keys reach terminal adult sizes several times larger than those from some reef populations. Whether these size differences are due to the nutritional factors, presence or lack of a sponge or other association, or whether these forms represent two different cryptic species awaits further research using such modern tools as DNA sequencing techniques.

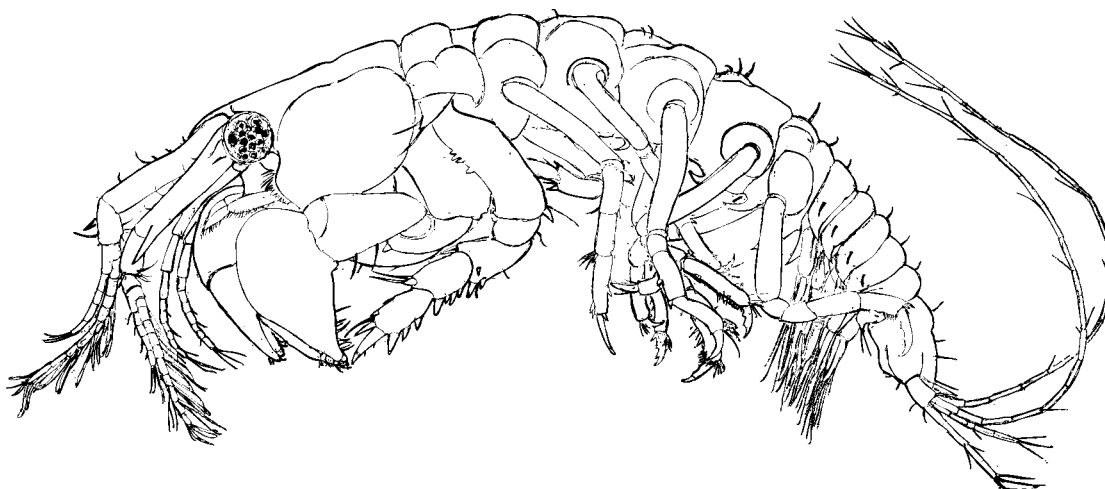


Figure 37

Family Kalliapseudidae Lang, 1956

Synonyms.—Cirratodactylidae Gardiner, 1973a.—Tanapseudidae Băcescu, 1980

Seven genera representing 26 species currently comprise the members of this widely distributed family, which are confined to coastal and shelf habitats. Kalliapseudids differ from other apseudomorphans by a combination of characters including: (1) the absence of a palp on the maxillule, (2) the absence of a coxal spine on pereopod 1, (3) the presence of a specialized sensory seta or cluster of sensory setae, usually found on the dactyls of pereopods 1-6, (4) having manca stages with exopods on pereopods 4 and 5, and (5) domiculous inhabitants (tube dwellers). There are three subfamilies, the Hemikalliapseudinae Guàrdia, 1972, the Kalliapseudinae Lang, 1956 and the Tanapseudinae Băcescu, 1978, containing, 3 genera and 4 species, 3 genera and 20 species, and 1 genus and 2 species, respectively.

The three kalliapseudids presently known from Florida waters are all representatives of the largest subfamily, the Kalliapseudinae, which is distinguished by the presence of a uniarticulate mandibular palp and 5 articles in the antennal peduncle. Two of these species are in the genus *Kalliapseudes* Stebbing, 1910 and the third is in the genus *Psammokalliapseudes* Lang, 1956. Both species of *Kalliapseudes* are referable to the subgenus *Mesokalliapseudes* Lang, 1956, with known members being reported from the waters of the Atlantic and Pacific coasts of the Americas. This subgenus is characterized by the absence of exopods on both the cheliped and pereopod and the presence of well-developed sensory setae on pereopods 2 and 3. Relevant references to the family include those of Lang (1956a,b), Guàrdia (1996b), Guàrdia 2001, Hansknecht et al. (2002), and Bamber (2003).

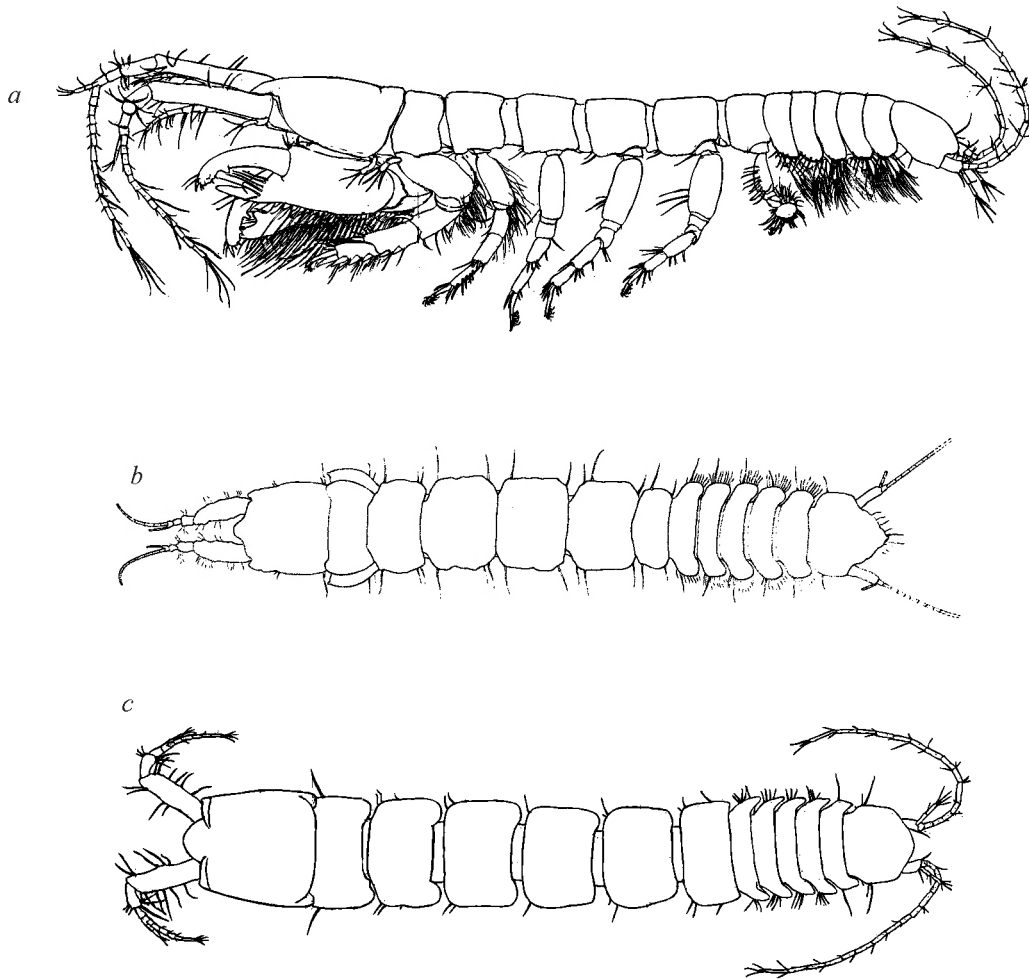
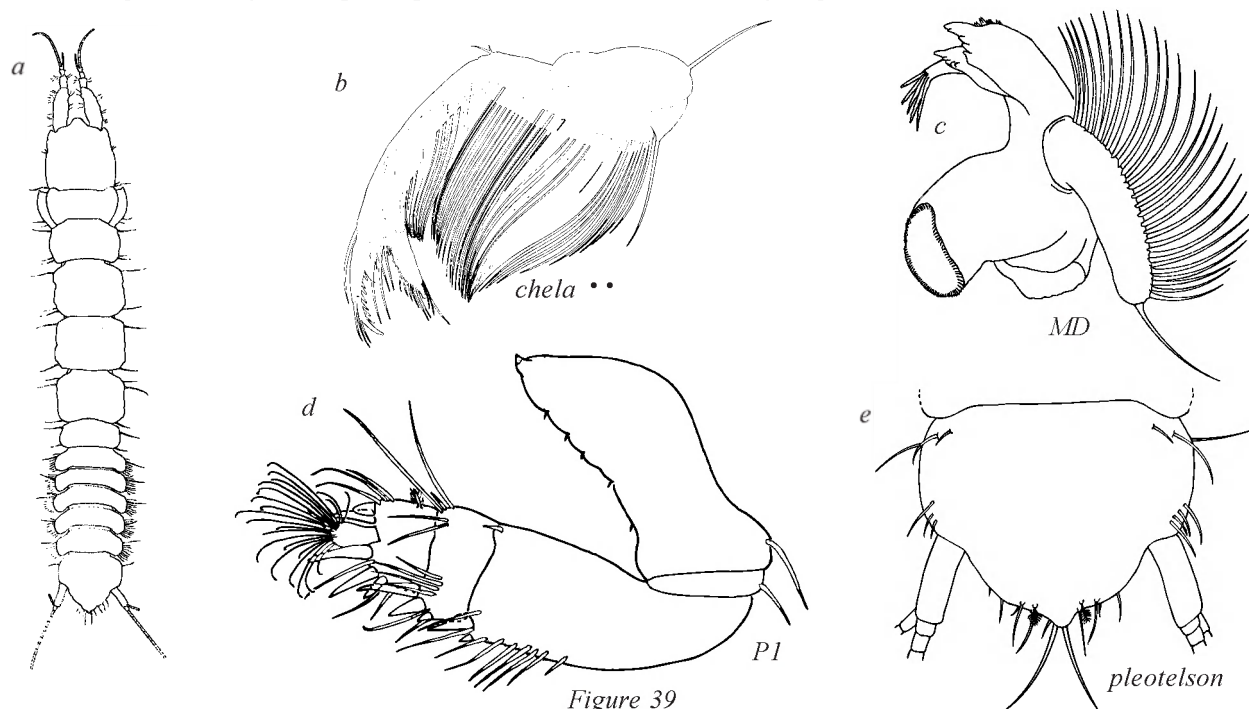


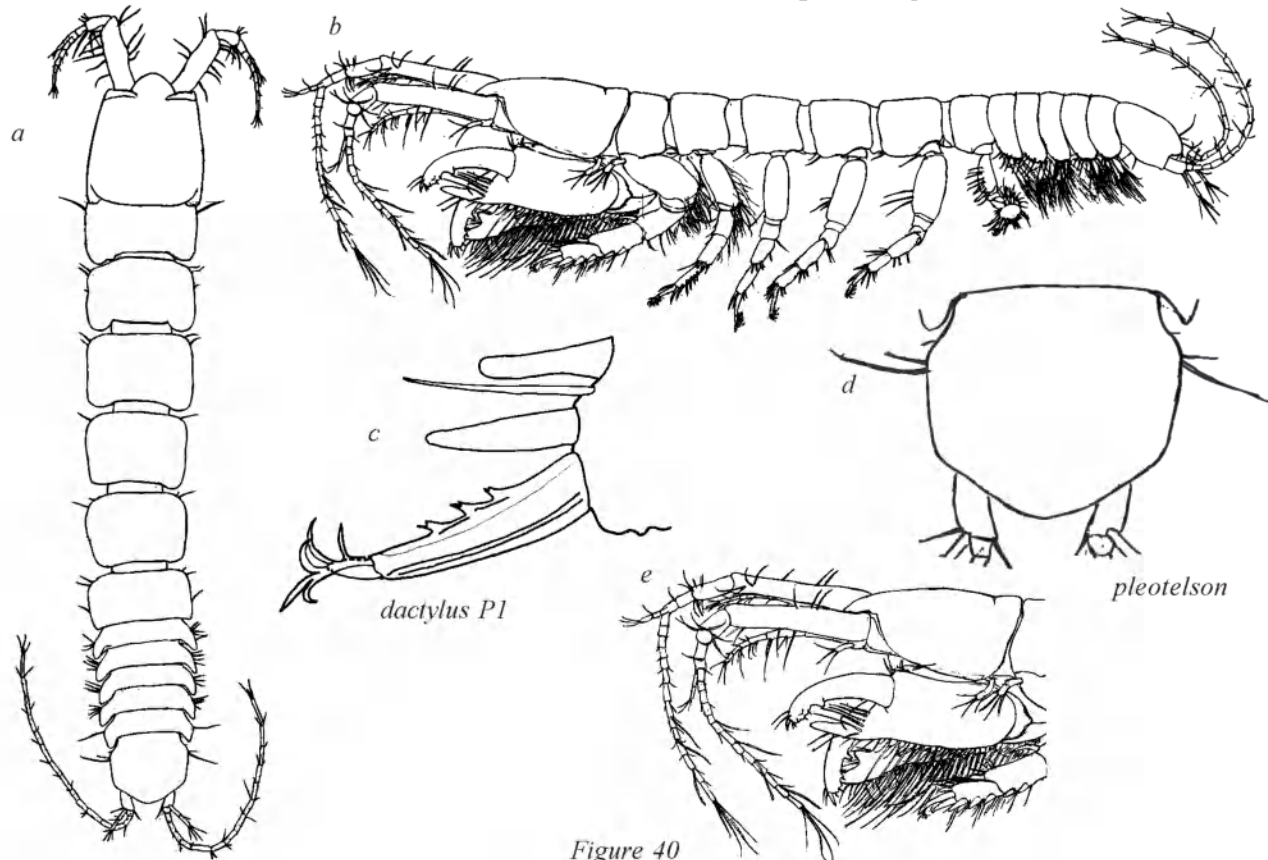
Figure 38

KEY TO THE SPECIES OF KALLIAPSEUDIDAE KNOWN FROM FLORIDA WATERS

- 1 •Carpus and propodus of cheliped and mandibular palp with row of long seta on inner ventral margins. Dactylus of pereopod 1 with brush like sensory organ 2



- Carpus and propodus of cheliped and mandibular pap lacking long setae; dactylus of pereopod 1 with setal curls *Psammokalliapseudes granulatus* Silva Brum, 1978



- 2 • Antennae having article 3 without lateral process. Dactylus of female cheliped nearly 4 times as long as fixed finger. *Kalliapseudes cf. bahamaensis* Sieg, 1982a

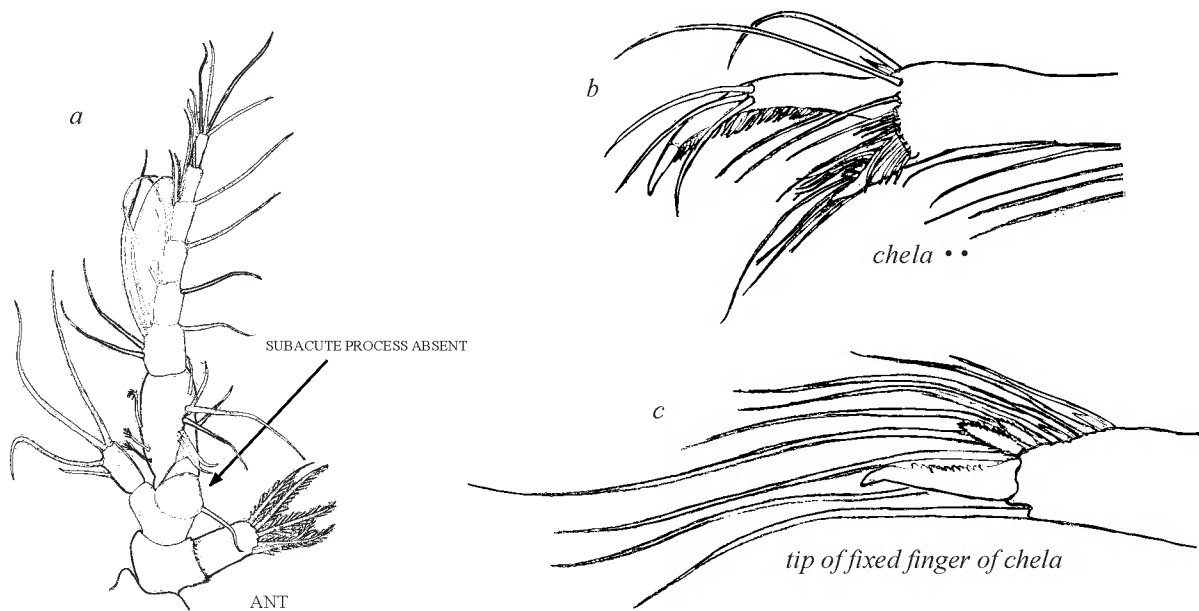


Figure 41

- Antennae having article 3 with lateral process. Dactylus of female cheliped about 2 times length of fixed finger. Chela of male more robust than that of female, dactylus with large subdistal tooth
 *Kalliapseudes macsweenyi* Drumm, 2003

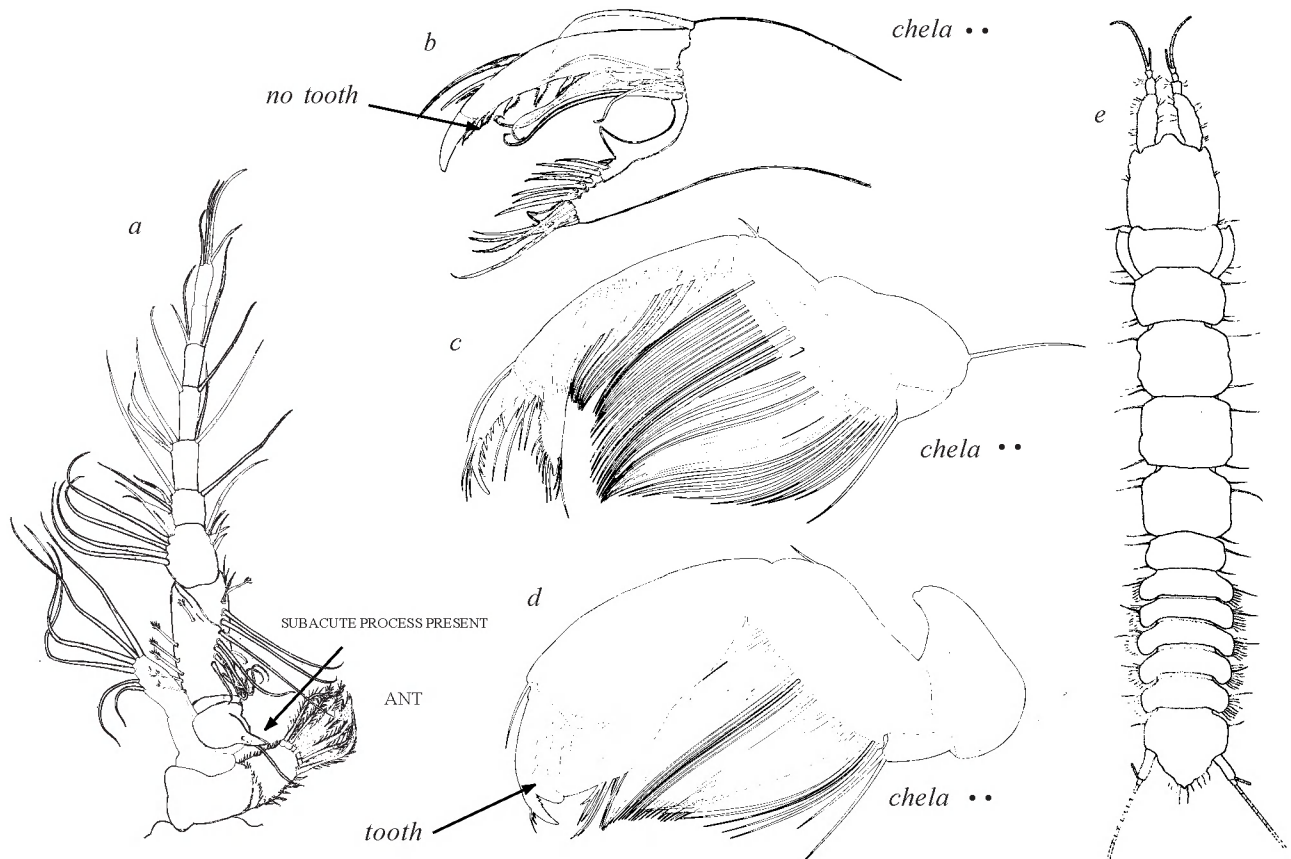


Figure 42

Family Kalliapseudidae Lang, 1956

Kalliapseudes (Mesokalliapseudes) bahamaensis Sieg, 1982

Recognition characters.—*Mesokalliapseudes*. Apparent article 3 of antenna lacking acute medial process. Chela with fixed finger less than 1/3 the length of movable finger. Pereopod 1 with setal formula, merus, carpus, propodus: 1/1:0/2:2/4

Distribution/ Ecology.—Northwest Atlantic: Bahamas.—Southeastern United States (South Carolina to southern Florida., eastern Gulf of Mexico. There is no specific ecological data available for this species. This species has a shallow inner shelf to mid shelf bathymetric range.

Remarks.—*Kalliapseudes bahamensis* Sieg, 1982, was originally described from El Salvador Island in the Bahamas. Based on Sieg's (1982) description, there are some minor differences between the specimens described from the Bahamas and those we examined from coastal waters of South Carolina, Georgia and Florida (both Atlantic and Gulf coasts). At this time we consider these difference to be intraspecific, but further detailed study is needed verify or refute this assumption. In Florida waters *Kalliapseudes bahamensis* co-occurs with *Kalliapseudes mcsweenyi*, from which it is separated by the lack an acute process on article 3 of the antenna and by a chela with a fixed finger less than 1/3 length of movable finger. *Kalliapseudes bahamensis* appears to have its closest affinities with *Kalliapseudes soniadownae* Bamber, 1993, described from the southern Caribbean (Trinidad), and *Kalliapseudes crassus* Menzies, 1953, known from the warm waters of the eastern Pacific, but it apparently differs from them by the setation of chelae and pereopods (Menzies 1953, Bamber 1993).

Kalliapseudes (Mesokalliapseudes) mcsweenyi Drumm, 2003

Synonyms.—: *Apseudes alicii nomen nudum*. -- *Kalliapseudes* sp. A: Rakocinski et. al 1993, 1996, 1997, 2000

Recognition characters.—*Mesokalliapseudes*. Apparent article 3 of antenna with acute process. Chela with fixed finger over 1/2 length of movable finger. Pereopod 1 with setal formula; merus, carpus, propodus: 0/1:1/2:2/3.

Distribution/Ecology.— This species is presently known from near shore and shelf waters of the Atlantic coast from South Carolina southward to the Florida Keys and in the Gulf of Mexico north westward along the Florida, Alabama, and Mississippi coasts. *Kalliapseudes mcsweenyi sensu lato* is a tube dwelling species occurring in quartz or carbonate “sand” substrata in lower intertidal to mid shelf depths. Like other members of its genus, it appears to be a filter or suspension feeder (Drumm 2003a).

This species is appears to be a geminate or sister species to *Kalliapseudes viridis* Menzies, 1953 known from the Pacific coasts of northern Mexico and Southern California. The chela of the female *Kalliapseudes mcsweenyi sensu lato* from northern Gulf of Mexico populations, which occur in coarse quartz sand substrata, is usually found to lack a tooth on the fixed and dactylus. In contrast, a tooth and denticle, respectively, are nearly always present on chelae on females and males collected from moderate to fine quartz and carbonate substrata in southern Florida and off South Carolina waters. Whether this and other less evident differences are due to clinal, ecophenotypic variation, or to the presence to two or more cryptic species needs further study using DNA sequencing.

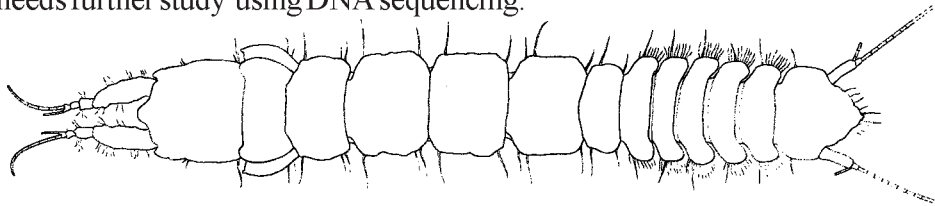


Figure 43

Psammokalliapseudes granulosus Silva-Brum, 1973

Synonym: *Cirratodactylus floridensis* Gardiner, 1977

Recognition characters.—*Mesokalliapseudes*. Rostrum short, broadly rounded. Eye lobes reduced, without spines. Pereonites quadrate, wider than long with nearly parallel margins lacking spines. Pleon lacking lateral projections. Cheliped sexually dimorphic; male with chela greatly enlarged having dactylus bearing 2 teeth and fixed finger with 1 tooth; dactyl of cheliped in mature males greatly overlapping fixed finger. Female cheliped with no teeth, setae only. Pereopod 1 (stab leg sensu Lang) with inconspicuous sensory seta on dactyl; spiniform setal formula: merus/carpus/propodus; 1/1, 1/2, 2/4 Pereopods 1-6 with dactyls bearing sensory setae. Pereopod 6 with paddle shaped propodus. Hyposphenia on pleonites only. Mucus glands (seen in Rose Bengal stained specimens) on pereonites 2-6 and pleotelson

Distribution/Ecology.— Western Atlantic.- Gulf of Mexico: off Panama City, Appalachicola, Tampa Bay, Florida Keys, Florida Bay, Florida East coast: Port Everglades Miami, Ft Lauderdale, Florida Keys (Key West).- Puerto Rico.- Tobago.- Brazil (type locality). In Florida waters this tubiculous species occurs in carbonate substrata and carbonate outcrops. It is reported to feed on fine particles of detritus (Drumm 2003a).

Remarks: *Psammokalliapseudes granulosus*, originally described from northern Brazil, was previously known in Florida waters as *Cirratodactylus floridensis*. Gardiner (1973a) established the monotypic family Cirratodactylidae to accommodate this species. Based on the works of Lang (1956) and Silva-Brum (1973), Băcescu and Absalao (1985) established that Gardiner's species and family were junior synonyms of *P. granulosus* and the family Kalliapseudidae, respectively.

Psammokalliapseudes granulosus is distinguished from members of the genus *Kalliapseudes* by (1) having a glabrous body lacking seta, (2) all pereopods having numerous curls on dactyls, (3) male chela being massive and having ventral margin of merus and carpus lined with basally swollen setae, (4) pereopod 1 lacking distal setal brush on pereopod, (5) pereonites quadrate (lateral margins relatively straight and lacking spines).

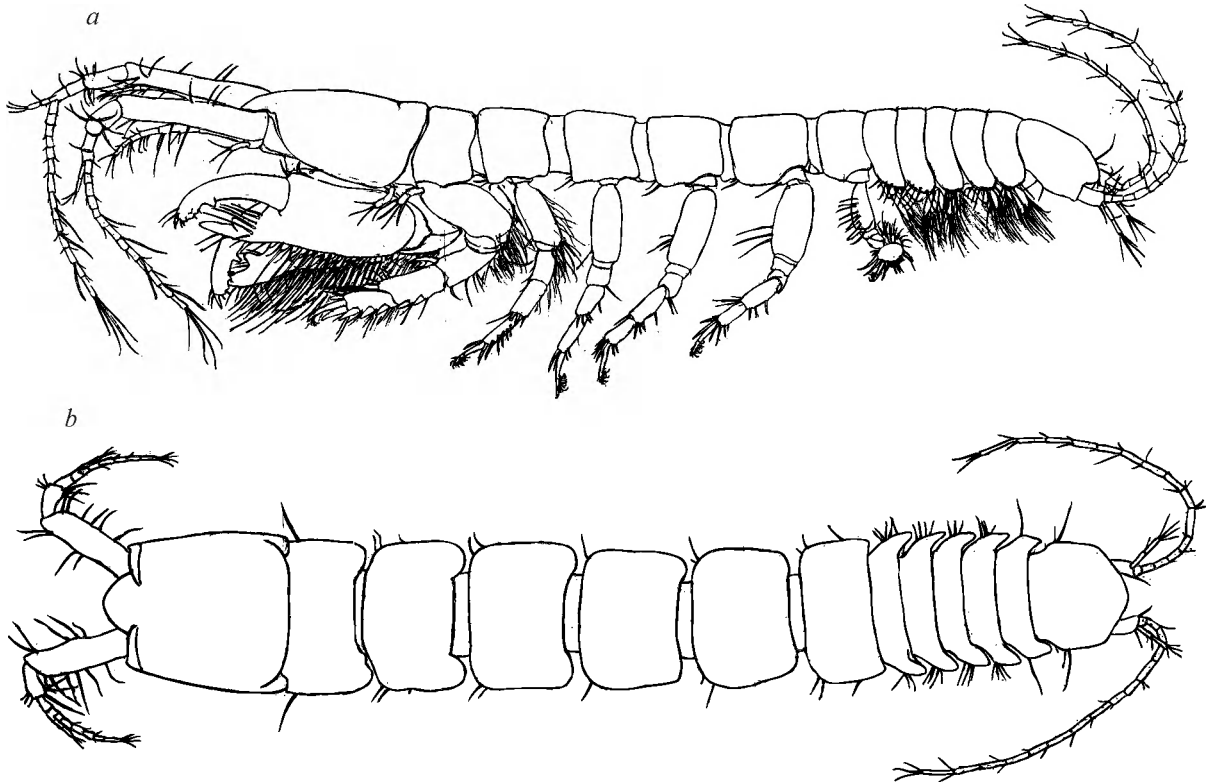


Figure 44

Family Parapseudidae

Members of the family Parapseudidae superficially resemble those of the Apseudidae, but are distinguished by the absence of a coxa spine on pereopod 1. Often members of the family have the basis of the last 3 pereopods swollen. Preserved specimens belonging to the family are often fragile, and lose most of their appendages during the processing of the benthic samples. With a few exceptions such as the deep water species *Pakistanapseudes thokozele* Bamber and Sheader, 2003, most members of the family occur in coastal and shelf waters.

At present about 40 species within 10 genera comprise the family. Within Florida costal and shelf waters, six genera and seven species are tentatively recognized. Three other parapseudid genera, *Ascumnella* Guñu and Heard, 2003; *Discapseudes* B•eeacu and Guñu, 1975; and *Longiflagrum* Guñu, 1995, which are now known from the Caribbean or southwest Gulf of Mexico (Guñu and Heard 2003; T. Hansknecht, per. observations), may eventually be found in Florida waters.

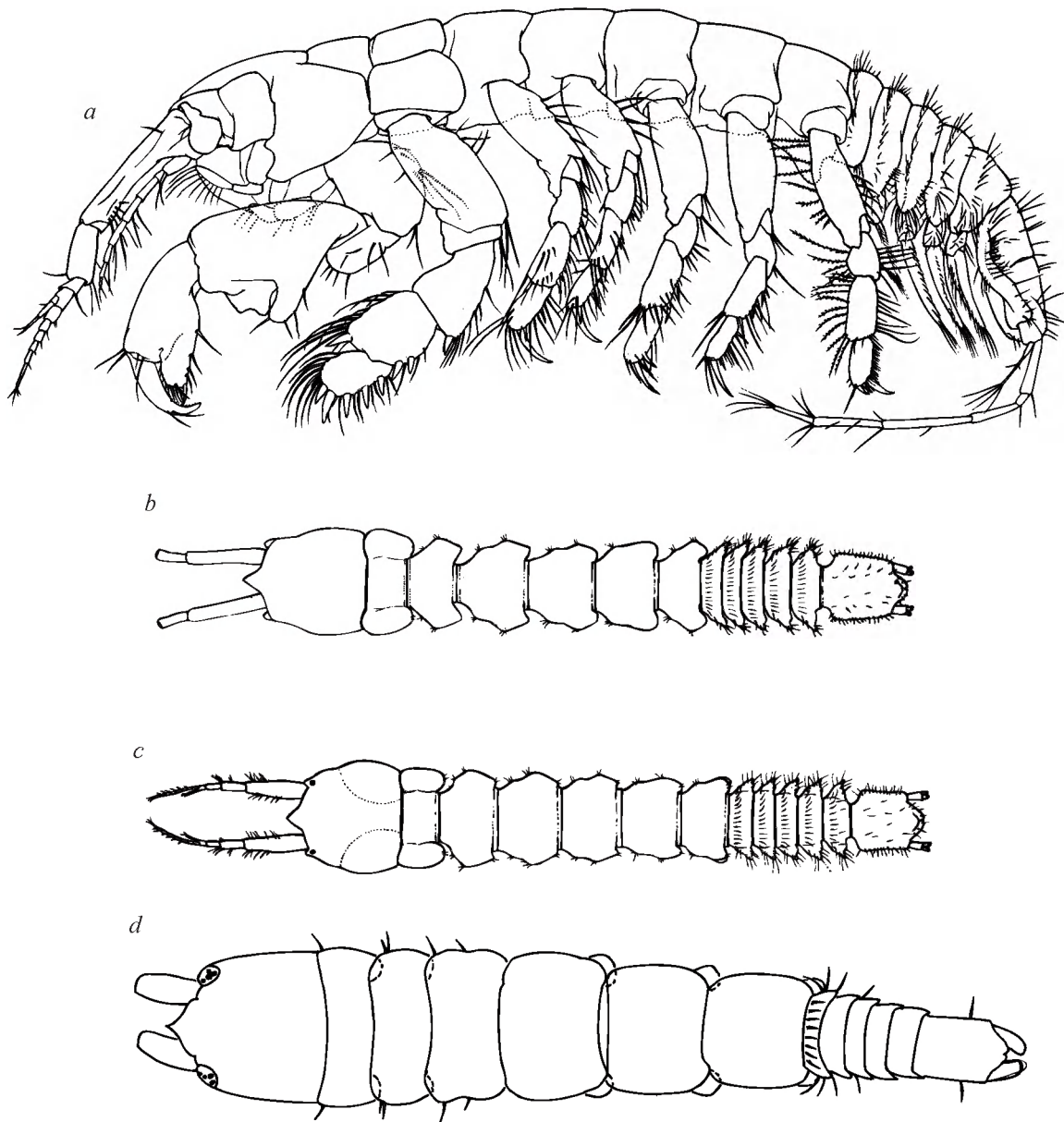


Figure 45

KEY TO THE SPECIES OF PARAPSEUDIDAE KNOWN FROM FLORIDA WATERS

1. •Pleonites 1 or 1-5 with setal band extending into dorsal region [Rostrum subacute] 2

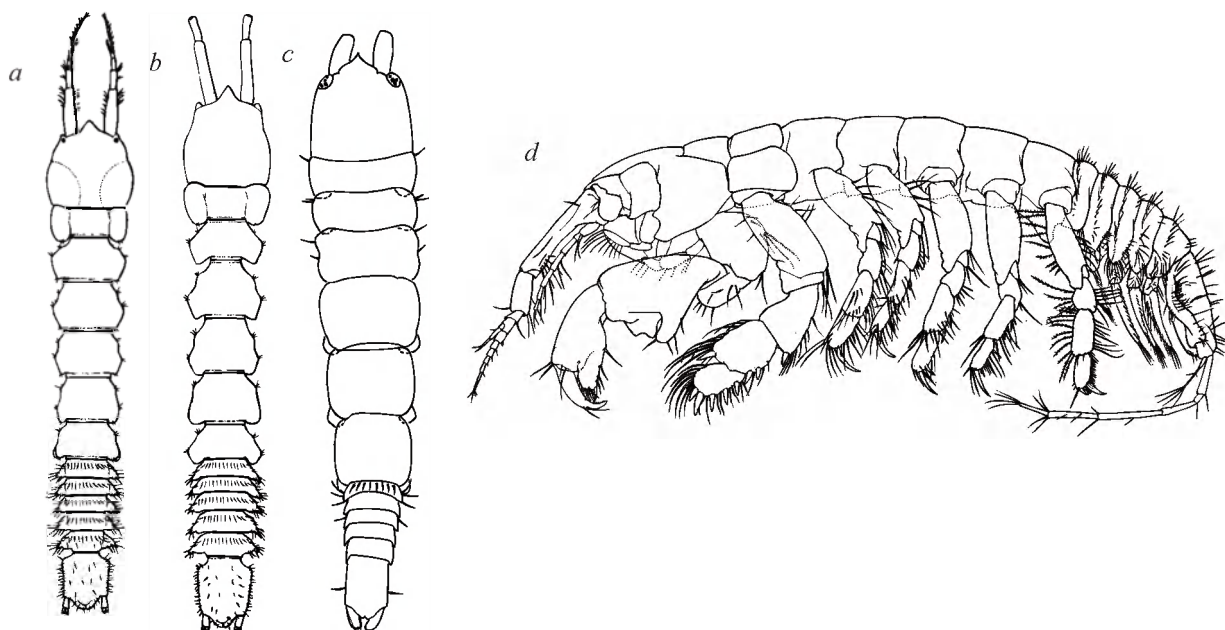


Figure 46

- Pleonites 1 -5 lacking setal bands [Rostrum rounded or subacute] 4

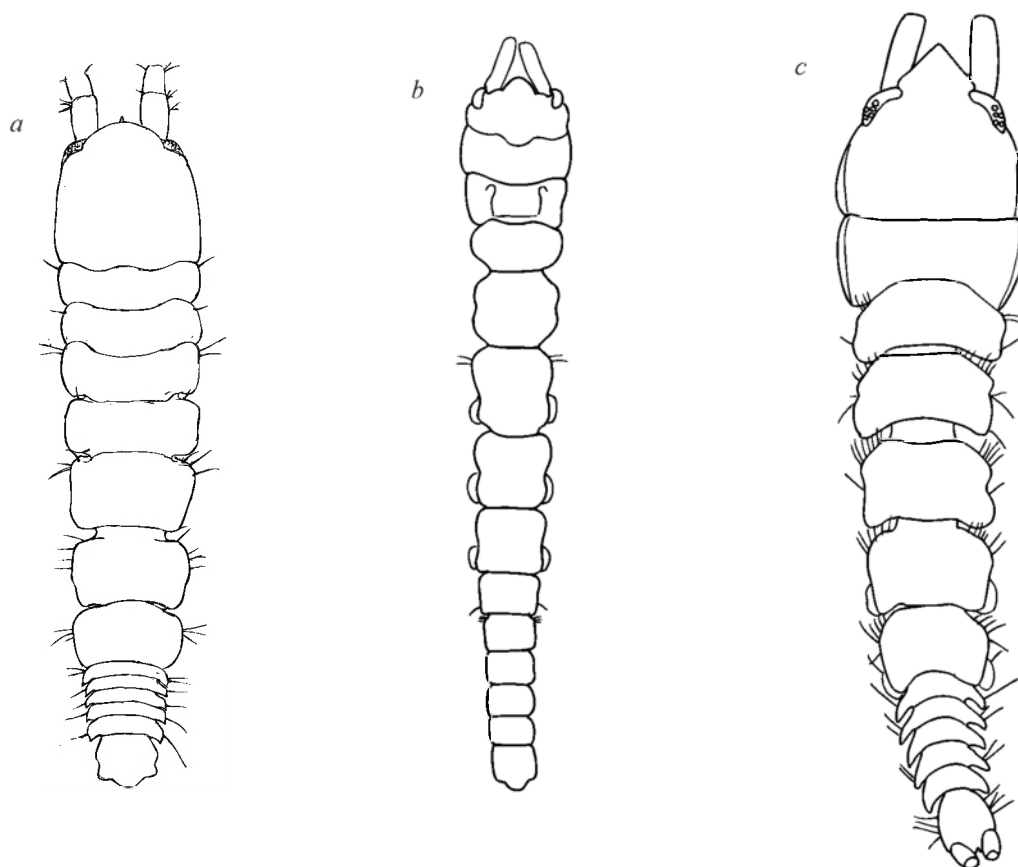


Figure 47

2. • Antenna with first peduncular article inflated laterally to form broad sub quadrate projection bearing 4 setae along lateral margin. Squama on inner distal margin of article 2, small, subcylindrical with 3 terminal setae and (excluding terminal setae) not extending beyond midregion of antennal article 4. Peraeopod 1 with merus, carpus, and propodus inflated. Hyposphenial spines absent. Pleonites 1-5 having setal bands (*Halmyrapseudes*). 3

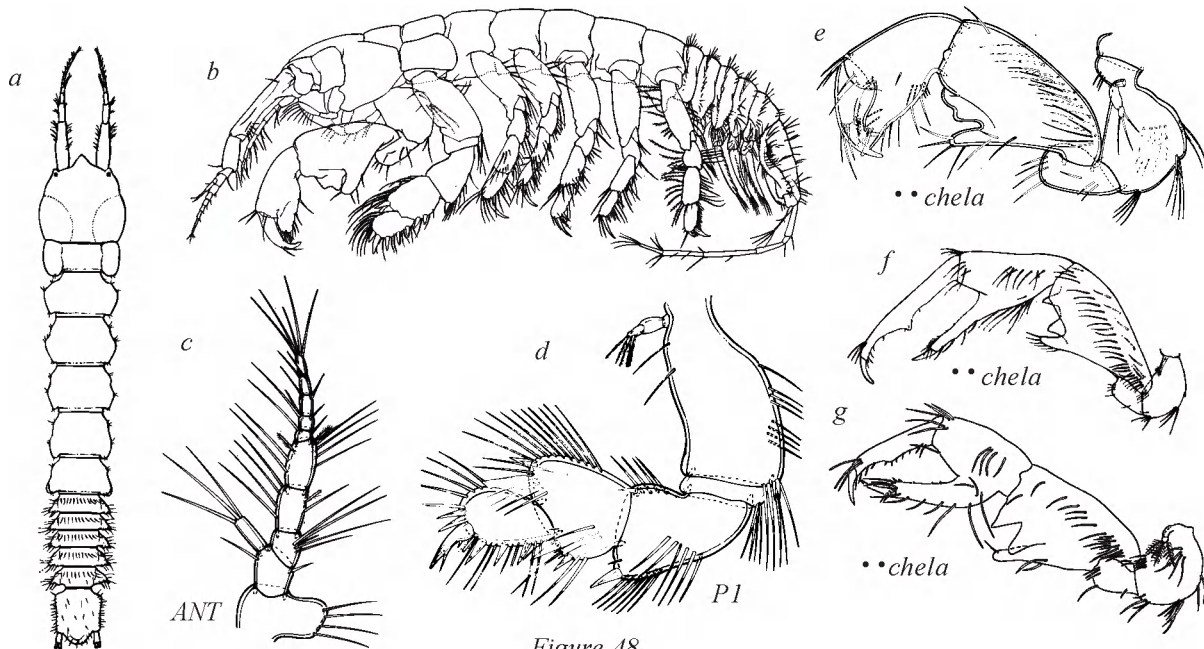


Figure 48

- Antenna with peduncle article 1 having moderately developed rounded lobe (projection) bearing 3 distal setae. Squama on inner distal margin of article 2, well-developed, extending to at least middle of antennal article 5 and having both lateral and terminal setae. Peraeopod 1 with merus, carpus, and propodus not noticeably inflated. Hyposphenial spines present on peraeonites. Pleonite 1 only with setal band. *Saltipedis* sp. A

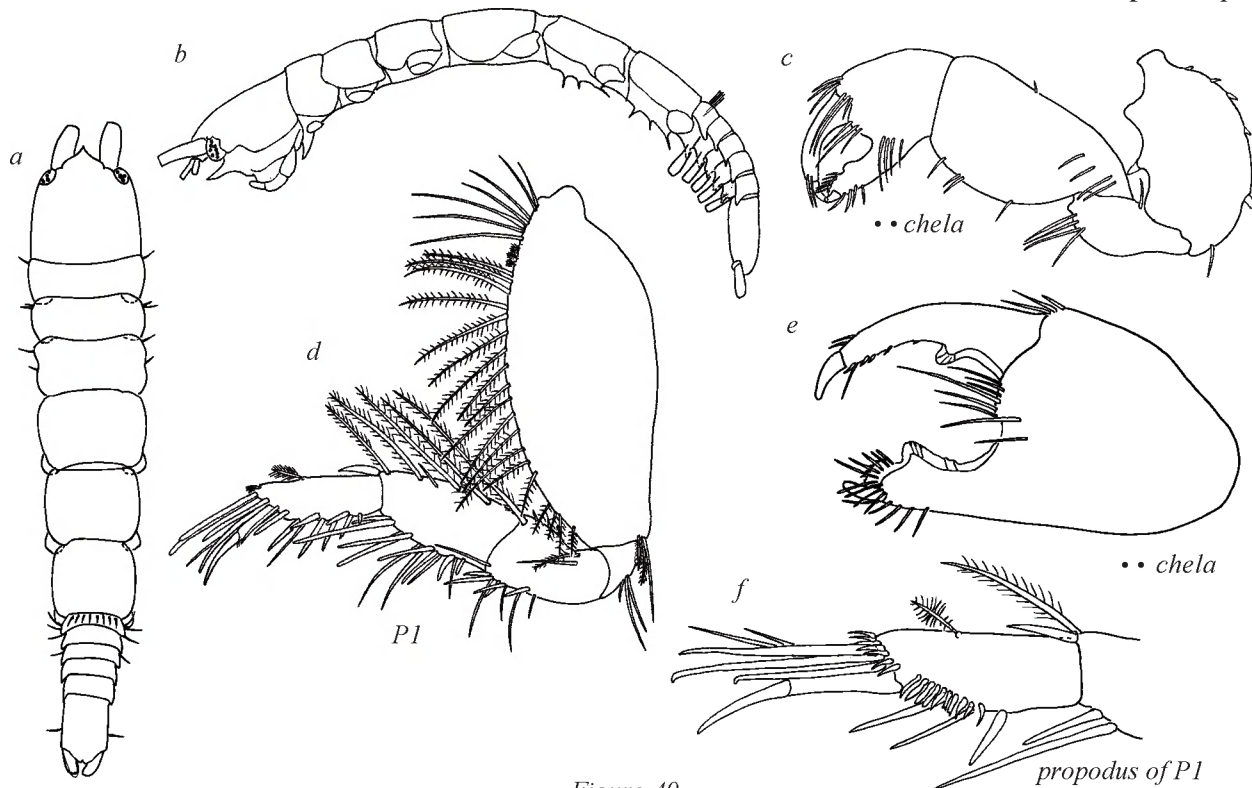


Figure 49

3. • Eyes lacking visual elements and lacking pigment. Chela of male with dactyl having low median ventral tooth on cutting edge *Halmyrapseudes cf. cubanensis* Băcescu and Guă, 1974

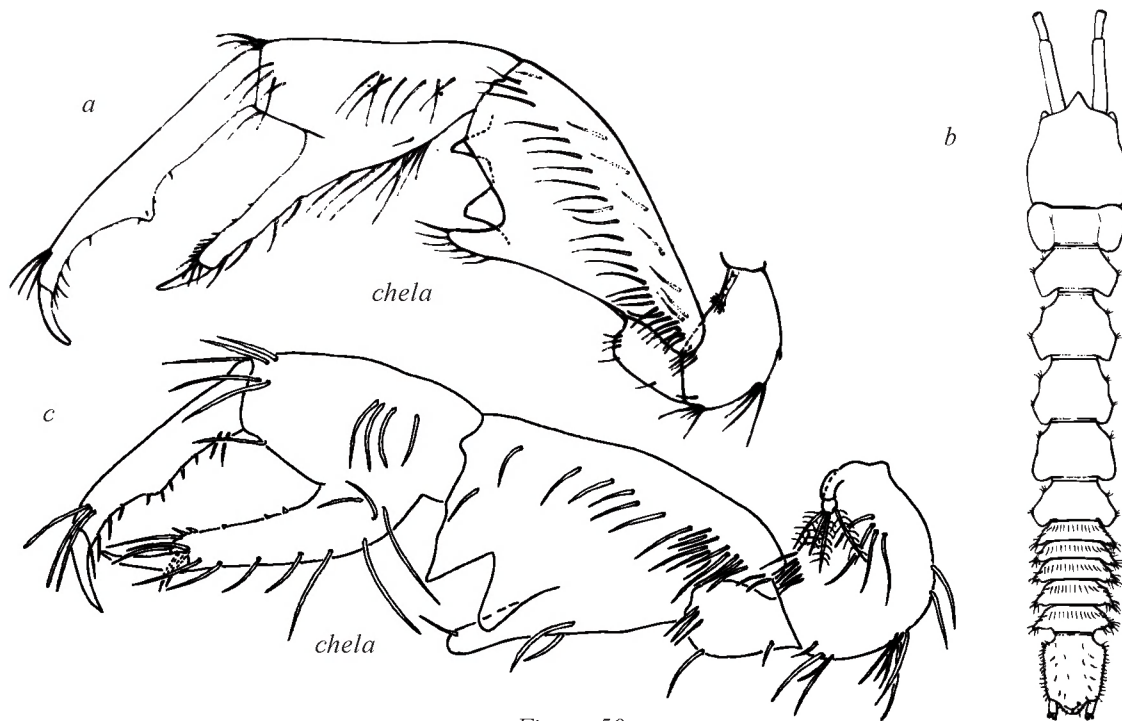


Figure 50

- Eyes with visual elements and some pigment. Male with dactylus of cheliped lacking median ventral tooth *Halmyrapseudes cf. bahamaensis* Băcescu and Guă, 1974

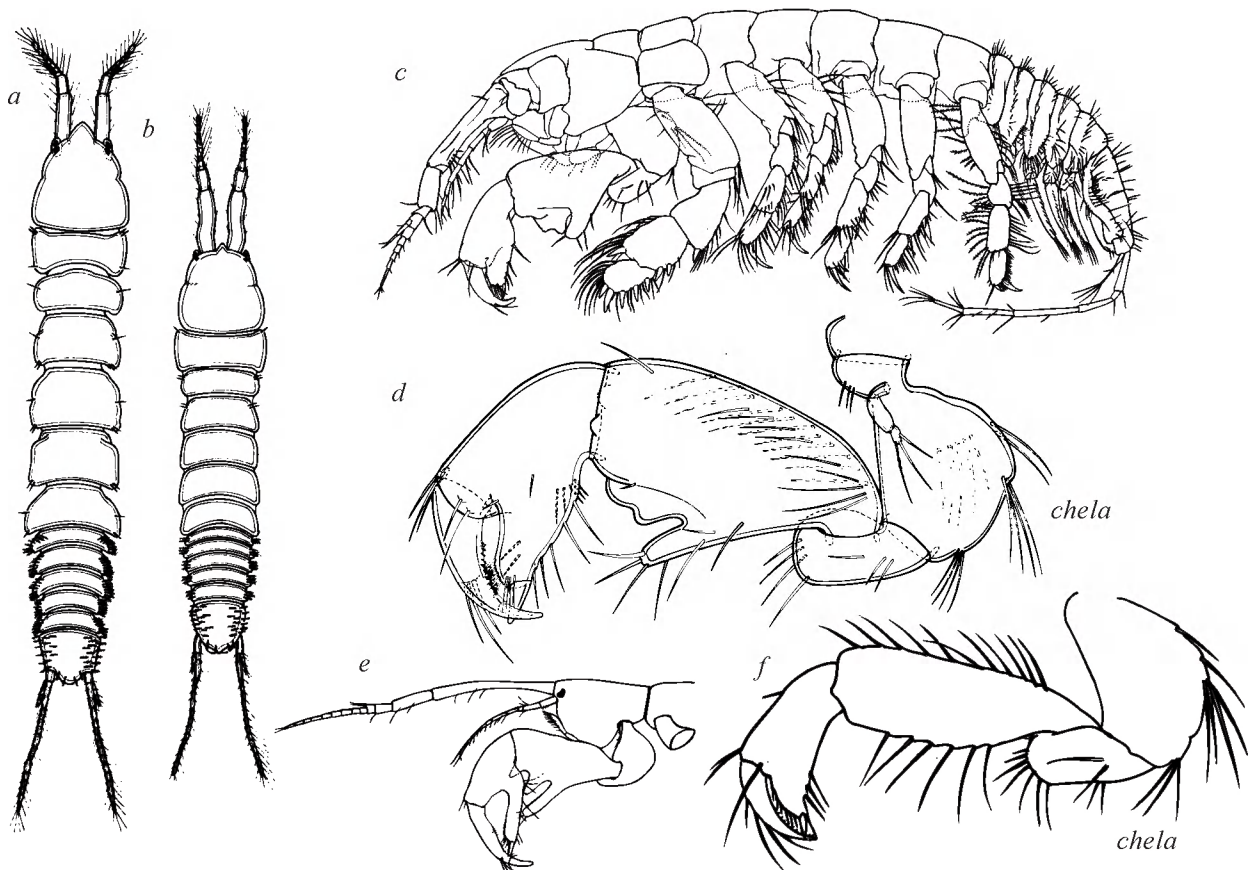


Figure 51

4. • Body distinctly elongate, more than 4 times longer than wide. Male with antennular flagellum long, tapering, with numerous annulate articles bearing sensory setae (asthetosacas). Peraeopod 1 having dorsal margin of merus armed with 1 large spiniform setae. [Rostrum rounded. Chelae delicate, elongate, in female forceps like. Pleonites nearly as long as wide] *Pakistanapseudes* sp. A

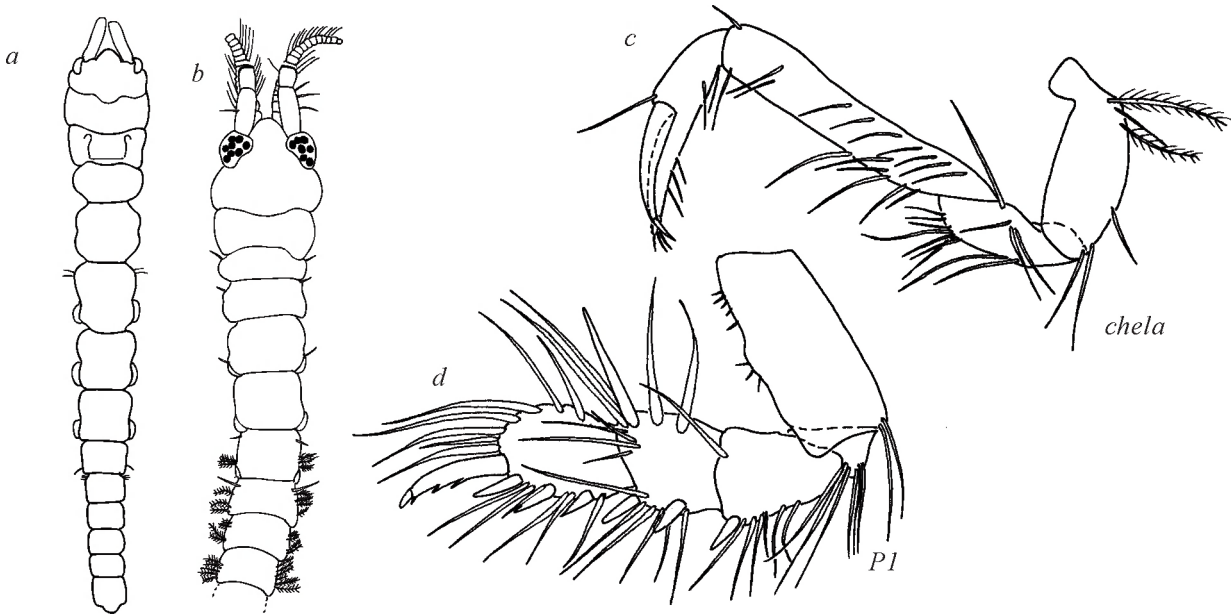


Figure 52

- Body not exceptionally elongate, less than 4 times longer than wide. Male with antennular flagellum typical, not having tapering flagellum composed of numerous annulate articles. Peraeopod 1 with stout spiniform on both dorsal and ventral margins. [Chelae of male robust, and that of female not exceptionally elongate]. 5

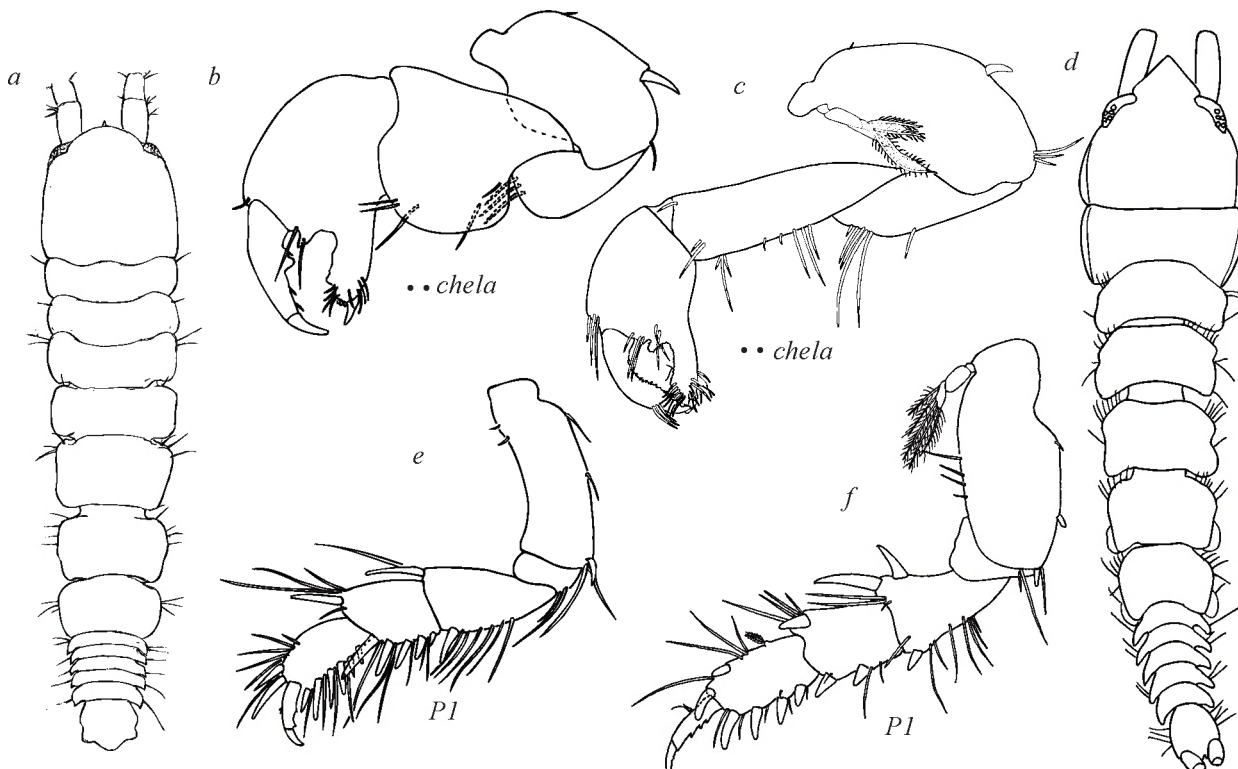


Figure 53

5. •Rostrum broadly rounded dorsally, armed ventrally with sub apical tooth. Peraeopod 1 having dorsal margin of merus armed with 1 large spiniform setae. Abdomen with 4 pairs of pleopods on first 4 segments (pleonites); segment 5 lacking pleopods *Parapseudes* sp. A

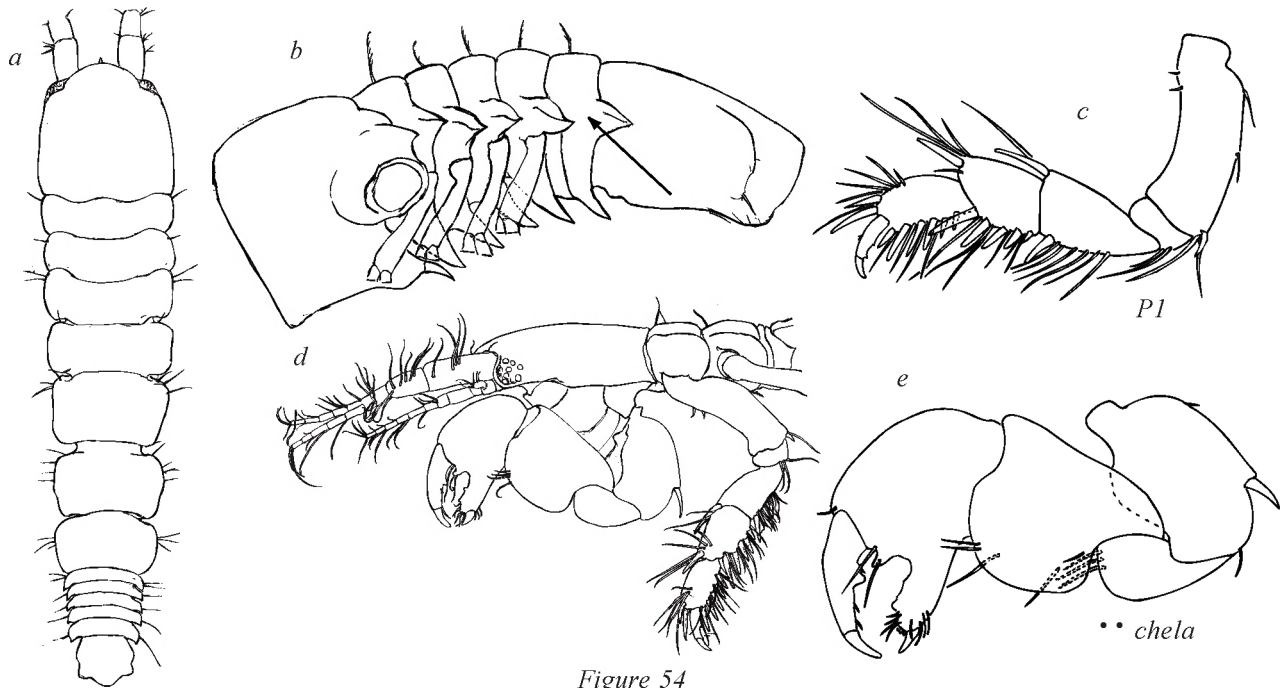


Figure 54

- Rostrum sub triangular. Peraeopod 1 having dorsal margin of merus armed with 1 large spiniform setae. Abdomen with pleopods on first 5 segments (pleonites) Parapseudid-like species A

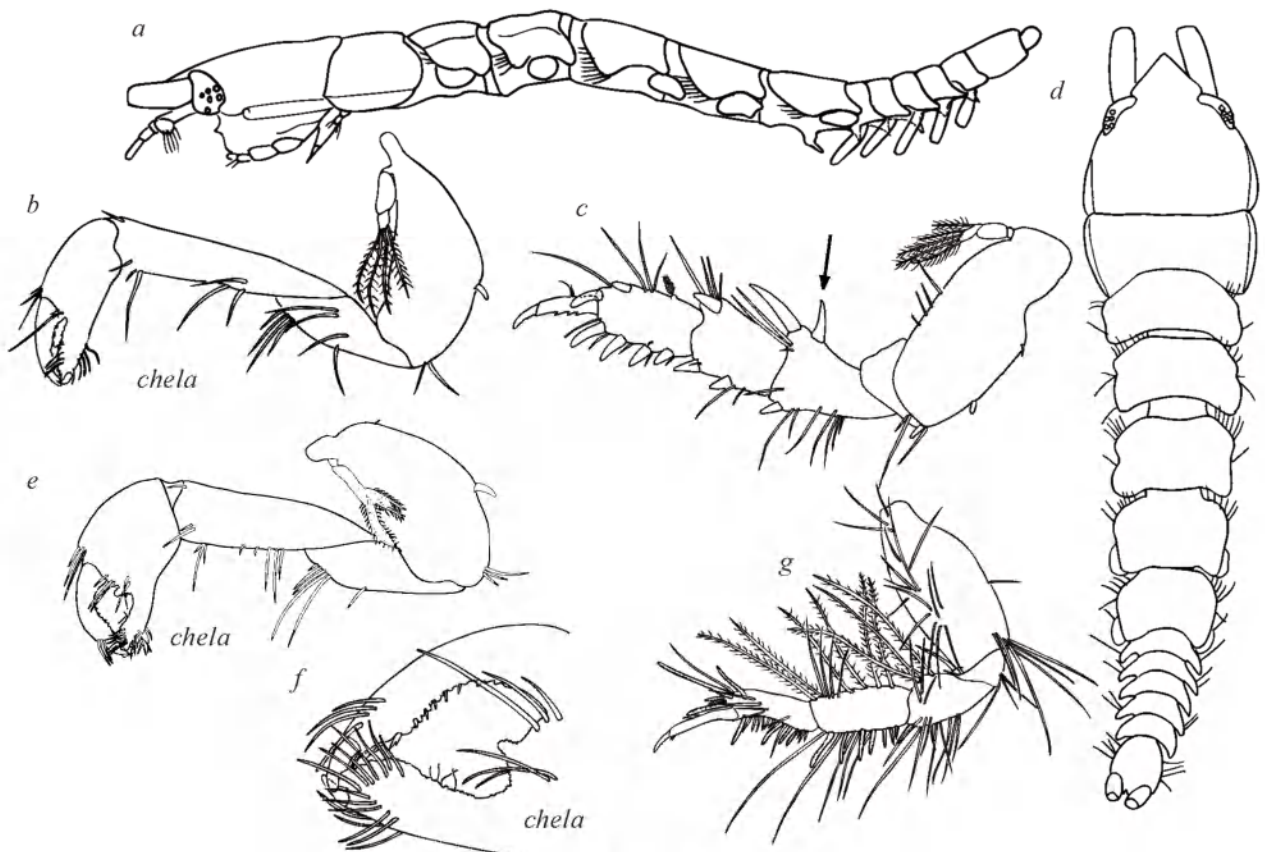


Figure 55

Family Parapseudidae

Halmyrapseudes bahamensis Băcescu and Guă, 1974

Recognition characters.—Rostrum subacute. Eyes weakly developed, but with visual elements, some pigment present in fresh or recently preserved specimens). Antenna with first peduncular article inflated laterally to form broad sub quadrate projection bearing 4 setae along lateral margin). Squama on inner distal margin of article 2, small, subcylindrical with 3 terminal setae and (excluding terminal setae) not extending beyond mid-region of antennal article 4. Male with dactyl of male cheliped lacking median ventral tooth. Pereopod 1 with merus, carpus, and propodus inflated; carpus with distodorsal lobe extending over proximal part of propodus. Abdominal segments lacking hyposphenial spines. Pleonites 1-5 with dorsal setal bands.

Distribution/Ecology.—Bahamas, NE Florida (present study), NW Florida (St. Marks). The species appears to inhabit soft muddy substrata in the lower intertidal and shallow subtidal muddy habitats associated with mangroves and tidal marshes. This species was originally described from a mangrove habitat in the Bahamas (Băcescu and Guă 1974). Later Sieg et. al (1982) reported it from *Spartina-Juncus* tidal marshes in NW Florida.

Remarks.—The taxonomic status of *Halmyrapseudes bahamensis sensu stricto* in Florida intertidal and shallow water habitats is clouded and our inclusion of the single female specimen available to us from the NE coast of Florida is only tentative. Because of differences in the male chela and situation, the specimens attributed to *H. bahamensis* by Sieg et. al (1982) from NW Florida need to be carefully reexamined and compared with the type material or specimens collected from the type locality. Additionally, *H. cubensis* Băcescu and Guă, 1974 (type species), *H. bahamensis sensu* Sieg, et. al (1982), and material from NW Florida and South Florida, which share some characters of both species (T. Hansknecht and R. Heard, per. observations), should be carefully examined employing both systematic and molecular methodologies to clarify the taxonomic status of genus *Halmyrapseudes* in Florida waters.

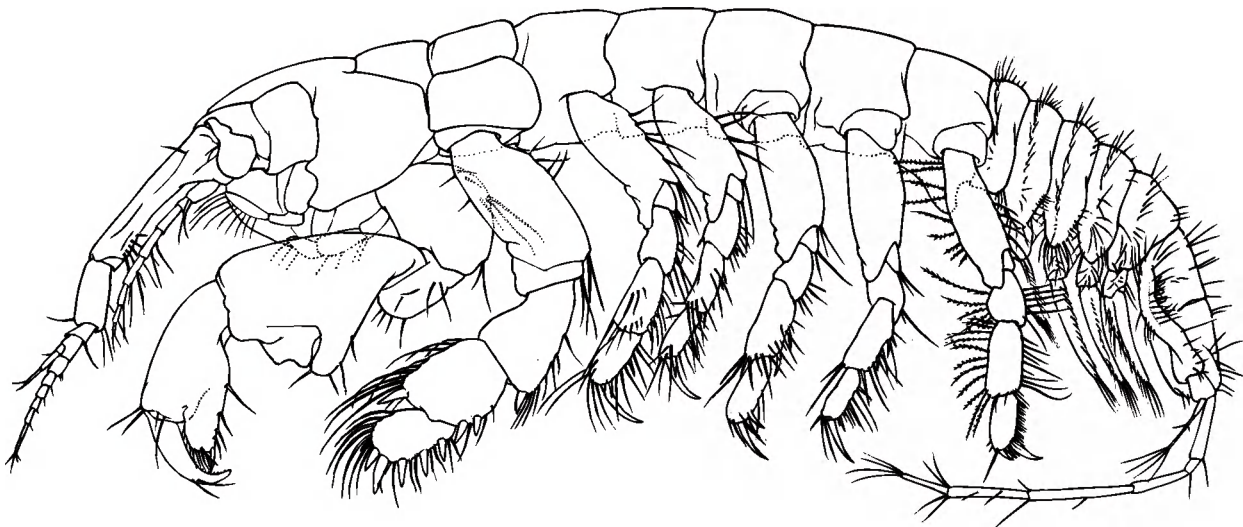


Figure 56

Halmyrapseudes cubensis Băcescu and Guă, 1974

Recognition characters.—Rostrum subacute. Eyes lacking visual elements and pigment. Antenna with first peduncular article inflated laterally to form broad sub quadrate projection bearing 4 setae along lateral margin). Squama on inner distal margin of article 2, small, subcylindrical with 3 terminal setae and (excluding terminal setae) not extending beyond mid-region of antennal article 4. Male with dactyl of male cheliped with low weakly developed median ventral tooth. Pereopod 1 with merus, carpus, and propodus inflated; carpus with distodorsal lobe extending over proximal part of propodus. Abdominal segments lacking hyposphenial spines. Pleonites 1-5 with dorsal setal bands.

Distribution/Ecology.—Cuba (type locality), Florida West coast from Suwannee River southward. Like *H. bahamensis*, this species appears to inhabit shallow subtidal muddy habitats associated with mangroves and tidal marshes. This species was originally described from a mangrove habitat in Cuba (Băcescu and Guă 1974).

Remarks.—Like *Halmyrapseudes bahamensis*, the taxonomic status of *H. cubensis* in Florida shallow water habitats is clouded because differences exist in setation and the number of articles in the antennule. Specimens collected from the Florida West coast are tentatively referred to this species. Careful verification using detailed morphological observations and DNA finger printing are needed before the Florida specimens can be assigned with certainty to *H. cubensis sensu* Băcescu and Guă (1974) and the Florida localities are only tentative.

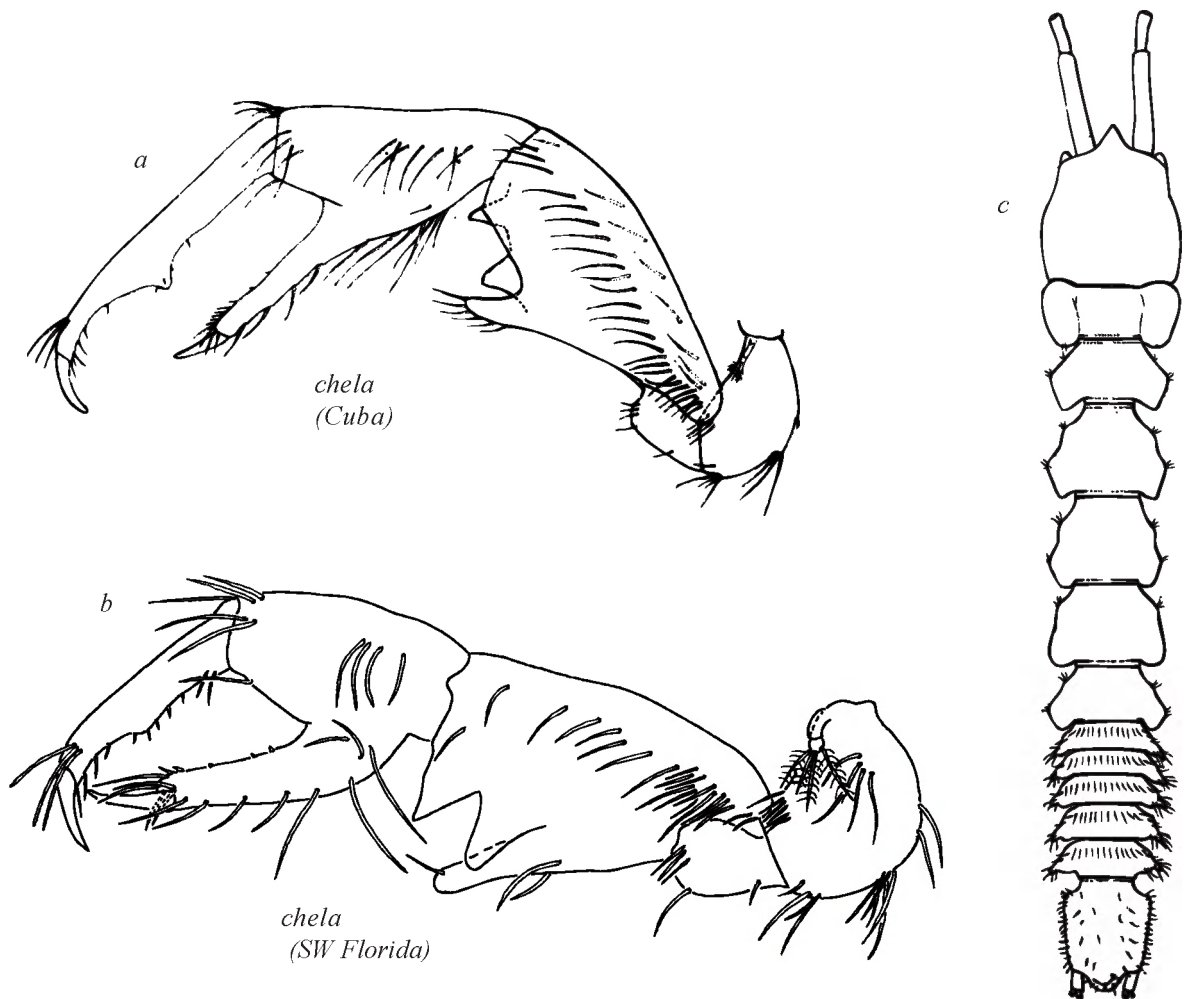


Figure 57

Pakistanapseudes sp. A

Recognition characters.—Body distinctly elongate, more than 5 times longer than wide. Male with antennular flagellum exhibiting secondary articulation, long, tapering, with numerous annulate articles bearing sensory setae (aesthetascs). Male also with greatly enlarged eyelobes. Chela in both sexes delicate, forceps-like, with carpus very elongate. Pereopod 1 with dorsal margins of merus, carpus, and propodus lacking short spiniform setae, but armed instead with long acutely tipped setae; merus/ carpus/ propodus spiniform setal formula=0/1:0/2:0/3. Abdomen elongate, first pleonite lacking dorsal row of setae; all pleonites quadrate, as long or nearly as long as wide.

Distribution/Ecology.— This species is presently known only from shallow waters off southern Florida in fine carbonate substrata.

Remarks.— *Pakistanapseudes* sp. A appears to be undescribed and represents the first record of the genus from the northern Atlantic. Two Brazilian species, *P. brasiliensis* Guzmán, 1996 from shallow water and *P. thokozele* from deep water, are the only members of the genus known from the southern Atlantic. The seven remaining species occur in the warm waters of the western Pacific (see Bamber and Shearer 2003)

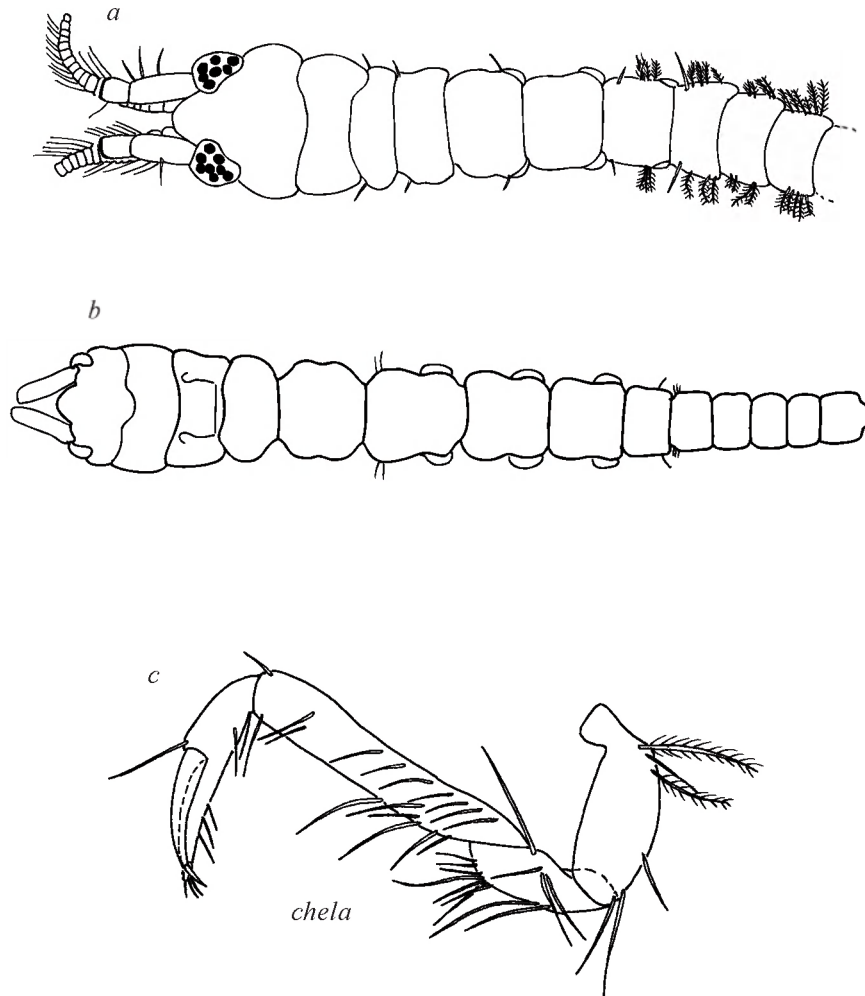


Figure 58

Saltipedis sp. A

Recognition characters.—Rostrum triangular with acute tip. Chela of male strongly developed, massive, with dactyl having subdistal tooth on cutting edge of fixed finger, movable finger with tooth just proximal to mid part of cutting edge, basis with 2 lobes on frontal margin, last of with armed distally with spiniform seta, posterior margin with small, short, spiniform seta on margin. Chela of female weakly developed, slender, lacking teeth. Hyposphenia present on abdominal segments 5-6. Pleonite 1 only with dorsal setal band. Pleotelson distinctly longer than wide, longer than combined length of last 3 pleonites.

Distribution/Ecology.— There is very little information on the overall distribution and ecology of the species. It is currently only known from southern Florida and appears to be a shallow water species occurring in carbonate substrata.

Remarks.— *Saltipedis* sp. A is the second species of the genus to be reported in northern Atlantic; the other species, *S. navassensis* Hansknecht, Heard, and Martin, 2001 was described from Navassa Island in the northern Caribbean east of Cuba (Hansknecht, et al 2001). The shallow water genus *Saltipedis* Guara, 1995 contains five additional species, two from the western Pacific and three from the southwest Atlantic (Bamber and Shearer 2003).

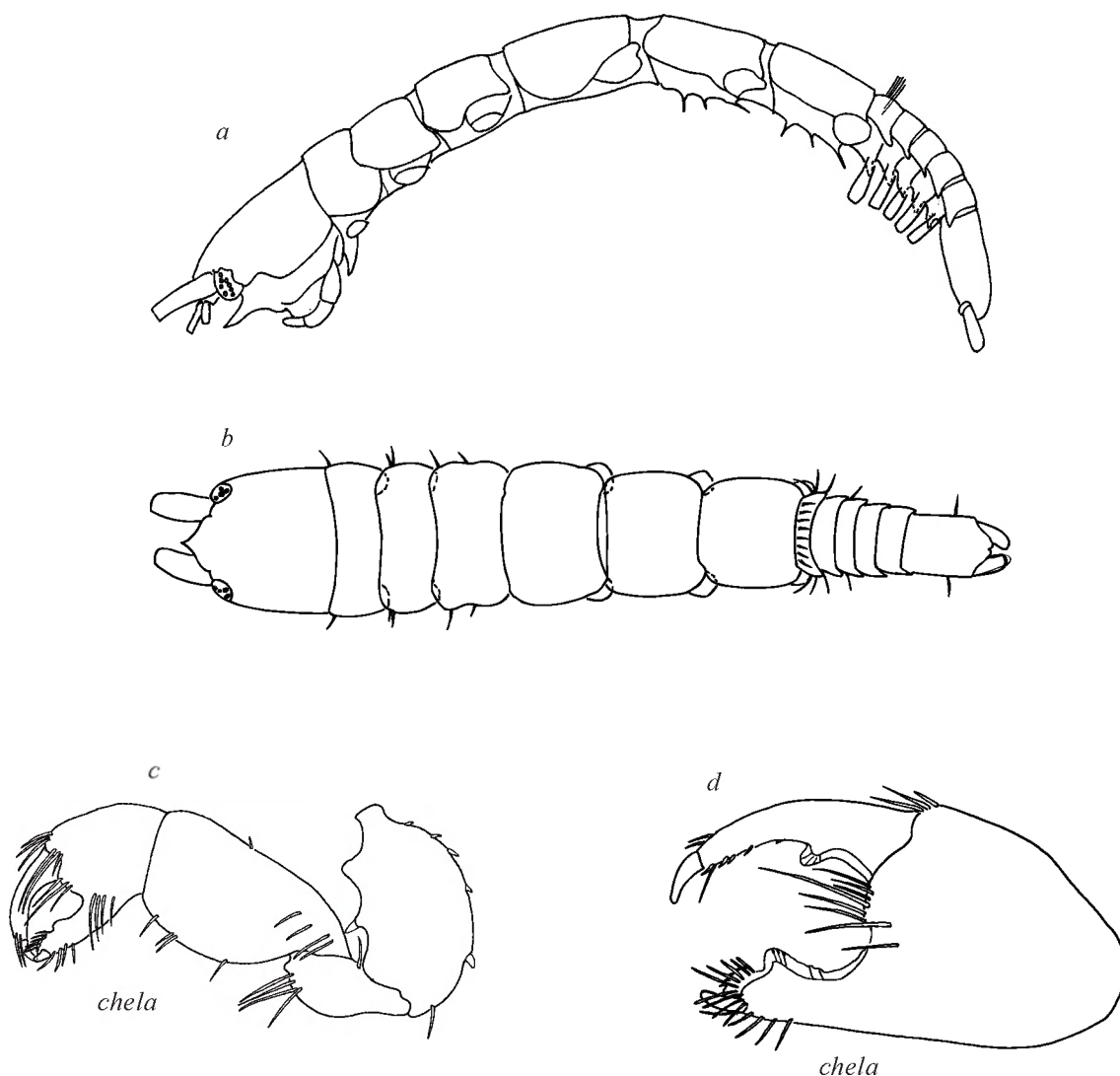


Figure 59

Parapseudes sp. A

Recognition characters.— Body short. Rostrum broadly rounded armed ventrally with small subapical spine. Chela of male strongly developed, massive, with dactyl having subdistal tooth on cutting edge of fixed finger, movable finger with tooth just proximal to mid part of cutting edge, basis with frontal margin entire, posterior margin with large spiniform seta. Chela of female weakly developed, slender, lacking teeth. Pereopod 1 with dorsal margin of merus having 1 large spiniform setae. Squama on inner distal margin of article 2; small, subcylindrical with 3 terminal setae. Four pairs of pleopods present, fifth pair absent. Pleonite 1 -5 lacking setal bands Abdomen with only 4 pairs of pleopods on first 4 pleonites.

Distribution/Ecology.— Like *Pakistanapseudes* sp. A and *Saltipedis* sp. A, there is very little information on the overall distribution and ecology of this species. It is currently known only from a few specimens collected depths of 3-30m from southern Florida. It has been collected from carbonate substrata associated with live bottom and coral reef habitats.

Remarks.— *Parapseudes* sp. A, like *P. goodei* Richardson, 1902, a species described from Bermuda and the only member of the genus known from the northwestern Atlantic, has four pairs of pleopods. Since Richardson did not indicate the presence of a subapical ventral spine on the rostrum of *P. goodei* and the base of the rostrum of our Florida material lacks a distinct constriction, we consider the two species as distinct. However, a careful comparison of Richardson's type material with the specimens from Florida should be made to check the possibility that the two forms might be conspecific. Sieg (1983) considered all of the nominal species of *Parapseudes* Sars, 1882 as a single widely spread species, *Parapseudes latifrons* (Grube, 1864); however, a recent examination of specimens of *P. pedispinis* (Boone, 1923) and *P. Miller*, 1940 from the eastern Pacific and Hawaiian Islands, respectively, indicate that these two species are valid (R Heard, per. observations).

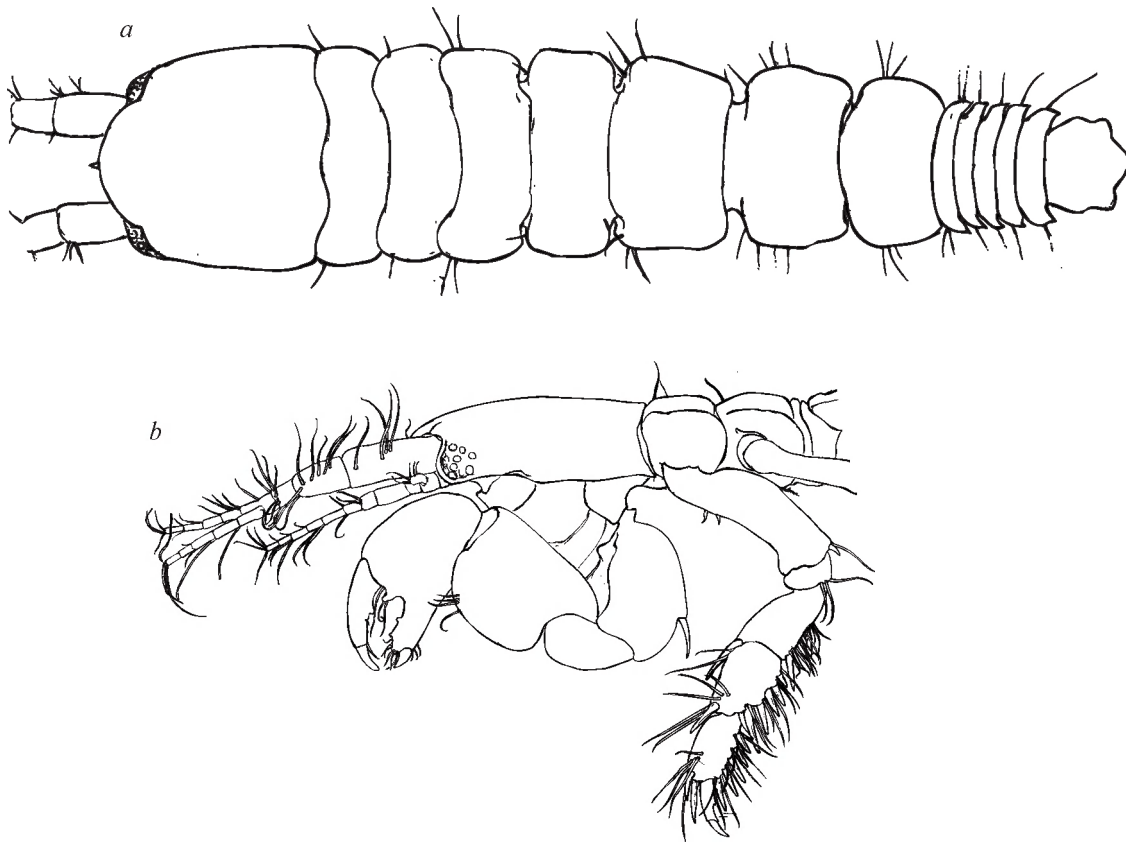


Figure 60

Parapseudid? sp. A

Recognition characters.— Rostrum triangular, spade-like with ventral median keel; eyes large; eye spines absent. Antennule peduncle without denticles. Pereonites with smooth lateral margins lacking lobes and spines. Pleonites with lateral cusps. Cheliped and pereopod 1 with exopods. Male chela gaping with proximal tooth in gape on anterior margin of palm. Pereopod 1 without coxal spine; spiniform setal formula for merus, carpus, and propodus = 2/1:1/2: 2/4. First hyposphenal spine on males and precopulatory females conical, not bidentate. Additional hyposphenia on pereonite 6 and pleonites 1-5. Pereopod 6 with propodus lacking distal comb setae; merus, and carpus with plumose dorsal seta. Pleonites lacking lateral plumose seta.

Distribution/Ecology.— Gulf of Mexico shelf off Pensacola southward to Florida Bay.—Florida Keys (off Key west). This species occurred on sand, carbonate sand and coralline sand on the mid and outer continental shelf. Collected with *Bunakenia* sp. A and *Pakistanapseudes* sp. A in Northeast Gulf and Florida Keys samples.

Remarks.—Parapseudid? sp. A superficially resembles *Saltipedis* sp. A, but pleonite 1 lacks a dorsal setal band. Based on the mouth parts and setation of the pereopods, it appears to be an atypical member of the Apseudidae with affinities to *Bunakenia* sp. A. Besides the lack of a coxal spine on pereopod 1, Parapseudid? sp. A is distinguished from *Bunakenia* sp. A (1) by lacking ocular spines, (2) by having the merus of pereopod 1 armed with 2 large curved spiniform setae on dorsal margin, (3) pereonites 3-5 having anterolateral setae, but lacking spines or cusps, and (4) having first hyposphenal spine conical, not bidentate in males and precopulatory females.

The chela of the male resembles that of *Bunakenia* sp. A, but there is no tooth on the fixed finger, but instead is proximally found in the gape of the palm. Like *Bunakenia* sp. A, the distal margin of the maxillipedal endite of Parapseudid? sp. A, bears distinctive, stout, clavate setae. Preserved specimens of Parapseudid? sp. A are very fragile and are rarely found intact.

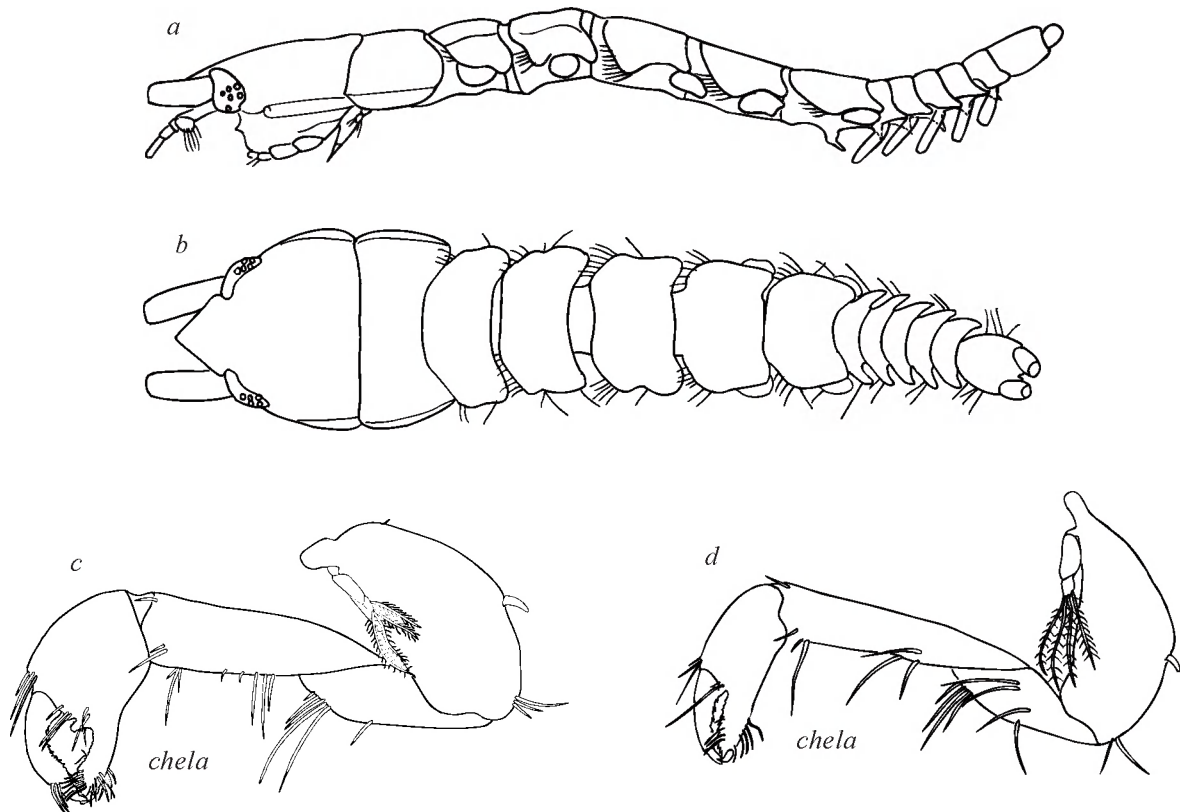


Figure 61

Family Metapseudidae Lang, 1970

The family Metapseudidae represents a highly derived group of apseudomorphs, which, with one exception (*Julmarichardia* Gu^{an}, 1989), has the coxa of first pereopod lacking a spine or acute anterior process. In general the pereopods are modified more for grasping and moving over hard substrata rather than for fossorial activities. Most of members of the family occur in warm temperate, subtropical, or tropical coastal and shelf waters and are usually associated with live bottom habitats. Worldwide there are currently two subfamilies and nine genera representing approximately 50 recognized species. In Florida waters there are least five genera, four in the subfamily Metapseudinae Lang, 1970 and one in the subfamily Synapseudinae Gu^{an}, 1972. Seven species are tentatively recognized from the Florida region.

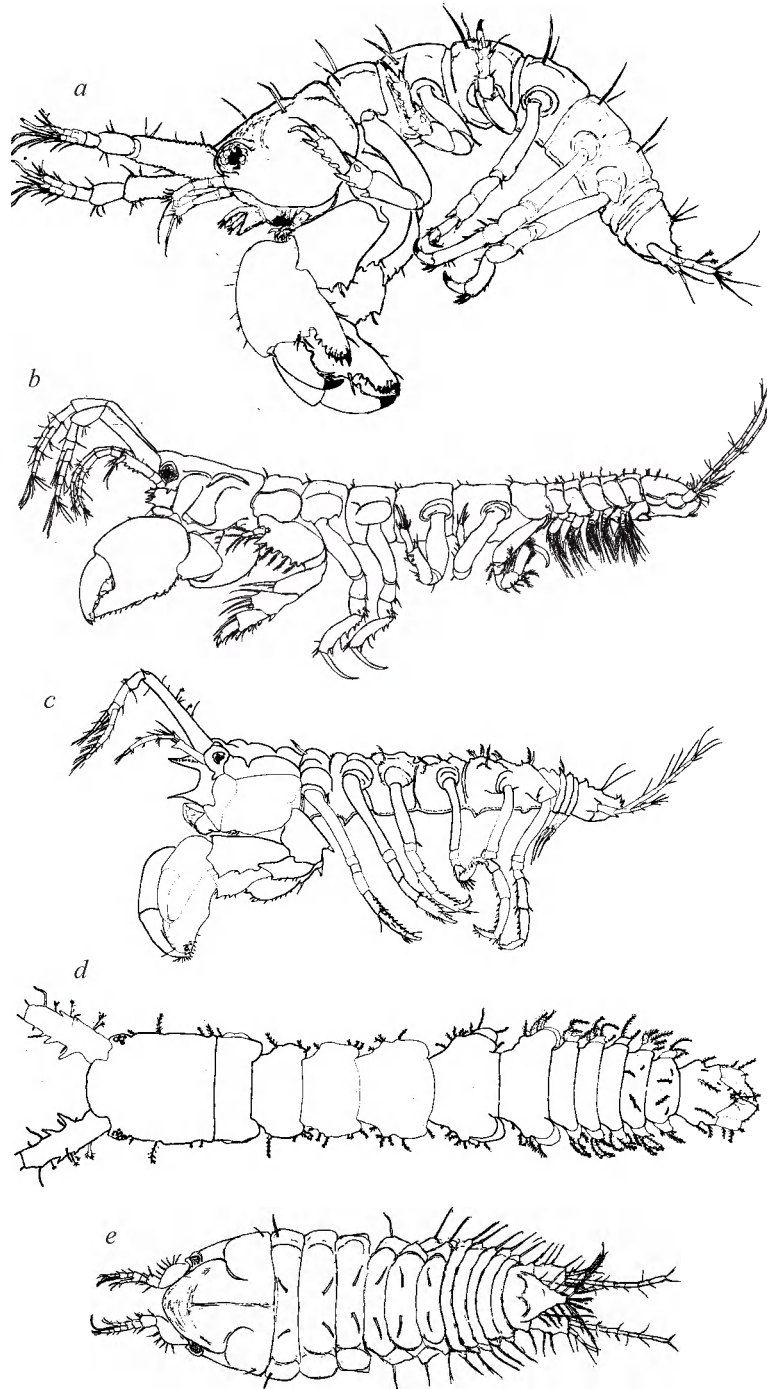


Figure 62

KEY TO THE SPECIES OF METAPSEUDIDAE KNOWN FROM FLORIDA WATERS

1. • Rostrum bilobed. Antenna lacking squama [Pleopods lacking in both sexes. Antennule with short, 2 article flagella. Uropod having endopod with 4 apparent articles.] *Synapseudes* sp. A

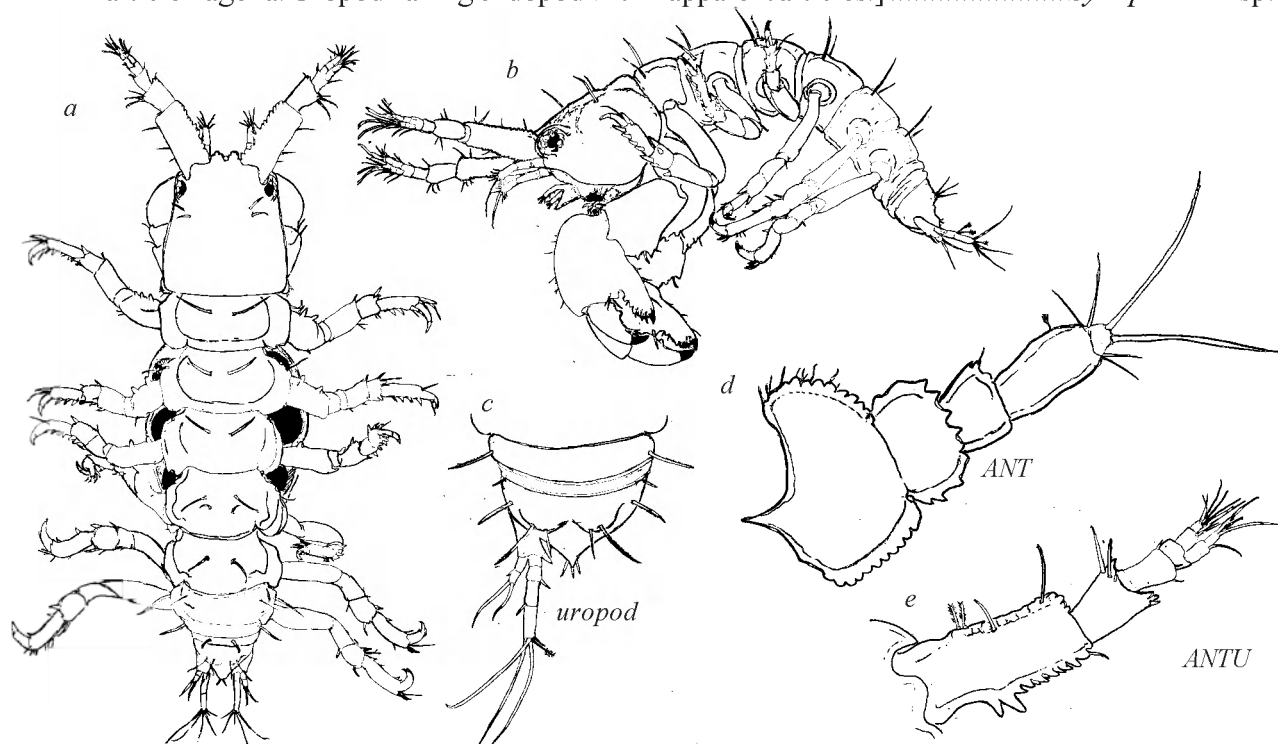


Figure 63

- Rostrum subacute, rounded or nearly lacking, not bilobed. Antenna with small squama. [Pleopods, 3-5 pairs present on males; 0-5 pairs on females] 2

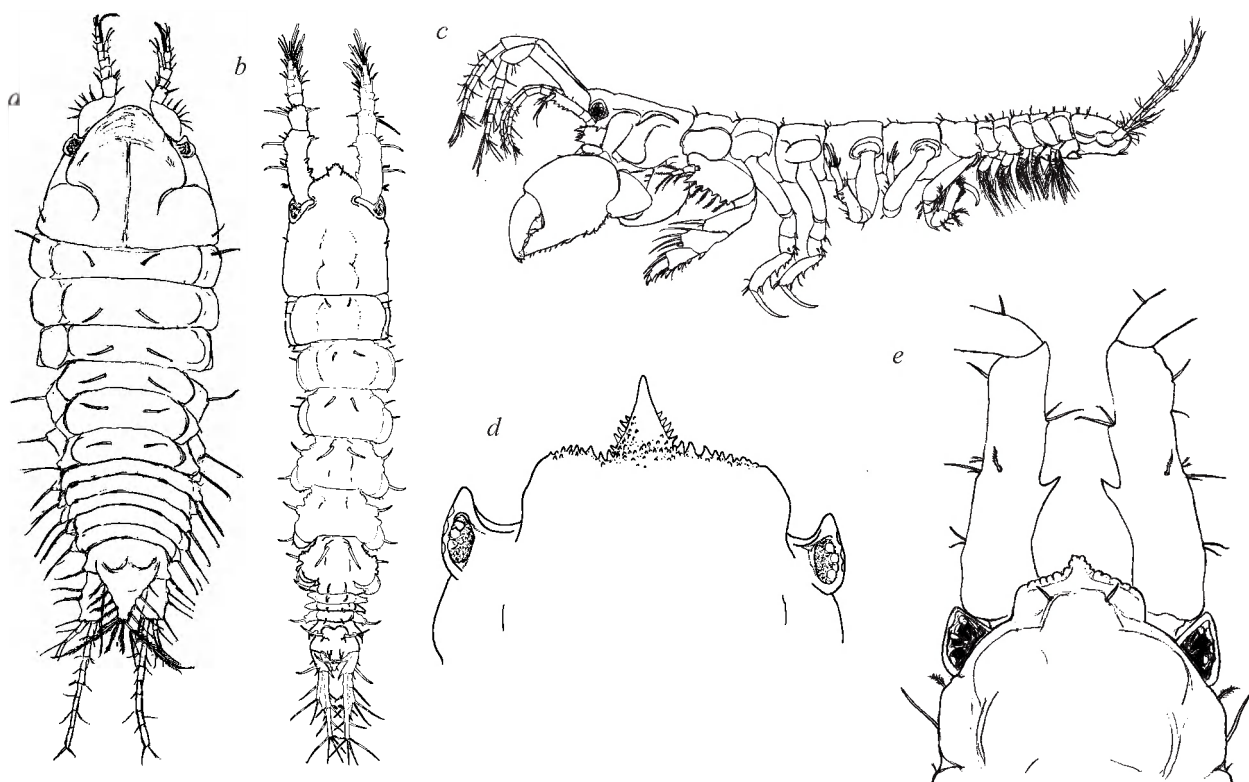


Figure 64

2. • Body relatively stout, less than 3 times longer than wide. Cephalothorax broad with rostrum large and broadly triangular. Eye lobe with small blunt tubercle on anterior margin. Peraeonites and pleonites with spiniform, lateral setose processes [Pleopods biramous, 5 pairs. Pleotelson with prominent pair of large, laterally directed distal setae, attenuated and constricted posteriorly to form blunt point] *Cyclopoapseudes* sp. A

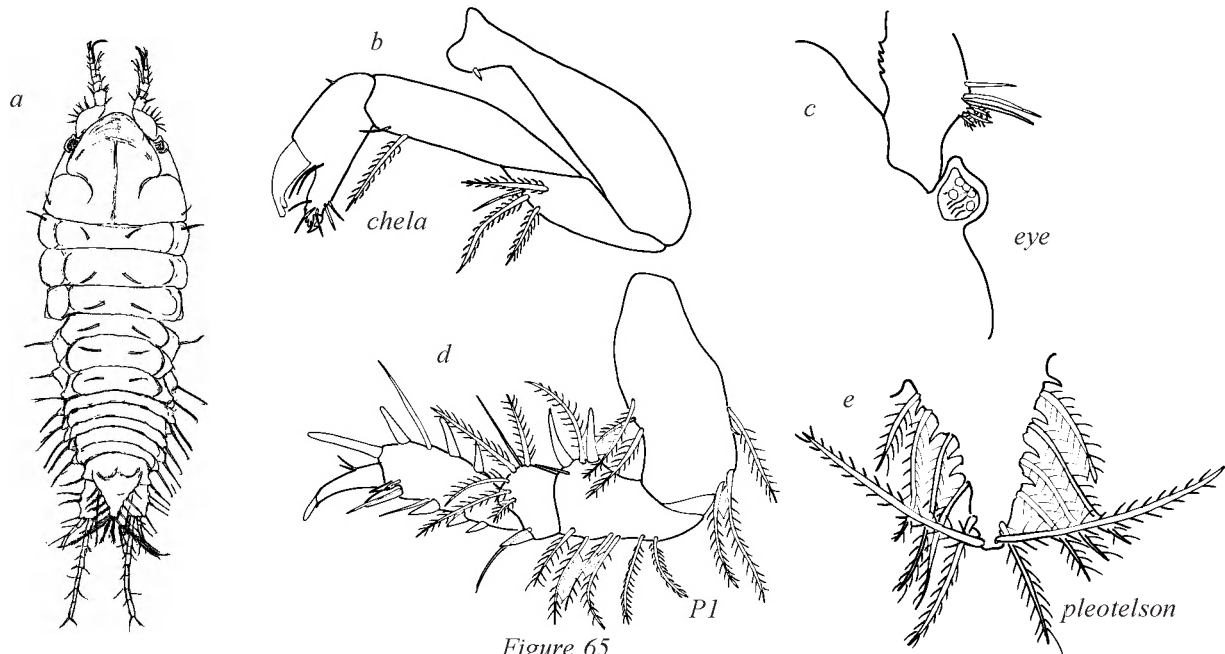


Figure 65

- Body typical, more than 3.5 times longer than wide. Rostrum triangular, acute, blunt or otherwise; pereonites and pleonites without lateral setose lobes; pleonites 1-5 normal or partially fused [0, 3, or 5 pairs of pleopods present] 3

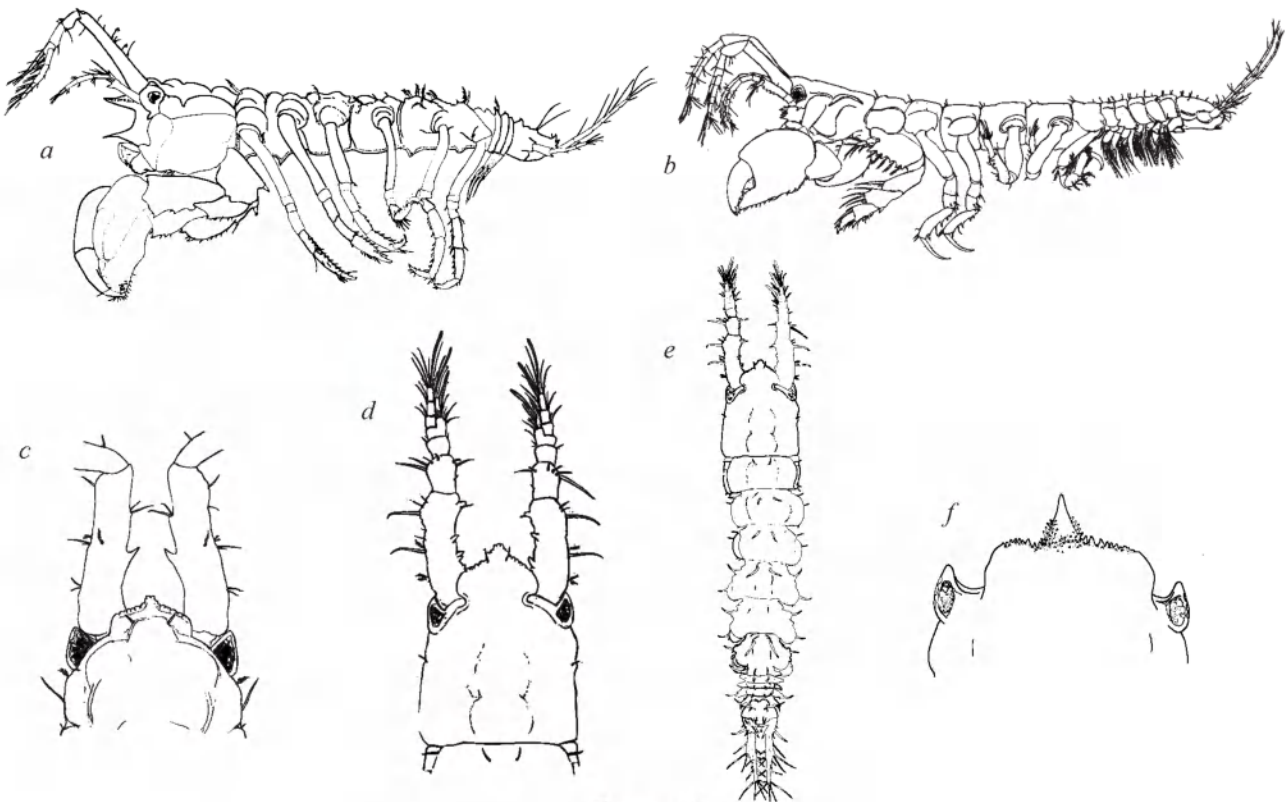


Figure 66

3. •Peraeopod 1 with anterior margin lacking row of spines and long plumose setae on basis. Pleopods reduced or absent; male 3-5 pairs, female with 0-5 pairs; when present each pleopodal ramus armed with only 1 seta (located on on distal tip of ramus)(*Apseudomorpha*) 4

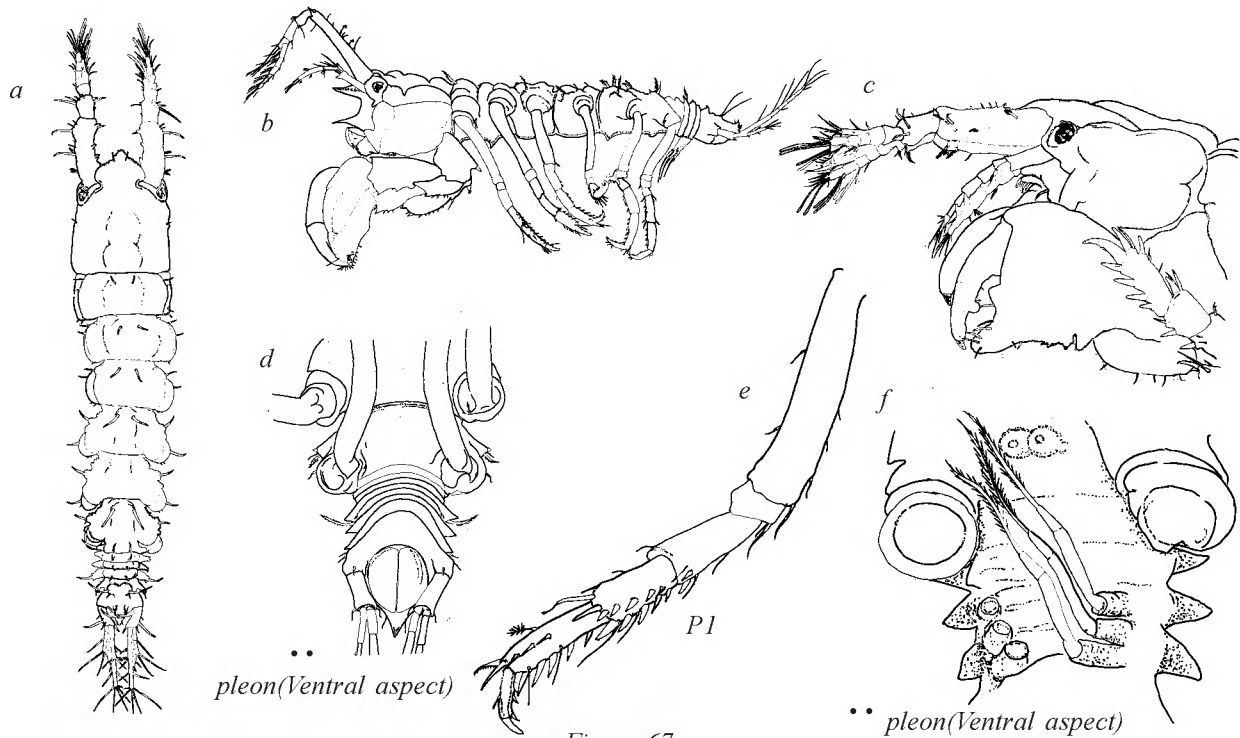


Figure 67

- Peraeopod 1 having anterior margin of basis armed with row of 3-6 spines and associated plumose setae. Pleopods, 5 biramous pairs, rami multi setose in both sexes(*Calozodion*) 5

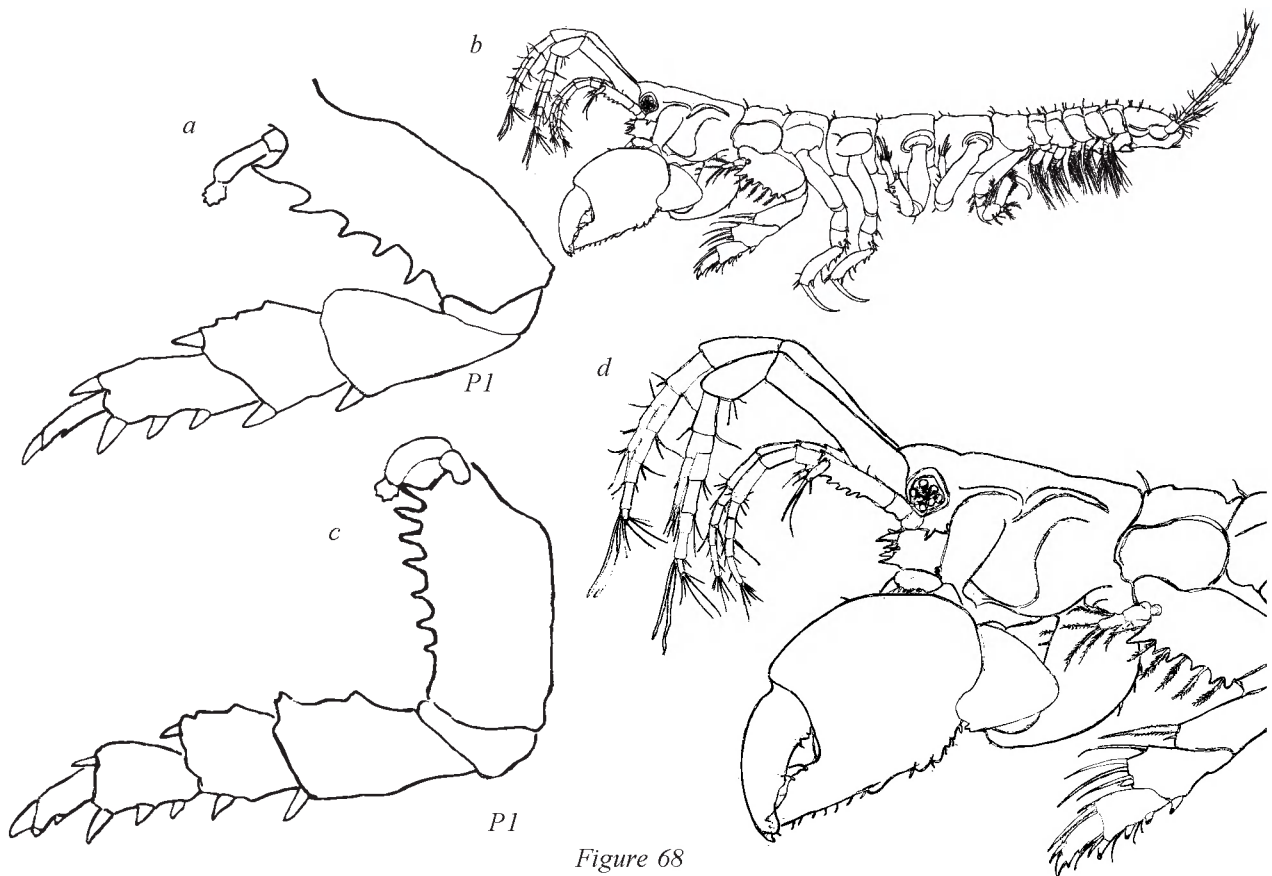


Figure 68

4. • Rostrum having broad base with an acute anteriorly directed tip medially, broad posteriorly with relatively long, acute with margin armed with small curved spines. Antennule with article 1 having a well developed spinose process on the inner and outer distal margins. Epistomal spine well developed projecting anteriorly nearly to rostrum. Male with 1 chela enlarged and smaller chela like those of female, inner face of male chela with carpus lacking ridges. Pleopods absent in female; reduced to 3 uniramous pairs located on first 3 abdominal segments

..... *Pseudoapseudomorpha* sp. A

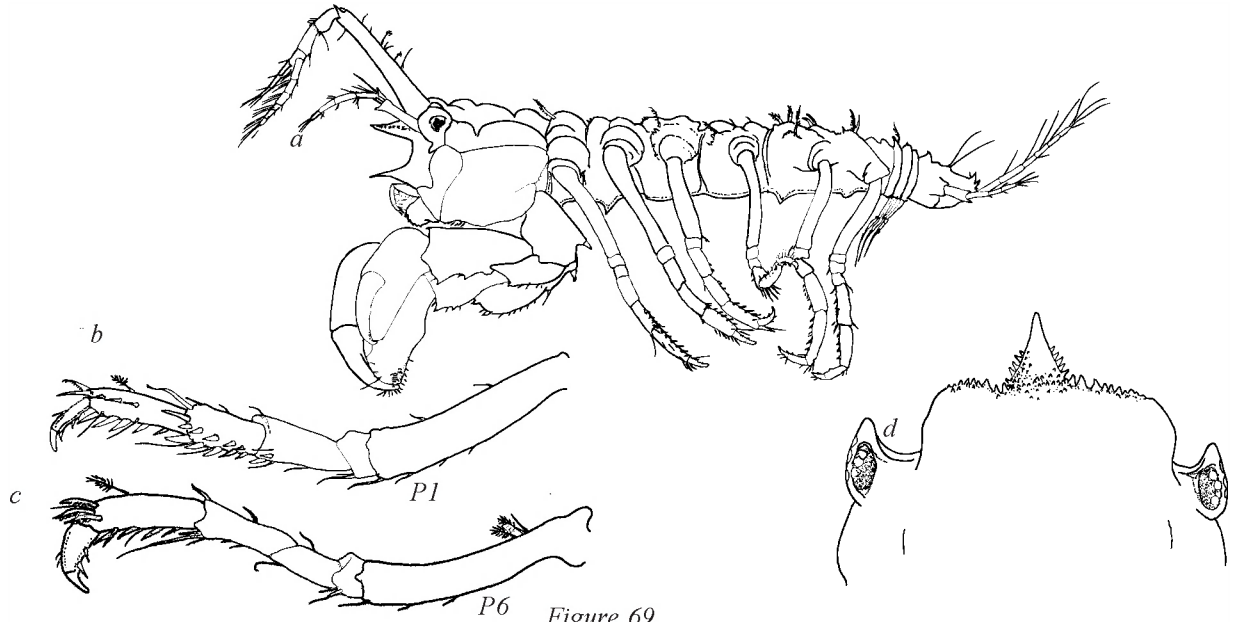


Figure 69

- Rostrum sub-triangular ending in subacute tip. Antennule with article 1 lacking a well developed spinose process on the inner and outer distal margin (1 or 2 small spines may be present on inner margin and sub-distally on outer margin). Epistomal tip not reaching anteriorly to near tip of rostrum. Male with chelae equal, more robust than those of female, inner face of carpus with series of ridges. Five pairs of biramous pleopods having rami reduced, with only a single distal seta on each ramous.

..... *Aapseudomorpha* sp. A

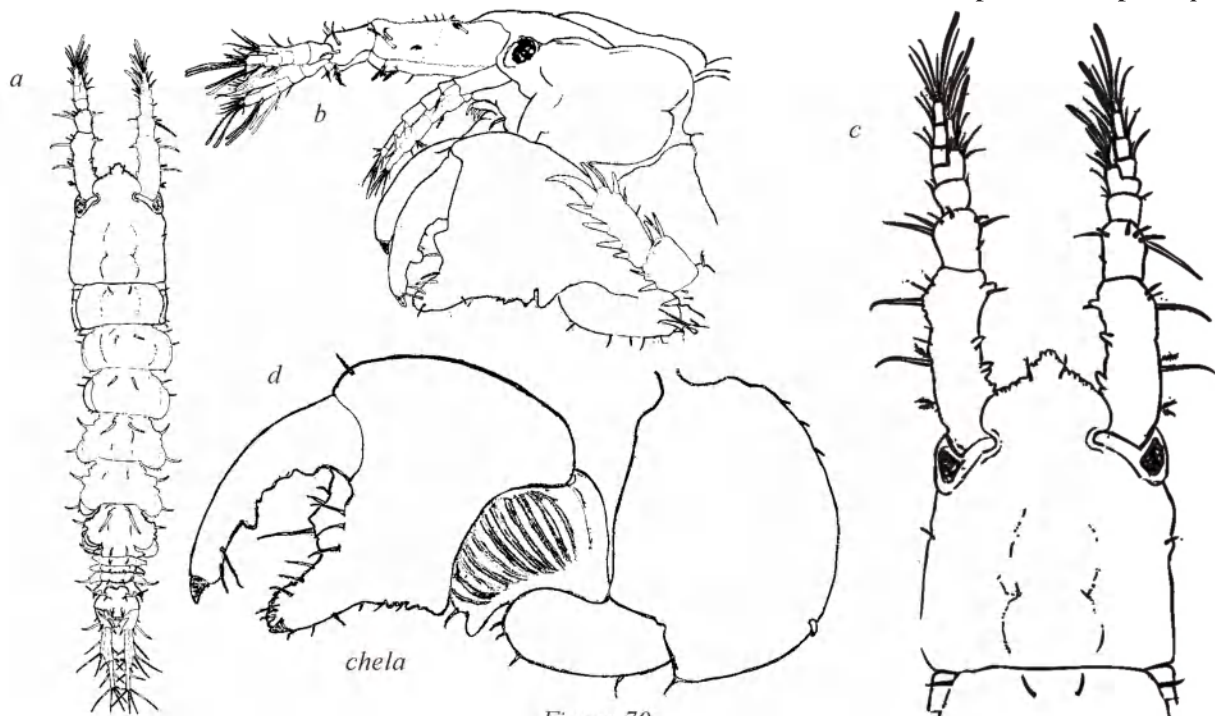


Figure 70

5. • Antennule with inner margin of first peduncular article armed with 1 spinose process. Pleotelson lacking lateral lobes, lateral margins with small granulate, denticulate processes

..... *Calozodion heardi* Guana, 2003 *

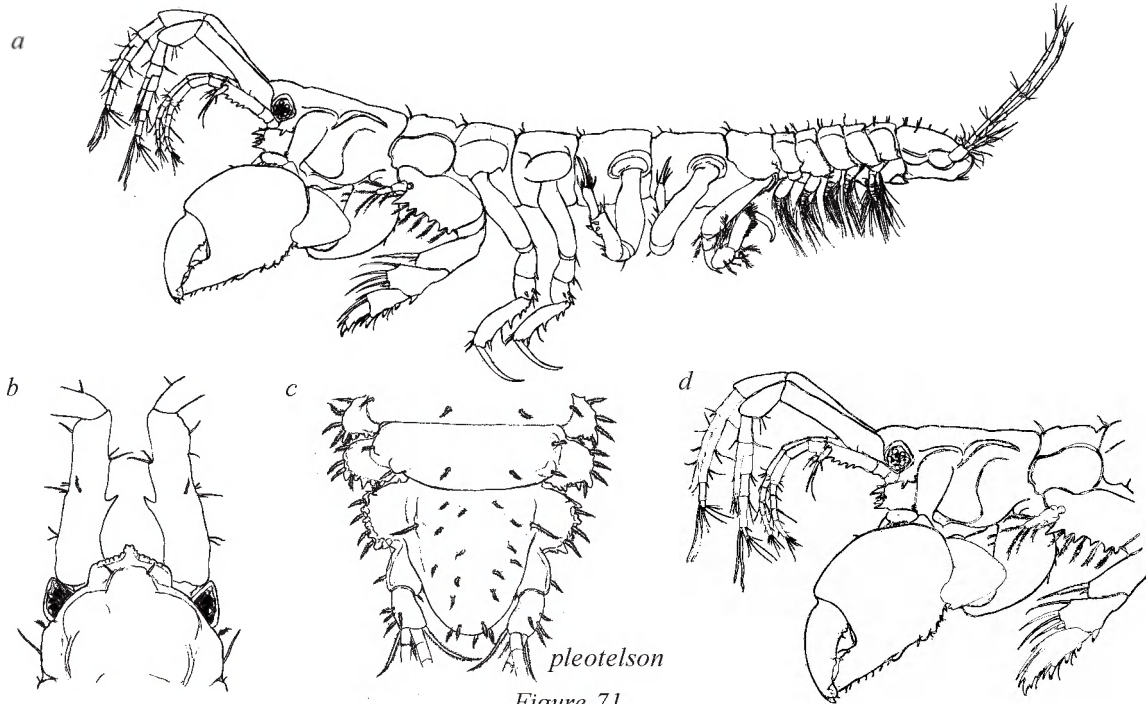


Figure 71

- Antennule with inner margin of first peduncular article armed with 2 spinose processes. Margin of pleotelson, excluding uropodal insertions, bilobed, not denticulate 6

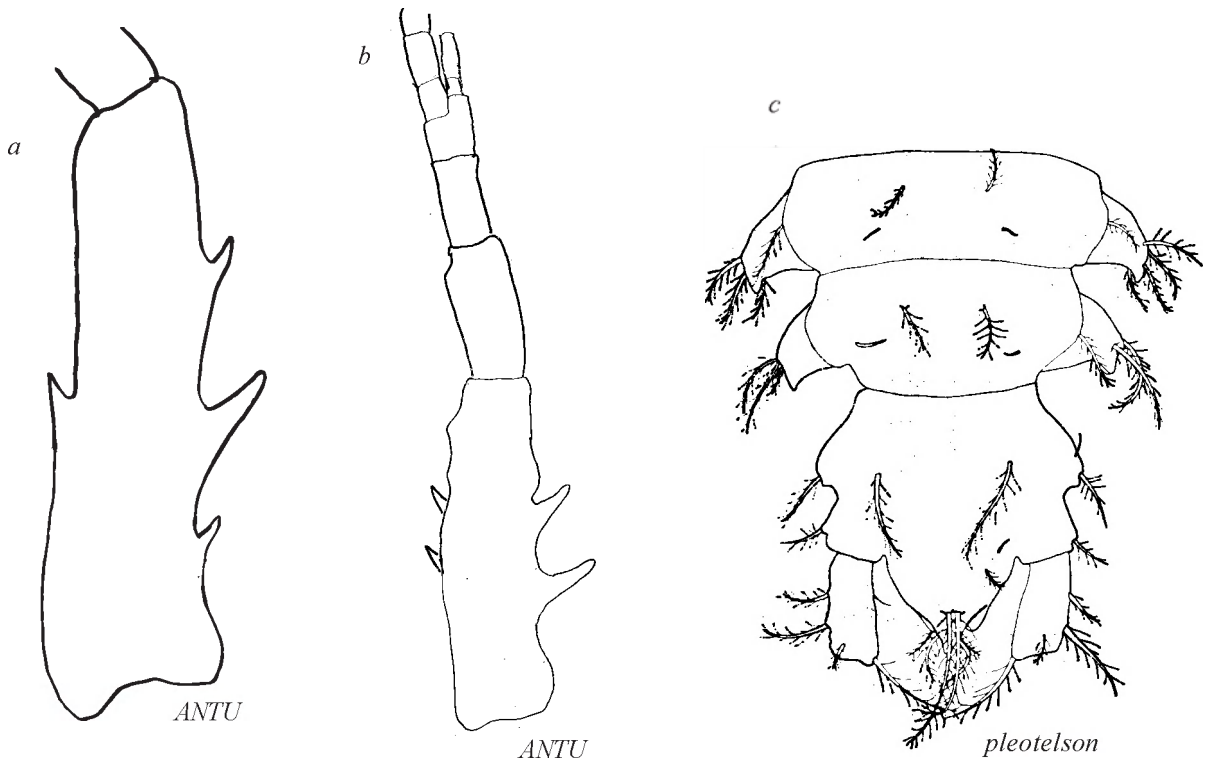


Figure 72

6. • Antennule with basis having 3 spines on inner margin. Chela with ventral margin armed with 2 or more sharp spines. Basis of pereopod 1 with about 7 equal sized spines on anterior margin. Dactylus of pereopod 1 with large ventral tooth near distal claw. *Calozodion multispinosum* Guo, 1984

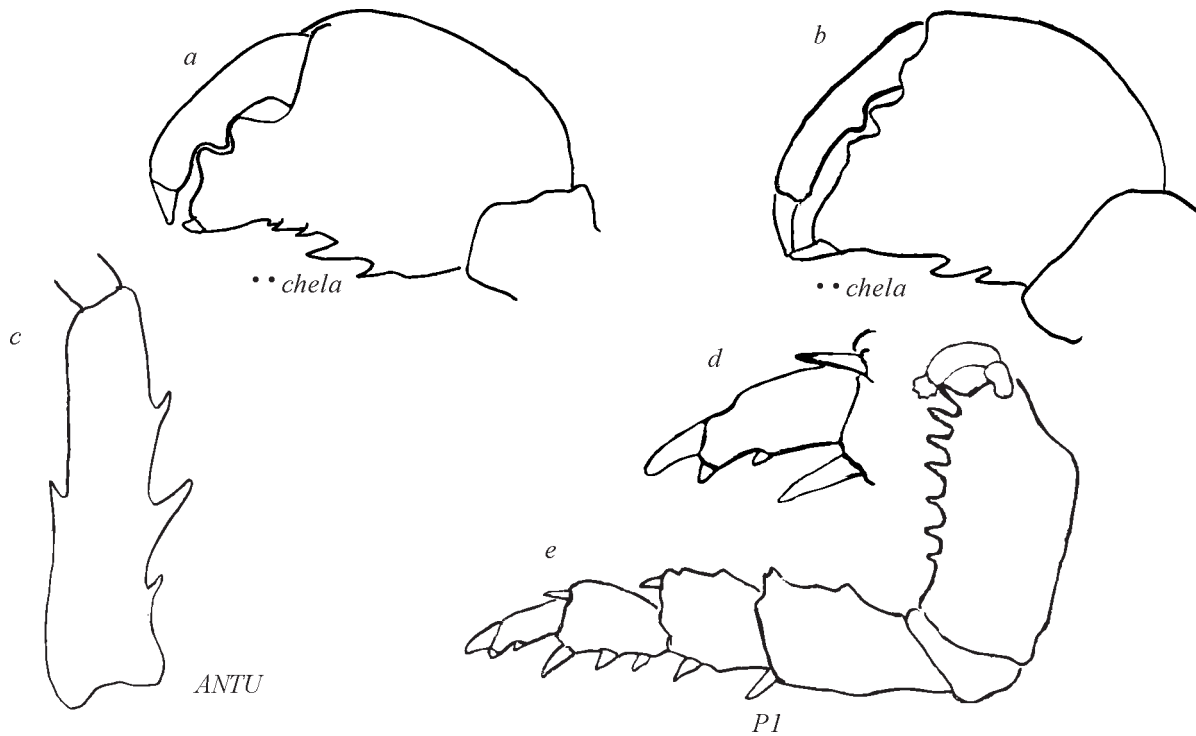


Figure 73

- Antennule with basis having 2 spines on inner margin. Chela with ventral margin bearing blunt tubercles. Basis of pereopod 1 with about 5 unequal sized spines on anterior margin. Dactylus of pereopod 1 with small ventral tooth. *Calozodion wadei* Gardiner, 1973

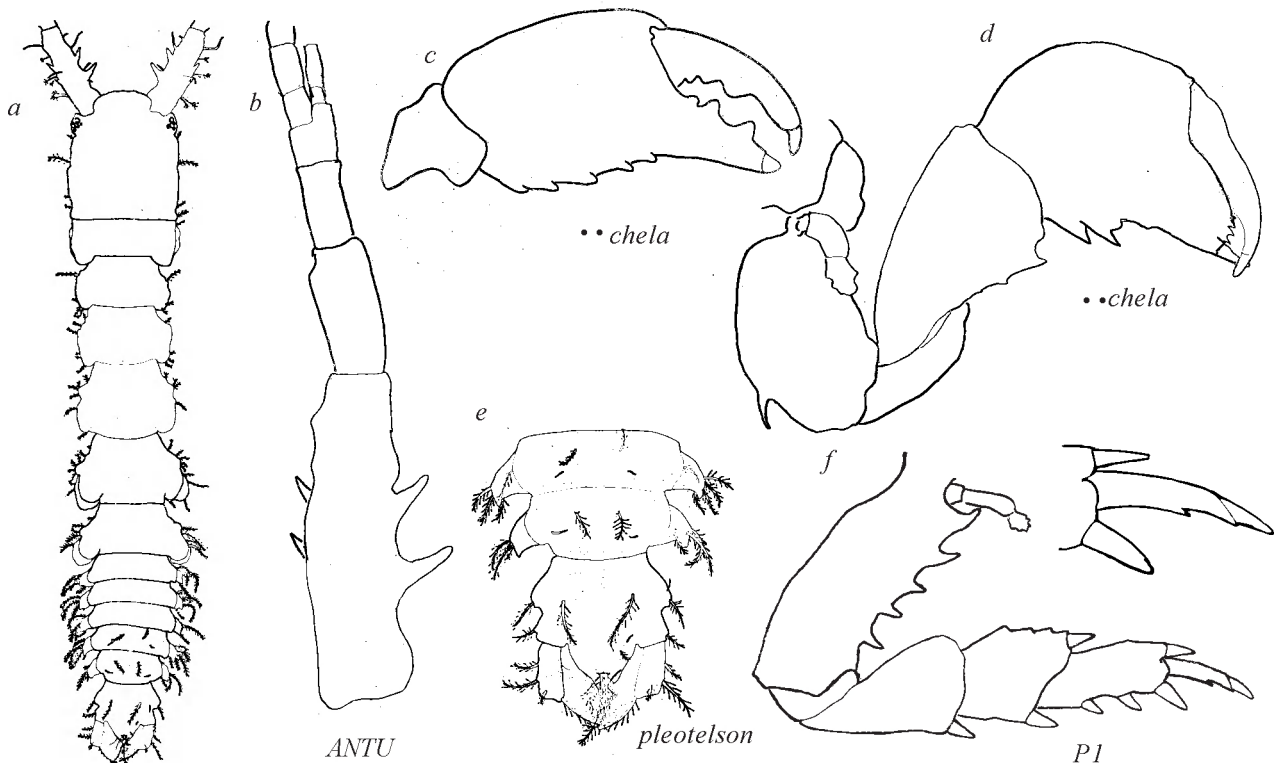


Figure 74

Family Metapseudidae Lang, 1970

Apseudomorpha sp. A

Recognition characters.—Rostrum sub triangular, ending in subacute tip. Antennule with article 1 lacking well-developed spinose process on inner and outer distal margin (1 or 2 small spines may be present on inner margin and sub distally on outer margin). Cheliped strongly developed, inner face of male carpus with distinctive row of about 10 parallel ridges and grooves. Pereopod 1 basis lacking tubercles and spines along frontal margin. Pleopods, 5 pairs in both sexes; peduncle elongate; rami reduced, outer ramous only having 1 long setulate seta; inner ramous with 2 long setulae setae, both terminal.

Distribution.— This species is currently known only from shallow water off West Palm Beach in association with benthic algae.

Remarks.— *Apseudomorpha* sp. A closely resemble *Apseudomorpha glebosus* Menzies, 1953, known from the Pacific coast of the Americas (California to Equador). Although the Florida species appear to be a closely related cognate of *A. glebosus*, they are larger and generally have fewer articles in the exopod, of the uropod, as well as, differences in the spination of the chela. Menzies (1953) originally placed *A. glebosus* in a new genus *Imitapseudes* Menzies, 1953, which is now considered a junior synonym of *Apseudomorpha* Miller, 1940 (see Lang 1956). Heard et. al (in press) collected a large series of *A. glebosus* or a very similar geminate form from the Caribbean coast of Costa Rica. Their specimens are about the same size and have the same number of articles in uropodal endopod as those of *A. glebosus sensu* Menzies from the Pacific; but differ only in the some slight differences in the morphology of the male chela.

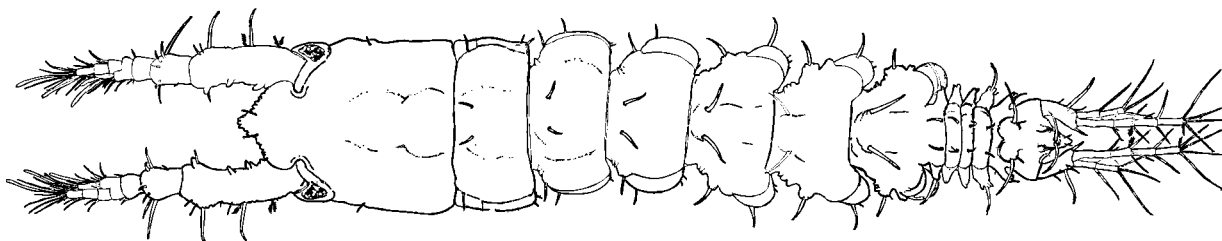


Figure 75

Cyclopoapseudes Menzies, 1953

Cyclopoapseudes sp. A

Recognition characters.— Body wide. Rostrum broadly rounded; eyes present; eye lobes with inner cusps. Antennule flagellum geniculate at junction of articles 1 and 2 of peduncle. Pereonites, distinctly wider than long with lateral epimera bearing setose lobes. Pleonites wider than long with epimera bearing setose lobes. Exopods present on cheliped and pereopod 1. Cheliped of male with broad tooth both on fixed and movable finger. Cheliped of female with movable finger distally bidentate. Pereopod 1 without coxal spine and merus/ carpus/ propodus = 2/0:0/1:4/5 Pleotelson with lateral denticles and long paired plumose seta; distal margin of telson upturned with paired setae.

Distribution/Ecology.— Gulf of Mexico: Florida Middle Grounds, Florida Bay. Florida Keys: Key West. Florida East coast: Port Everglades.—?Barbados, British West Indies. This species occurs on live bottom and in coral reef habitats. In Florida waters it has been collected at depths of 7 to 10 m.

Remarks.— This relatively small “isopod shaped” metaspeudid represents an undescribed species and the first record for the genus *Cyclopoapseudes* Menzies, 1953 in from Atlantic Ocean. The only other two described species, *C. indecorus* Menzies, 1953 from eastern Pacific and *C. diceneon* Gardiner, 1973 from the Pacific coast of southern Chile, are known. We have also examined specimens, which appear closely related or conspecific with the Florida specimens, from Barbados, British West Indies. Because of its apparently cryptic occurrence, associated with hard bottom collections, this species is not commonly taken in benthic samples.

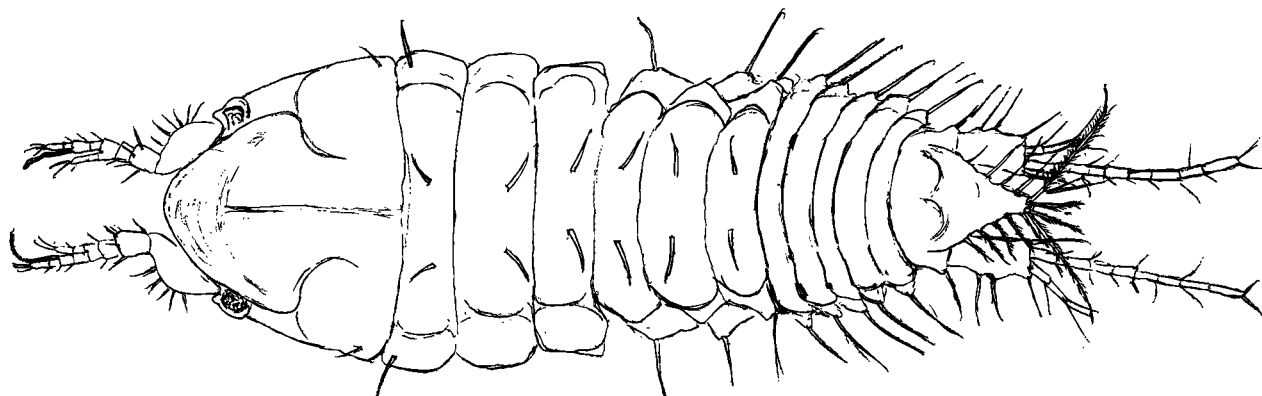


Figure 76

Calozodion Gardiner, 1973

Calozodion was originally designated to receive *C. wadei* Gardiner, 1973, which was described from a single female collected in Jamaican waters (Gardiner 1973b). Since then Gu[•] (1984, 1989, 1996, 2003) has added six additional species, mostly from the western Atlantic, to the genus. This genus *Calozodion* is generally characterized by having the first pereopod basis with blunt spines and associated long plumose setae along the frontal margin, and by having unfused pleonites with 5 pairs of well-developed, multi setose pleopods.

Calozodion heardi Gu[•] 2003

Recognition characters.—Rostrum broad at base, margin granulate, tip subacute, occasionally shallowly bidentate. Antennule with first article of peduncle with 1 distinctive spine on inner margin. Pereopod 1 having 5-6 unequal sized spines on anterior margin, dactyl with distinctive blunt ventral tooth at base of claw; merus/carpus/propodus=2/0:0/1:4/5. Pleotelson with margins of lateral lobe having small granulate, denticulate processes.

Distribution/Ecology.— This species is presently known from near coastal and shallow shelf waters off Georgia southward to Biscayne Bay and from the eastern Gulf of Mexico off Tampa (Gu[•] 2003, present observations). *Calozodion heardi* appears to occur in association with live bottom habitats and is presently known from depths of 21–40 m.

Remarks.— *Calozodion heardi* is distinguished from *Calozodion multispinosus* Gu[•], 1984 and *Calozodion wadei* Gardiner, 1973, the only other known species of the genus, by the presence of a single spine on the inner margin of the first antennular margin. *Calozodion heardi* was recently described from shelf waters off Tampa, FL along with another nominal species *C. singularis* Gu[•], 2003, whose description was based on two subadult females and/or males having an atypical rostrum and lacking long plumose setae on the pereopods 3-5. The type series of both *C. heardi* and *C. singularis* were collected together at the same station. Since the presence of plumose setae on the pereopods occurs on adult females and not on males and sub adult females and the morphology of the rostral tip is quite variable (e.g. sometime slightly bidentate), these two species appear to be synonymous. The apparent sexual dimorphism expressed by the setation of pereopods 3-4 within the genus *Calozodion* is currently being investigated by M. Gu[•] and R. Heard.

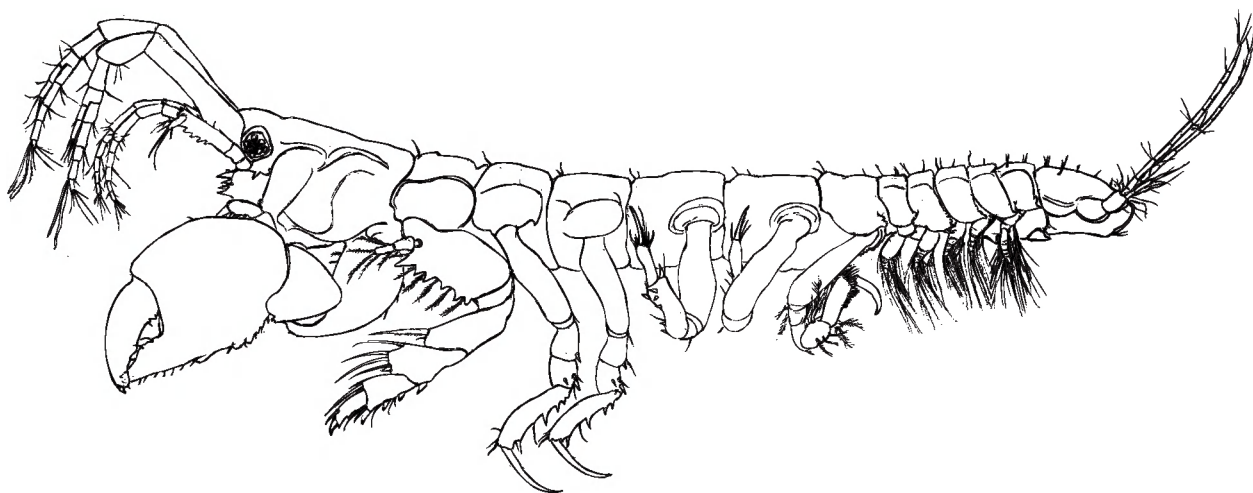


Figure 77

Calozodion multispinosum Gu• 1984

Diagnosis.—Carapace with short pointed rostrum. Antennule with first peduncular article usually having 1 and 3 blunt spines (or tubercles), respectively, on outer and inner margins. Cheliped in male with wide propodus; palm (excluding fixed finger) about as wide as long, armed ventrally with 2 or 3 acute spines. Pereopod 1 in both sexes usually with 7 blunt spines along frontal margin of basis; dactyl with 2 tubercle like spiniform setae on ventral margin. Pereopods 2 and 3 dissimilar.

Distribution/Ecology.— This species was described known from Cuba (Gu• 1984), and specimens were collected on the inner continental off southwest Florida, Tampa Bay and Trinidad. Little is known of its ecology other than it occurs in association with a carbonate substratum

Remarks.— *Calozodion multispinosum*, which was originally described from Cuba, appears to be closely related to *C. heardi* Gu•, 2003. It is distinguished from this species mainly by lacking a tuberculate surface on the pleotelson and by having more strongly developed spines on the margins of the first peduncle article of the antennule. It differs from *Calozodion wadei*, the only other warm water Northwest Atlantic species, (1) by usually having the antennule with 3 spiniform tubercles on inner and 1 on the outer margin of the first peduncular article (2 on each margin in *C. wadei*), (2) by having the dactyl of pereopod 1 armed ventrally with two distinctive spiniform tubercles (2 small spines present on *C. wadei*), and (3) by having the cheliped of the male with a wide propodus, palm (excluding fixed finger) about as long as wide (in *C. wadei* palm distinctly longer than wide).

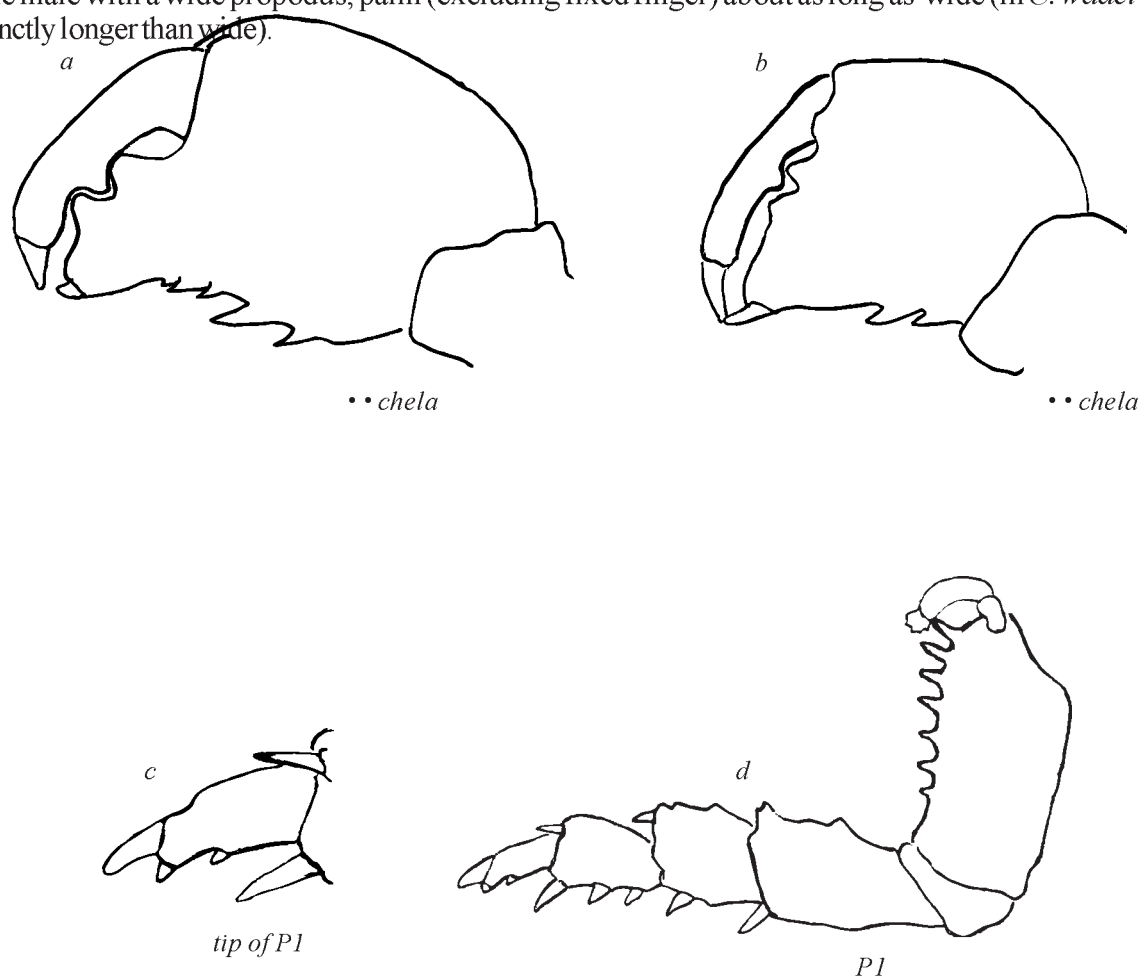


Figure 78

Calozodion wadei Gardiner, 1973

Diagnosis.—Carapace lacking pointed rostrum. Antennule with first article of peduncle usually having 2 spines (or tubercles) on inner and on outer margins. Cheliped in male with palm of propodus relatively long, distinctly longer than wide, and with ventral margin armed with 5-6 blunt or subacute spines. Pereopod 1 of male with 5 blunt and that of female with 3 spines along frontal margin of basis; dactyl with 2 small spiniform setae on ventral margin. Pereopods 2 and 3 similar.

Distribution/Ecology.—The type locality for *C. wadei* is Jamaica and specimens attributed to this species have been reported from off the southwestern coast of Florida, including Tampa Bay, Florida Bay and Key West. Like *C. heardi* and *C. multispinosum*, *C. wadei* is known from depths of less than 50 m on live bottoms with carbonate substrata.

Remarks.—*Calozodion wadei* was described from a single female specimen collected in shallow water in Jamaica. Guôu (1984) gave a supplemental description of both the adult male and female of *C. wadei* based on material collected from southwestern Cuba. Florida records for *C. wadei* are based on unpublished reports of specimens collected on off the southwestern Florida during the studies sponsored by the Bureau of Land Management (1974-1978) along with N.O.A.A. and other material. These specimens should be reexamined in detail to confirm the range extension of this species into Florida waters.

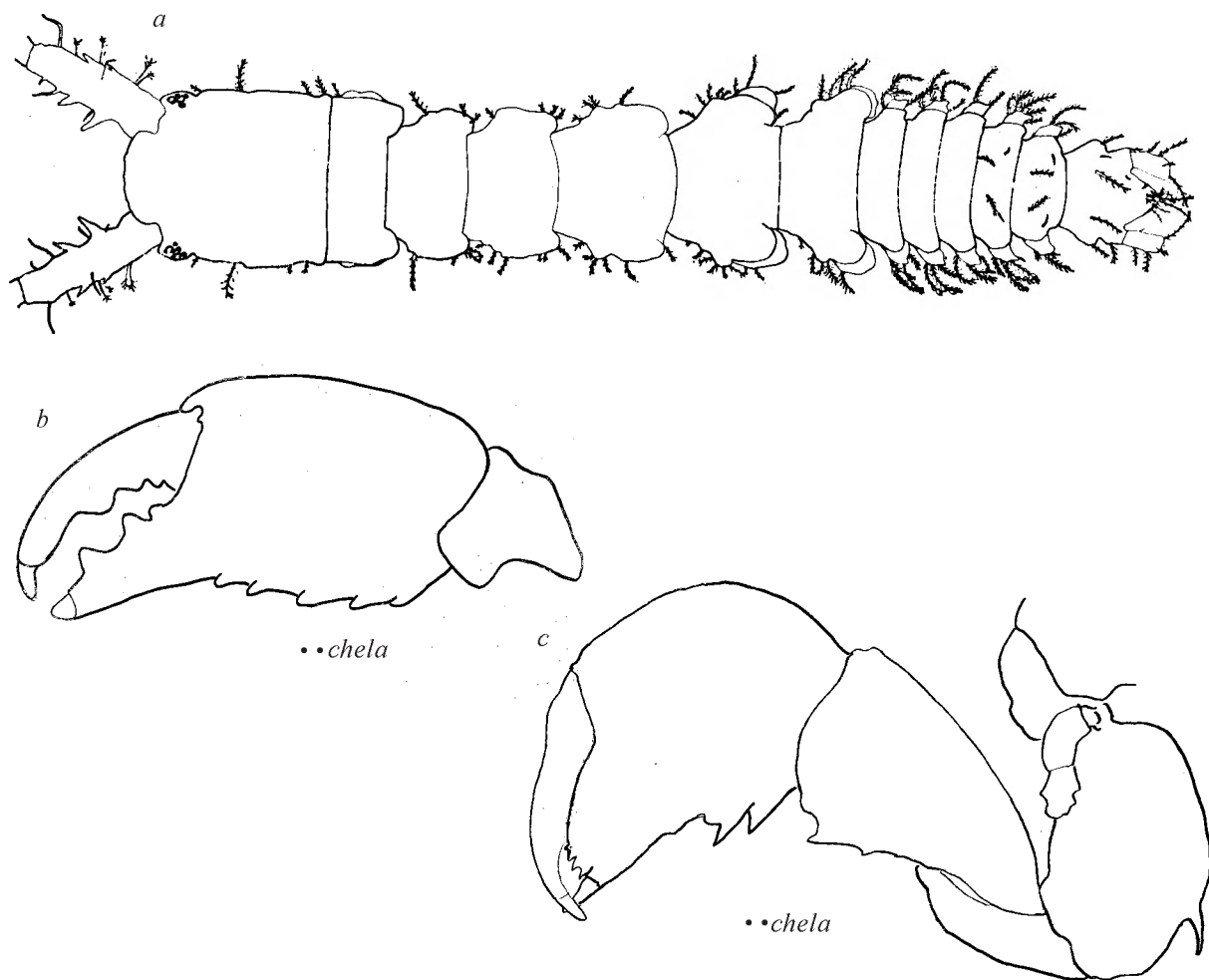


Figure 79

Pseudoapseudomorpha Gu[•], 1991

Pseudoapseudomorpha sp. A

Recognition characters.—Rostrum acute. Epistomal spine strongly developed, extending anteriorly nearly as far as rostrum. Maxillule with well-developed palp. Pereopod 1 without exopod; similar in size and shape to pereopod 2. Male with 3 pairs of reduced uniramous pleopods each bearing single, long, distal seta; female lacking pleopods. Uropods with endopod having more than 5 articles.

Distribution/Ecology.—Southern Florida, Bahamas, and northern Caribbean Sea (Mexico, Cayman Islands, Navassa Island). *Pseudoapseudomorpha* sp. A was collected on live bottoms and in reef habitats at depths of 1 to 50 m.

Remarks.—The specimens that we have examined from Florida, the Bahamas, and the northern Caribbean appear to have their closest affinities to the monotypic genus *Pseudoapseudomorpha* Gu[•], 1991, described from the Indian Ocean off the eastern coast of Madagascar. Unfortunately, the description of the type species, *P. madagascariensis* Gu[•], 1991, is based on two juvenile specimens (subadult males?) each having a pair of reduced pleopods on the first two pleonites (Gu[•] 1991). Notwithstanding, we have tentatively attributed our specimens from the Western Atlantic to this genus.

Pseudoapseudomorpha sp. A from Florida, Bahamian, and northern Caribbean waters has a pair of reduced uniramous pleopods on the first three pleonites of the male, but completely lacks pleopods on the female. It also has a well-developed palp on the maxillule, which was reported as missing in *Pseudoapseudomorpha madagascariensis* (see Gu[•], 1991). An examination of adult male and female specimens of *P. madagascariensis* are needed to determine if the two species are cognates.

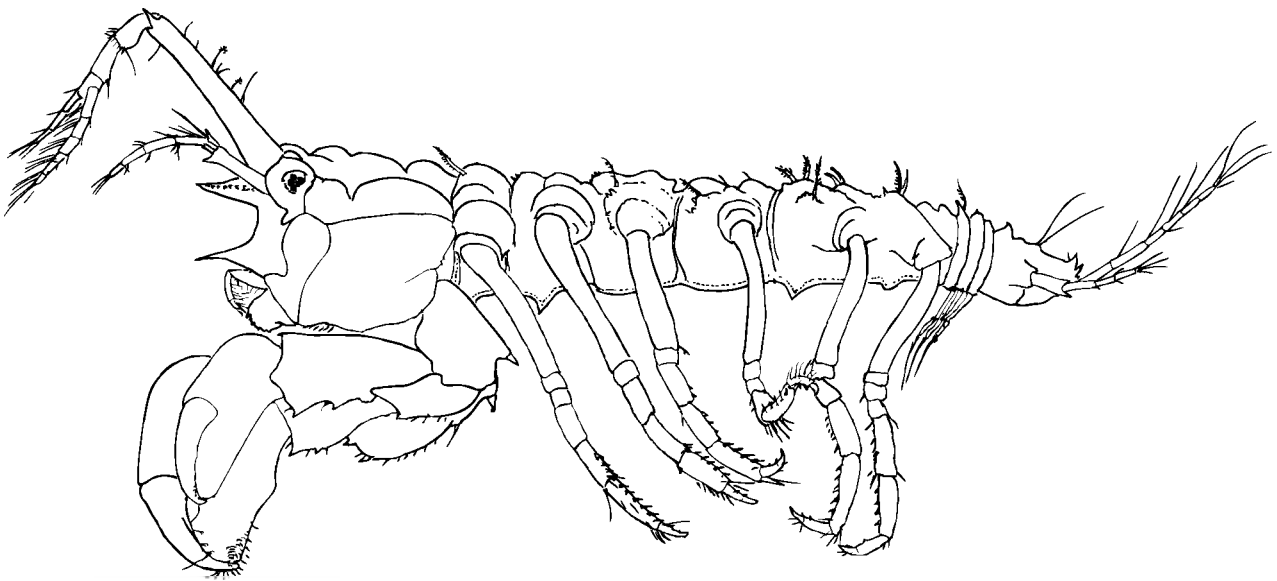


Figure 80

Subfamily Synapseudinae Guin, 1972

Synapseudes Miller, 1940

Synapseudes sp. A

Diagnosis.— Small, stout body. Rostrum short blunt, weakly bidentate. Antennule with short flagella. Antenna short, lacking squama. Chela strongly developed. Pereopod 1 with frontal margin of basis armed with 2-3 tubercles or blunt spines. Abdomen with all but first 2 pleonites fused; pleopods absent in both sexes.

Distribution/Ecology.— This species has been collected from shallow-water (3-30 m) reef areas from South Carolina southward to vicinity of Port Everglades, Florida. Little is known of the ecology of this form other than it occurs in association with carbonate, hard bottom or coral reef habitats.

Remarks.— There are no published records for members of this relatively large (19 species) highly derived metapseudid genus from the northwestern Atlantic. *Synapseudes* sp. A is distinguished from the other shallow water Florida apseudomorphans by the lack of a squama on the antenna, the absence of pleopods in both sexes, and the fusion of all but the last two pleonites.

Specimens of *Synapseudes* sp. A examined for this study came from a shallow reef habitat off Ft. Lauderdale and from collections made off the coast of South Carolina (T. Hansknecht, per. observations). Similar and possibly conspecific specimens have also been collected in shallow back reef areas on Grand Cayman Island and from the Flower Garden Banks off Texas (R. Heard, per. observations). Also, another smaller species having males with distinctly asymmetrical chelae may be present in South Florida shallow waters off Port Everglades, but an intact specimen was unavailable for study, so this species is not treated here.

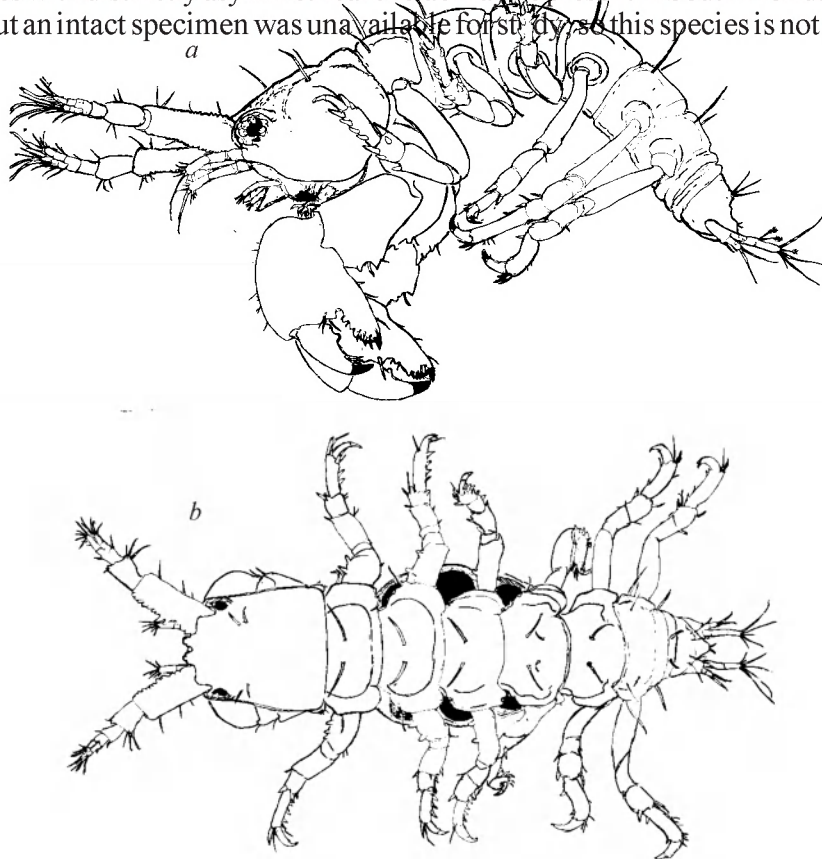


Figure 81

KEY TO THE FAMILIES OF TANAIIDAMORPHA KNOWN FROM FLORIDA WATERS

1. • Peraeopods lacking ischium. Oostegites modified into single pair brood sacs (ovisacs). Pleon having first 3 free pleonites with pleopods, last 2 pleonites reduced or fused, lacking pleopods. Uropods uniramous, protopod not fused with endopod. (Superfamily Tanaioidea)

..... Family Tanaidae

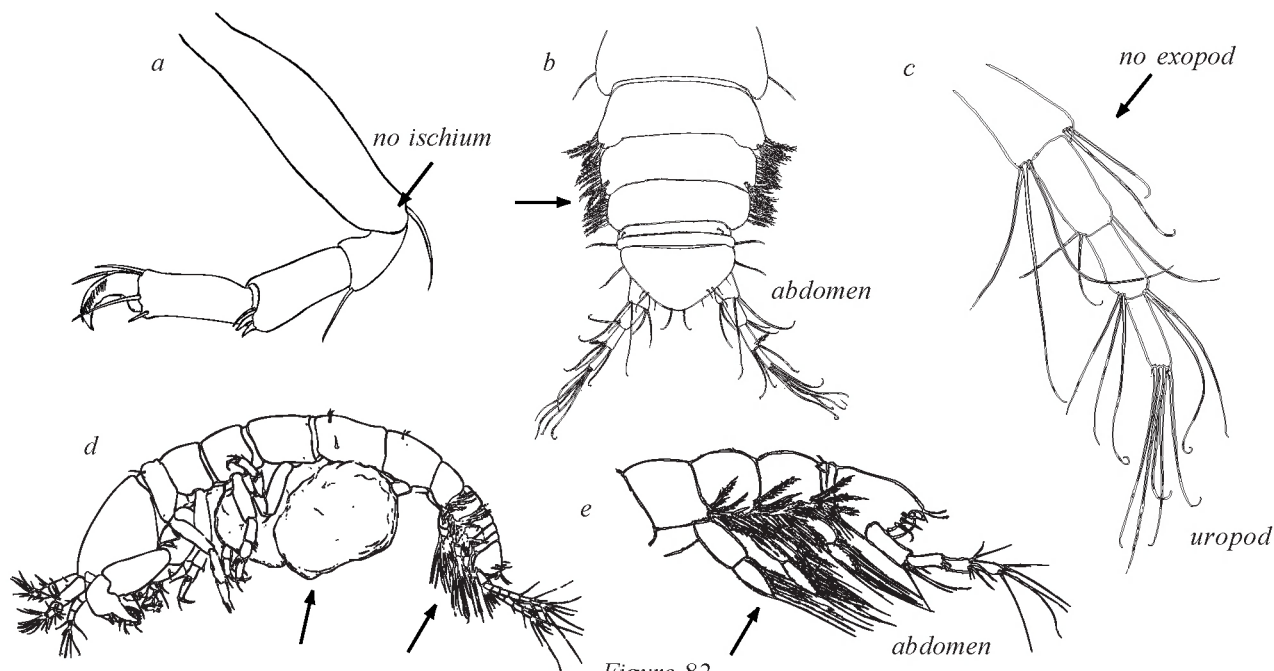


Figure 82

- Peraeopods having small, but distinct ischium. Pleon with 5 unfused pleonites, usually bearing pleopods; 1 (*Pseudotanaidae*) to 4 pairs of oostegites, none modified into brood sacs. Uropods biramous or with exopod fused to protopod to form lateral process. (*Tanaellidae*). (Superfamily Paratanaoidea) 2

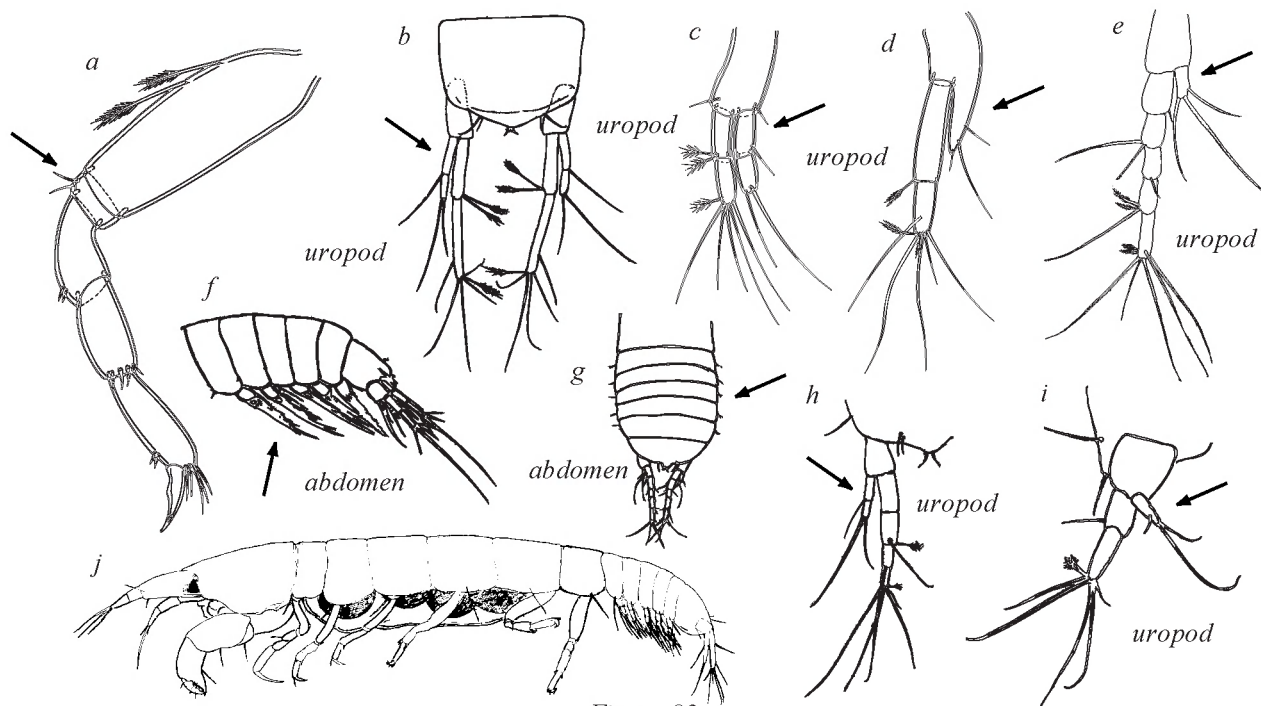


Figure 83

2. •Uropods with endopod having 3-6 articles [male chela greatly enlarged or highly modified] Leptocheliidae

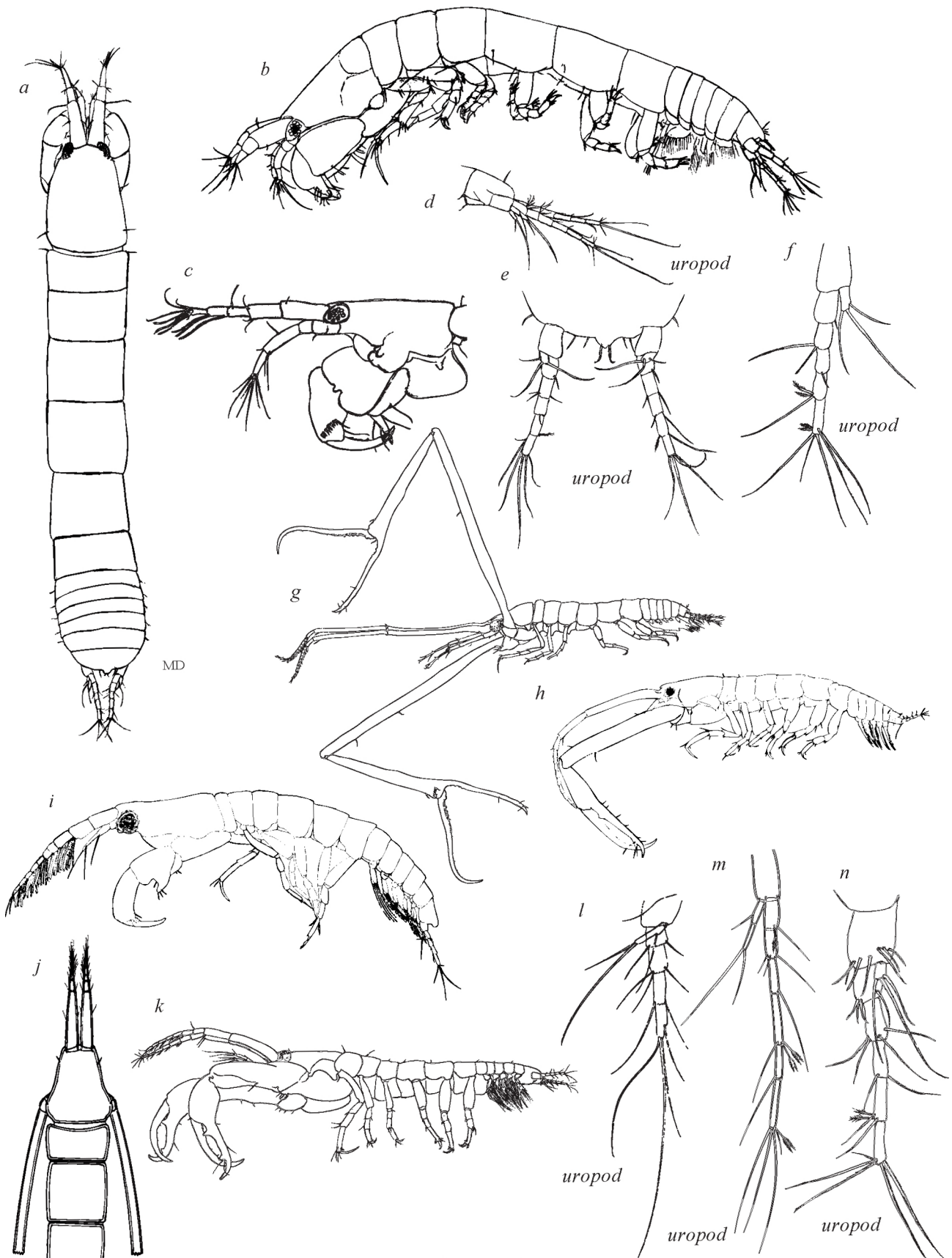


Figure 84

- Uropods with endopod having 2 articles. [Male chela may be larger but not highly modified] 3

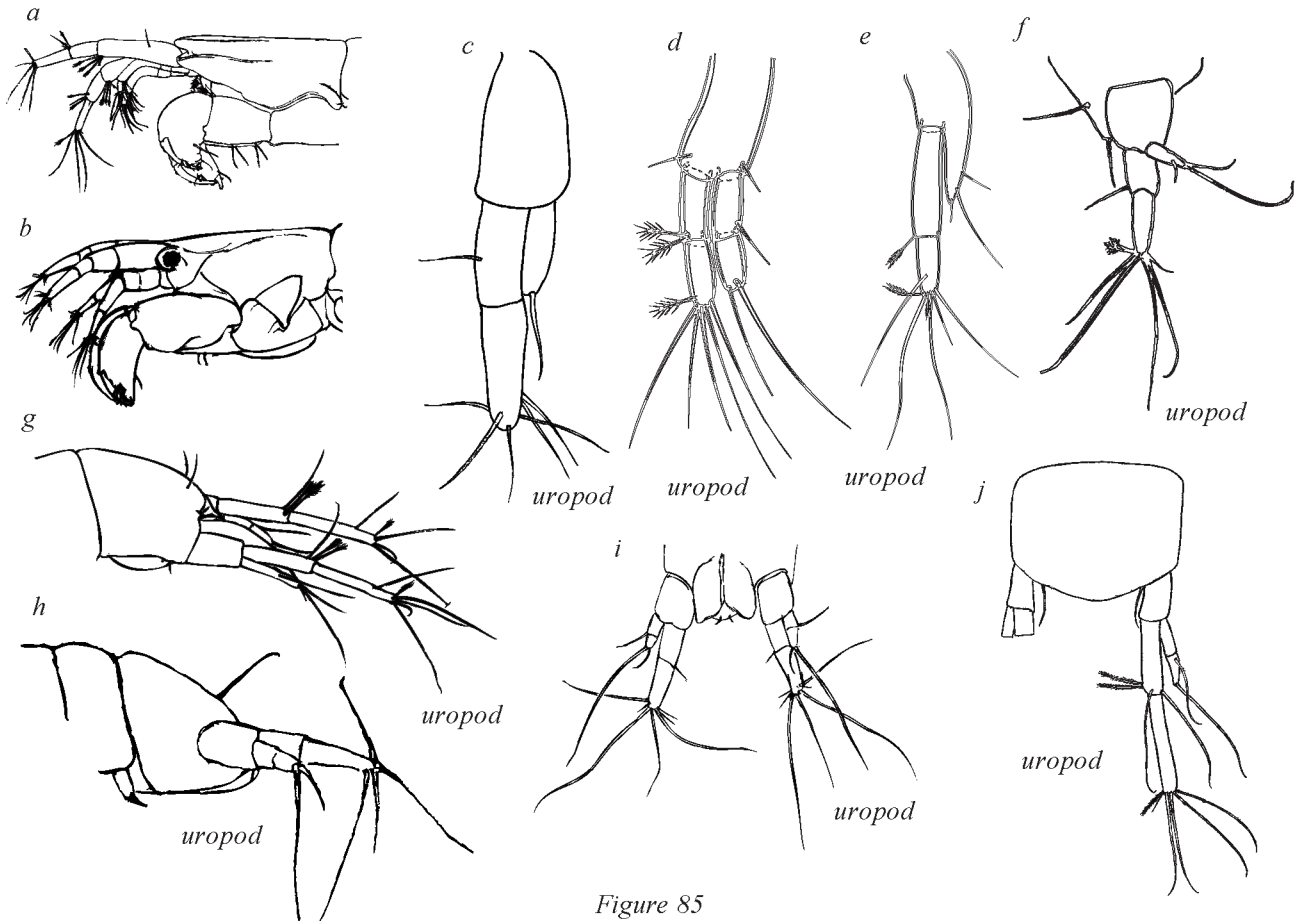


Figure 85

3. • Female with carapace having thickened chitinous “plates.” Maxilliped endites wider than basis, distal margin appearing serrate. Peraeopods 3-6 with stout (some wider than high) and often complex multidentate, spiniform setae. Basally swollen, plumose seta on lateral margins of first 4 pleonites. [Antennule of female with 4 distinct articles, and 1 minute distal article. Males small and compressed with large eyes. Antennule with 7 articles bearing numerous aesthetascs. Uropods of both sexes short with exopod uniarticulate.] Paratanaisidae (*Paratanais* sp. A)

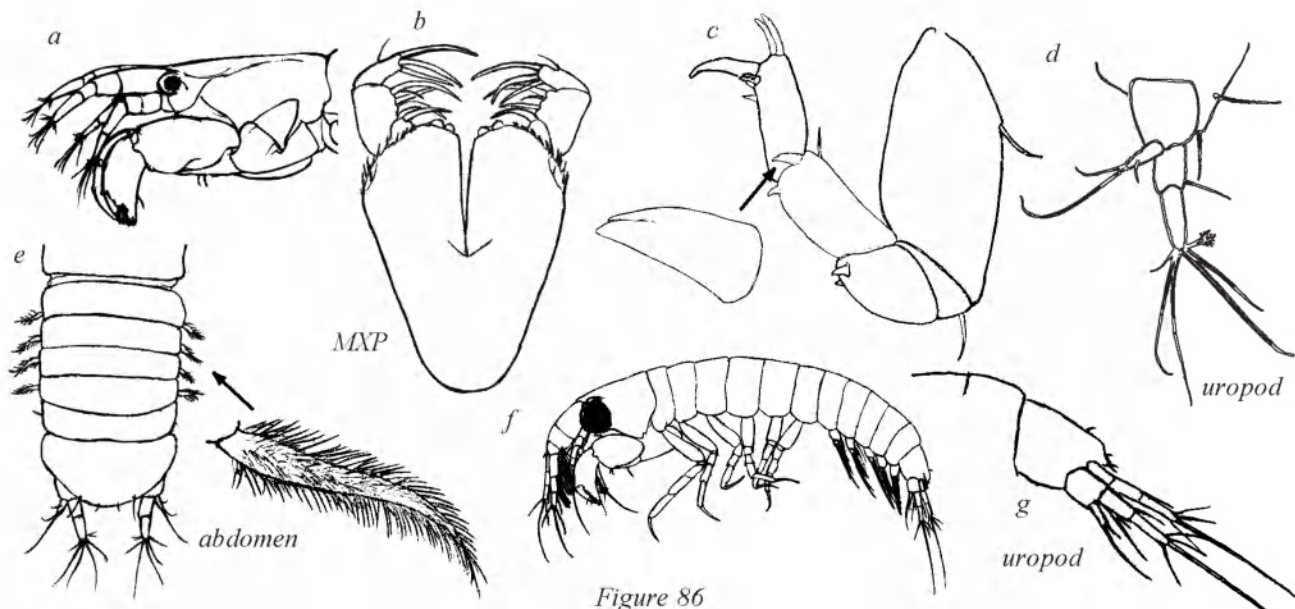


Figure 86

• Carapace lacking thickened chitinous “plates.” Maxilliped with endites narrower than basis, distal margin not appearing serrate. Peraeopods 3-6 with lacking modified stout bidentate or multidentate, spiniform setae. No basally swollen plumose setae on lateral margin of pleonites. [Antennule of female with 3 or 4 distinct articles, an additional minute distal article present or absent. Uropod with exopod biarticulate, except in *Araphura* and *Protanaiss*] 4

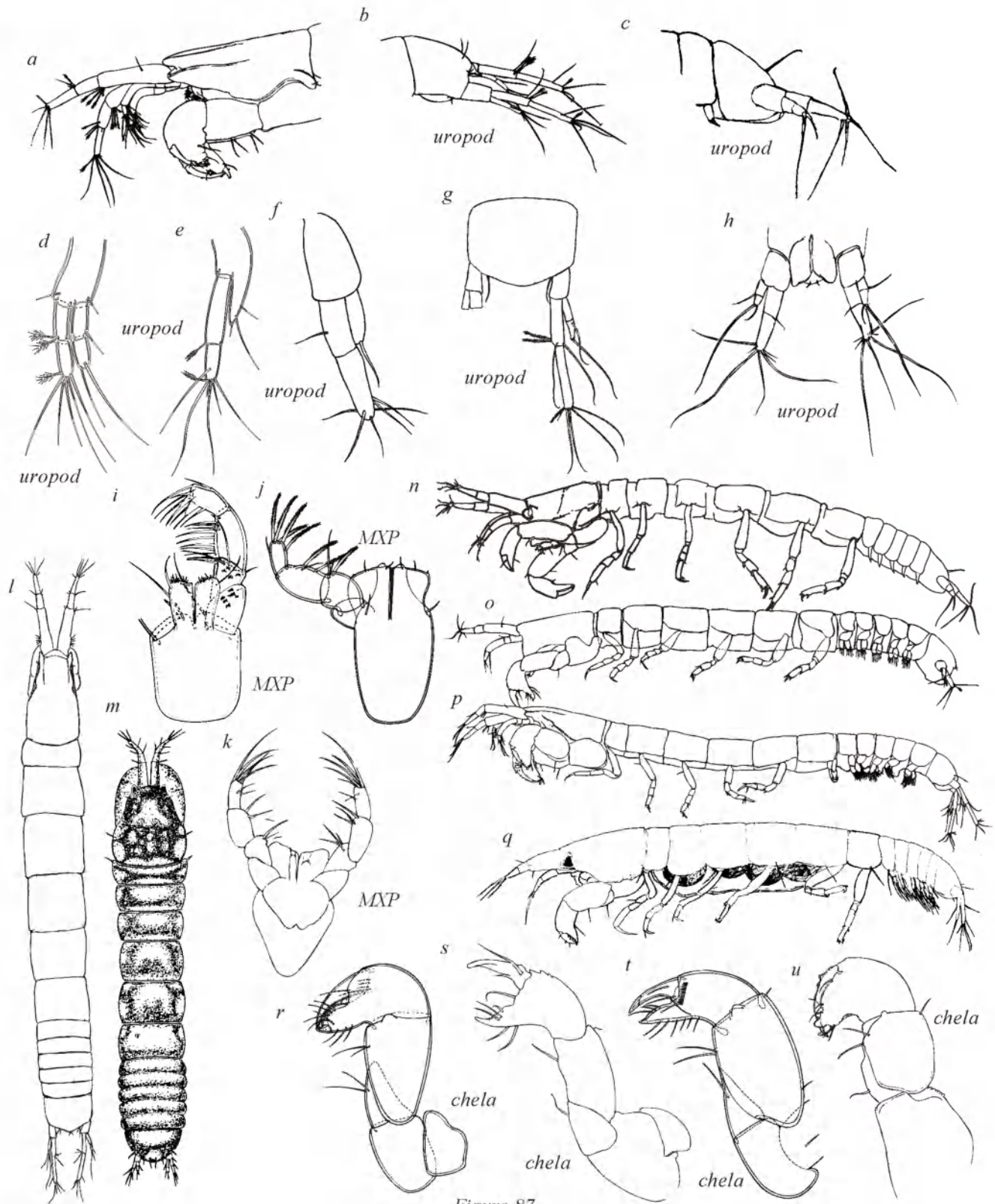


Figure 87

4. • Uropod with exopod fused to the protopod to form lateral process [Body small, very elongate]
 Tanaellidae (*Araphura higginsi*)

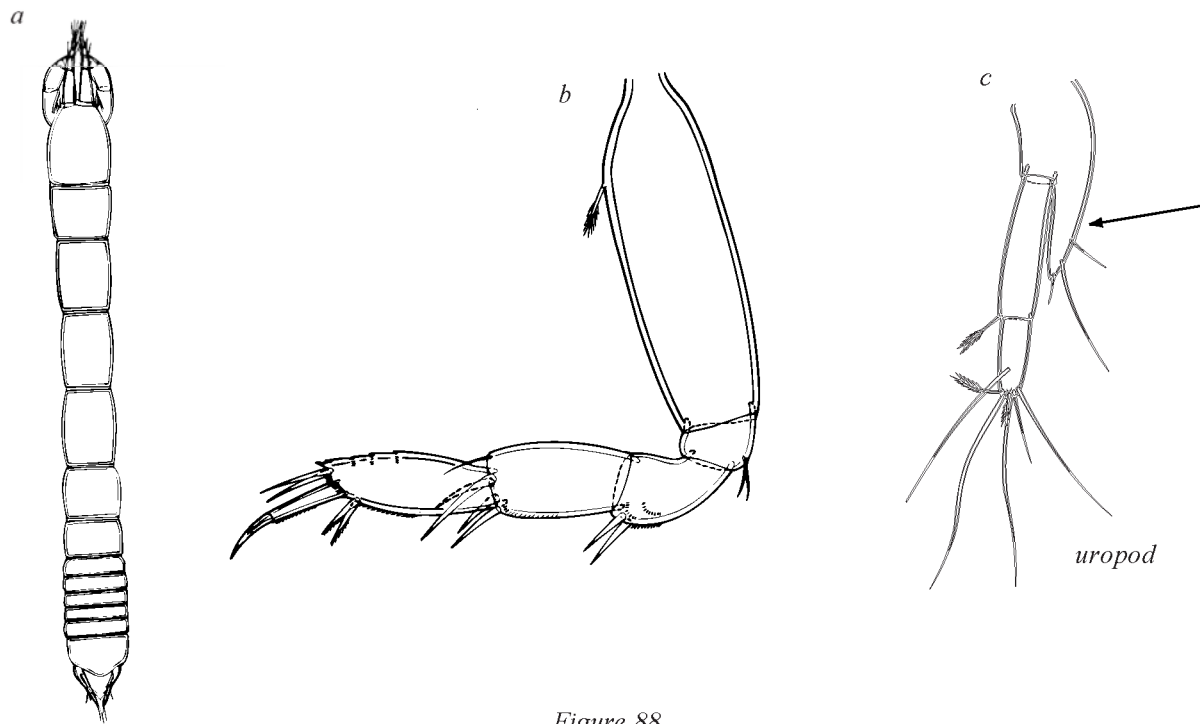


Figure 88

- Uropod with exopod not fused to protopod, distinctly articulate [Body short and compressed or elongate] 5

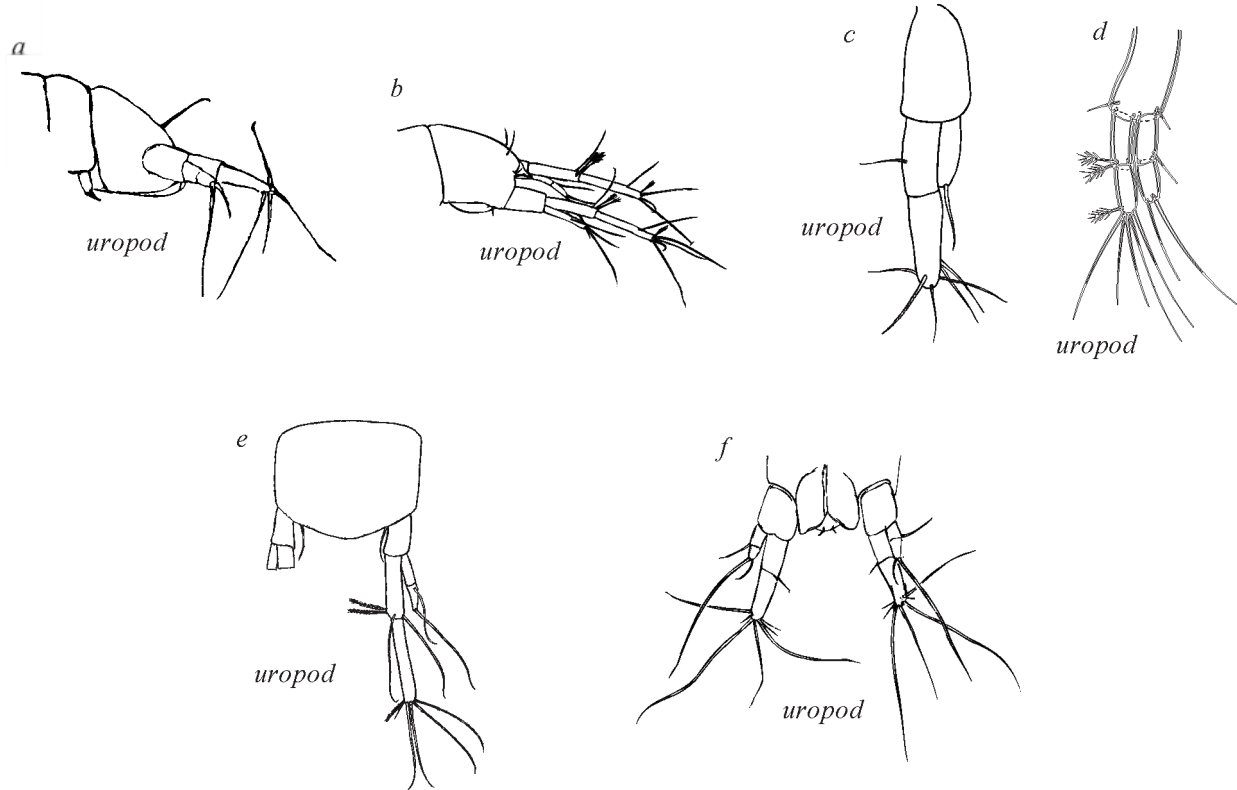


Figure 89

5. • Chela distinctly elongate, extending anteriorly (propodus and carpus not geniculate); propodus, including fixed finger, about 3 times longer than dactyl (moveable finger). Pereopod 4-6 with dactyl ventrally dentate. [Body small, short, compact. Uropodal exopod appearing uniarticulate].
 Pseudotanaidae (subfamily Cryptocopinae: *Iungentitanais* cf. *primitivus* Sieg, 1976)

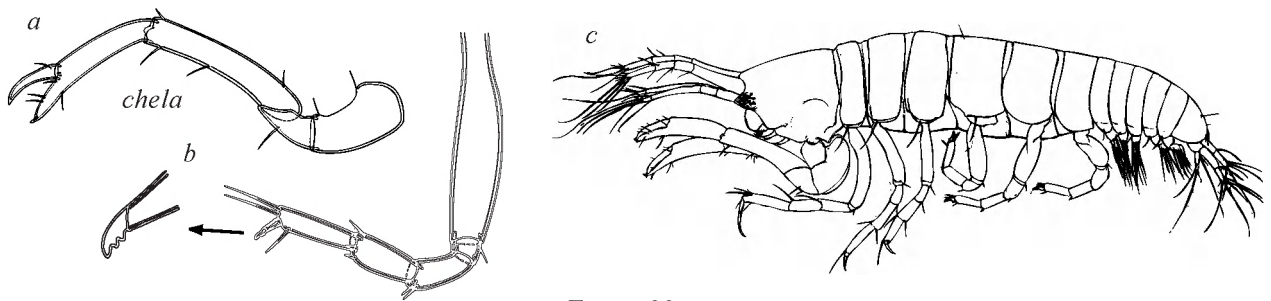


Figure 90

- Chela not unusually elongate (propodus and carpus usually geniculate); propodus, including fixed finger, less than twice as long as dactyl. Peraeopods 4-6 with dactyl not ventrally dentate. [Body small and compact to relatively large and elongate. Uropodal exopod uniarticulate or biarticulate] ...
 6

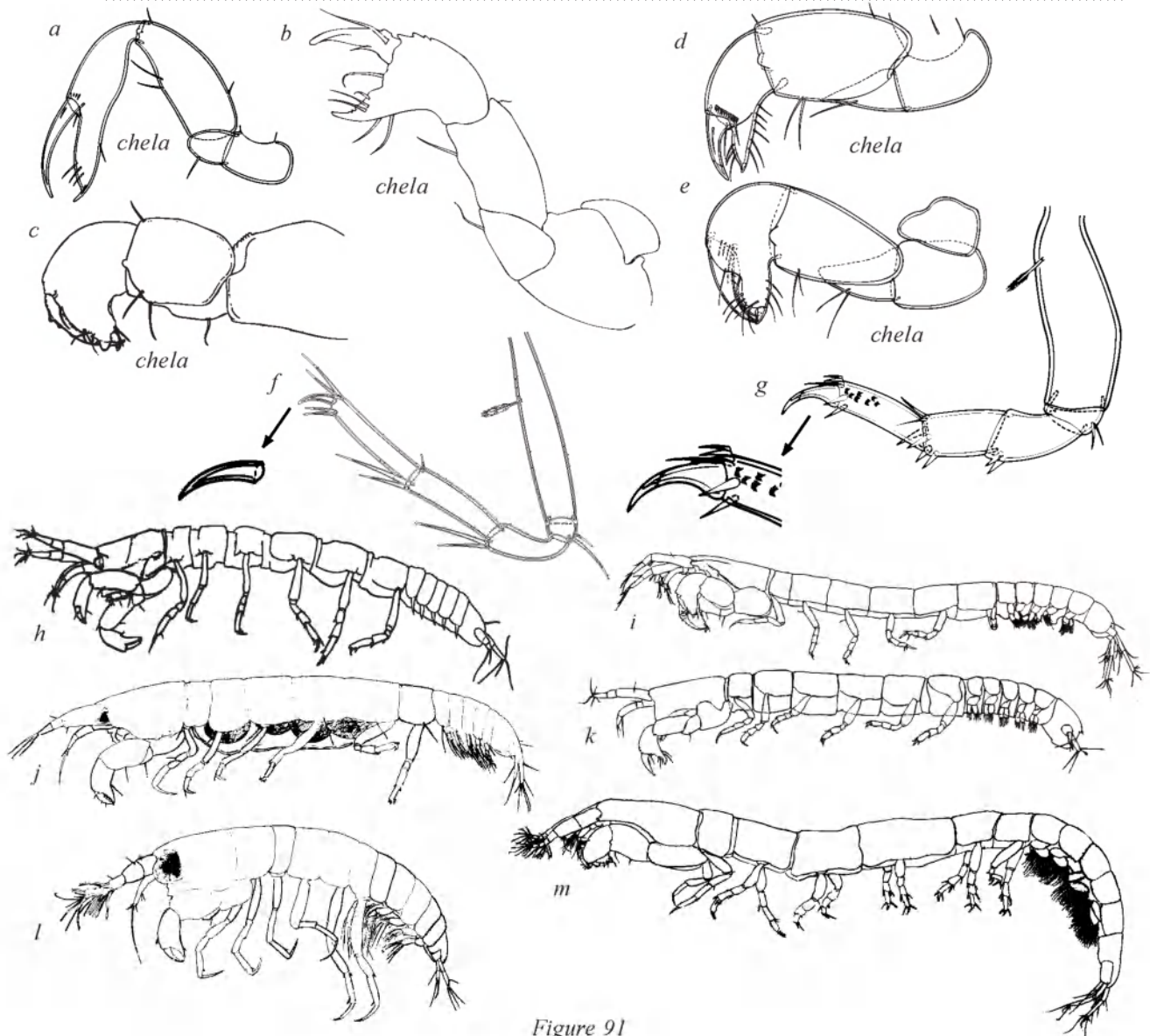


Figure 91

6. •Peraeonite 1 reduced to a band having nearly same width as basis of pereopod 1. Chela with narrow, delicate fingers. Marsupium consisting of 1 pair of oostegites. [Body small , generally short. Pereopods 4-6 with dactyl having unguis long. Uropodal exopod biarticulate]. Pseudotanaidae (subfamily Pseudotanainae)

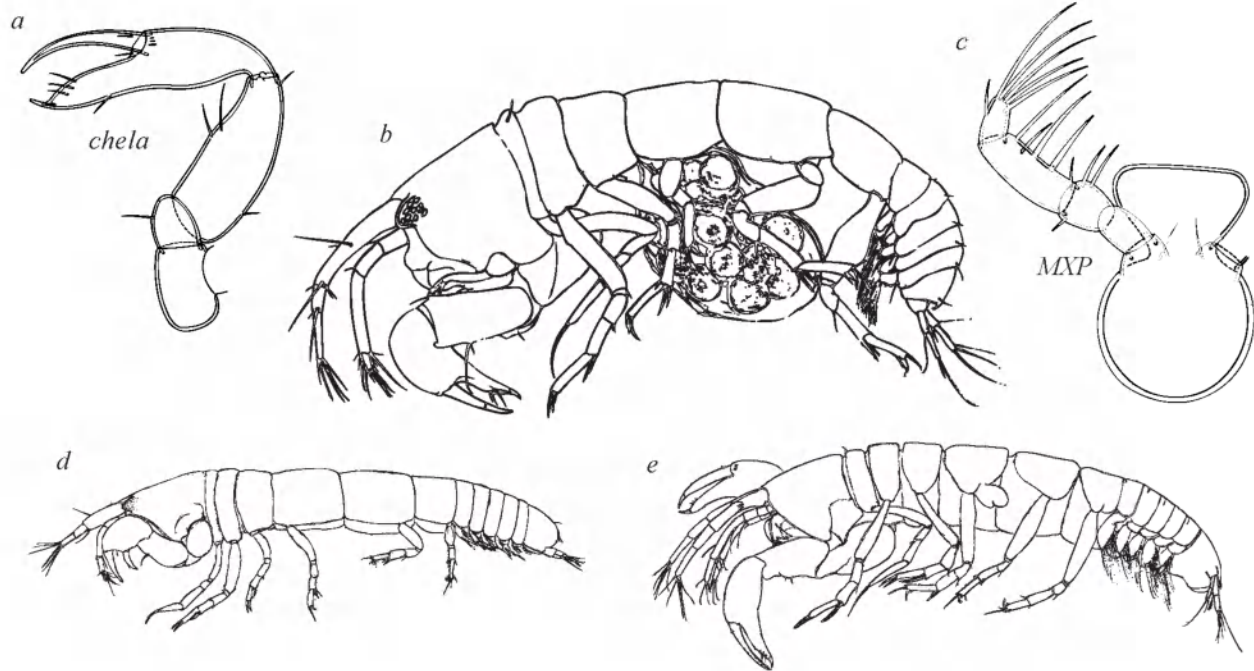


Figure 92

- Peraeonite 1 at least three times wider than basis of pereopod 1. Chela with fingers stout, strongly developed (not delicate). Marsupium composed of 4 pairs of oostegites. [Body minute and short to relatively large and elongate. Pereopods 4-6 with unguis fused with dactylus forming a claw. Uropodal exopod uniarticulate or biarticulate]. Nototanidae

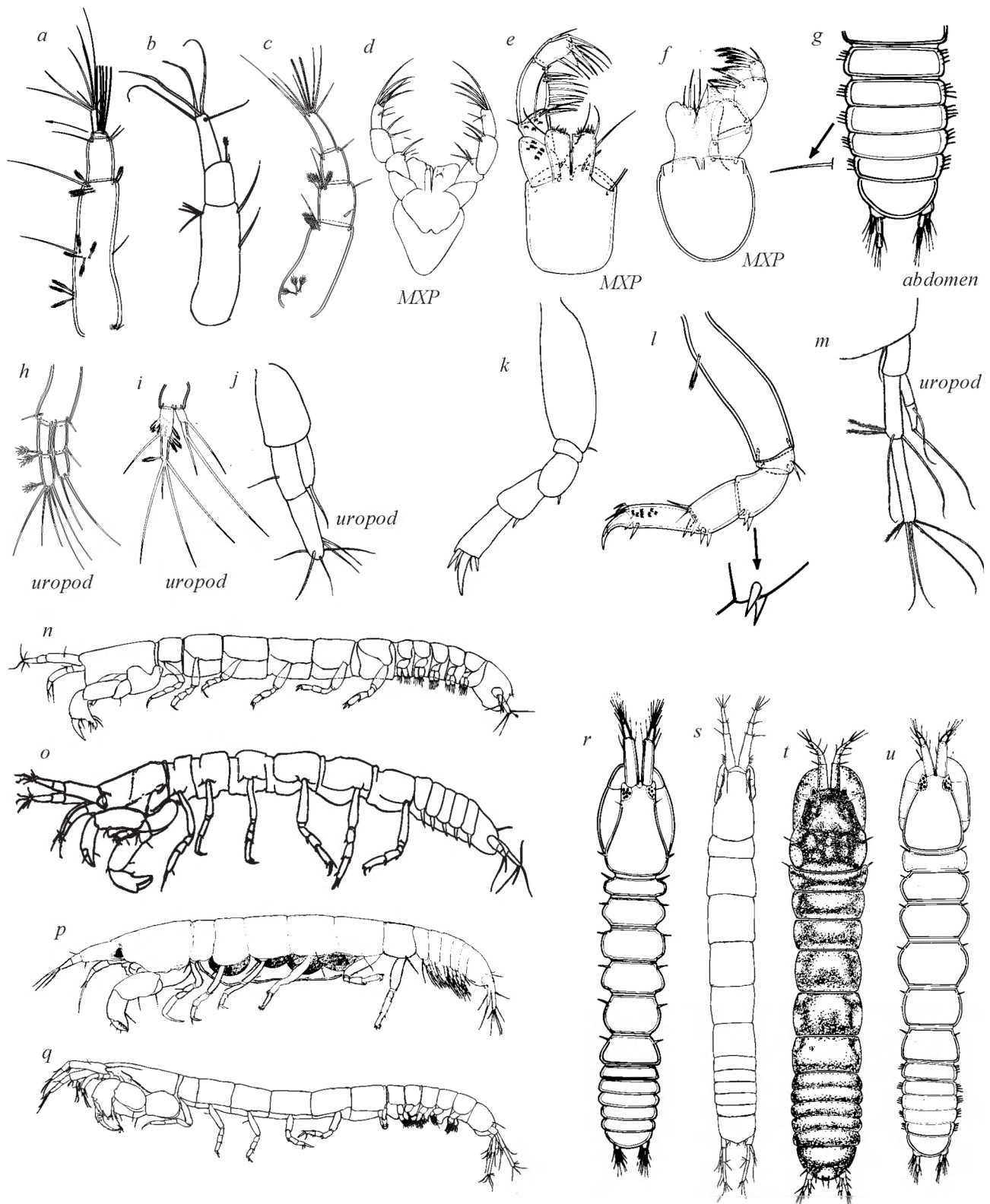


Figure 93

Suborder Tanaidomorpha Sieg, 1980
Superfamily Tanaioidea Sieg, 1980
Family Tanaidae Dana, 1849

This Superfamily Tanaioidea contains a single family, the Tanaidae, 16 genera, and 41 species. Its members occur in coastal and continental shelf waters throughout the world. At least one species, *Sinelobus stanfordi*, has been able to adapt to freshwater conditions. Many members of this tube dwelling family have apparently been spread by maritime activities or as epibionts on turtles resulting in nearly world wide distributions. This family displays some derived characters, but it has retained plesiomorphic features not displayed in the more highly derived superfamily Paratanaioidea. These include a maxillule having multiple (3 or more) cleaning setae on the palp, and a maxilliped having (1) a coxa present, (2) the basis and endites separated, and (3) the distal margin of endites bearing a pair of long setulate setae. Some of the more derived characters are the (1) lack of an ischium on the pereopods, (2) marsupium consisting of a single pair of ovisacs, instead of 1 (Pseudotanaidae) or 4 pairs of leaf or plate-like oostigites, (3) the loss of the last two pairs of pleopods, and (4) reduction and sometimes partial or complete fusion of the last two pleonites. As in many other tanaidomorph families the chelipeds of tanaids are attached laterally via a sclerite (modified coxa of some authors). Most members of the family are pigmented and in some cases the pigment patterns are specifically distinct.

In Florida this family is represented by at least four species belonging to three genera, two of which are monotypic. It would not be surprising if several other species [e.g., *Tanais dulongii* (Audouin, 1826; *Zeuxo exsargasso* Sieg, 1980)] are found to occur in Florida waters.

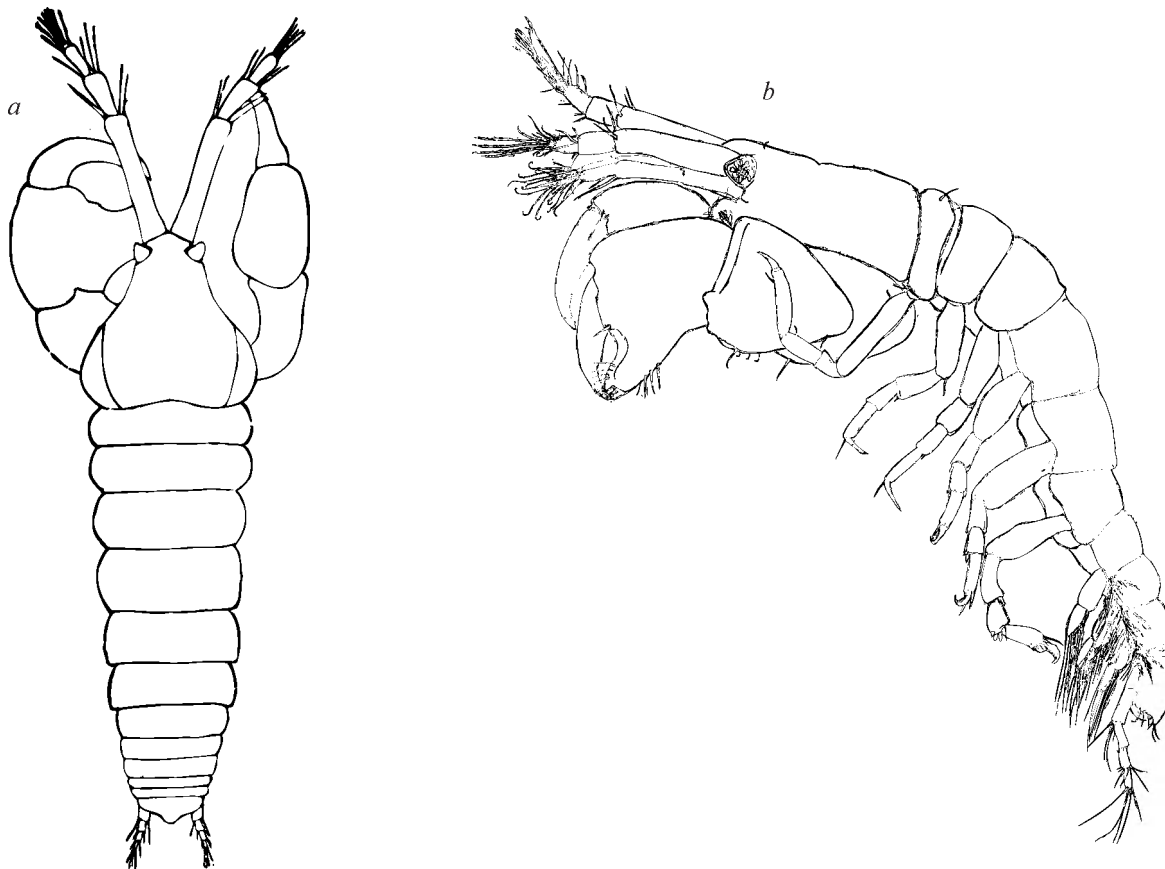


Figure 94

KEY TO THE SPECIES OF TANAIIDAE KNOWN FROM FLORIDA WATERS

- 1 • Abdomen with 4 unfused segments (pleonites) dorsally [Labium with terminal lobe well-developed, distinctly longer than wide. Uropod of adult with total of 4 articles, including protopod].
 *Sinelobus stanfordi* (Richardson, 1901)

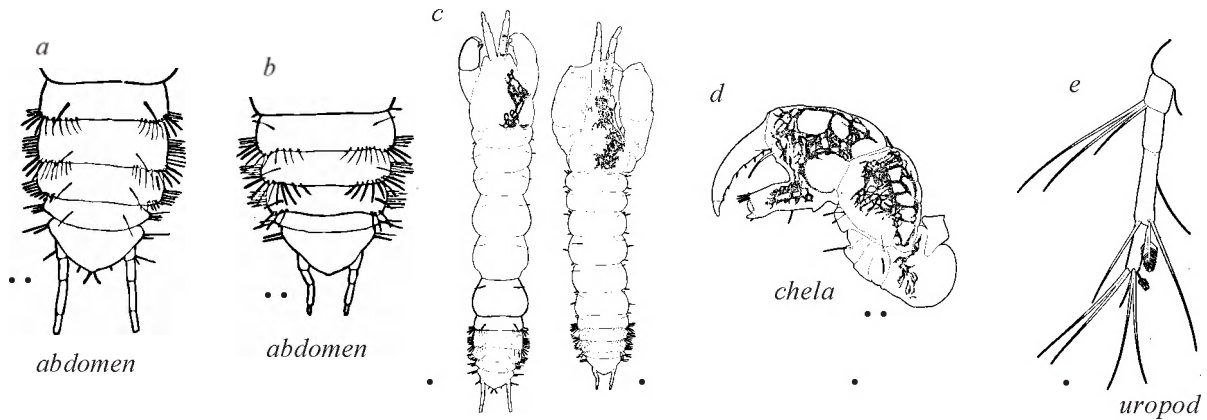


Figure 95

- Abdomen with 5 unfused segments (pleonites) dorsally [Labium with terminal lobe well-developed, longer than wide; or short, rounded, wider than long]. Uropod of adult with total of 4-6 articles, including protopod] 2

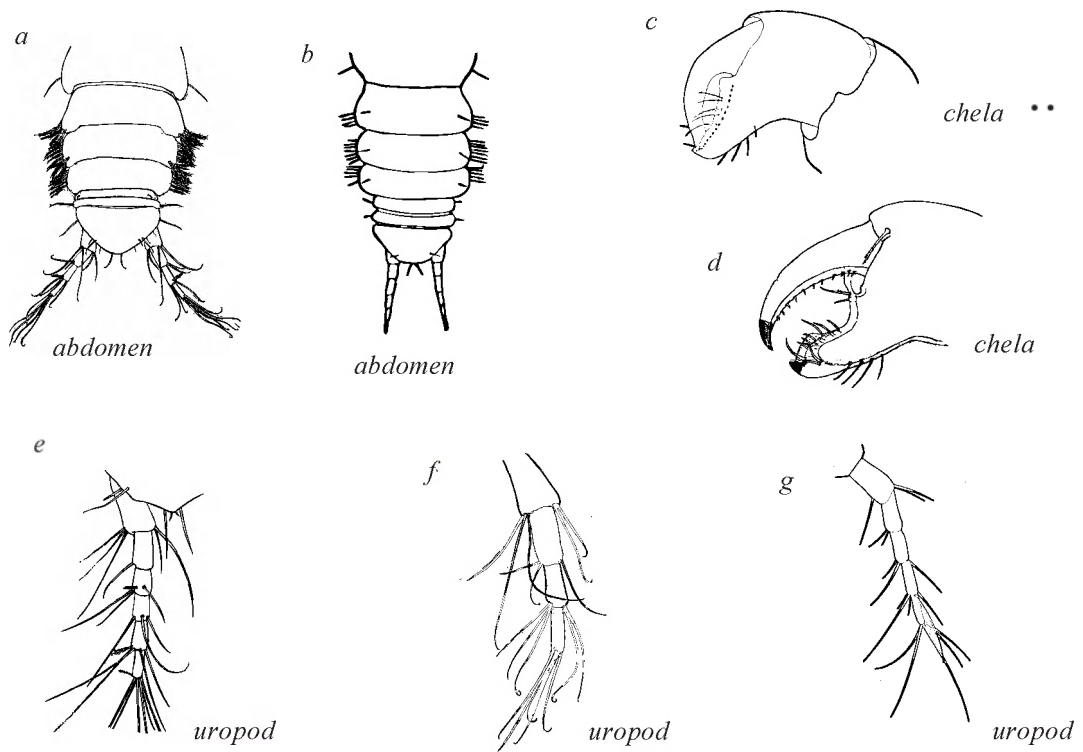


Figure 96

2. • Pereopod 1 with coxa having distinct anterior lobe, longer than wide. Pereopod 6 with dactyl armed laterally with row of 6 spinules, basal lobe not markedly inflated. Uropod with total of 5-6 articles. [Labium with terminal lobe well-developed, distinctly longer than wide]
 *Zeuxo kurilensis* Kussakin & Tzareva, 1974
 (Synonym: *Zeuxo maledivensis* Sieg, 1980)

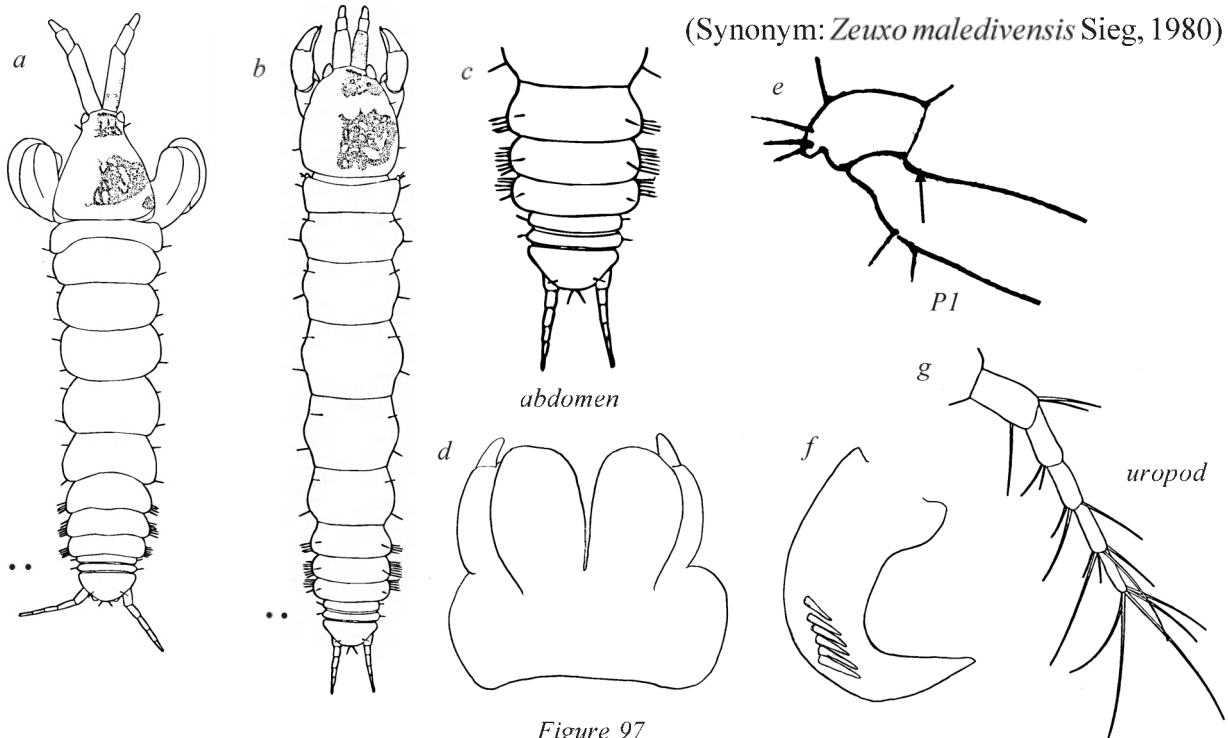


Figure 97

- Pereopod 1 with coxa lacking distinct anterior lobe. Pereopod 6 with dactyl armed laterally with row of 9 or more spinules, basal lobe markedly inflated. Uropod usually with total of 4 articles. [Labium with terminal lobe either distinctly longer than wide or short, rounded, and wider than long] 3



Figure 98

3. • Labium with terminal lobe short, rounded, wider than long. Pereopod 6 having dactyl armed with 8-10, usually 9, relatively large setules on lateral face. [Uropod with total of 4 articles].

..... *Hexapleomera robusta* Moore, 1894

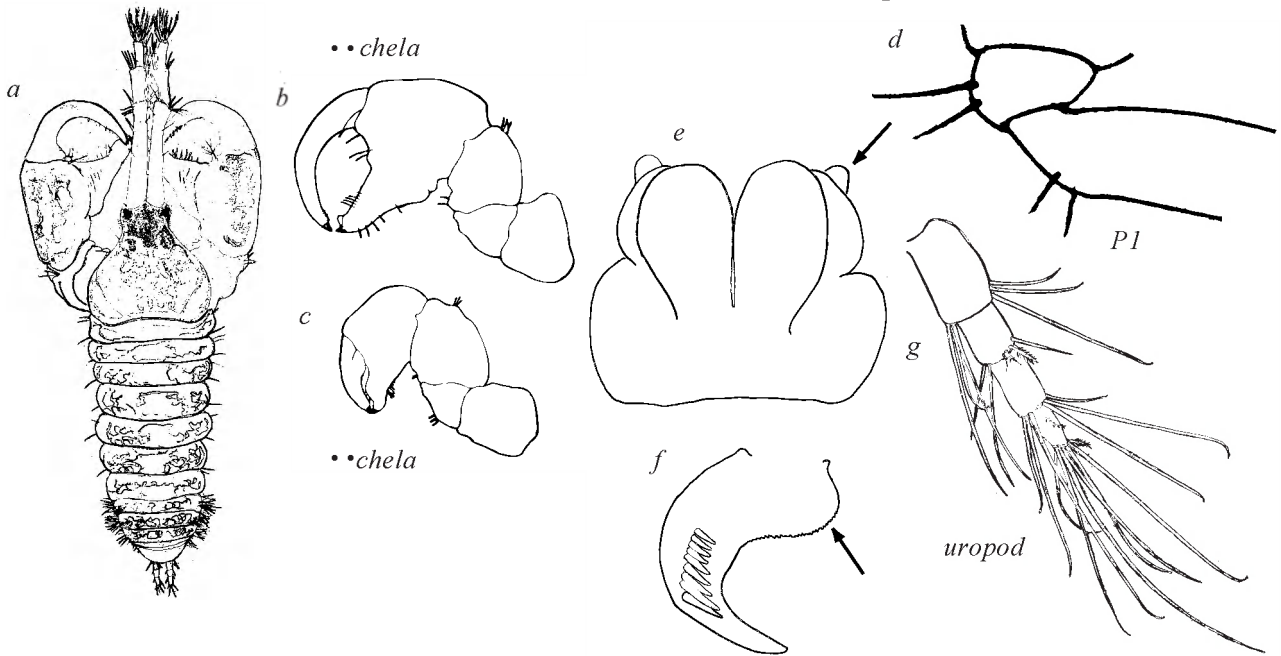


Figure 99

- Labium with terminal lobe elongate, distinctly longer than wide. Pereopod 6 having dactyl armed with 11-113 small spinules on lateral surface. [Uropod usually with total of 4, occasionally 5, articles] ...

..... *Zeuxo (Parazeuxo) coralensis* Zieg, 1977

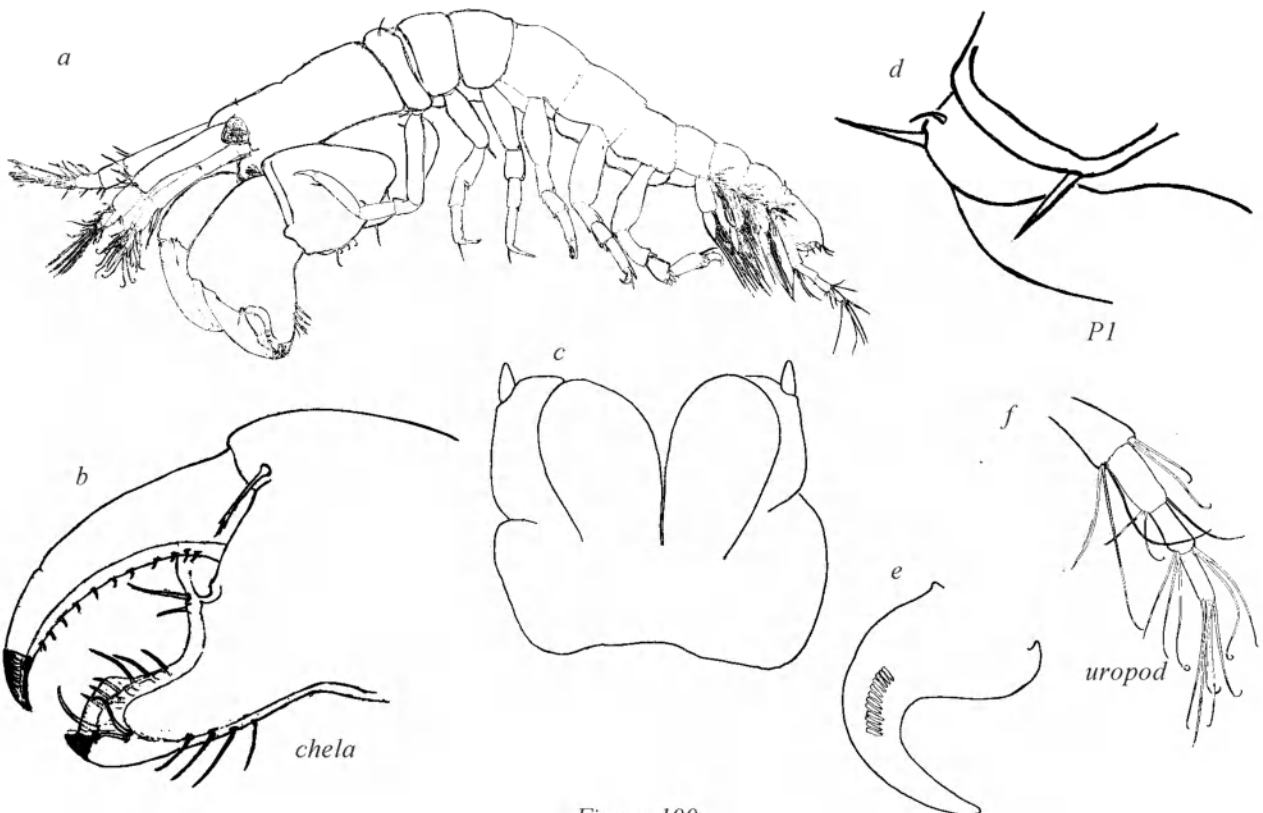


Figure 100

Family Tanaidae Dana, 1849

Sinelobus Sieg, 1980

Sinelobus stanfordi (Richardson, 1901)

Synonym.— *Tanais stanfordi* Richardson, 1901 (see Sieg 1980, 1983a for a full synonymy)

Recognition characters.— Outer lobe of labium without terminal process. Cheliped having fixed finger with distal process, in male cheliped much more developed and larger than female; fixed finger with more pronounced distal process. Pleon consisting of 4 pleonites and pleotelson; pleonites 1 and 2 each with strong transverse row of long plumose setae. Uropod consisting of protopod with 3 articles, terminal article not reduced.

Distribution/Ecology.—Reported nearly world wide from sub Antarctic (Southern Ocean) to the tropical and temperate waters of the western Atlantic and eastern and western Pacific Oceans, and Indian Ocean. The type locality is the Galapagos Islands. This euryhaline species, has been recorded worldwide in littoral zones from subpolar waters to the tropics including as well as “freshwater” and hypersaline lakes (Gardiner 1975b; Sieg 1980b, 1983a).

Remarks.— *Sinelobus stanfordi*, which represents a monotypic genus, is a widely occurring euryhaline species. It is characterized by having four pleonites, and by lacking a distolateral or terminal process on outer lobe of labium.

Based on the South Florida records presented in an unpublished masters thesis by McSweeney (1968), Gardiner (1975b) published the first records for this species in southeastern United States. We also have also examined specimens from Lake Okeechobee and from tidal fresh water habitats in the North West Florida.

The widely reported distribution, the variety of habitats from which it has been reported, and the range of morphological variation reported (e.g., length of articles in uropod) indicate that this species may represent two or more distinct species

There is a reasonable possibility that the superficially similar and widely distributed species, *Tanais dulongii* (Audubon, 1826), which has been previously reported from US East Coast and the Bahamas (Sieg 1980b, 1983a), may occur in Florida waters. Like *S. stanfordi* the fourth and fifth pleonites have become fused revealing only four dorsally visible pleonites. *Tanais dulongii* is immediately distinguished from *S. stanfordi* by having a uropod with a protopod and only 2 articles. Other distinguishing characters of *T. dulongii* include the presence of an anterolateral process on the outer lobe of the labium, the fixed finger of the chela tapering to subacute tip, and the presence of more than 6 blade setae on the inner distal margin propodus of pereopod 6 (4 present on *S. stanfordi*).

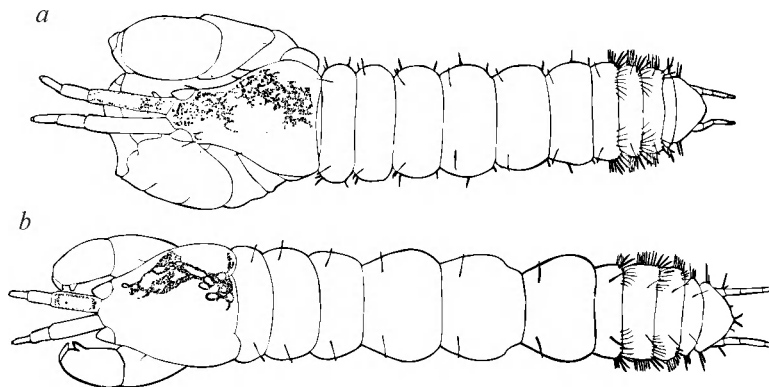


Figure 101

Hexapleomera Dudich, 1931

Hexapleomera robusta (Moore, 1894)

Synonyms.— *Tanais robustus* Moore, 1894. *Tanais testudinicola* Dolffus, 1898.— *Tanais testunaria*, Vanhoffen 1914.— *Anatanaïs robustus*.— *Anotanaïs robustus*, Kocatas 1976 (see Sieg 1980, 1983 for full synonymy).

Recognition characters.—Outer lobe of labium with terminal process weakly developed, low, widest at base. Adult male and female with first 3 pereonites wider than combined length. First pereopod with coxa lacking posterior process or lobe. Male cheliped massive with large gape, much larger than that of female; fixed finger with weakly developed proximal process; female cheliped lacking gap, fixed finger truncate, bearing low proximal processes. Uropod having protopod with 3 articles, terminal article not reduced.

Distribution/Ecology.— This species has been reported from the Atlantic coasts of North and South America, the eastern Pacific the eastern Atlantic (Mediterranean and northwestern coast of Africa) and the eastern Pacific (Galapagos). The type locality is Sea Isle City, New Jersey, where *H. robusta* was originally collected from the carapace of a loggerhead sea turtle (*Caretta c. caretta*). This species appears to a common epibiont of sea turtles (R. Heard, pers. obs.).

Remarks.— Dudich (1931) created the genus *Hexapleomera* to receive a new species *Tanais schmidtii* Dudich, 1931. Sieg (1980) considered the nominal species to represent a single species, *H. robusta* (Moore, 1894). This species appears to be a common epibiont on sea turtles (e.g., *Caretta caretta*) where it usually constructs its tubes on the posterior region of carapace, usually between or under edges of the scutes, or on the surface of the commensal barnacle *Chelonibia testudinata* (R. Heard, pers. observations). The terminal male of *H. robusta* represents one of the largest members of the family Tanaidae.

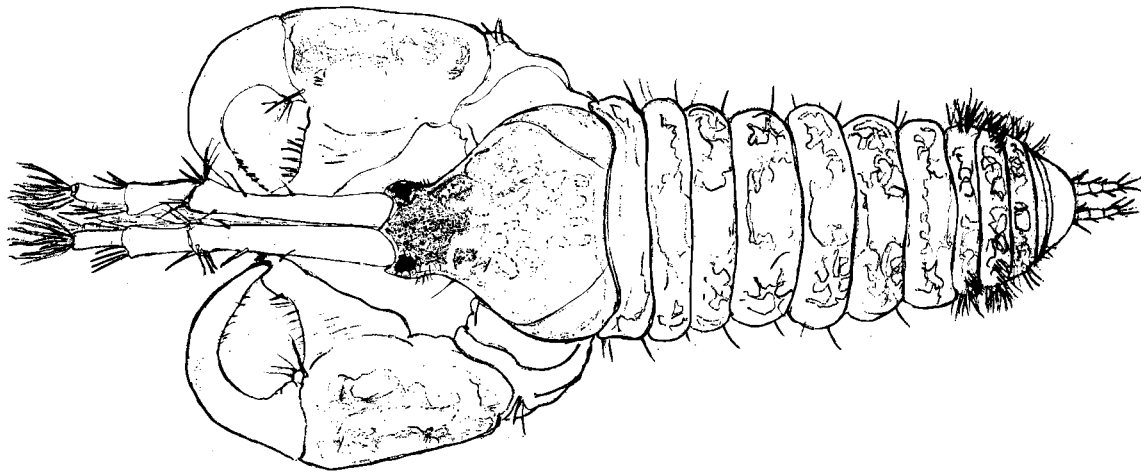


Figure 102

***Zeuxo* Templeton, 1840**

Subgenus *Parazeuxo* Sieg, 1980

***Zeuxo kurilensis* (Kussakin and Tzareva, 1974)**

Synonyms.—*Antantais* sp. (?*mormani*), Kussiakin and Tzareva 1972.—*Antantais kurilensis* Kussakin and Tzareva, 1974:222-226(2 figs).—*Zeuxo maldivensis* Sieg, 1980.—*Zeuxo kurilensis*, Sieg 1983b)

Distribution/Ecology.—This species is widely distributed and has been reported from the northwestern Pacific (Kuril Islands, Russia: Type locality), Indian Ocean (Maldive Islands), and northwestern Atlantic (South Florida). In Florida waters this species has been found associated with shallow water, live bottom or hard bottom communities (e.g., reefs, jetties). We have new records based on specimens collected from rock jetties at the mouth of St. Andrew Bay, which extends the species distribution into the northern Gulf of Mexico.

Recognition characters.—Cheliped having fixed finger without process, male chela distinctly larger than in female. Coxa of pereopod 1 with distinct anterior lobe. Pleon with 5 pleonites, last 2 reduced; pleonite 4 with single lateral seta, pleonite 5 usually with 2 lateral setae, the largest being distinctly longer than seta on pleonite 4. Uropod with protopod and 4 to 5 articles.

Remarks.—Based on specimens, *Zeuxo* sp. sensu McSweeney (1968), collected in Dade County, Sieg (1980) reported this species as *Z. maldivensis* Sieg, 1980 from South Florida shallow waters. In his extensive catalogue of the Tanaidacea, Sieg (1983a) synonymized *Z. maldivensis* with *Anatanais kurilensis* Kussakin and Tzareva, 1974, and reassigned the species to the genus *Zeuxo*; he had overlooked Kussakin and Tzareva's species in his 1980 monograph on the family Tanaidae.

There are unpublished reports of another species of *Zeuxo*, *Z. coralensis* Sieg, 1980, from Florida waters; however, all of the specimens that we examined attributed to this species were found to be *Z. kurilensis*. *Zeuxo coralensis* is currently known from warm and temperate waters of the Pacific and Atlantic Oceans (Japan, Panama, Red Sea, Maldive Islands). Several characters, including the distinct anterior lobe on the coxa of pereopod 1 and the inflated base of the dactyl on pereopod 6, distinguish *Z. kurilensis* from *Z. coralensis*.

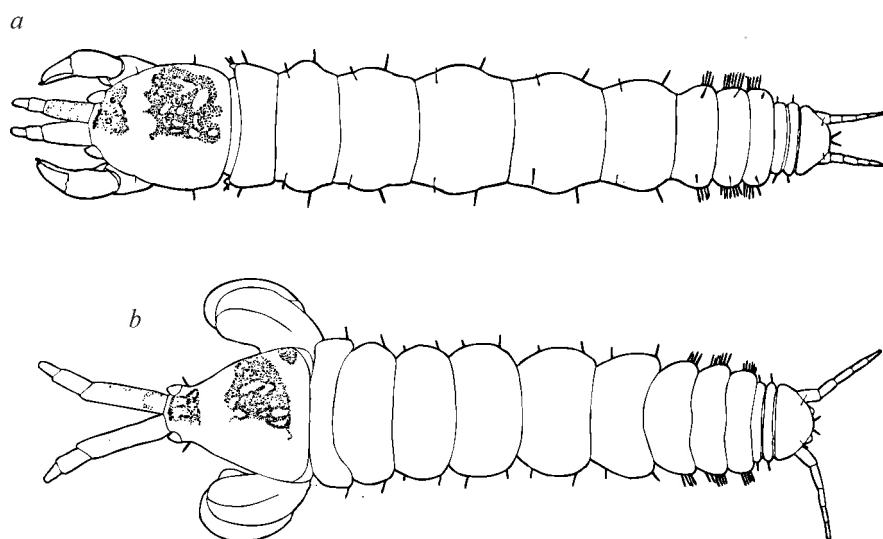


Figure 103

Zeuxo coralensis Sieg, 1977

Synonyms.— none

Recognition characters.— Body elongate with pigment on carapace, pereonites, and pleonites. Labium with terminal lobe well developed, distinctly longer than wide. Labrum with terminal lobe (palp) distinctly longer than wide (smaller than in *Z. kurilensis*). Cheliped with fixed finger lacking process, male chela distinctly larger than in female (similar to *Z. kurilensis*). Coxa of pereopod 1 lacking distinct anterior lobe. Pleon with 5 unfused pleonites. Uropod including protopod usually with 4 articles.

Distribution/Ecology.— Previously this species was known from Maldiv Islands [northern Indian Ocean](type locality), Red Sea, eastern Mediterranean, Japan, Brazil and the Pacific coast of Panama (see Sieg 1980, 1983). Specimens examined during this study came from the Florida Keys, Florida SW shelf off Florida Bay.

Remarks.— This species is difficult to distinguish from subadult *Z. kurilensis* because the characters generally used are mostly qualitative and overlap. Although the adults of *Z. coralensis* usually have a uropod with 3 articles (excluding protopod) and those of *Z. kurilensis* have 4 or 5, apparently the most reliable character for separating the species *sensu* Sieg (1980) in Florida waters is the lack of a small, but distinct lobe on the anterior coxal margin of pereopod 1 in *Z. coralensis*. Other characters used to separate the species include the distal setation of the carpus on pereopod 2, and the relative size of the palp on the labrum (smaller in *Z. coralensis* than in *Z. kurilensis*).

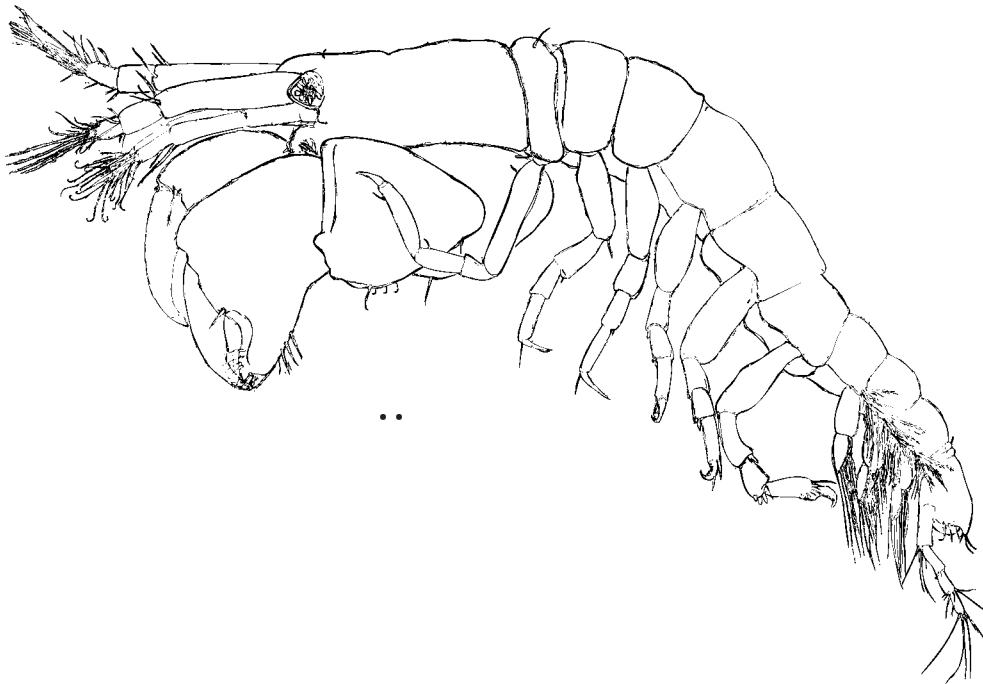


Figure 104

Family Tanaellidae Larsen and Wilson, 2002

This small family, whose members are primarily deep water species, contains four genera *Araphura* Bird and Holdich, 1984; *Araphuroides* Sieg, 1986; *Arthrura* Kudinova-Pasternak 1966; *Tanaella* Norman and Stebbing, 1886 (Larsen and Wilson 2002). It is characterized by having a uniramous uropod derived from the fusion of the exopod and protopod. In the genera *Araphura*, *Arthrura*, and *Araphuroides* the fused exopod is expressed as a distinct distal outgrowth or process fused to the protopod. This process is reduced to small knob in members of the genus *Tanaella*, which gives the uropods a uniramous appearance. Other characters of the family include the lack of eyes, antennule with 4 articles, dactyl and unguis on pereopods 4-6 not fused into a hook-like process. Males, where known, do not express a high degree of sexual dimorphism; the antennule, although broader than in the female, has 4 articles and functional mouth parts are present (Larsen and Wilson 2002, Larsen and Heard, 2003).

In Florida waters only the genus *Araphura* Bird and Holdich, 1984 is currently represented. This widely distributed genus (Atlantic, Antarctic, Pacific Oceans) contains seven species. Until recently, only one species, *Araphura higginsi* Sieg and Dojiri, 1989, was known from waters of the southeastern United States, including the shelf waters off Florida. Larsen (2003b) described a new species from deep water off Texas.

Araphura higginsi Sieg and Dojiri, 1989

Recognition characters.—Female: Body elongate cylindrical, 2.5-3.5mm in length, about 11 times longer than broad. Antennule with 4 articles, distal most or penultimate article narrower and distinctly longer than preceding or antipenultimate article. Antenna with 6-7 articles with partial fusion of articles 4 and 5. Mandible with molar process (pars molaris) attenuated, ending in 1 subterminal and 4 terminal spine-like, curved processes. Maxilliped endites with 1 seta and 2 distal denticles. Pereonite 2 in adult females about 1.5 times longer than broad. Pereopods 1-3 with dactyl and unguis as long as- or shorter than propodus. Uropod with endopod having 2 articles, proximal article over 1.5 times longer than distal article; distolateral process of protopod (fused exopod) extends about half the length of the endopod and more than 2/3 length of the first article of endopod. Pleotelson broader than long. Male: Unknown.

Distribution/Ecology.— Shelf waters off: South Carolina (22 m); Florida, Ft. Pierce area (35-146m), and mid shelf northwest of Florida Keys. Little is known about the ecology of this species other than it occurs in shelf waters on “fine sand” or “muddy sand” substrata (Sieg and Dojiri 1989).

Remarks.—*Araphura higginsi* is the only member of the family Tanaellidae known from Florida shelf waters. It is immediately distinguished from other Florida tanaidomorphs by the exopod being fused with protopod to form a lateral process that extends about half the length of the endopod.

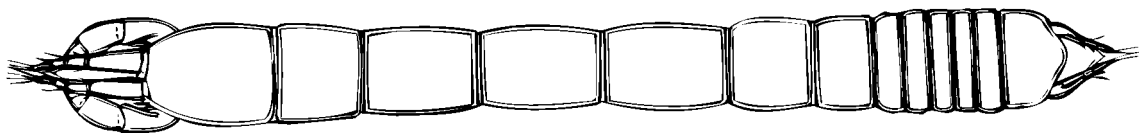


Figure 105

Family Paratanaidae Lang 1949

This family contains about 20 recognized species distributed between two subfamilies, the Paratanainae Dana, 1852 and the Bathytanainae Larsen and Heard, 2000. The subfamily Paratanainae consists of only the type genus *Paratanais* Dana, 1852, which has approximately 11 recognized species, all of which are known from relatively shallow depths.

Female members of the family Paratanaidae have (1) four apparent articles in the antennule, plus a minute distal article, (2) maxillipedal endites unfused, broader than basis, with distolateral margins having scale-like setae (appearing serrate), and distal margin of each endite with a pair of blunt, ovoid-shaped setae, (3) distinctive, proximally inflated, setulate setae on lateral margins of the first 4 pleonites, (4) a uropod with 2 apparent articles in endopod and 1 to 2 articles in the exopod or 2 articles.

The subfamily Bathytanainae, which is characterized by having the antennule and antenna modified for filter or suspension feeding, is known only from southern Pacific waters. This subfamily contains two genera, *Bathytanais* Beddard, 1886 with five species and *Pseudobathytanais* Kudinova-Pasternak, 1991 with two species (Larsen and Heard 2000).

Only males for some of the species of the genus *Paratanais* are known. These are characterized by having (1) a much shorter body than the female, (2) large eyes, 3 times that of the female, (3) pleonites about the same general size and appearance as the pereonites, (4) antennule with 6-11 articles of which articles 3 and 4 with dense ventral clusters of aesthetascs, (5) pereopods 4-6 with basis not significantly thicker than that of pereopods 1-3, and (6) dactyl and unguis not modified into a claw.

One member of this family, an apparently undescribed species of *Paratanais*, is presently known from Florida waters.

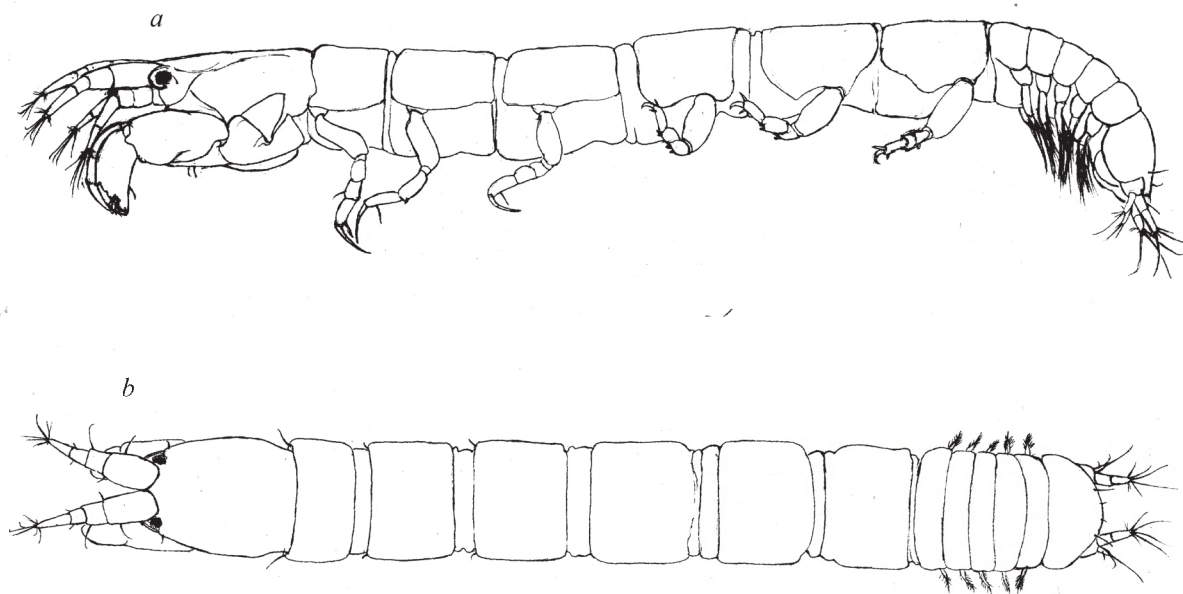


Figure 106

Paratanais Dana, 1852

Paratanais sp. A

Recognition characters.—Female: Body elongate, 7-8 times longer than wide. Antennule with 4 apparent articles (article 5 terminal, microscopic). Antenna with article 3 having dorsal spiniform setae curved downward. Maxilliped with basis partly fused; endites not fused, broader than basis with 2 flat distomedial setae, and row of small, acute scale setae on anterolateral margins giving pectinate appearance. Cheliped with 2 small, stout, movable setae on inner face of propodus just proximal to attachment with dactyl (movable finger), attachment via sclerite (modified coxa). Coxa present on pereonites 1-3, but not distinguishable on pereonites 4-6. Spiniform setae on pereopods 3-6 not complexly dentate, some spiniform setae with bidentate tips present.

Male: Sexual dimorphism pronounced. Body significantly shorter than female with pereonites and pleonites compressed, much better developed than female. Eyes large, 3 or more times larger than female. Antennule with more than 7 articles, densely packed with aesthetascs. Mouthparts reduced. Cheliped not enlarged. Pleopods well developed with plumose setae much longer relative to body than on female. Uropod with protopod, inflated, nearly as wide as long in lateral view; endopod biarticulate and exopod uniarticulate, about as long as first article of endopod.

Distribution/Ecology.—Florida East Coast (Port Everglades), Florida Keys (Long Key), and Florida West Coast (Tampa Bay). Little is known of the ecology of *Paratanais* sp. A, other than it occurs in depths of 1 to 10 m in carbonate sediments, often associated with live bottom habitats.

Remarks.—*Paratanais* sp. A, a relatively small and apparently undescribed species, is distinguished from the members of other tanaidomorph families known from Florida by the presence of basally swollen plumose setae on the lateral margins of its first 4 pleonites. The female can be distinguished from other known female members of the genus *Paratanais* by a combination of characters including (1) its relatively small size, (2) the downwardly curved large spiniform seta on the antenna, (3) the presence of an unmodified, simple spiniform setae on the basal article of the maxillipedal palp, (4) a chela with 2 small, stout, movable setae on the inner face of propodus just proximal to attachment of the dactyl, and (5) the absence of complex multidentate spiniform setae on pereopods 3-6 (only simple and weakly bidentate setae present).

Only one species referable to the genus *Paratanais* has previously been reported from the western Atlantic. Makavyeyeva (1970) reported *Leptochelia* (= *Paratanais*) *elongata* (Dana, 1855) from shallow (5-10m) Cuban waters. Although she placed her specimens in the genus *Leptochelia* Dana, 1852, her illustrations show an antennule with 4 distinct articles (with article 4 being as long or longer than the combined lengths of articles 2 and 3) and a body form more typical of the genus *Paratanais*. There is a possibility that Makavyeyeva's species may be conspecific with our material from South Florida, but her illustrations are not detailed or complete enough to tell.

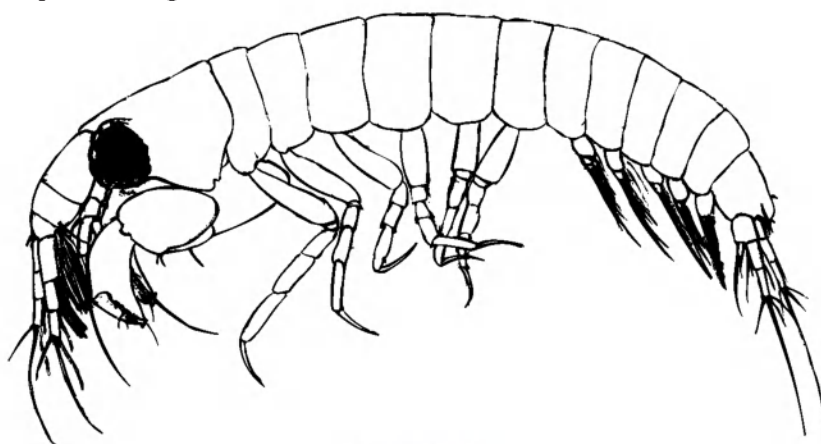
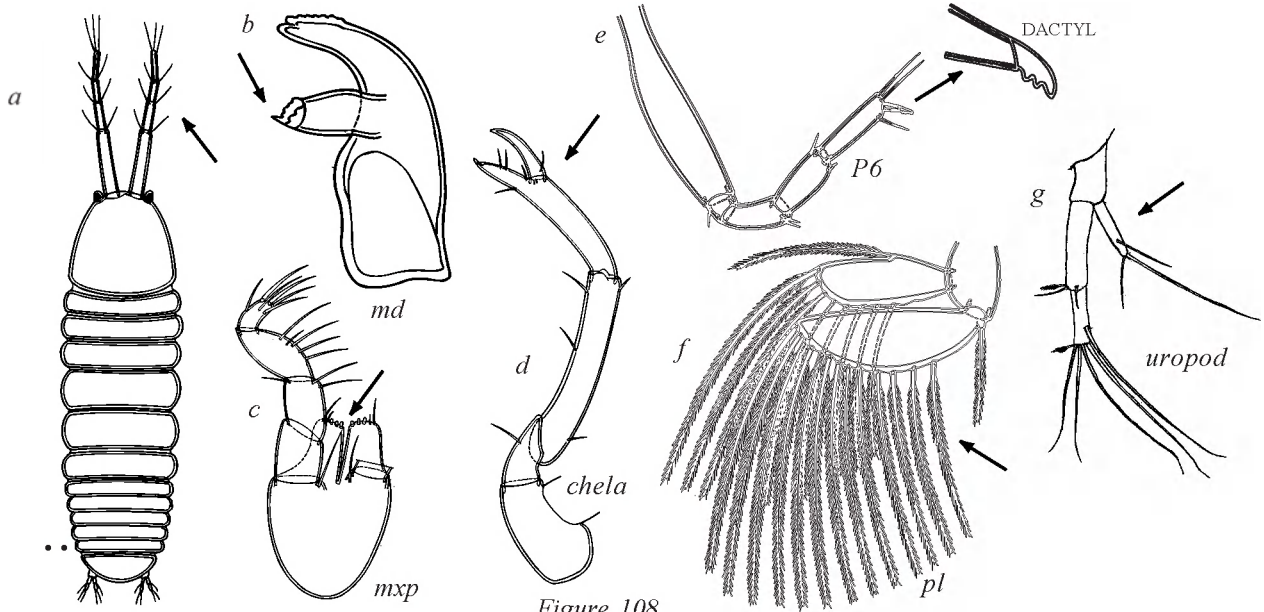


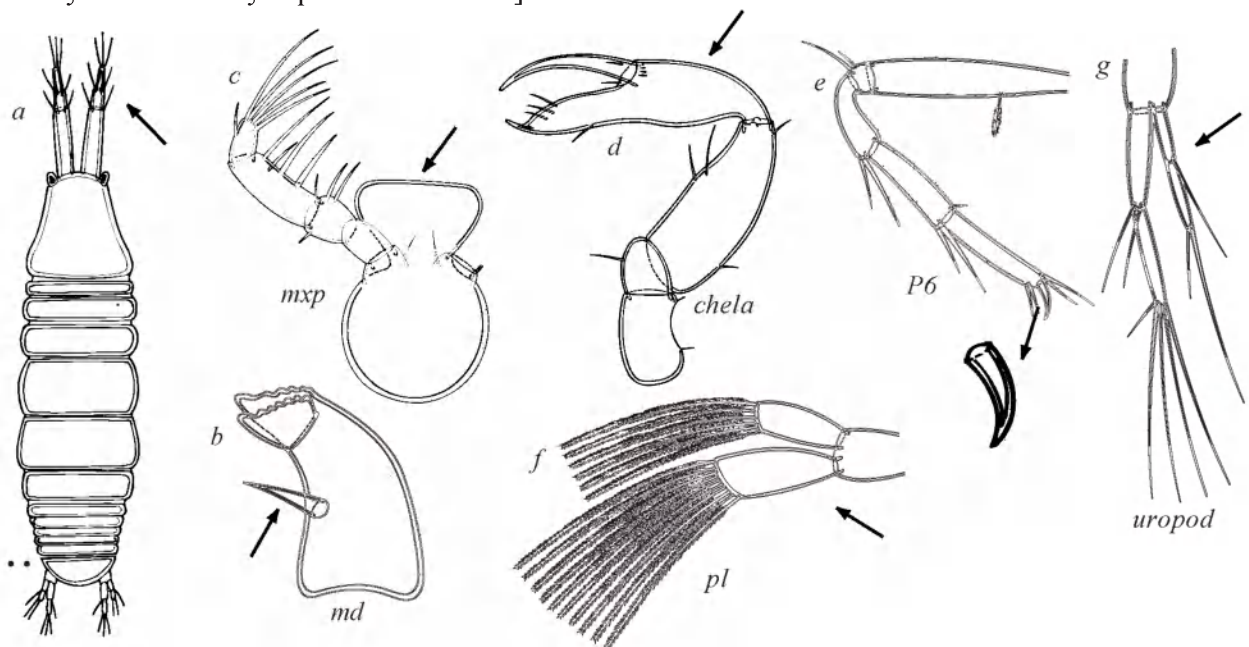
Figure 107

KEY TO FLORIDA SPECIES OF PSEUDOTANAIIDAE

1. •• Antennule with 4 articles. Mandible with molar process typically developed, not highly modified. Maxilliped with endites unfused. Cheliped attenuated, narrow; palm of propodus (excludes fixed finger) elongate, about twice as long as dactyl (movable finger). Dactyl of peraeopods 4-6 denticulate. Pleopod with setae extending into proximal half of endopod. Exopod of uropod unarticulate, not as long as article 1 of endopod. [Body about 2.5 times longer than broad, eye lobes and eyes present] *lungentitanais cf. primitivus* Sieg, 1977



- Antennule with 3 articles. Mandible with molar process reduced to a styliform or spiniform process. Maxilliped with endites fused. Cheliped not elongate, dactyl as long as or nearly as long as palm. Dactyl of peraeopods 4-6, entire (not dentate). Pleopod with endopod and exopod having setae terminal or subterminal, confined to distal half of rami. Exopod of uropod biarticulate, as long as, or longer, than first article of endopod. [Body shape variable, eye lobes and eyes present or absent] 2



2. • Eyes well-developed, with 8 or more distinct ommatidia. Peraeopods 2-6 with carpus having only simple setae on distal margin. [Uropodal exopod reaching past article 1 of endopod, about 2/3 length of endopod]... *Pseudotanaïs* (*Akanthinotanaïs*) *mortenseni* Sieg, 1976

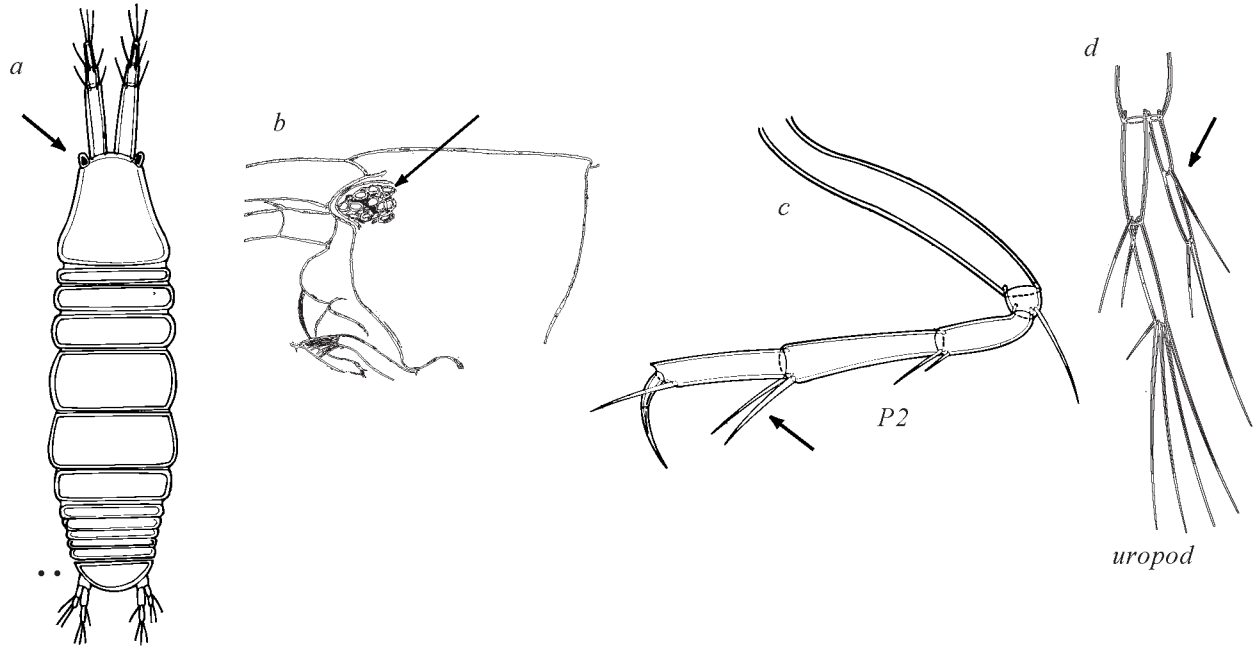


Figure 110

- Eyes and eye lobes absent or poorly developed, lacking distinct ommatidia. Peraeopods 2-4 with carpus having blade-like or spatulate seta distally... (subgenus *Pseudotanaïs*) 3

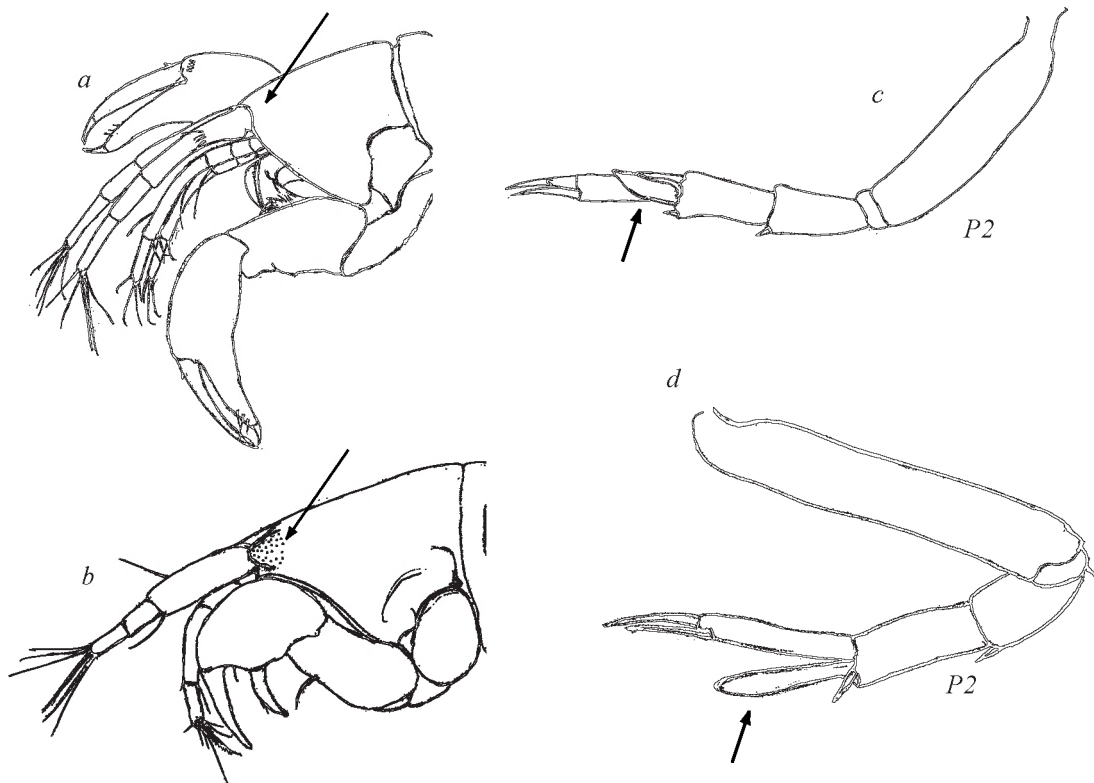


Figure 111

3. ••Fingers of chela without distinct gap between base of fixed finger and articulation of movable finger. Carpus of pereopods 2-6 armed with blade-like spiniform setae on distal margin. Eyes and eye lobes absent. Uropodal rami relatively long, exopod reaching slightly beyond, first article of endopod, less than 2/3 length of endopod *Pseudotanaïs* (*Pseudotanaïs*) sp. A

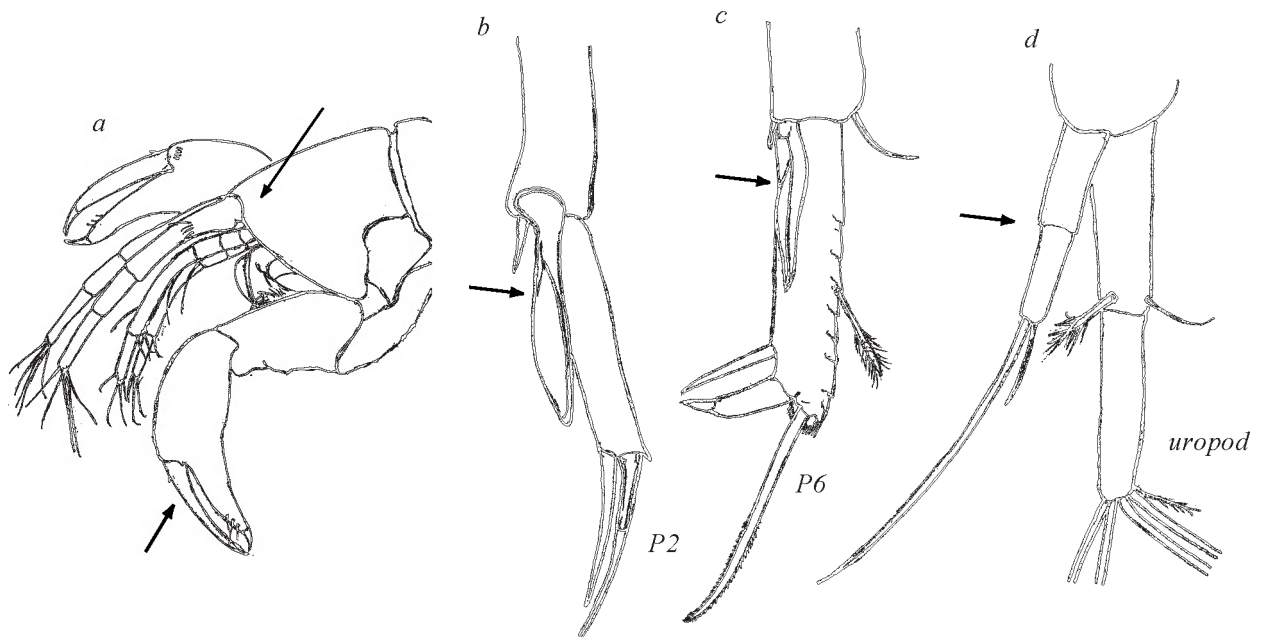


Figure 112

- Fingers of chela having distinct gap between fixed finger and articulation of movable finger. Carpus of pereopods 5-6 with small stout, rounded setulate seta distally (instead of blade-like seta). Eye lobes weakly developed, brownish-orange pigment present. Uropod relatively short, exopod reaching well past first article of endopod, about 3/4 length of endopod
..... *Pseudotanaïs* (*Pseudotanaïs*) sp. B

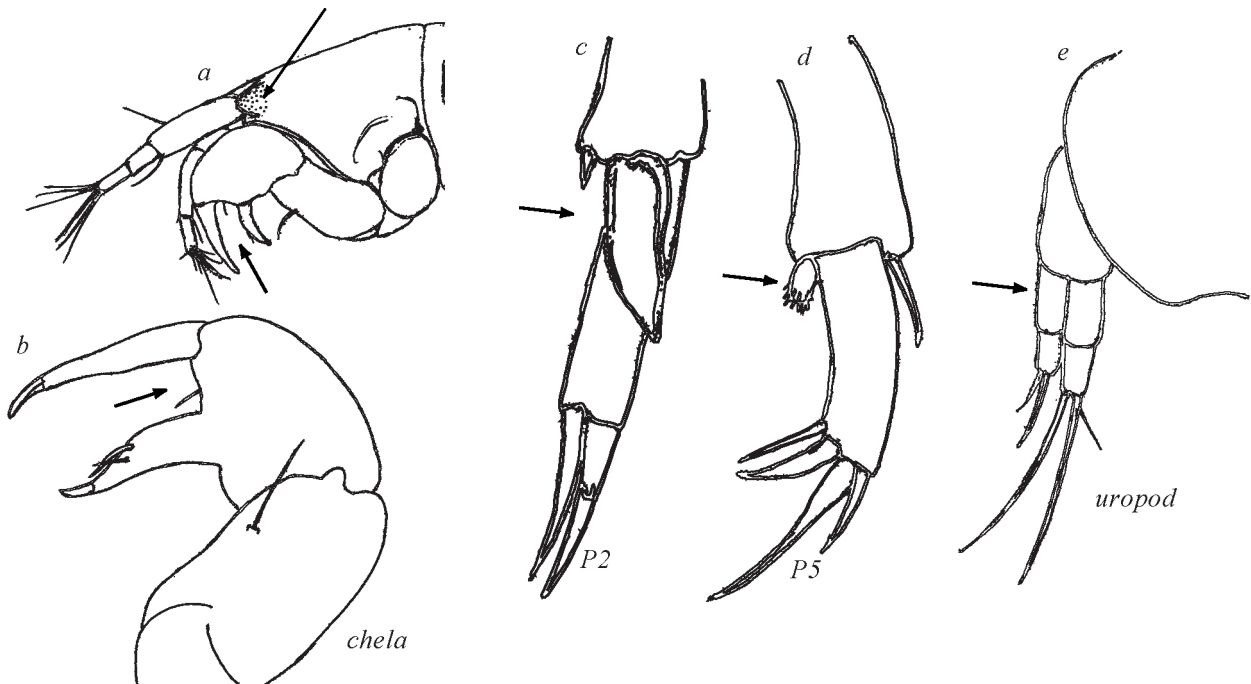


Figure 113

Family Pseudotanaidae Sieg, 1977

The family Pseudotanaididae and its two subfamilies, Pseudotanainae and Cryptocopinae were established by Sieg (1977) to accommodate several genera characterized by the reduction of the first peraeonite and having females with a single pair of oostegites. Most members of the family are small, often less than 1 mm in length. In addition to Sieg (1977), the papers by Sieg and Heard (1988) and Bird and Holdich (1989) should be consulted for additional information on this family.

The two subfamilies can be distinguished by the fused maxillipedal endites in the Pseudotanainae, except in the atypical genus *Parapseudotanaia* Bird and Holdich, 1989, and unfused (distinctly cleft) endites in the Cryptocopinae. At present, the subfamily Pseudotanainae is composed of the two monotypic genera *Mystriocentrus* Bird and Holdich, 1989 and *Parapseudotanaia* Bird and Holdich, 1989, and the much larger type genus *Pseudotanaia*. *Pseudotanaia* contains two subgenera (*Pseudotanaia* and *Akanthinotanaia* Sieg, 1977), which together have about 32 species. In contrast, the subfamily Cryptocopinae has six genera (*Cryptocope* G. O. Sars, 1882; *Cryptocopoides* Sieg, 1976; *Curtichelia* Kudinova-Pasternak, 1987; *Iungentitanaia* Sieg, 1977; *Latitanaia* Kudinova-Pasternak, 1987; *Paraiungentitanaia* Sieg, 1977) representing only 8 species.

The males of the family, when known, differ from the females by being shorter, by having 6 to 7 articles in the antennule with the distal ones bearing several aesthetascs, by having only moderately larger chelae, and by having pleopods, which are larger and with better developed natatory setae.

Although the members of the Pseudotanaidae are largely confined to deep water (Sieg and Heard 1988), four species, one belonging to the subfamily Cryptocopinae, and three belonging to the subfamily Pseudotanainae, have been collected from Florida coastal waters.

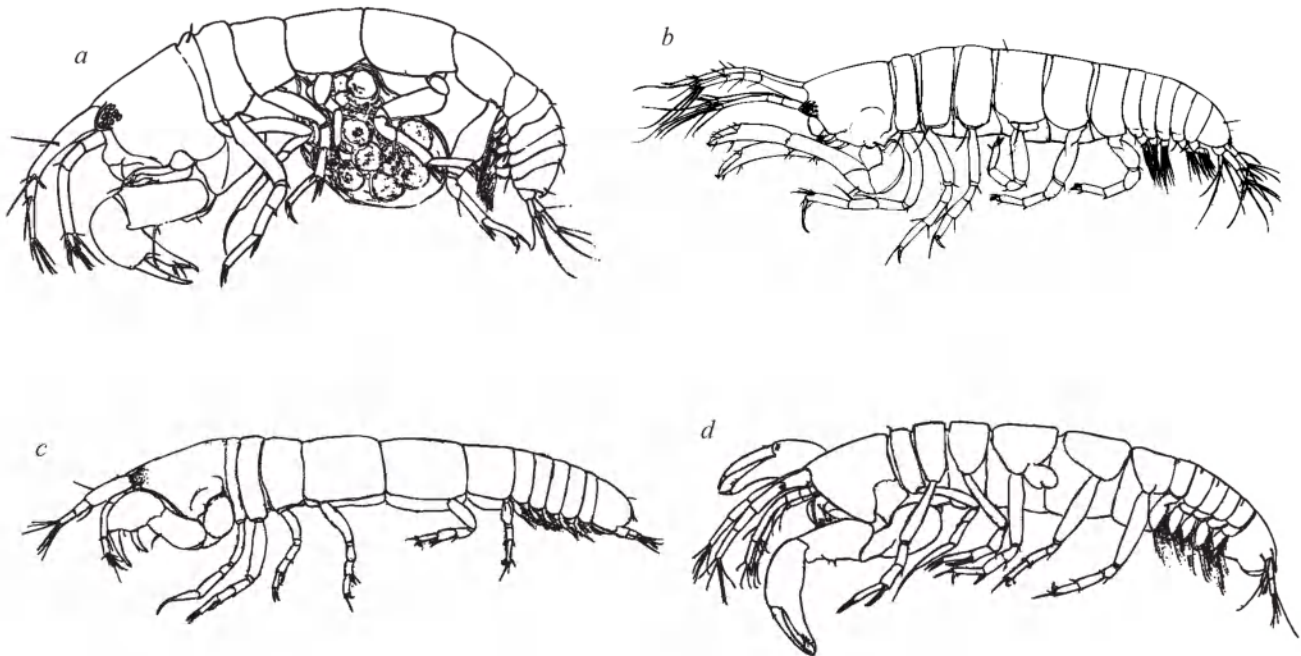


Figure 114

Subfamily Cryptocopinae Sieg, 1977

Iungentitanais primitivus Sieg, 1977

Recognition characters. – Female. Body small, 0.8-0.9 mm long, 2.5 times longer than broad. Antennule longer than carapace and first two pereaeonites combined, very slender. Cheliped with carpus and propodus elongated; dactyl and fixed finger short (less than half length of palm). Peraeopods 4-6 unguis ventrally dentate. Pleopod with exopod and endopod having natatory setae extending along rounded inner margins into proximal half of rami. Uropod having endopod biarticulate, exopod appearing uniarticulate. Male unknown.

Distribution/Ecology. – Presently known only from the southwestern Gulf of Mexico, southeastern Florida coast (off Port Everglades), Florida Keys (Pumpkin Creek and Shark Channel) and St. Thomas, Virgin Islands (type locality) in depths ranging from 4-28m. Little is known of the ecology of this small cryptic species other than it is associated with carbonate substrata of the inner continental shelf.

Remarks. – The distinctive elongate chela with its relatively short fingers distinguishes this species from all other tanaidomorphs known from Florida waters. We have tentatively attributed the Florida specimens to *Iungentitanais primitivus* to the one described by Sieg (1977) from the southern Caribbean. There are some differences between the original description and specimens that we have examined from South Florida, and most notably being the presence of an apparent uniarticulate uropodal exopod, which in our material is shorter than the first article of the endopod. Sieg (1977) and Sieg and Heard (1988) have reported and illustrated the exopod of *I. primitivus* as being biarticulate. Study of type material and additional material from the Keys and SE Gulf of Mexico is needed to better determine the taxonomic status of Florida populations.

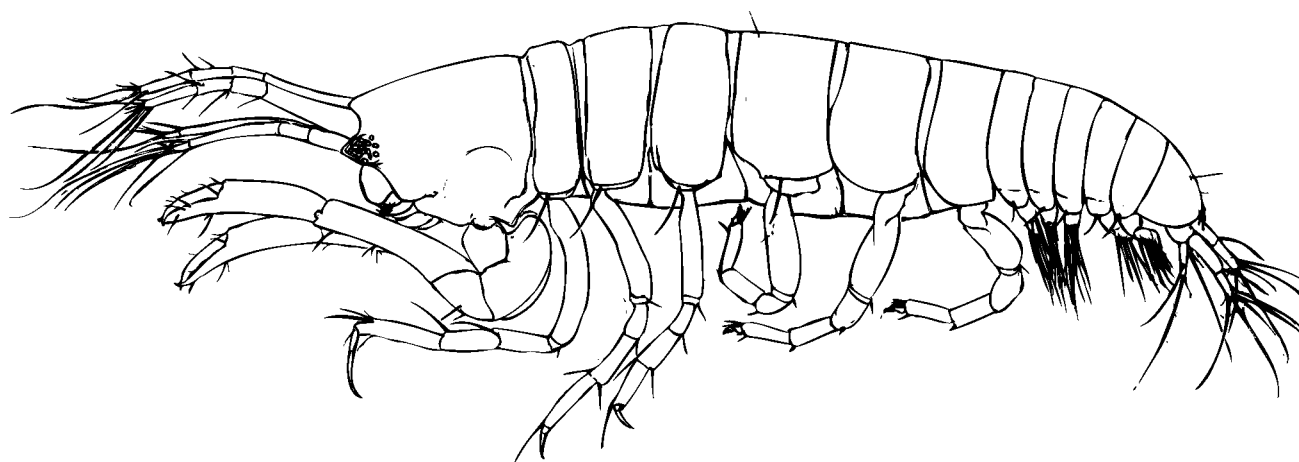


Figure 115

Subfamily Pseudotanainae Sieg, 1977

Pseudotanais (Akanthinotanis) mortenseni Sieg, 1977

Recognition character.—Female: Eyes present, well-developed with distinct ommatidia. Chela without distinct gape between fingers. Distal margin of carpus on pereopods 2-4 with simple setae. Peraeonites 4 and 5 relatively small, broader than long, lateral margins convex. Pleopods present, well-developed; exopod and endopod with natatory setae on distal margin only. Exopod distinctly longer than first article of endopod. Male unknown.

Distribution/Ecology.— St. Thomas, Virgin Islands (type localities) and southwestern Gulf of Mexico (see Sieg 1977, Sieg and Heard 1988). Like *I. primitivus*, little is known of the ecology of this small cryptic species other than in Florida it is associated with carbonate substrata of the inner continental shelf.

Remarks.— The presence of well-developed eyes and simple setae instead of a blade-like seta on the distal margin of the carpus of pereopods 2-5 immediately distinguishes *P. mortenseni* from the other two species, both of which belong to the subgenus *Pseudotanais*, reported here from Florida shelf waters. *Pseudotanais mortenseni* has been previously reported from depths of 18-25 m (Sieg and Heard 1988) in carbonate sediments. As in the case of *Iungentitanais primitivus*, there are some differences between the original description of *P. mortenseni* and the material examined in Florida. Further detailed taxonomic study of the Florida populations attributed to *P. mortenseni* is needed.

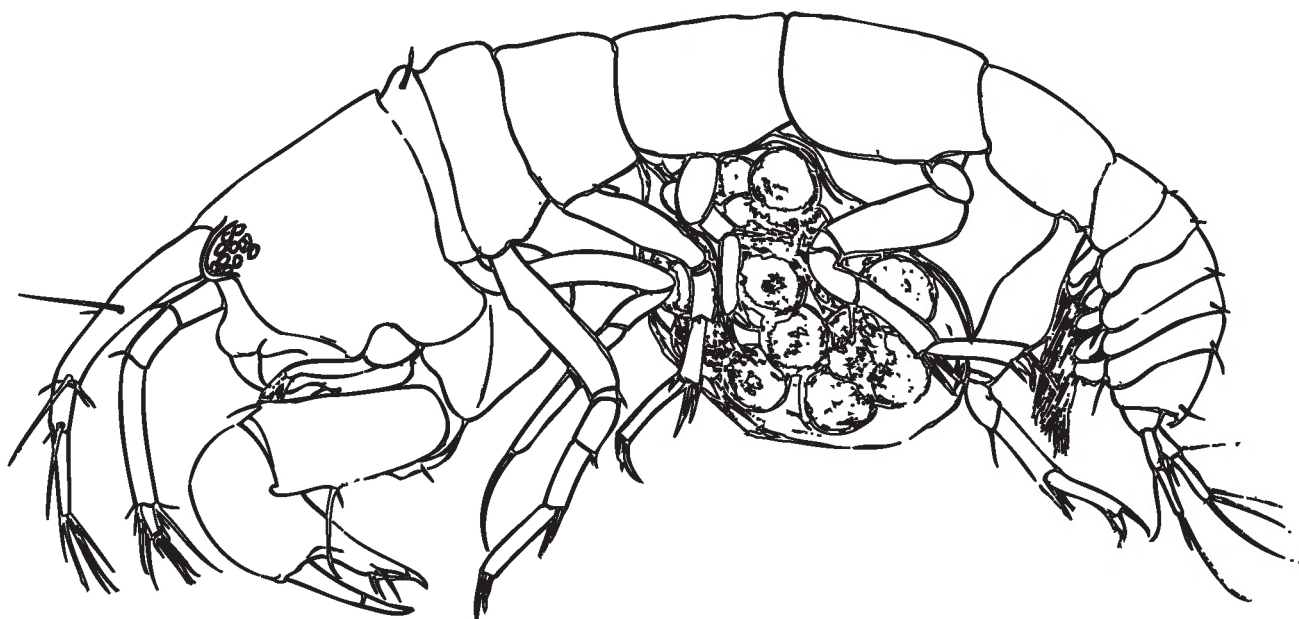


Figure 116

Pseudotanaïs (Pseudotanaïs) sp. A

Recognition characters.—Female. Body relatively stout, about 1 mm long. Eye lobe and eyes absent. Chela without gap between fingers. Peraeopods 2-6 with blade-like seta on carpus, blade-like seta on peraeopods 2-3 well-developed, extending nearly to dactyl those on peraeopods 4-6 smaller. Male. Unknown.

Distribution/Ecology.—Known only from the southwestern Florida shelf, just north of the Florida Keys. Nothing is known of the ecology of this species except that it occurs in carbonate sediments.

Remarks.—*Pseudotanaïs* sp A appears to be undescribed. It is characterized and differs from other members of the genus by a combination of characters, including its relatively large size, the shape of the chela, and the distinctive setation of the peraeopods. It is distinguished from *Pseudotanaïs mexikolpos* Sieg and Heard, 1988, known from the northern Gulf of Mexico, by the longer blade-like spiniform setae on peraeopods 2-4 and 5-6, and from *Pseudotanaïs* sp. B by lacking a distinctive gap between the fingers of the chela and lacking eye lobes.

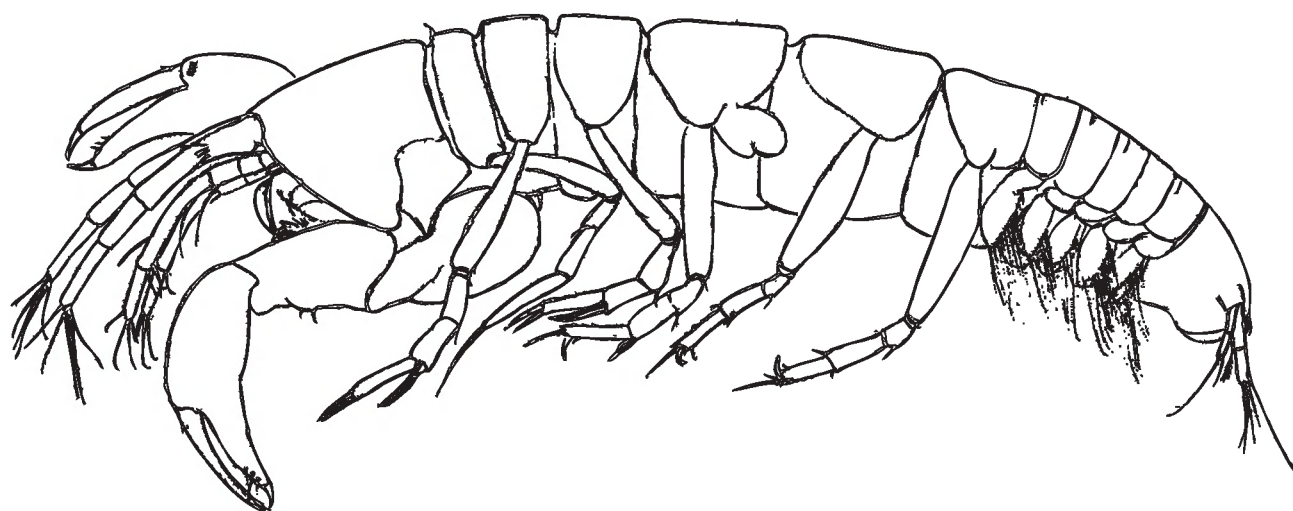


Figure 117

Pseudotanaïs (Pseudotanaïs) sp. B

Recognition characters.—Female.—Body elongate, about 1 mm long. Eye lobes weakly developed, brownish-orange pigment present, distinct visual elements (ommatidia) apparently absent. Fingers of chela with distinct gap between articulation of dactyl and fixed finger. Distal margin of carpus on pereopods 5 and 6 with small stubby (nearly as wide as long), rounded, distally setulate seta. Uropodal exopod reaching well past first article of endopod, 3/4 length of endopod. Male. Unknown.

Distribution.—Known only from a single location north of the Florida Keys on the southwestern Florida shelf. As for *Pseudotanaïs* sp. A, nothing is known of the ecology of this species except that it occurs in mid-shelf carbonate sediments.

Remarks.—This apparently undescribed species is distinguished from the other two species known from Florida waters by the distinctive gap between the fixed finger and the articulation of the dactyl (movable finger) and by the distinctive setation of the pereopods, especially 5 and 6. *Pseudotanaïs californiensis* Dojiri and Sieg, 1997, described from shelf waters off California, appears to be a closely related sister species to *Pseudotanaïs* sp. B. Two other species, *P. (P.) jonesi* Sieg, 1977 and *P. abyssi* Hansen, 1913, both from deep water, also have the gap between fixed finger and articulation of dactyl. *Pseudotanaïs* sp. B is immediately distinguished from these two deep water forms by the presence of the stubby rounded seta, which occurs in place of blade-like seta, on the distal margin of the carpus on pereopods 5 and 6.

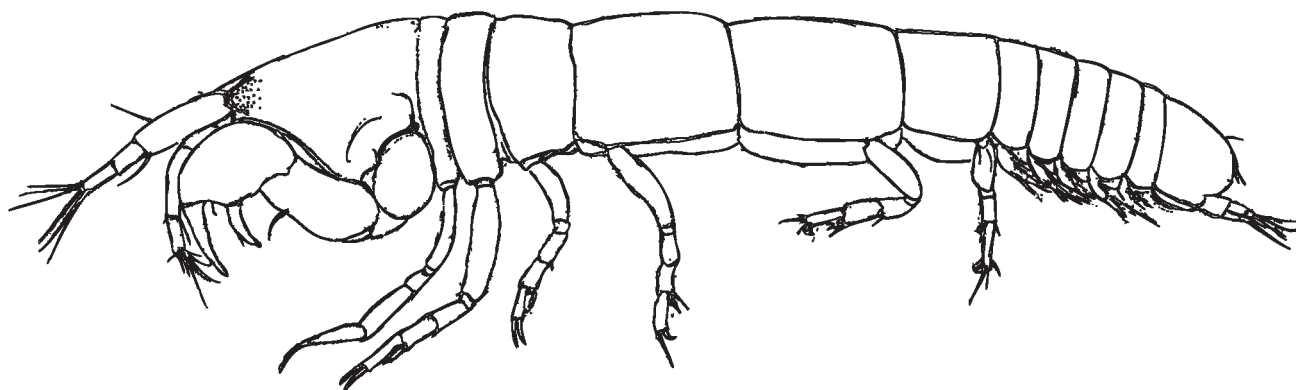


Figure 118

Family Leptocheliidae Lang, 1973

Some of the members of this widely distributed family, especially those belonging to the genus *Leptochelia* Dana, 1852, represent some of the most challenging tanaidaceans to identify. This is due largely to the morphological homogeneity displayed by the female and neuter stages, and to the high degree polymorphism and sexual dimorphism exhibited by the males (e.g.; members of *Leptochelia dubia* complex). One of the most reliable characters for distinguishing leptocheliids from other members of the superfamily Paratanoidea is the presence of 3 or more articles in the endopod of the uropod. Except for the four members of the deep water Atlantic genus *Mesotanaïs* Dollfus, 1897, members of the other leptocheliid genera have eyes. Other characters of the family include (1) antennule of female and neuter forms having 3 apparent articles (excluding microscopic terminal article), those of some the terminal females and protogynic premale neuter stages with 4 apparent articles (e.g., *Leptochelia cf. forresti*), and those of the males having 5 or more articles, usually densely armed with aesthetascs; (3) maxilliped in females with basis and endites not fused; and (4) maxilliped, as well as the other mouth parts, in males being degenerate, non-functional, greatly reduced, or absent.

As presently constituted, the family contains two subfamilies, nine genera, and 42 species (see Larsen and Wilson 2002, Larsen 2003, and Tanaidacea home page). The subfamily Heterotaninae Larsen and Wilson, 2002, which is composed of two genera, *Heterotanaïs* G. O. Sars, 1882 and *Heterotanoides* Sieg, 1977 containing a total of seven species. In Florida shelf waters there is a single unconfirmed record of “*Heterotanaïs* sp.” by Camp, et al (1977) (see remarks for *Leptochelia dubia*). The subfamily Leptocheliinae Lang, 1973 contains seven genera. Of these *Leptochelia* Dana, 1849, *Pseudoleptochelia* Lang, 1973, *Pseudonototanaïs* Lang, 1973 alone contain over two thirds (35) of the currently recognized species within the family. The other four genera, *Hargeria* Lang, 1973; *Intermedichelia* Gutu, 1996; *Grallatotanaïs* Gutu and Iliffe, 2001, and *Bathyleptochelia* Larsen, 2003, are monotypic. In Florida coastal waters the subfamily is represented by four genera (*Hargeria*, *Leptochelia*, *Pseudoleptochelia*, and *Pseudonototanaïs*) with a total of seven species.

The subfamily status of the deep water leptocheliid genus *Mesotanaïs* Dollfus, 1897, remains uncertain (see Larsen and Wilson 2002). One species of this genus occurs in Florida shelf waters. (see Sieg and Heard 1989).

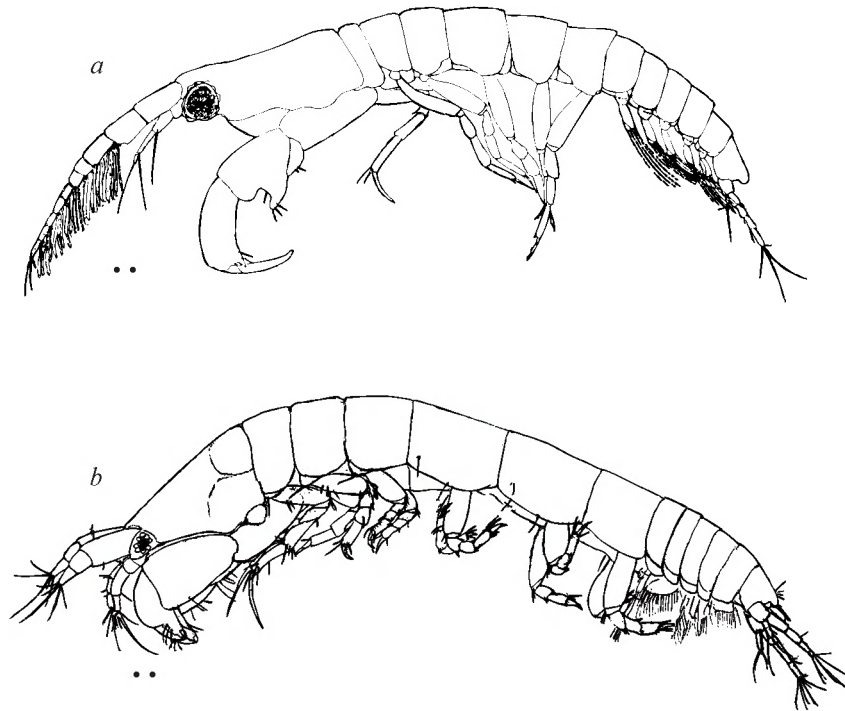


Figure 119

KEY TO THE SPECIES OF LEPTOCHELIIDAE KNOWN FROM FLORIDA WATERS

1. • Eyes absent in both sexes. [Uropod with endopod having 6 apparent articles and exopod having 2 apparent articles in both sexes; deep continental shelf and slope species] *Mesotanais vadicola*

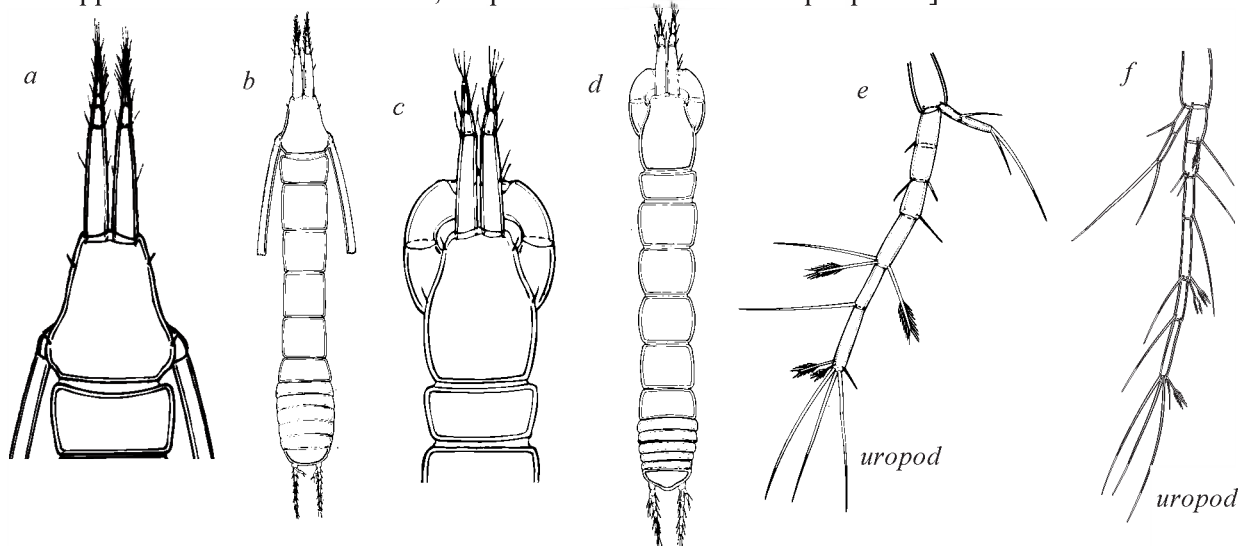


Figure 120

- Eyes present [Uropod with endopod having 3-6 apparent articles and exopod having 1-2 apparent articles in both sexes] 2

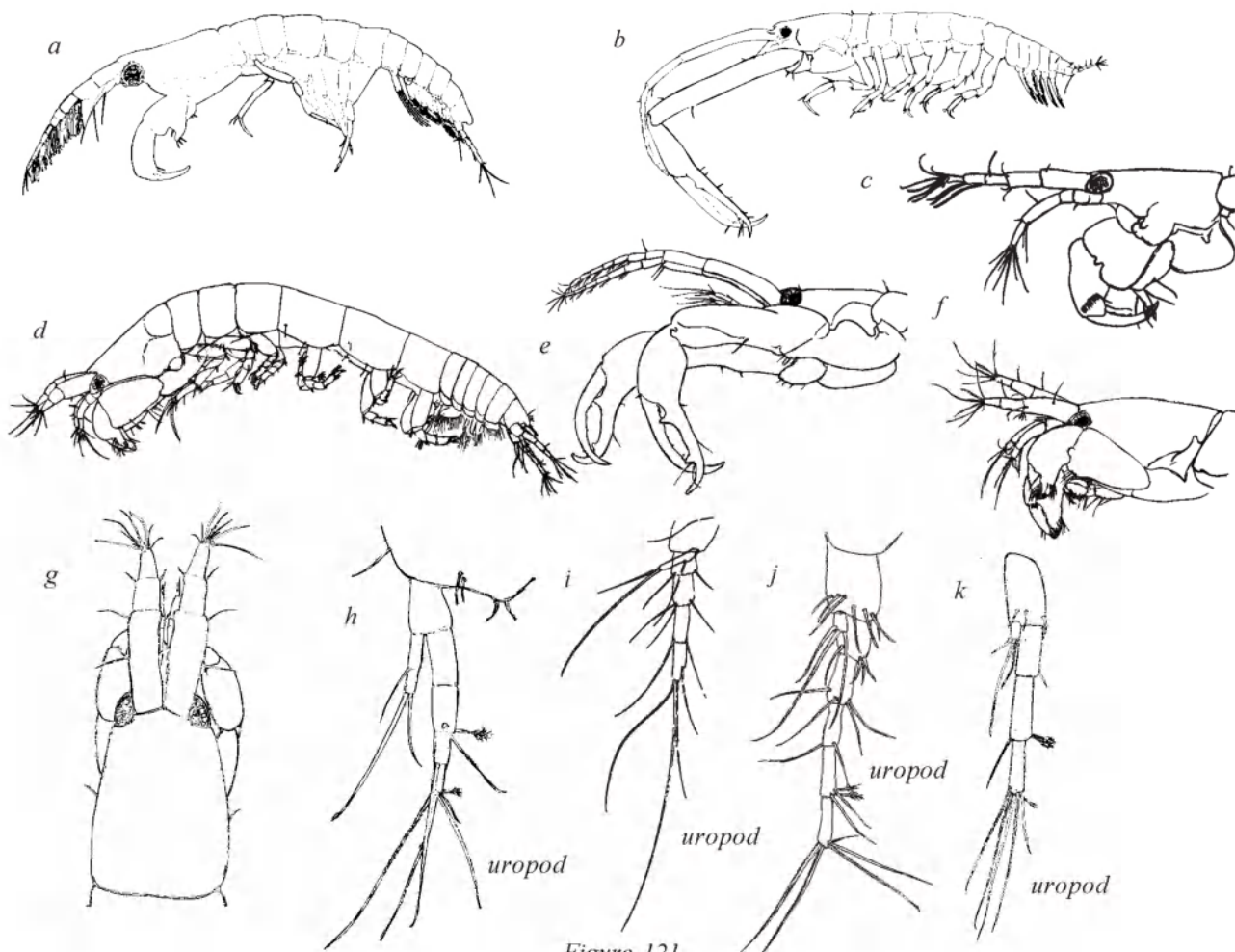


Figure 121

2. • Antennule with 5 or more apparent articles; numerous aesthetascs on smaller distal articles. Chela greatly enlarged or highly modified (males) 8

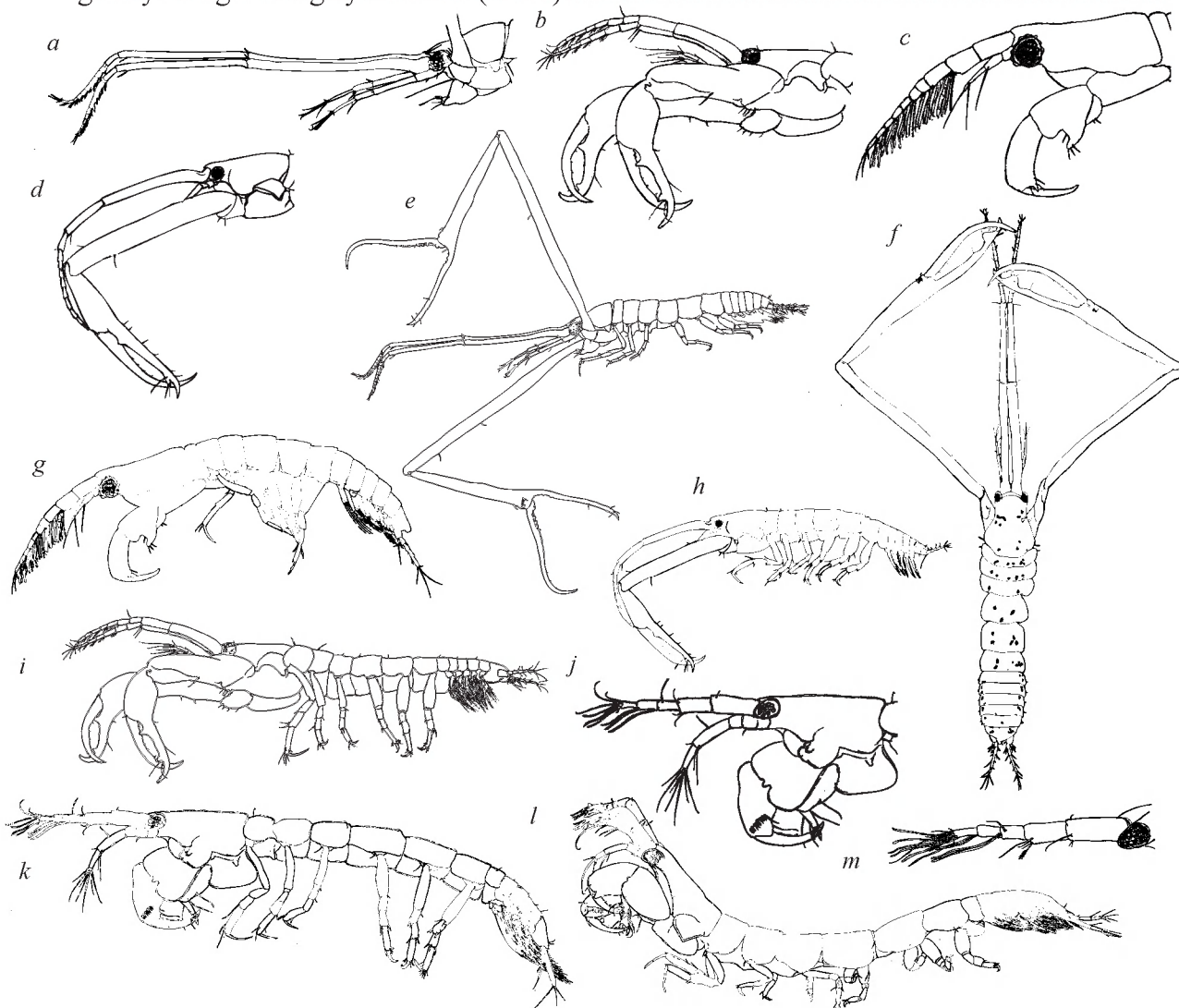


Figure 122

- Antennule with 3 or 4 apparent articles (excluding, minute distal 4 or 5 may be present; 0-2 aesthetascs on distal article. Chela not highly modified or greatly enlarged 3

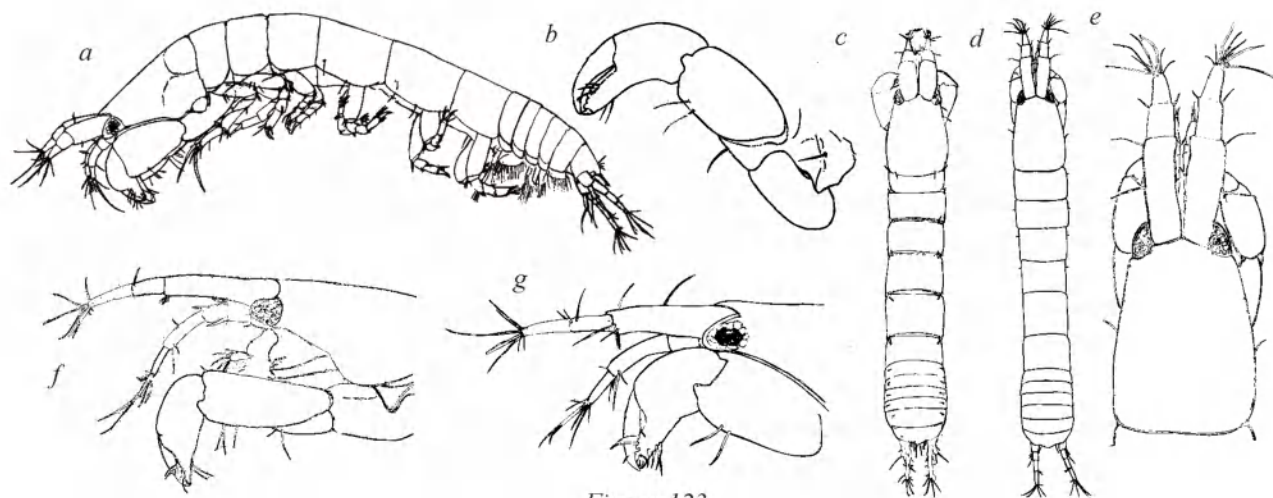


Figure 123

3. • Uropod with endopod having 6 apparent articles [Antennule with 3 (terminal female) or 4 (premale “neuter”) apparent articles and a minute distal article] (protogynic terminal female or pre-male stage of *Leptochelia forresti/longimana* complex)* 4

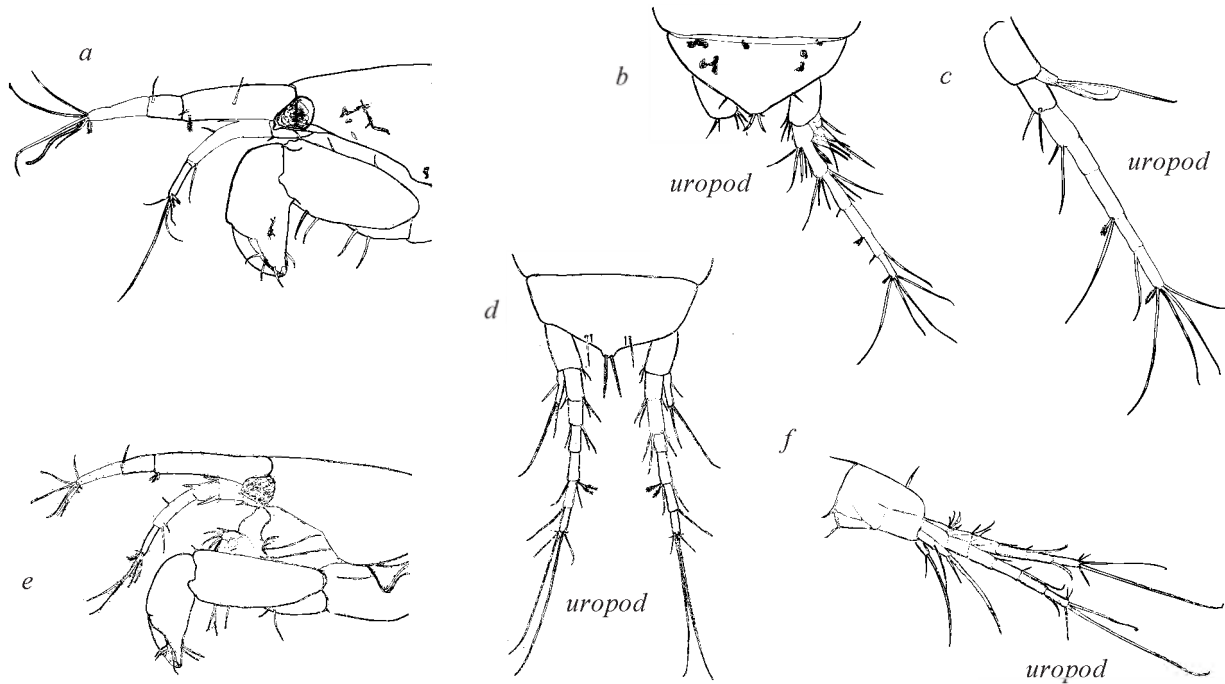


Figure 124

- Uropod with endopod having 3 to 5 articles [Antennule with 3 apparent articles and a minute distal article.] (most neuters & females) 5

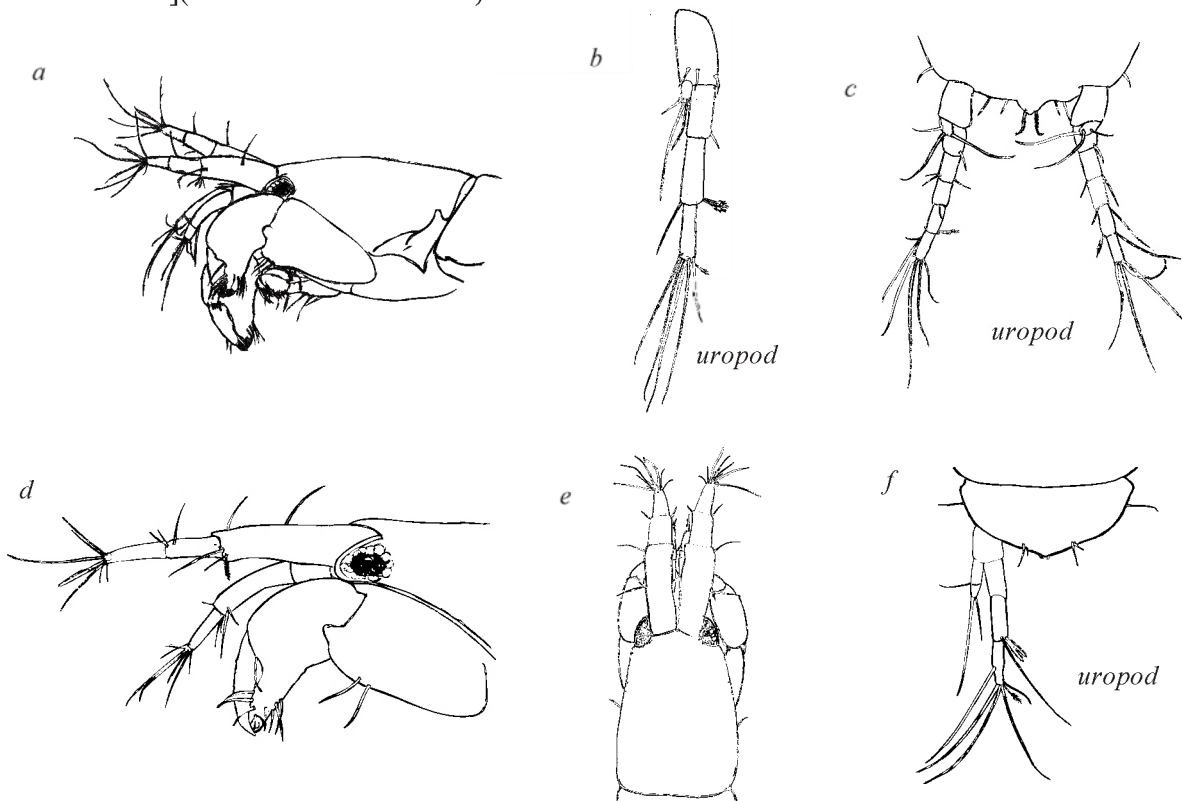


Figure 125

4. • Article 2 of antenna with distoventral margin armed with strongly developed spiniform seta with attenuated tip. Uropod with exopod as long or longer than first article of endopod. [Body lacking small, dark pigment spots in thorax and in abdomen at bases of pleopods] *Leptochelia* cf. *longimana* (terminal females and pre-male neuter)

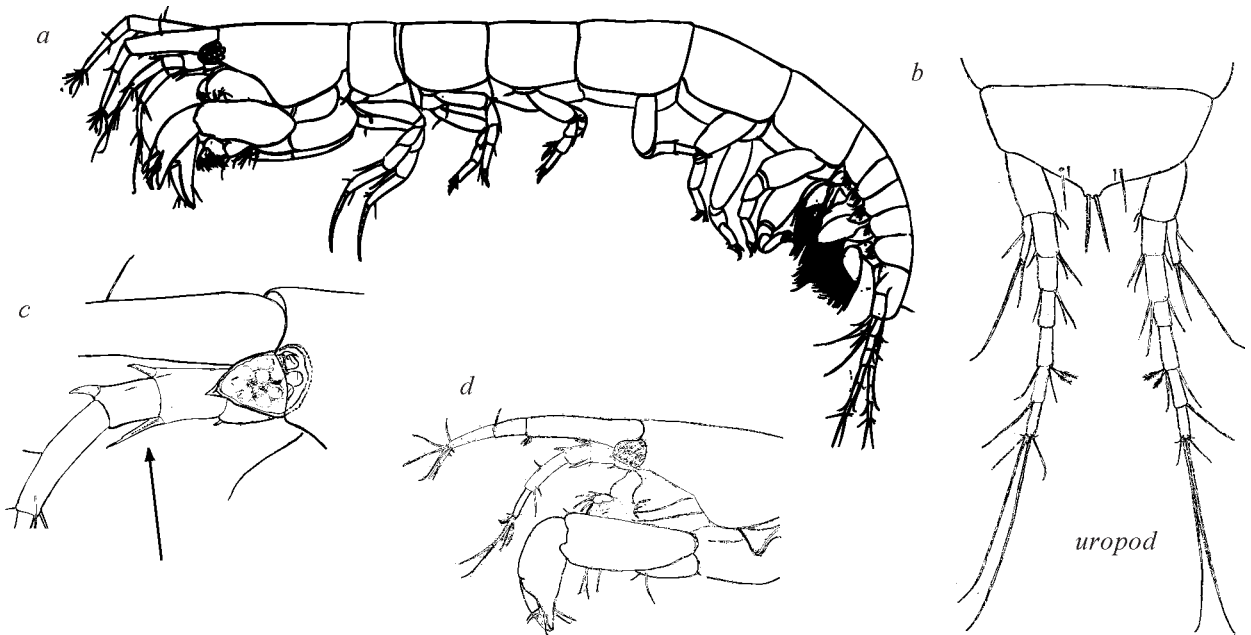


Figure 126

- Article 2 of antenna with distoventral margin armed with small spiniform setae. Uropod with exopod much shorter than first article of endopod. [In fresh or recently preserved specimens, body with small, dark pigment spots in thorax and in abdomen (especially at bases of pleopods)] *Leptochelia forresti* (terminal female & premale neuter)



Figure 127

5. • Uropod with 5 articles.
 *Hargeria rapax*/ *Leptochelia dubia* (females and neuters) and *Leptochelia foresti* L. cf
longimana (subterminal female and neuters)

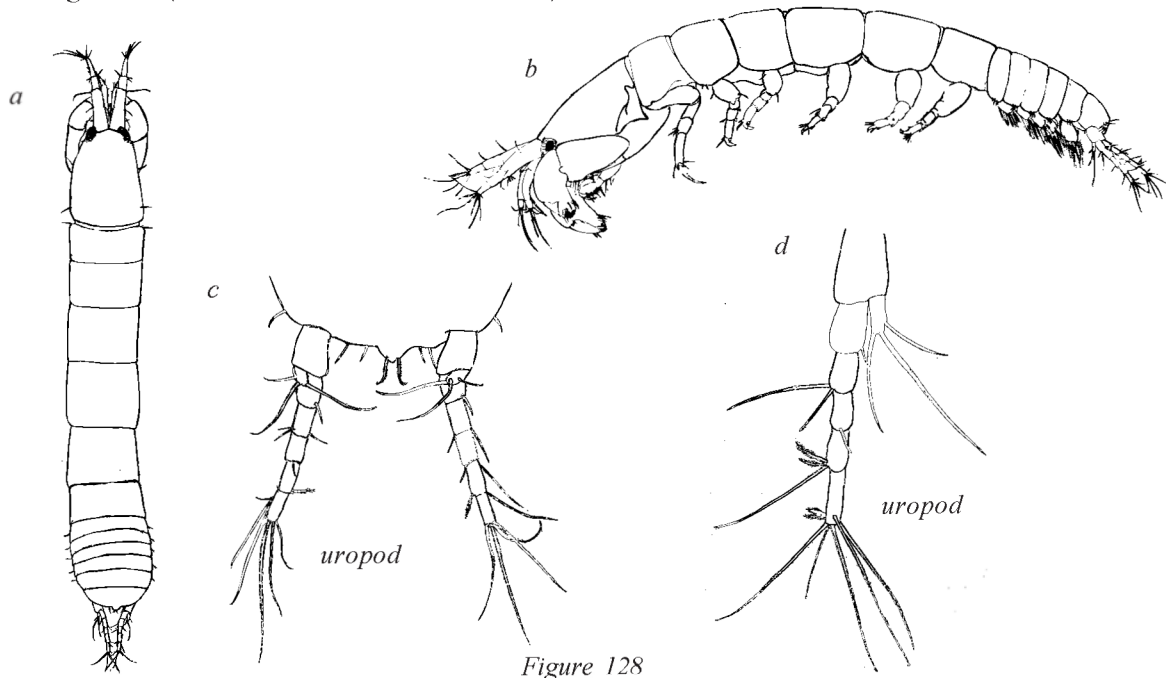


Figure 128

- Uropod having endopod with 3-4 apparent articles 6

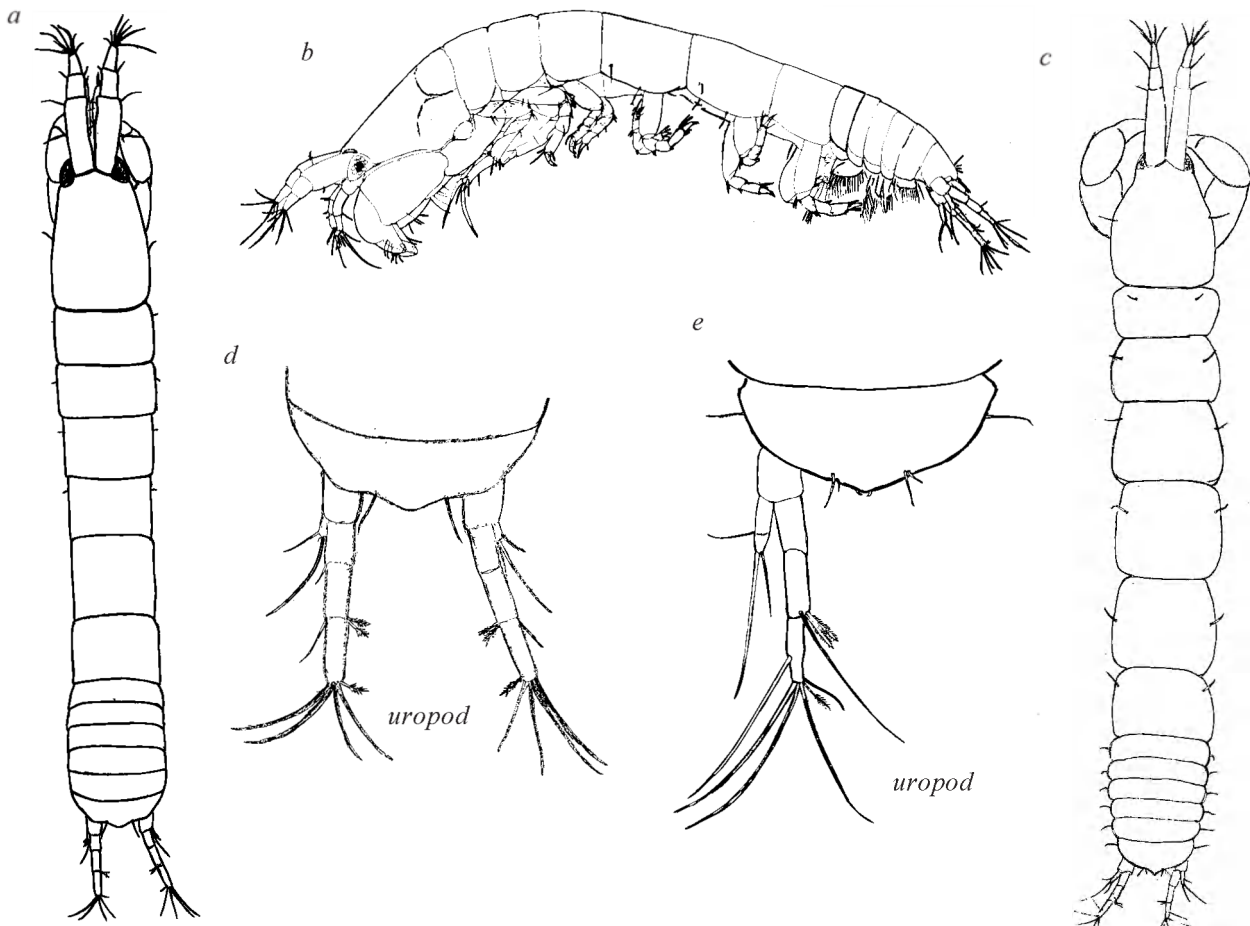


Figure 129

6. • Antennule relatively short with proximal article expanded dorsally *Pseudoleptochelia* sp. A (female)

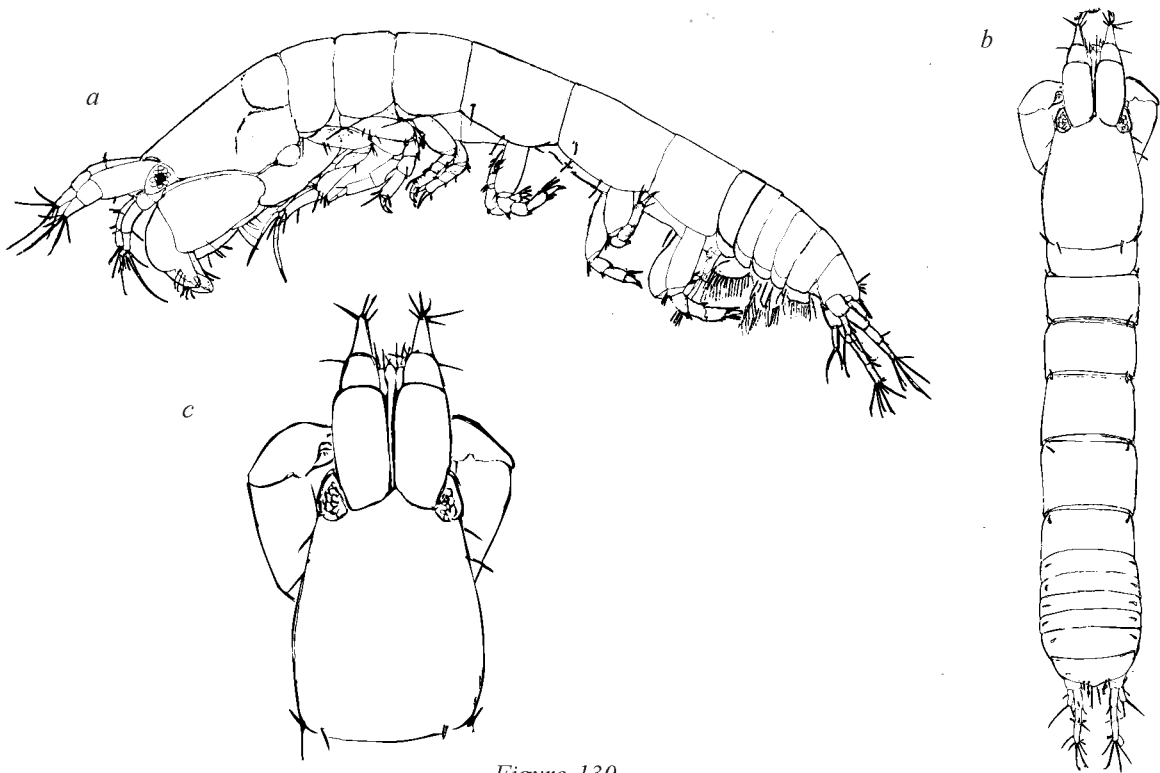


Figure 130

- Antennule relatively elongate with proximal article not dorsally expanded 7

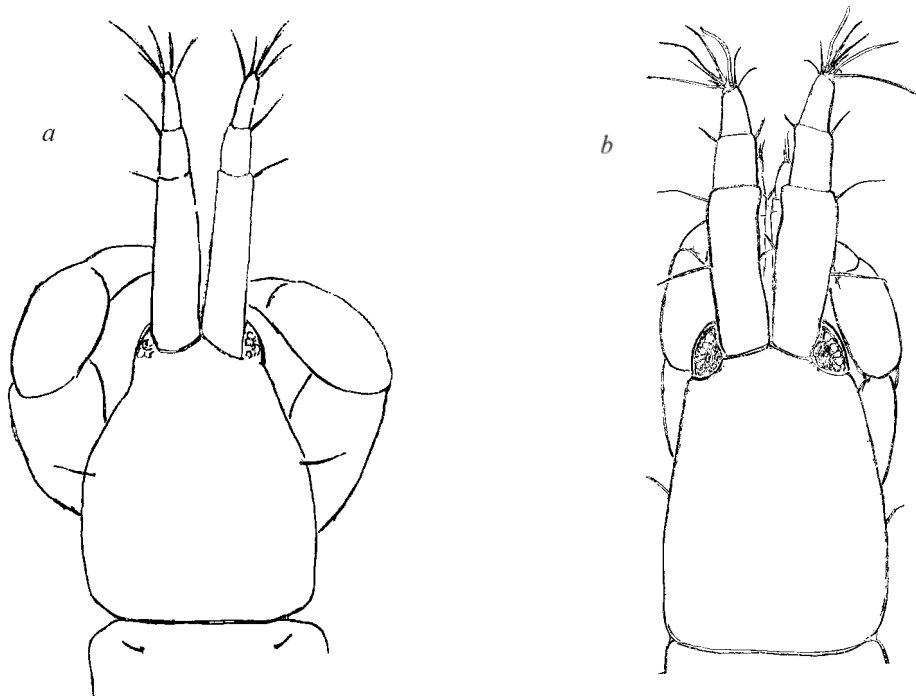


Figure 131

7. • Uropod with exopod extending to or past first article of endopod *Pseudonototanaia* sp. A (female)

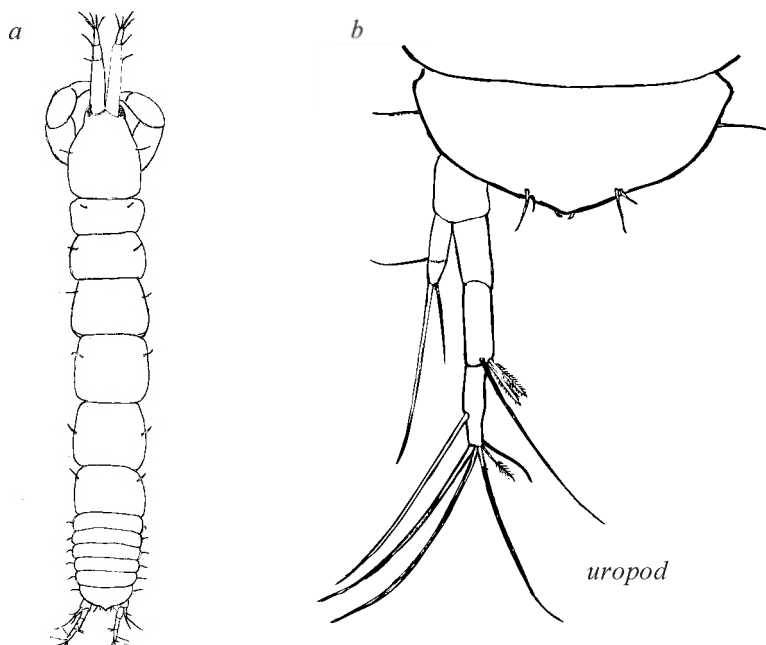


Figure 132

- Uropod with exopod reduced, extending less than half the length of first article of endopod *Pseudonototanaia* sp. B (female)

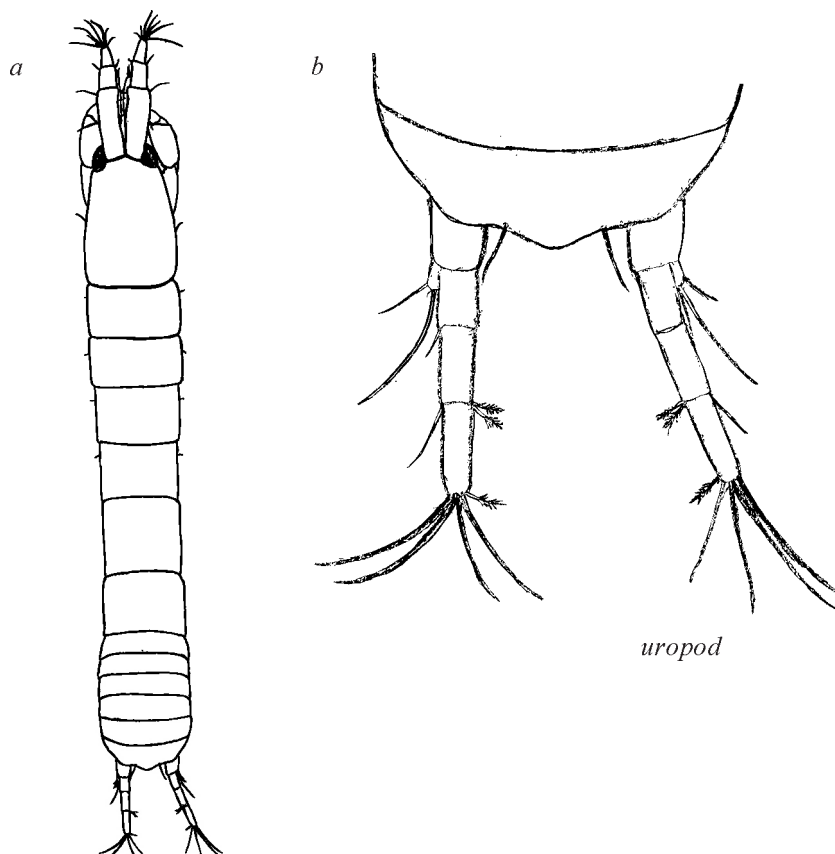


Figure 133

8. • Antennule having 5 apparent articles. Chela compressed with carpus expanded, extending over propodus; fixed finger directed ventrally, widely separated from movable finger at base. Uropod with endopod having 3 or possibly 4 articles... *Pseudonototanaia* (males) 9

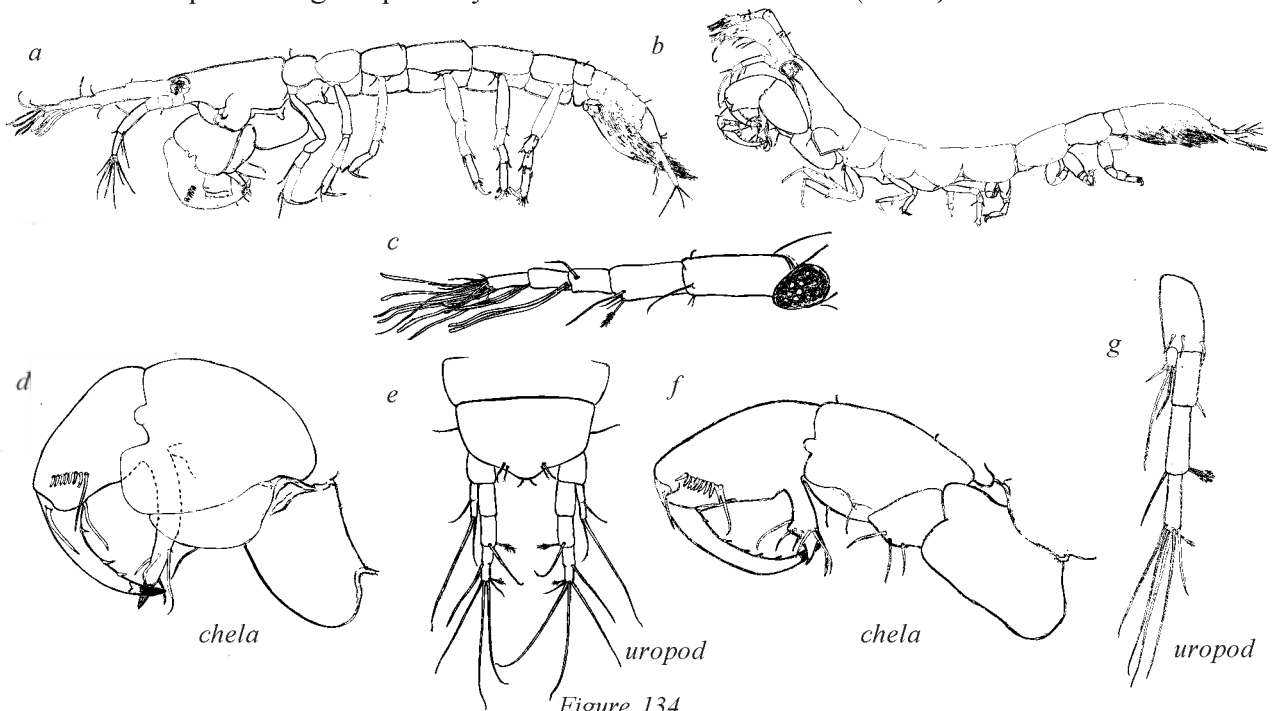


Figure 134

- Antennule having 7 or more articles, length half or more of the body length (excluding uropods).
Uropod with endopod having 4-6 articles 10

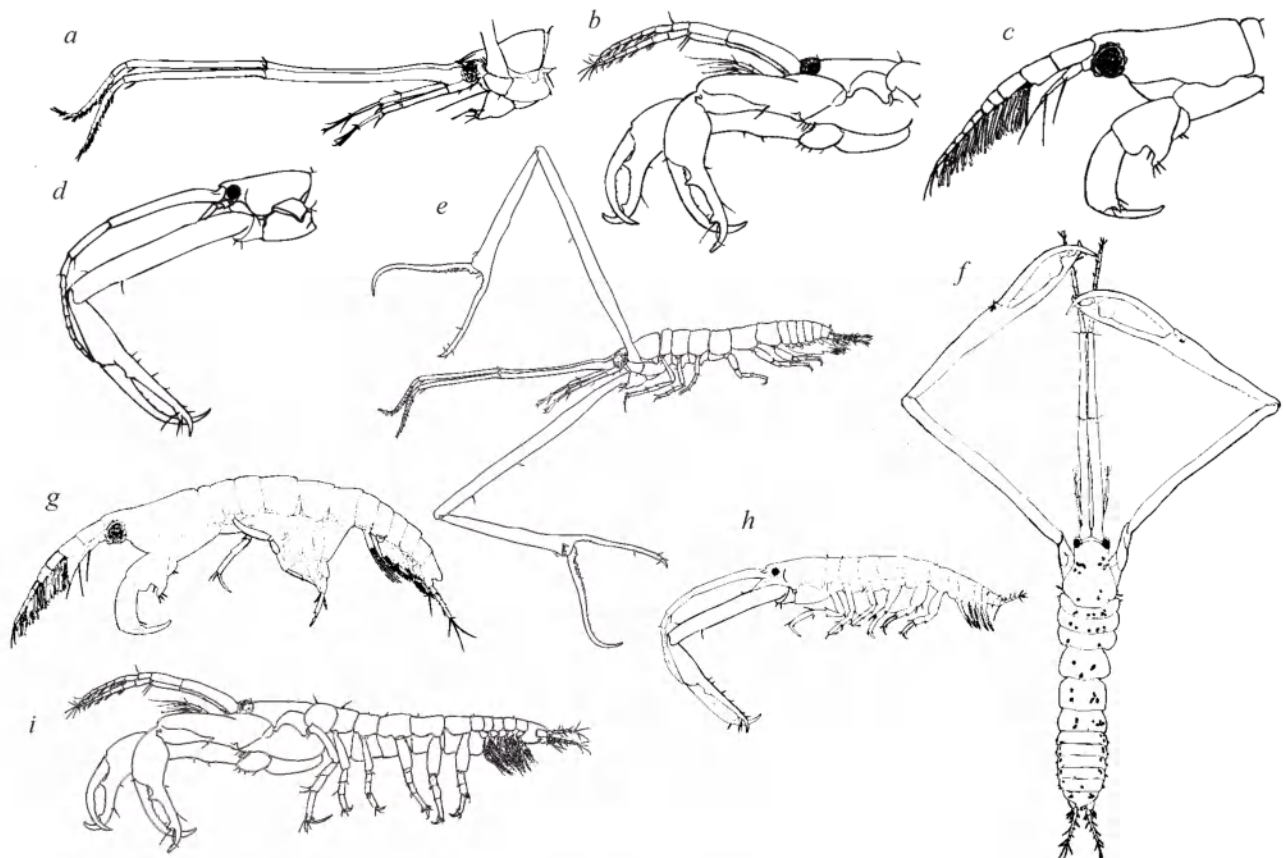


Figure 135

9. • Chela with inner face of propodus bearing row of 10-11 comb setae, fixed finger stiliform without distal, rounded tooth. Uropod with exopod extending past first article of endopod

..... *Pseudonototanaïs* sp. A (male)

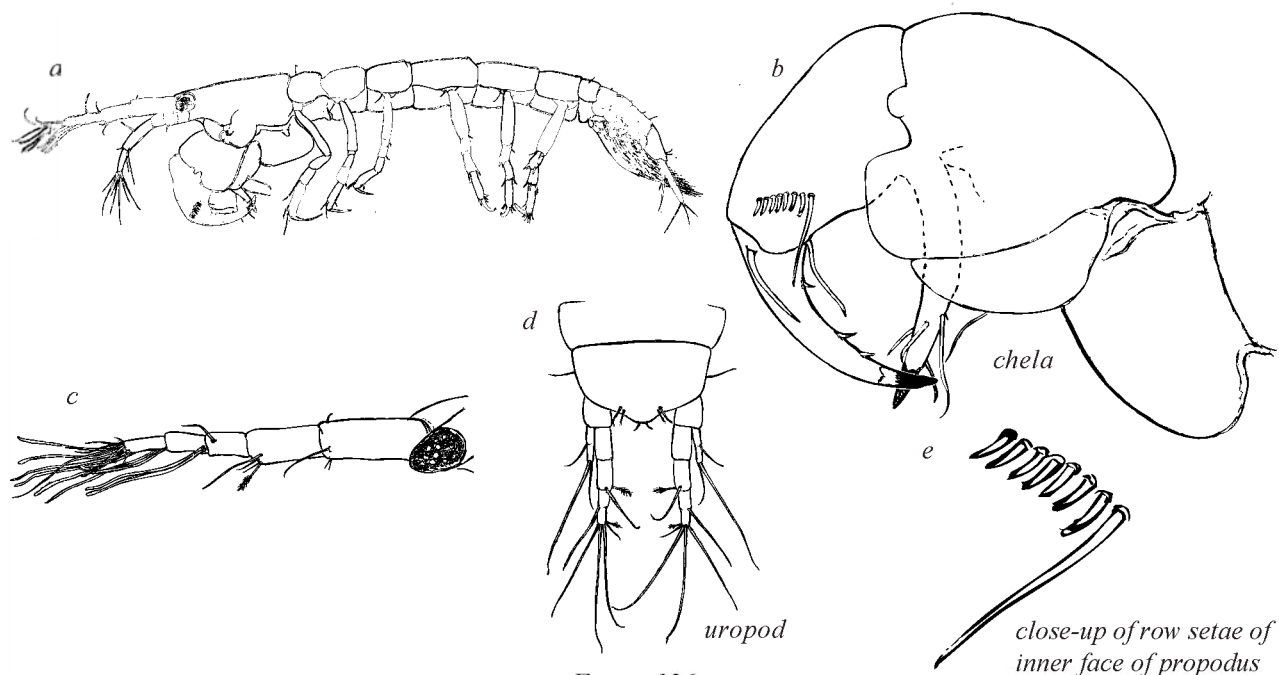


Figure 136

- Chela with inner face of propodus bearing row 13-14 comb setae; fixed finger with blunt, rounded, distal tooth. Uropod with exopod minute, extending less than half length of first article of endopod ..

..... *Pseudonototanaïs* sp. B (male)

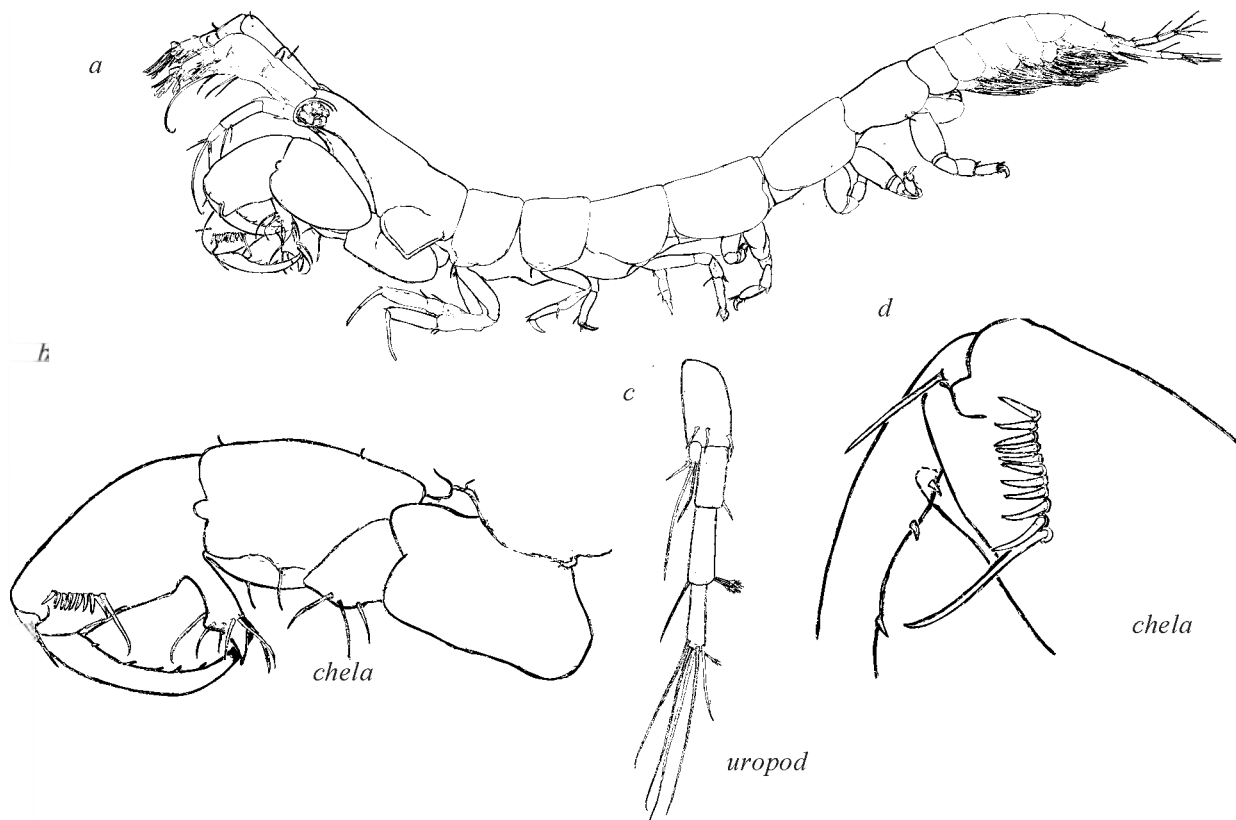


Figure 137

10. • Chela atypical, appearing parachelate, movable finger (dactyl) strongly developed and extending far past reduced fixed finger; carpus expanded with a blunt anteroventral process. Uropod with endopod having 4 articles *Pseudoleptocheila* sp. A

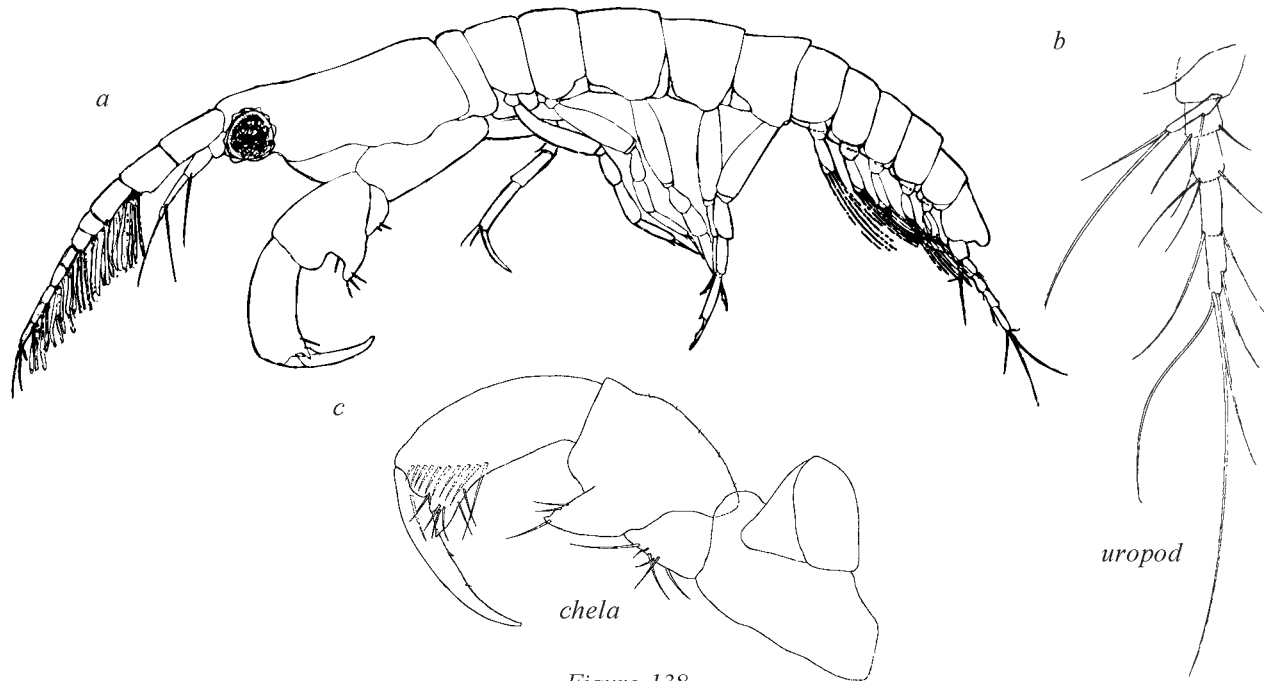


Figure 138

- Chela of typical form, but greatly enlarged. Uropod with endopod having 5-6 articles 11

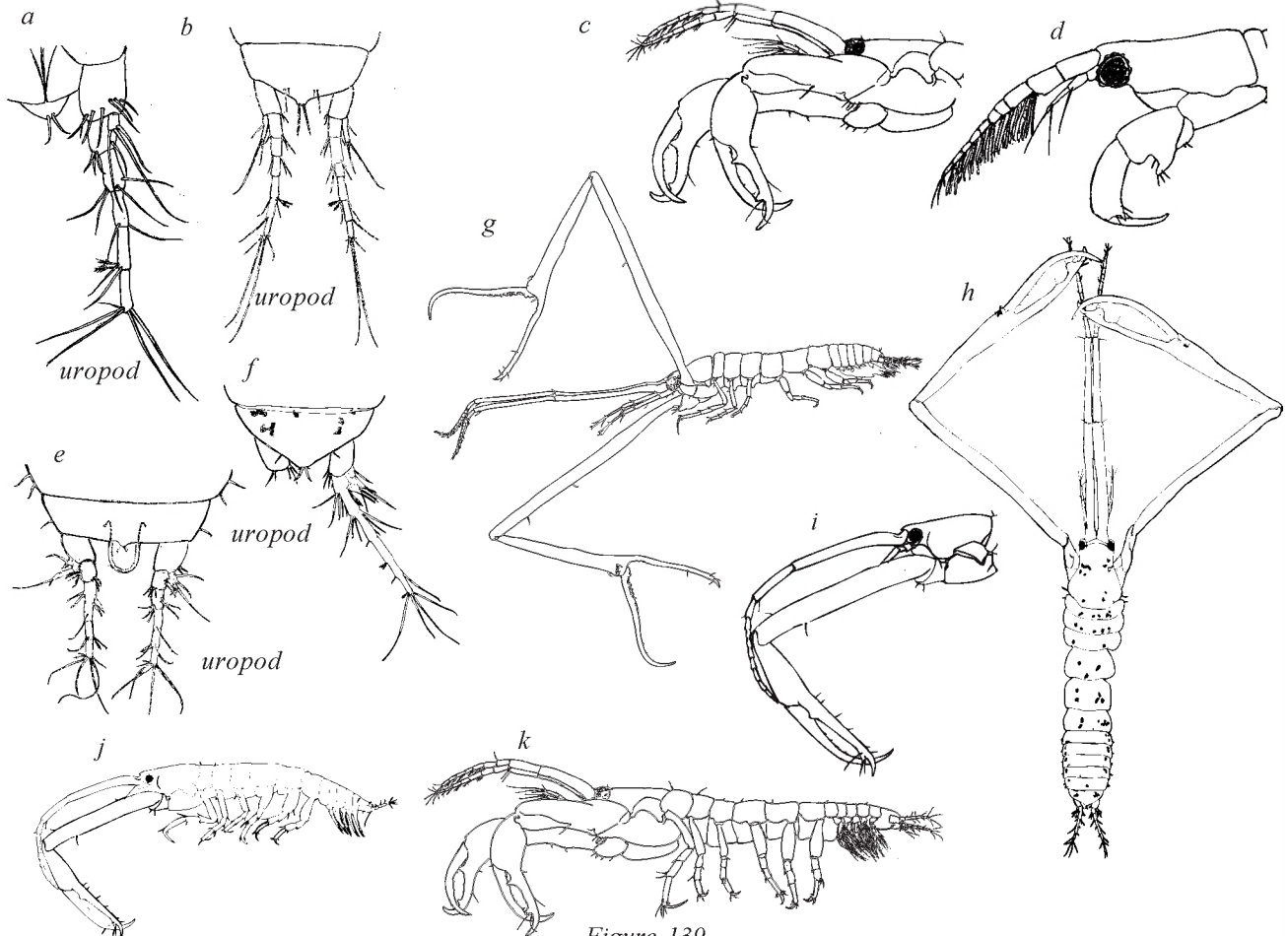


Figure 139

11. • Post-anal, spatulate process extending beyond apex of pleotelson *Hargeria rapax* (male)

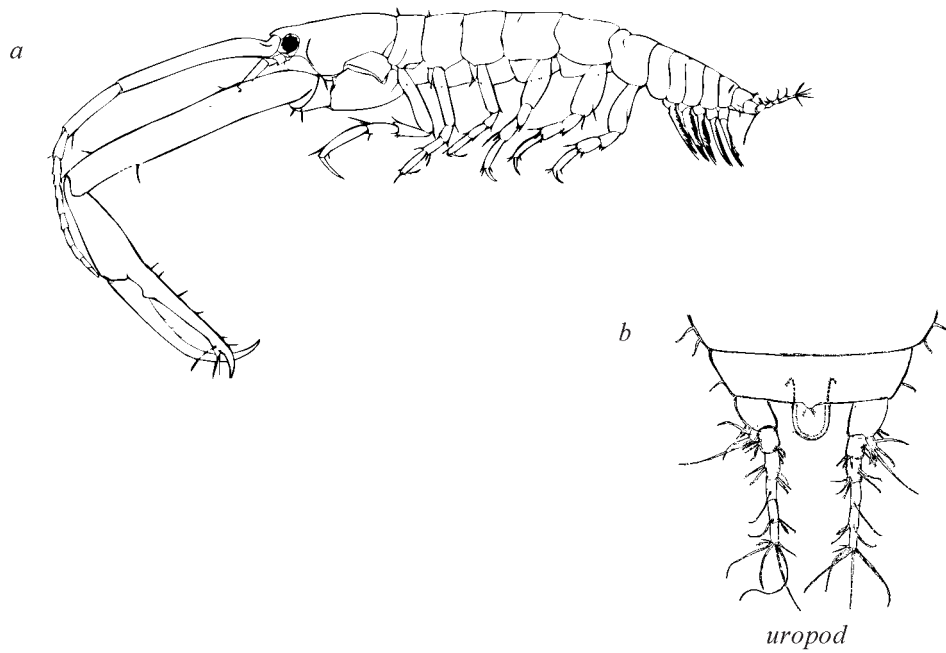


Figure 140

- Post-anal, spatulate process absent 12

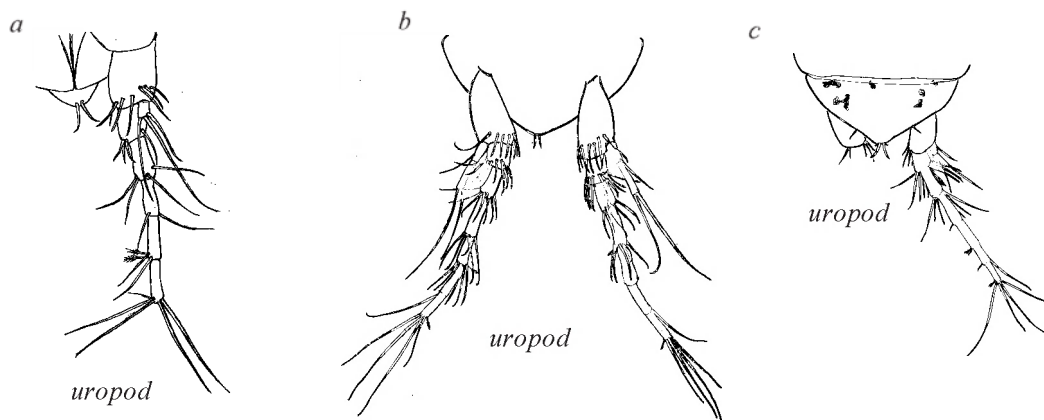


Figure 141

12. • Antennule less $\frac{2}{3}$ length of body with article 2 less than $\frac{2}{3}$ length of article 1. Chela not greatly attenuate or delicate and not longer than body. Uropod with endopod having 5 articles and exopod uniarticulate, not extending past article 1 of endopod *Leptochelia dubia* (male)

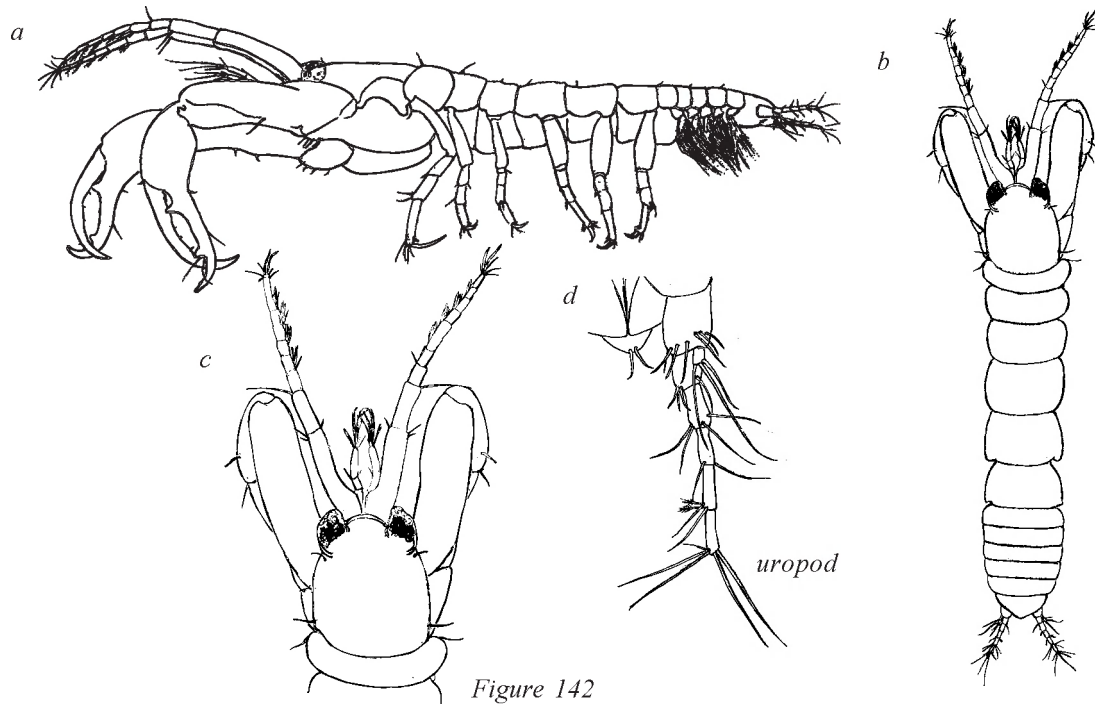


Figure 142

- Antennule as long as body (excluding uropods) with article 2 nearly about $\frac{3}{4}$ length of article 1. Chela greatly attenuated and delicate, about twice as long as body (excluding uropods). Uropods with endopod having 6 articles. 13

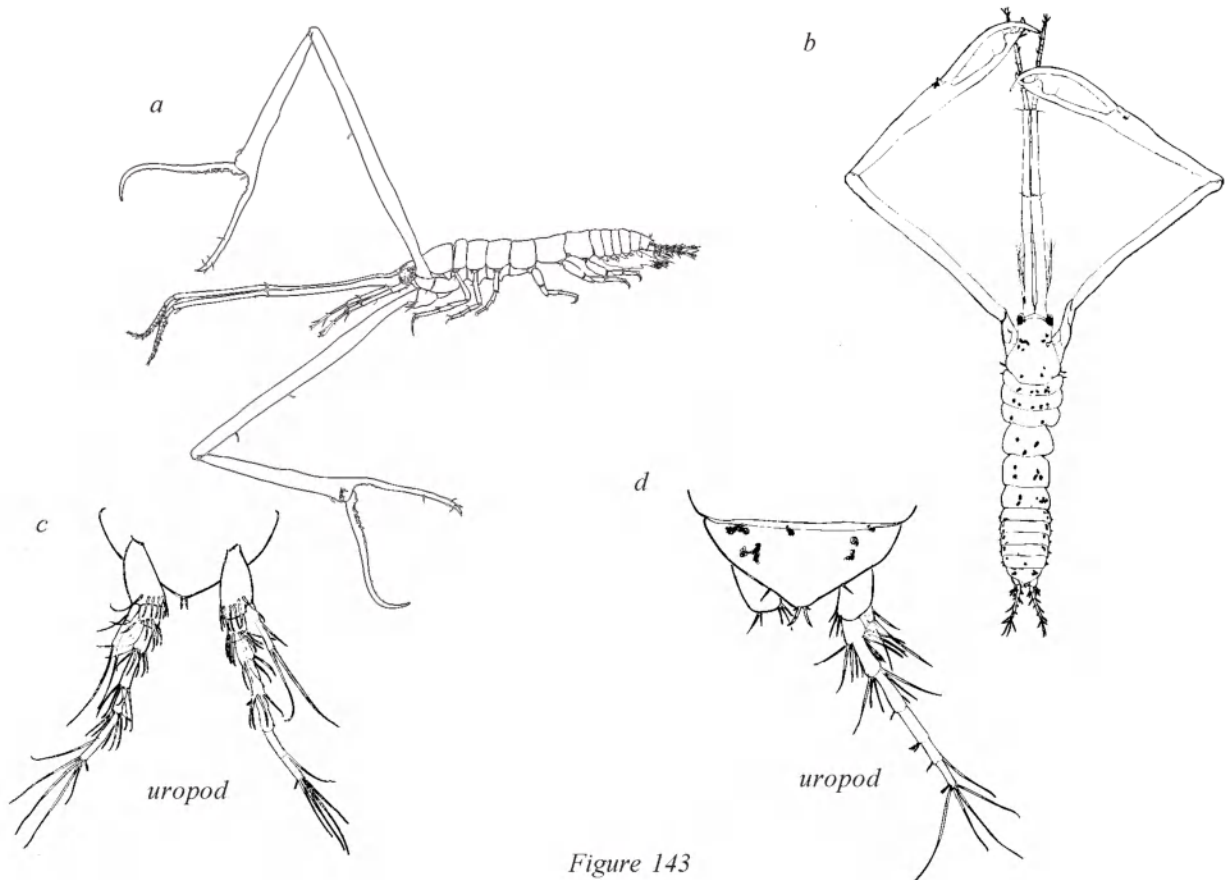


Figure 143

13. • Chela lacking proximal teeth on fingers; fixed finger with low keel like tooth or process on subdistal cutting edge. Uropod having exopod distinctly shorter than article 1 of endopod. [Body with small, dark pigment spots on freshly collected and preserved specimens] *Leptocheilia cf. forresti* (male)

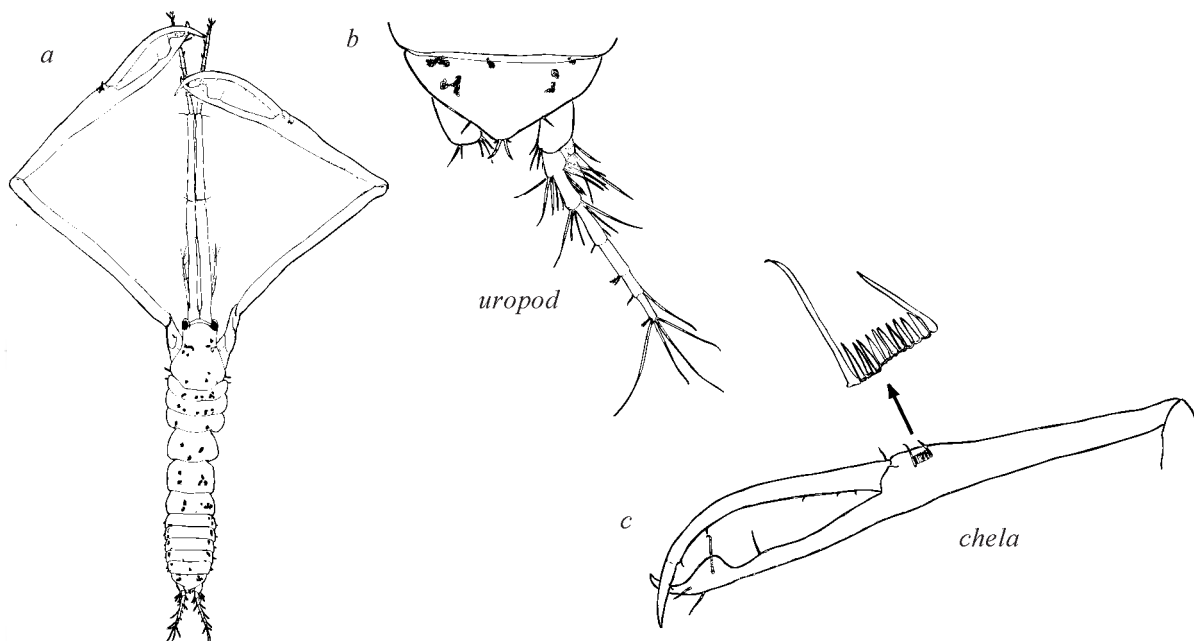


Figure 144

- Chela with small teeth on proximal cutting edges of both fingers; fixed finger lacking keel-like tooth or process on subdistal cutting edge. [Body lacking pigment spots on freshly collected and preserved specimens] *Leptocheilia cf. longimana* (male)

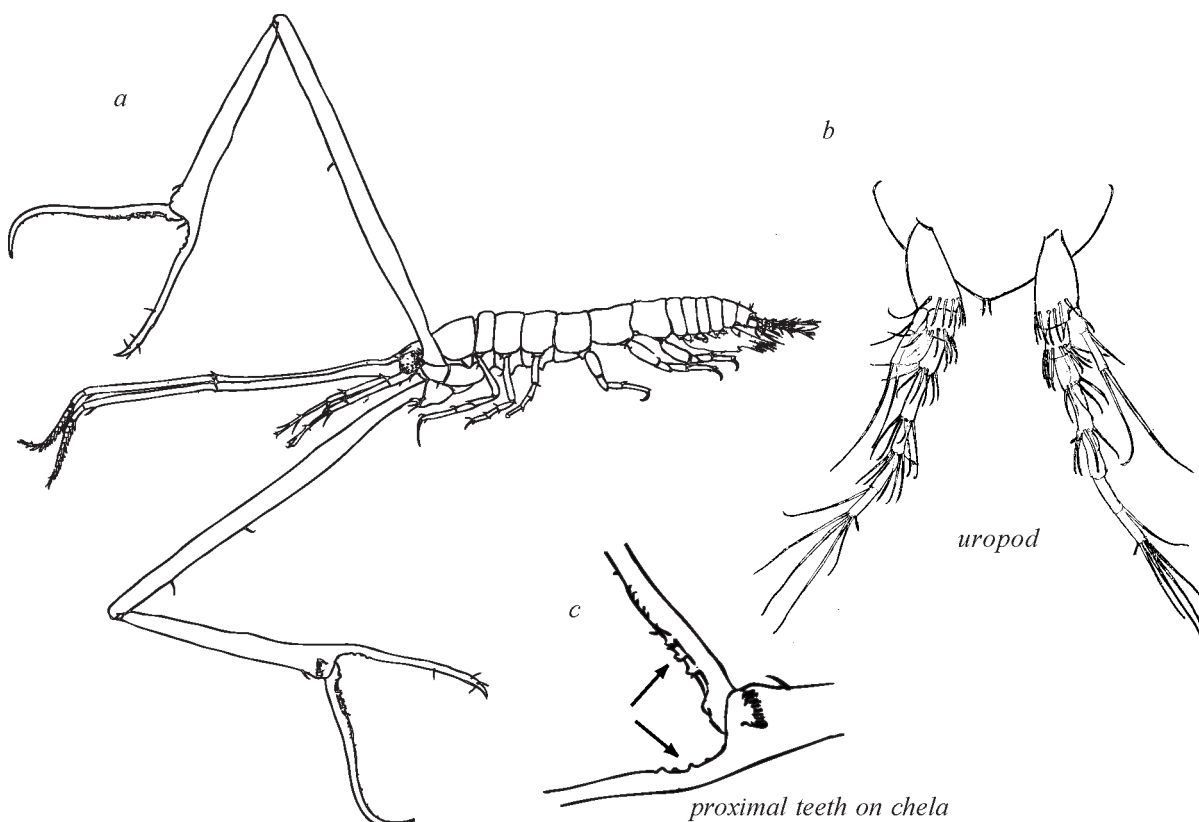


Figure 145

Family Leptocheliidae Lang, 1973

Subfamily Leptocheliinae Lang, 1973

***Hargeria* Lang, 1973**

***Hargeria rapax* (Harger, 1879)**

Synonym: *Leptochelia rapax* Harger, 1879

Recognition characters.—Uropod of both sexes having endopod of uropod with 5 articles; exopod uniarticulate, shorter than first article of endopod. Females: Antenna with well-developed “thorn” setae on ventral distal and dorsal distal margin of article 2 and on dorsal distal margin of article 3, practically indistinguishable from females of *Leptochelia dubia* having 5 articles in uropodal endopod. Male: *Leptochelia*-like, but with unique, post anal spatulate process, lacking in known males of *Leptochelia*.

Distribution/Ecology.—*Hargeria rapax* is known with certainty from brackish habitats in the temperate and tropical waters of the northwestern Atlantic (Northeast U.S. to the southern Mexico and the Cayman Islands). Along the coast of the southeastern U.S., it is often found associated with algae (e.g. *Cladophora* spp.) and submerged aquatic plants (e.g., *Ruppia maritima*). *Hargeria rapax* also has the ability to tolerate near freshwater conditions. During the early spring along the Gulf coast of Northwest Florida in tidal *marsh/Cladophora* habitats, *H. rapax* can occur in dense populations exceeding 40,000 m² (R. Heard, personal observations) and on the U.S. East coast Kneib (1992) has reported similar densities from Georgia tidal marsh habitats. For additional ecological information and references on this bionomically important species see Modlin and Harris (1989) and Kneib (1992).

Remarks.—The monotypic genus *Hargeria* was created by Lang (1973) to receive *Leptochelia rapax* Harger, 1879. Lang’s diagnosis for the genus was based primarily on the presence of spatulate, post anal process on the pleotelson of the male. The females and neuters of *H. rapax* are indistinguishable from those of the genus *Leptochelia*. Based on DNA sequencing, it appears that *Hargeria* should be a junior synonym of *Leptochelia* (Larsen and Heard, personal observations).

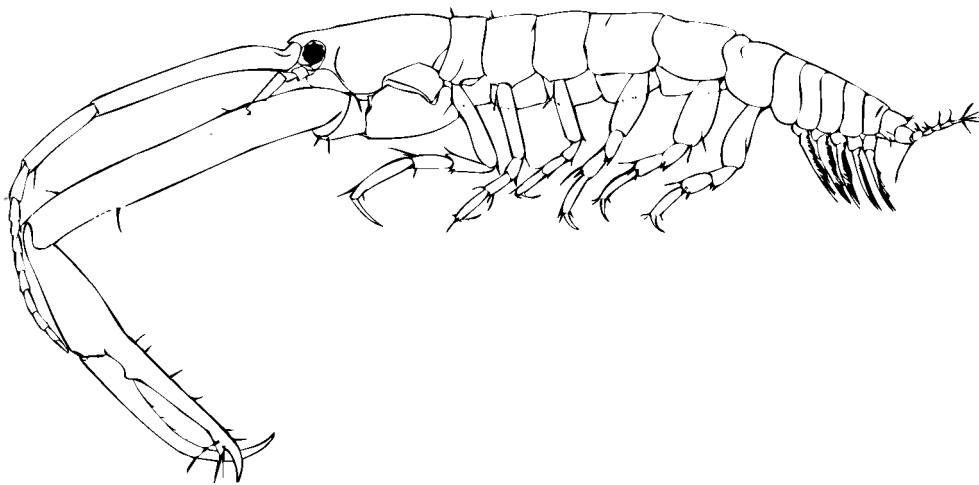


Figure 146

Leptochelia, Dana, 1852

Leptochelia, the largest genus in its family, currently contains 16 recognized species. Depending on the stage and the species, there are from 4 to 6 apparent articles in the uropodal endopod of males, females, and large neuters. The females have 3 apparent articles in the antennule, excluding minute distal article. The terminal pre-male neuter form of some species have 4 apparent articles. The males of this genus are characterized by having large, well-developed eyes, an antennule composed of 7 or more apparent articles bearing aesthetascs, and the cheliped, except for first form males of some species, greatly enlarged and elongate often with long thin fingers.

The three species of *Leptochelia* currently known from Florida waters have all been reported previously from the northwestern Atlantic (Lang, 1973. Sieg, 1983a).

Leptochelia dubia (Kröyer, 1842)

Synonym.—*Leptochelia savignyi* (Kröyer, 1842). *Heterotanais* sp. sensu Camp et al. (1977). For an extensive synonymy see Sieg (1983)

Recognition characters.—Neuter, female, and pre-male protogynic neuter stages having antennule with 3 apparent articles, excluding minute terminal article. Female: Antenna with well-developed “thorn” setae on ventral distal and dorsal distal margin of article 2 and on dorsal distal margin of article 3. Chela with base of fingers orangish in color. Uropodal endopod having 4-6 articles, 4 on first form female, 5 on most subadult and adult females, 6 on some terminal females. Male: With 6 or more stages or forms. First form male small, chela with short fingers lacking distinctive gap between them, teeth absent, carpus much more elongate than in female; uropod with endopod having only 4 articles. Post first form males having chelae large with distinctive gap between fingers; uropod with 5-6 articles.

Female: Antenna with well-developed “thorn” setae on ventral distal and dorsal distal margin of article 2 and on dorsal distal margin of article 3. Chela with base of fingers orangish in color. Uropodal endopod having 4-6 articles, 4 on first form female, 5 on most subadult and adult females, 6 on some terminal females.

Male: First form male small, chela with short fingers lacking distinctive gap between them, teeth absent; uropod with endopod having only 4 articles. Post first form males with 5 or more stages having chelae large with distinctive gap between fingers; uropod with 5-6 articles. Neuter, female, and premale protogynic neuter stages having antennule with 3 apparent articles, excluding minute terminal article.

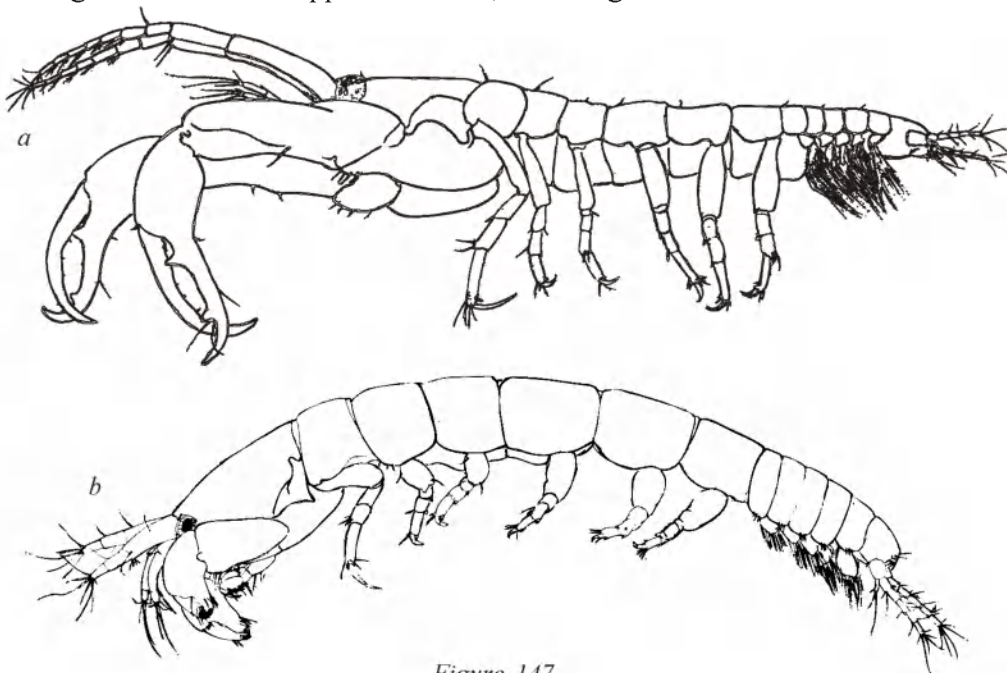


Figure 147

Distribution/Ecology. – *Leptochelia dubia sensu lato* is known worldwide from warm, temperate, and boreal (e.g., Alaska) regions. It is sometimes found in intertidal habitats, but is usually common in shallow high salinity habitats, although it has been reported from depths to 300 m (Sieg 1983a) and brackish habitats in the Black Sea (Makkaveeva, 1970). In Florida water this species appears to be an important component in reef and shallow shelf habitats (1-40 m) and in many instances *L. dubia* is the most common malacostracan crustacean in such habitats. This bionomically important species often occurs in huge population densities, often with several thousand or more individuals per square meter (Heard, per. observations, Makkaveeva 1970).

Remarks. – This species is characterized by having males with chelae distinctly shorter than the length of the body. Except for the small first form male, which (except for elongate carpus) have chela more like that of the female, the male chelae are stouter than those of *Hargeria rapax*, and with gaping fingers. Both males and females have uropodal endopods with 4-6 articles and the exopods distinctly shorter than the first article of their endopods. The males and females can attain large sizes and there are five or more males stages. For all practical purposes the small and medium sized females and neuters of *L. dubia*, which have 5 articles in the uropodal endopod, can not be distinguished from the subadult and adult female stages of *Hargeria rapax*.

Superficially, the small first form male of *L. dubia* appears to represent a different species because the fingers of the chelae small like those of the female, lack distinct teeth and have no gap between them. Also, the first form male, like the first form female, only has 4 articles in its uropodal endopod (See figure below). Because of the high degree of sexual dimorphism and protogyny, the life cycle of this species is extremely complex and as yet is not fully understood.

Leptochelia dubia, which is also known under the name *L. savignyi* Kröyer, 1842 by some authors, has a nearly worldwide distribution (see Lang 1973, Sieg 1983a, Dojiri and Sieg 1997), but some previous records may represent closely related sibling species (Ishimaru 1985, Larsen 2001). It was reported from the coast of El Salvador as *L. savignyi* by Sieg (1976), but later Sieg (1983) listed it under the name *L. dubia*. This nomenclatural problem arises because the species was originally described by Kröyer (1842) under two different names, *L. dubia* and *L. savignyi*, in the same publication. Kröyer's descriptions of *L. dubia* and *L. savignyi* were based on specimens from Brazilian and Mediterranean waters, receptively. He distinguished the two taxa by the number of articles in the uropodal endopod, 5 articles in *L. dubia* and 6 in *L. savignyi*. Later the two names were synonymized (see Sieg 1983a), but since both had the same publication date, neither has been established as a firm senior synonym. In Kröyer's original publication the name *savignyi* appears first in the text, but *dubia* is first alphabetically. Both names have appeared in the literature, but we have chosen to follow Sieg (1983a) and use *L. dubia*; however, this concept has not been followed by other authors (see Lang, 1973, Ishimaru, 1985). Because of the possibility of the existence of two cryptic or sibling species, comparative DNA studies should be conducted utilizing specimens collected from the type localities of these two nominal forms.

Several size morphs attributable to *L. dubia*, have been observed, but since so many male and female stages are known for some leptocheliid species, further careful study is need to determine whether a single polymorphic and widely distributed species or if one or more closely related cryptic species are present in the western Atlantic and in other oceans of the world.

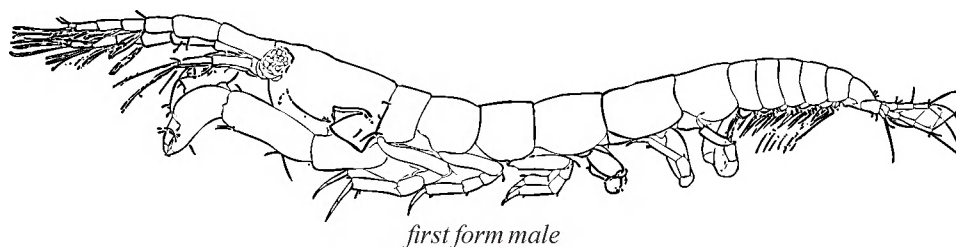


Figure 148

Leptochelia forresti (Stebbing, 1896)

Synonyms.—*Dolichochelia forresti* Stebbing, 1906.—? *Leptochelia brasiliensis sensu* Silva Brum, 1973.

Recognitions characters.—Body in fresh and recently preserved (up to a year or more) specimens with small, dark pigment spots in thorax and in abdomen (especially at bases of pleopods). Uropod with endopod having 5-6 articles, exopod uniarticulate, distinctly shorter than article 1 of endopod. Adult female: Antennule with 3 (subterminal neuters and females) to 4 (terminal female) distinct articles, excluding minute terminal article. Antenna with article 2 having distal margin with narrow attenuated spiniform setae dorsally and with small seta ventrally, article 3 having distal margin with narrow attenuated spiniform seta dorsally. Chelae with fingers not distinctly orangish and not as robust as in *Hargeria rapax* and *Leptochelia dubia*. Uropod with exopod uniarticulate, distinctly shorter than article 1 of endopod, endopod with 5 (subterminal neuters and females) to 6 (terminal females) articles. Final pre-male neuter (derived from terminal female stage): Antennule with 4 distinct articles, excluding minute terminal article. Uropod with exopod uniarticulate, distinctly shorter than article 1 of endopod, endopod with to 6 articles

Male: Carapace expanded posteriorly to accommodate attachment and musculature of enlarge chelae. Eyes bulging, very large with numerous large ommatidia. Antennule as long as body, with about 12 articles. Chela delicate, extremely long, attenuated, about twice as long as body; fingers long, scissor-like, fixed finger with low keel-like, sub-distal tooth. Uropod with exopod uniarticulate, distinctly shorter than article 1 of endopod, endopod with to 6 articles

Distribution/Ecology.—Recorded from southern Florida, the Gulf of Mexico, the Caribbean Sea, and possible northern coast of Brazil as *L. brasiliensis sensu* Silva Brum 1973. Specimens attributable to this species were most often found associated with mangrove root systems fouled with sponges and algae, or with algae associated with turtle grass (*Thalassia testudinata*) and other submerged vegetation.

Remarks.—We have examined specimens attributable to this species from the South Florida, the Cayman Islands, and the Caribbean coast of Mexico. The terminal adult females and pre-male protogynic neuters of *L. forresti* are distinguished from those of *Hargeria rapax*, *Pseudoleptochelia* sp. A, and most specimens of *Leptochelia dubia*, by having six articles in the uropodal endopod and the male differs from the males of these three species by its extremely long chelipeds which are about twice as long or longer than its body.

Leptochelia forresti is distinguished from the superficially similar species, *L. cf. longimana sensu* Lang (1973) by (1) having a much shorter uropodal exopod (less than half length of first article of endopod) in both sexes, (2) the presence of a low keel-like, sub-distal tooth on the fixed finger of the male, (3) females and neuters having a small seta, rather than a well-developed spiniform seta, on the disto-ventral margin of antennal article 2, and the presence of a long narrow spiniform setae on the disto-dorsal margin of antennal articles 2 and 3, instead of short spiniform setae. The terminal females and pre-male protogynic form of *L. forresti*, like pre-male protogynic *L. cf. longimana*, have four apparent articles in the antennule and six apparent articles in the uropodal endopod.

The presence of distinctive brownish-black pigment spots in fresh and recently preserved material distinguishes the neuters, females, and males of *L. forresti* from all other leptocheliids presently known from the northwestern Atlantic. In preserved specimens of *L. forresti* (neuters, females, and males) this distinctive pigmentation character can sometimes persist for up to a year or more.

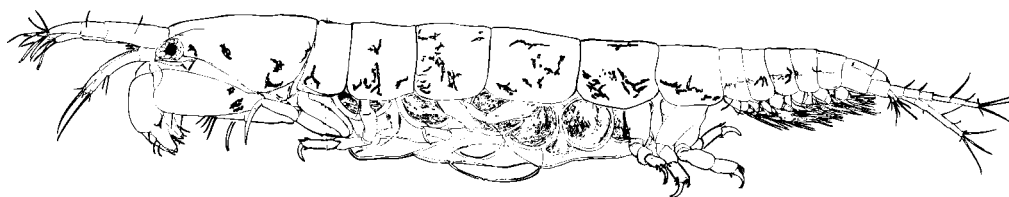


Figure 149

Leptochelia longimana Shiino, 1963 (sensu Lang 1973)

Recognitions characters.— Body somewhat similar to *L. forresti*, but without dark pigment spots. Uropod with exopod uniarticulate, as long or longer than article 1 of endopod. Adult female: Antenna with article 2 distal margin having with short spiniform setae dorsally and with narrow attenuated spiniform seta ventrally, article 3 having distal margin with short spiniform seta dorsally. Chela similar to *L. forresti* with fingers not distinctly orangish and not as robust as in *Hargeria rapax* and *Leptochelia dubia*. Terminal pre-male neuter (derived from terminal molt female): Antennule with 4 distinct articles, excluding minute terminal article.

Male: Carapace expanded posteriorly to accommodate attachment and musculature of chela of enlarge chelae. Eyes bulging, very large with numerous large ommatidia. Antennule as long as body, with 13-14 articles. Chela delicate, extremely long, attenuated, about twice as long as body; fingers long, scissor-like, fixed finger with a low keel-like, sub-distal tooth. Uropod with exopod uniarticulate, distinctly shorter than article 1 of endopod, endopod with to 6 articles.

Distribution/Ecology.— This species is presently known from the Caribbean (Caymans, Mexican Caribbean, and off Southwest Florida in the southeastern Gulf of Mexico (Lang 1973, R. Heard, pers. obs.). It has been collected in back reef and shallow shelf live bottom habitats at depths of 1-50m.

Remarks.— Specimens apparently conspecific with to *L. longimana* sensu Lang (1973) occurred in collections made in the shallow shelf waters of the Gulf of Mexico off southwestern Florida and the Caribbean coast of Mexico. These specimens most often were found associated with live bottom and reef habitats.

Like *L. forresti*, the terminal adult females and pre-male protogyne neuters of *L. longimana* have 4 apparent antennular articles and 6 articles in the uropodal endopod, which distinguish them from the adult females of *Hargeria rapax* and *Leptochelia dubia*. *Leptochelia longimana* is distinguished by (1) having a much shorter uropodal exopod (less than half length of first article of endopod) in both sexes, (2) having the chela of the male with small teeth on the proximal cutting edges of the fingers and lacking a low keel-like, sub-distal tooth on the fixed finger, (3) females and neuters having a well-developed spiniform seta, instead of a small seta, on the disto-ventral margin of antennal article 2, and the presence of a short spiniform setae, instead of a long narrow spiniform seta, on the disto-dorsal margin of antennal articles 2 and 3.

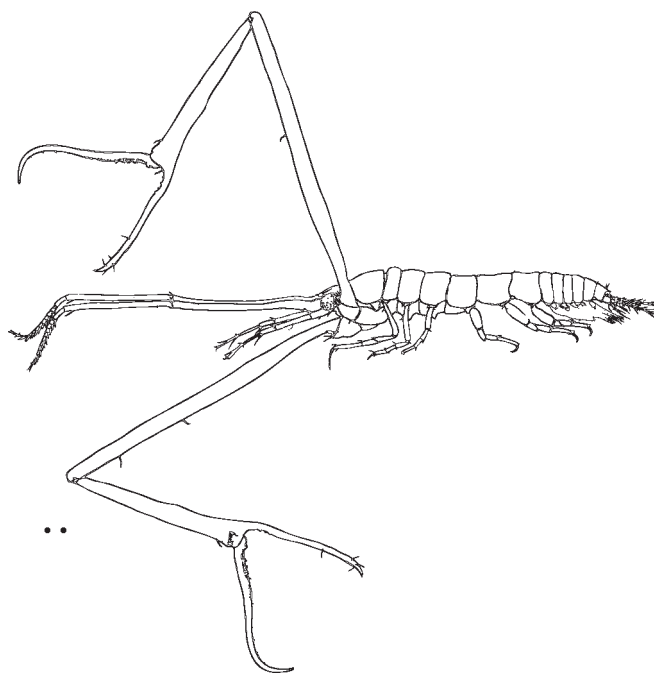


Figure 150

Pseudoleptochelia Lang, 1973

Pseudoleptochelia sp. A

Recognition characters.— **Female:** *Leptochelia*-like. Antennule relatively short with first article stout and wide dorsally. Uropod having endopod with 3-4 articles.— **Male:** Antennule with 10-11 articles bearing aesthetascs. Chela highly modified, parachelate-like, carpus with distinctive, well-developed disto-ventral lobe. Uropod similar to that of female, except more setose.

Distribution/Ecology.— Recorded from southern Florida, eastern Gulf of Mexico, the Caribbean Sea (southern coast of Mexico and Cayman Islands). Specimens often occurred in association with mangrove roots systems fouled with sponges and algae, or with algae associated with turtle grass (*Thalassia testudinata*), and shallow shelf and near coastal live bottoms.

Remarks.— The males, females, and neuter stages of this undescribed species appear to be fairly common in the high salinity coastal and inner shelf waters of southern Florida. *Pseudoleptochelia* sp. A resembles *P. mortenseni* Lang, 1973, a species described from the southeastern Caribbean Sea. The females of both species are nearly indistinguishable, but the males are separated on the morphology of their highly modified, parachelate-like, chelae. On the carpus of the cheliped of *Pseudoleptochelia* sp. A there is a distinctive, well-developed distoventral lobe, which is undeveloped on *P. mortenseni*. The females and neuters of *Pseudotanaïs* sp. A resemble those of the genus *Leptochelia*, but they generally differ from the latter forms by having relatively short antennules with first article distinctively broad in dorsal view, and uropods with only 3-4 articles in the endopod.

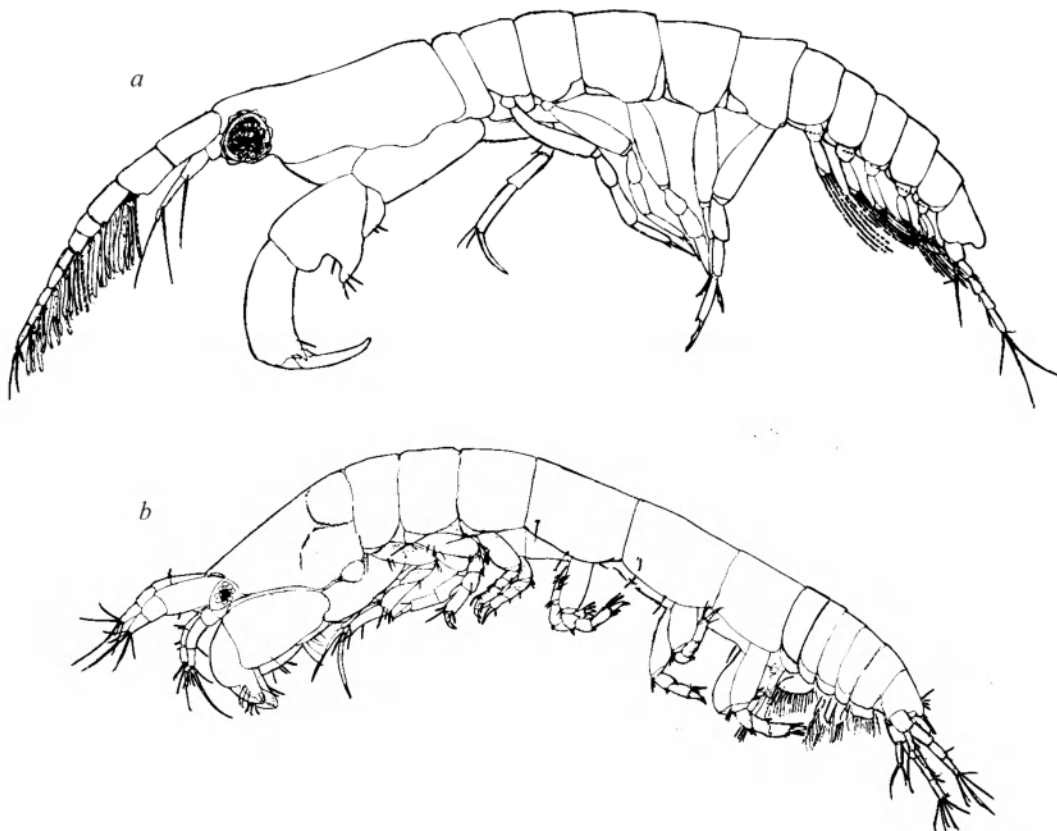


Figure 151

Pseudonototanaïs Lang, 1973

This genus *Pseudonototanaïs* currently contains two nominal species, the type, *Pseudonototanaïs werthi* (Vanhöffen, 1914) and *P. bransfieldensis* Sieg, 1986b, both known from the subantarctic waters (see Shiino 1978, Sieg 1986a). The two species from Florida waters treated in this guide, are both undescribed constituting a significant range extension for the genus into the warm subtropical waters of the northwestern Atlantic.

Both males and females have 3 apparent articles in the uropodal endopod. The males of this genus are characterized by (1) having an antennule composed of 5 apparent articles with dense rows of aesthetascs, (2) by having the cheliped compressed with the dactyl and fixed finger turned downward and separated by wide gap. The females of the genus are leptochellid-like in body form with 3 apparent articles in the antennule.

Pseudonototanaïs sp. A

Recognition characters.—Uropod in both sexes with uniarticulate exopod reaching to or past first uropodal article. Male chela with propodus subquadrate as deep as long, inner face bearing row of 10-11 grooming setae, fixed finger stiliform without distal, rounded tooth.

Distribution/Ecology.—*Pseudonototanaïs* sp. A is presently known from waters off southeastern Florida where it was collected in association with coral (*Oculina*) at depths of 20-80m.

Remarks.—*Pseudonototanaïs* sp. A is distinguished from *Pseudonototanaïs* sp. B by the relative length of uropodal exopod. In both sexes of *Pseudonototanaïs* sp. B, the apparent uniarticulate exopod is as long or longer than the first article of the endopod; whereas, in both sexes of *Pseudonototanaïs* sp. B the exopod short and not reaching much further than half the length of first article of the endopod. The male of *Pseudonototanaïs* sp. A is separated from that of *Pseudonototanaïs* sp. B by having chela with (1) the propodus being sub quadrate, (2) the inner face of the propodus bearing row 10-11 grooming setae (instead of 12-14); and (3) fixed finger being straight edged (lacking blunt, rounded, subdistal tooth). The uropodal exopod and endopod of this species has vestiges of having 2 and 4 articles, respectively, possibly indicating a transitional relationship between the genera *Heterotanaïs* and *Pseudonototanaïs*.

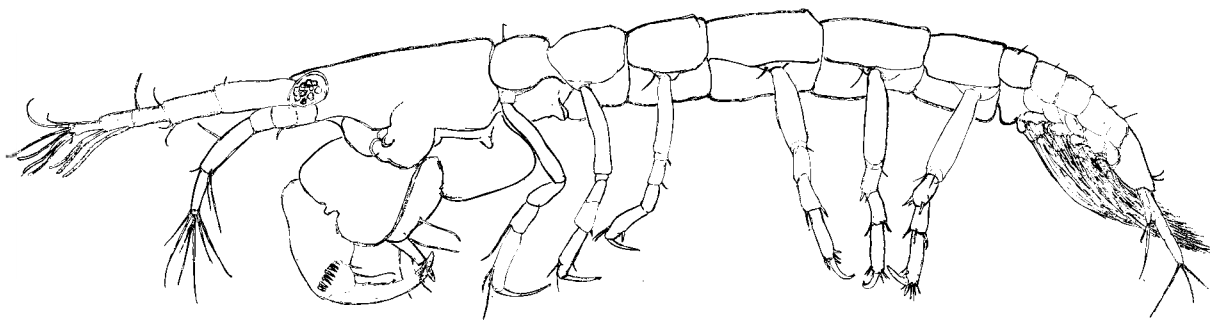


Figure 152

Pseudonototanaïs sp. B

Recognition characters.—Uropod in both sexes with the exopod uniarticulate, reduced, and not reaching more than $\frac{1}{2}$ length of the first endopodal article. Male chela with propodus longer than deep, inner face bearing row 12-14 grooming setae; fixed finger with blunt, rounded, distal tooth; small species.

Distribution/Ecology.— Found on live bottoms off Atlantic and Gulf coasts of South Florida in depths of 5 to 50 m.

Remarks.—*Pseudonototanaïs* sp. B can readily separated from *Pseudonototanaïs* sp. A by its larger adult size and the relative length of uropodal exopod. In both sexes of *Pseudonototanaïs* sp. B the uniarticulate exopod is reduced and much shorter than the first article of the endopod; whereas, in both sexes of *Pseudonototanaïs* sp. A, the exopod, which has vestiges of being biarticulate, reaches to or past the first article of the endopod. The male of *Pseudonototanaïs* sp. B is distinguished from that of *Pseudonototanaïs* sp. A by having chela with (1) the propodus being longer than deep (instead of sub quadrate), (2) the inner face of the propodus bearing row 12-14 grooming setae (instead of 10-11); and (3) fixed finger with blunt, rounded, distal tooth (instead of being unarmed and straight edged).

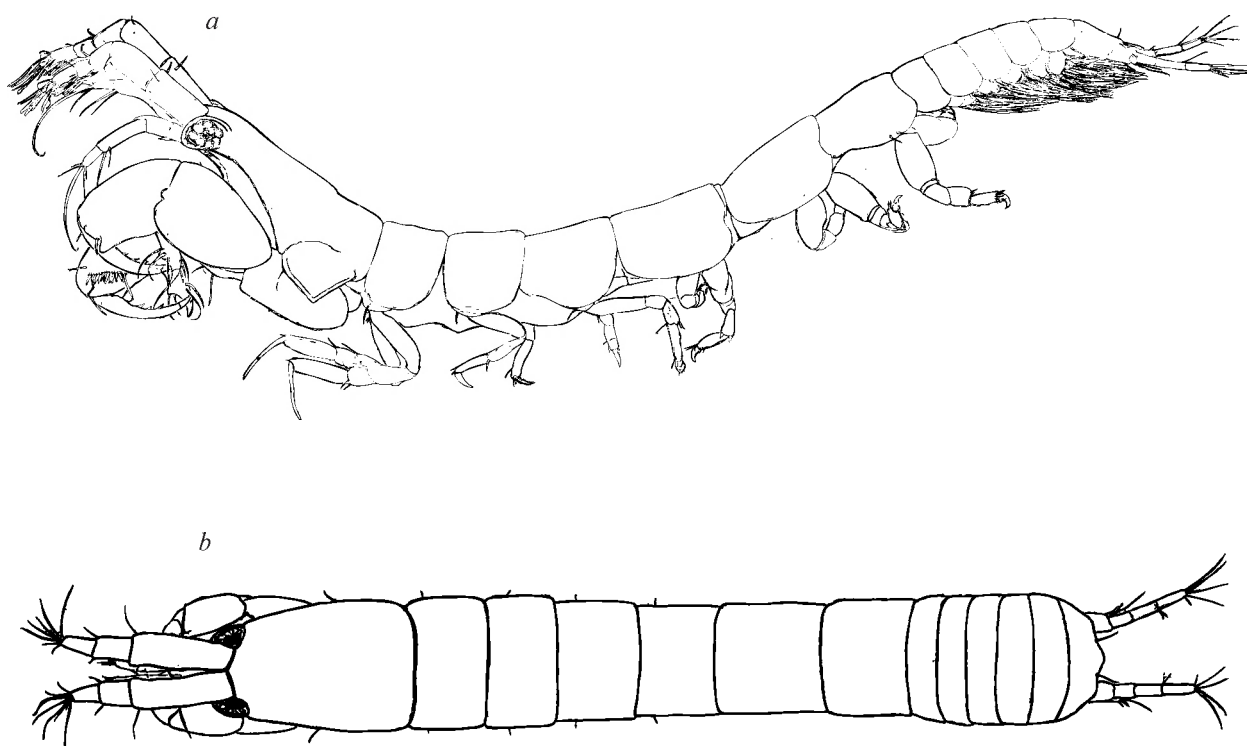


Figure 153

Subfamily undetermined (see Larsen and Wilson, 2002)

Mesotanais Dollfus, 1997

Mesotanais vadicola Sieg & Heard, 1989

Recognition characters.— Body cylindrical and elongate. Eyes absent. Uropod with exopod having 2 articles and endopod with 6. Female: Body. Antennule with 3 articles, excluding minute distal article. Labium with 2 pairs of lobes lacking lateral and medial processes. Maxilliped with basis having 2 long setae. Pereopod 1 dactyl and unguis longer than propodus. Male: Antennule with 7 articles with dense rows of aesthetascs on distal articles. Cheliped distinctly longer than body, propodus much longer than short movable finger (propodus over 3 times longer than movable finger), chela inflated distally, mitten shaped.

Distribution/Ecology.— US East Coast from South Carolina (type locality) southward to Florida (off Miami), and the Gulf coast of Florida (Sieg and Heard 1989). *Mesotanais vadicola* occurs over a wide depth range (22-1000+ m) on soft bottoms of the continental shelf and slope (Sieg and Heard, 1989).

Remarks.— *Mesotanais vadicola* belongs to an atypical genus containing four North Atlantic species, all of which lack eyes and generally occur at greater depths (22-1500+m) than those of other leptocheliid genera. *Mesotanais vadicola* and *M. setosa* Sieg and Heard, 1989 are reported from the shelf and slope in the western Atlantic US waters, and *Mesotanais dubius* Dollfus, 1997 and *M. elongatus* Sieg and Bird, 1989 are known from the eastern Atlantic off Europe and Northwest Africa (Sieg and Heard 1989, Sieg and Bird 1989).

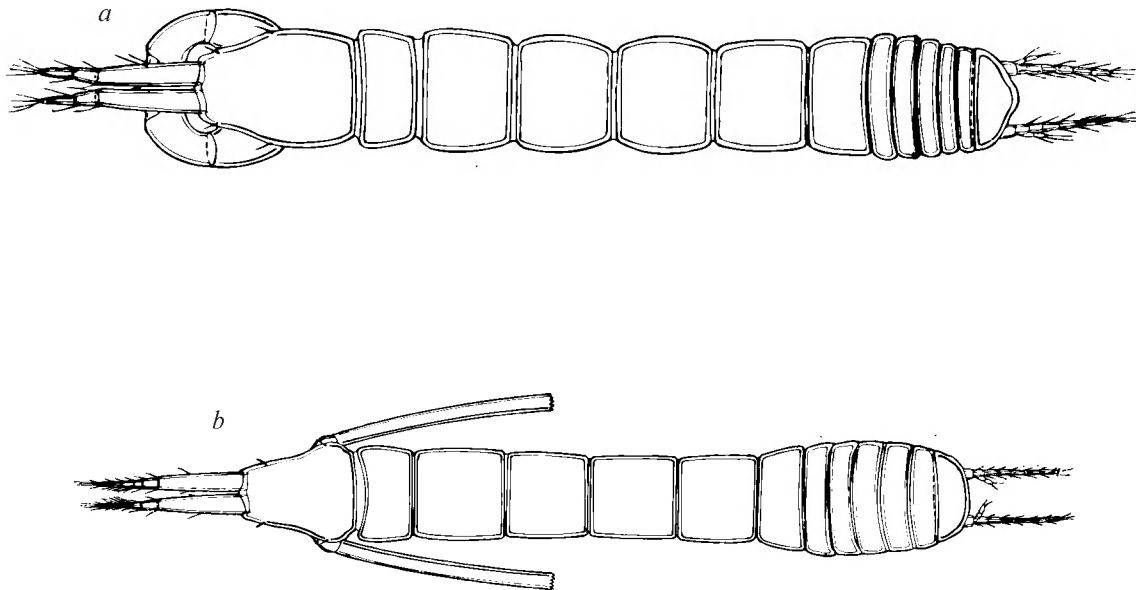


Figure 154

Family Nototanaidae Sieg, 1976

Synonym.– Typhlotanaidae Sieg, 1996

As recently defined by Larsen and Wilson (2002), this heterogeneous family contains 12 genera and about 82 recognized species, well over half of which belong to the blind, deep-water genus *Typhlotanais* G. O. Sars, 1882. Compared to the other tanaidomorph families, the Nototanaidae represents one of the most difficult groups to succinctly define. As part of their systematic treatment of the superfamily Paratanoidea, Larsen and Wilson (2002) considered the relatively homogeneous deep-water family Typhlotanaidae Sieg, 1986 as junior subjective synonym of the Nototanaidae. However, Larsen & Wilson, 2002 stated that the support values for this combination of Typhlotanaidae and Nototanaidae were weak and thus systematically unstable. Nototanaids occur in a variety of habitats from freshwater [*Androtanais beebei* (Van Name, 1925)] to the abyssal plain [*Typhlotanais* spp.] (see Sieg 1976, Van Name 1925, Larsen and Wilson 2002).

As presently defined members of the family have or lack eyes and have the dactyls and unguis of pereopods 4-6 fused into a claw. The females have (1) antennule with 3 or 4 articles, (2) antenna with 5 or 6 articles (article 3 with or without dorsal spiniform seta), (3) cheliped attached via sclerite or ventral coxa (*Nesotanais*), (4) pereopods 1-3 with coxa present and pereopods 4-6 coxa either absent or present, (5) pereopods 4-6 with dactyl and unguis fused into a claw, (6) pleopods usually well-developed, (7) uropod biramous, (exopod and endopod with 1 or 2 articles. Where known the males exhibit extensive sexual dimorphism with (1) antennule having 4 or more articles and often with multiple aesthetascs (2) mouthparts reduced, (3) pleopods usually well-developed, and (4) uropod with endopod having 2 or 3 articles and exopod having 1 or 2 articles. (5) Chelipeds larger and usually of different shape in males.

Two unidentified taxa, Nototanaid? sp. A and Nototanaid sp. B, treated in this guide are tentatively placed in the Nototanaidae; however, further detailed study may demonstrate that one or both of these (especially Nototanaid sp. B) should be referred to another family.

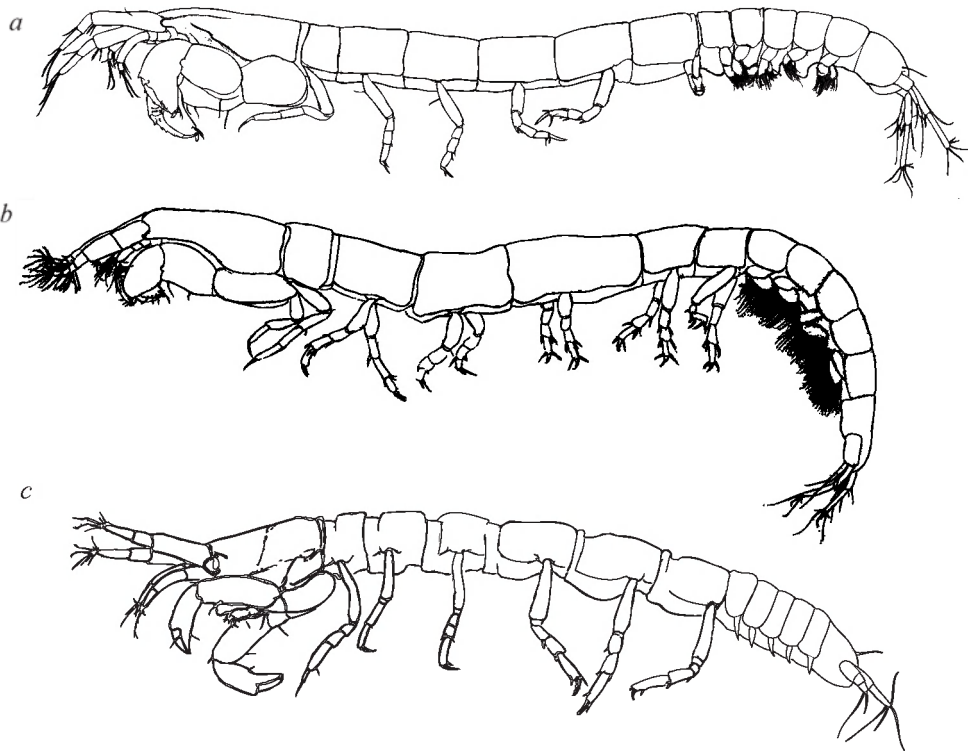


Figure 155

KEY TO THE SPECIES OF NOTOTANAIIDAE KNOWN FROM FLORIDA WATERS

1. • Body minute, compressed with very large eyes. Antennule with 6 apparent articles [Numerous aesthetes present on distal articles. Uropod with exopod biarticulate] Nototanaid? sp. A (male)

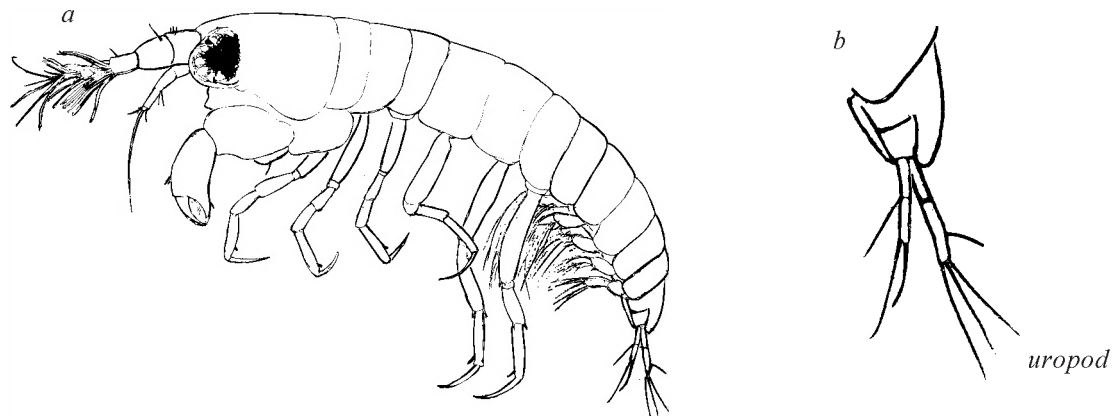


Figure 156

- Body elongate, with or without eyes. [One to many aesthetes present on distal articles. Uropod with exopod uniarticulate or biarticulate] 2

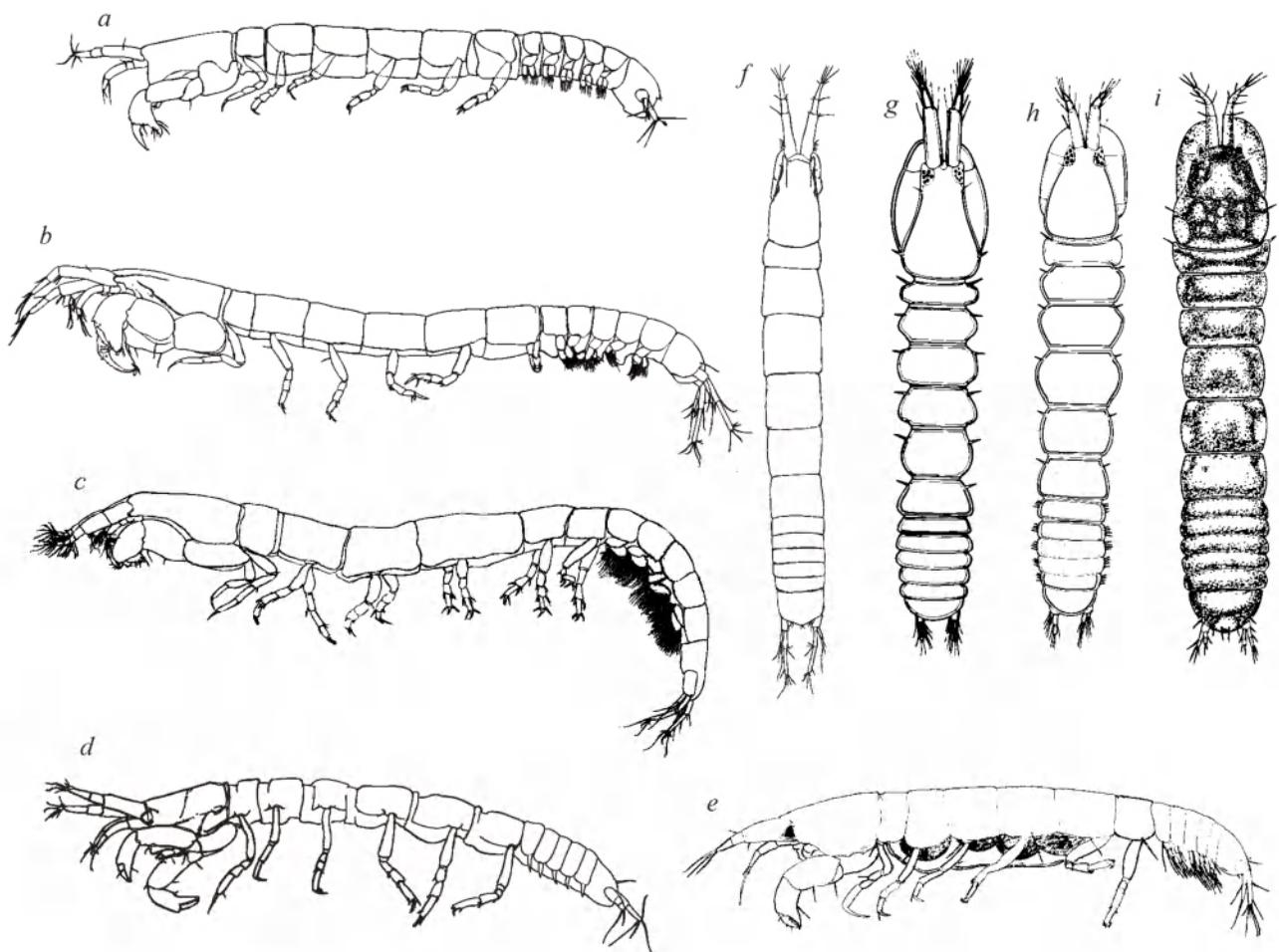


Figure 157

2. • Eyes absent or poorly developed (lacking ommatidia). Molar pointed. [Antennule with 3 (female) or 8 (male) articles] 3

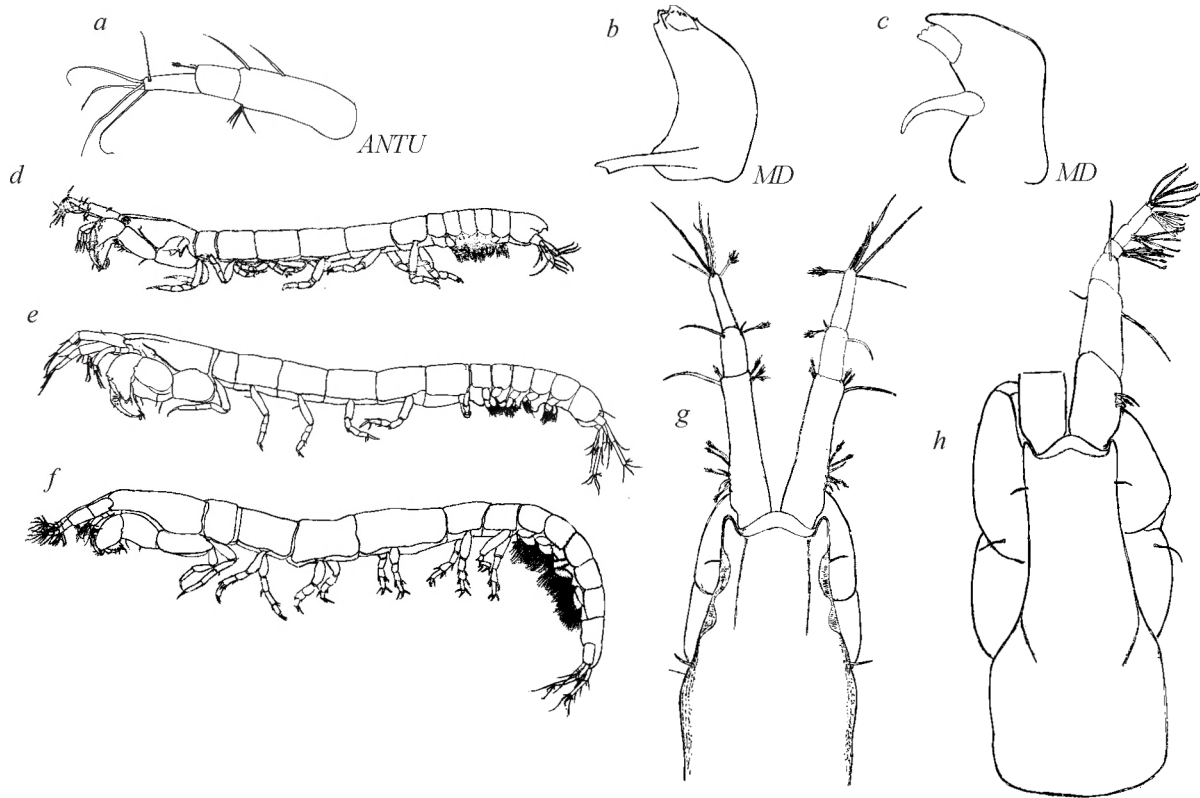


Figure 158

- Eyes present with distinct ommatidia. Molar broad. [Antennule with 3 (female) or 4 (male or female) apparent articles] 6

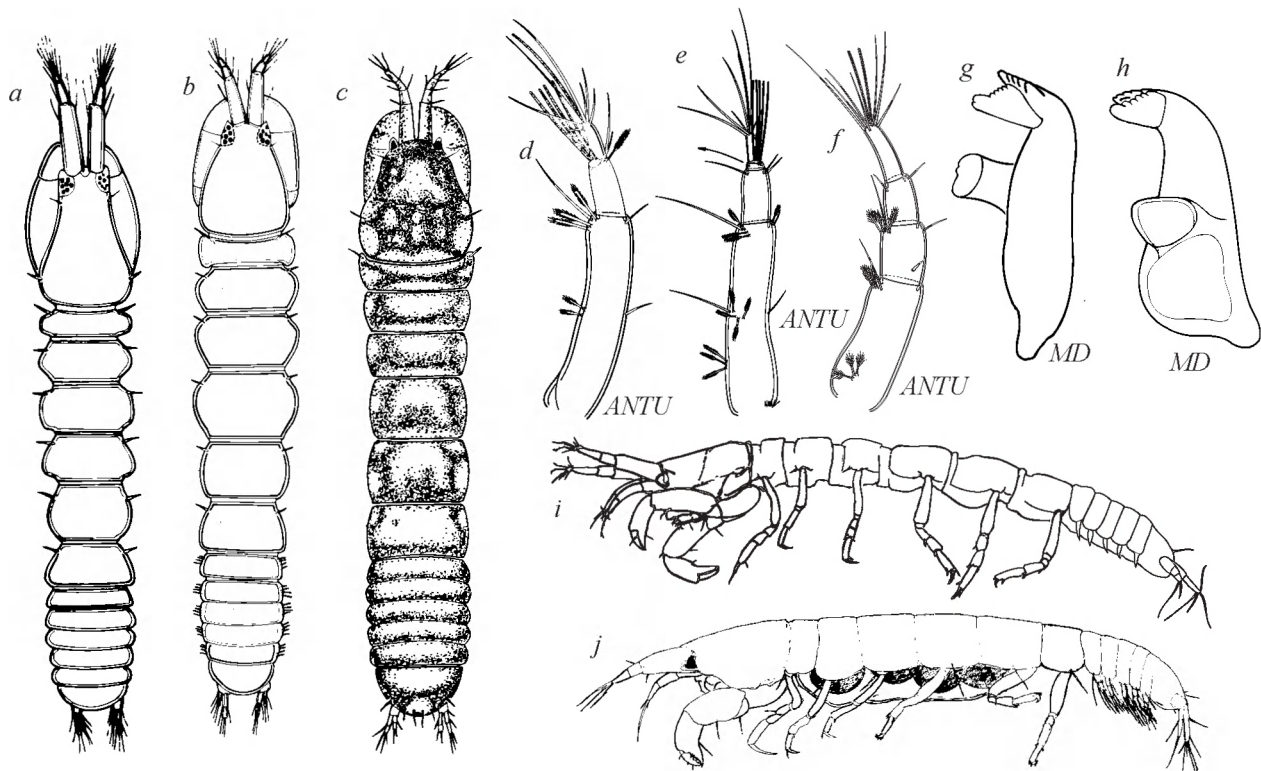


Figure 159

3. • Antennule composed of 8 articles, including small distal article. Chela with small tubercles on dactyl, and propodus with distal inner face having comb row of 9-10 setae, the last seta on each end of the row much longer than those in between. Telson longer than wide, constricted posteriorly. Maxilliped present but reduced; other mouthparts degenerate *Tanaissius psammophilus* (male)

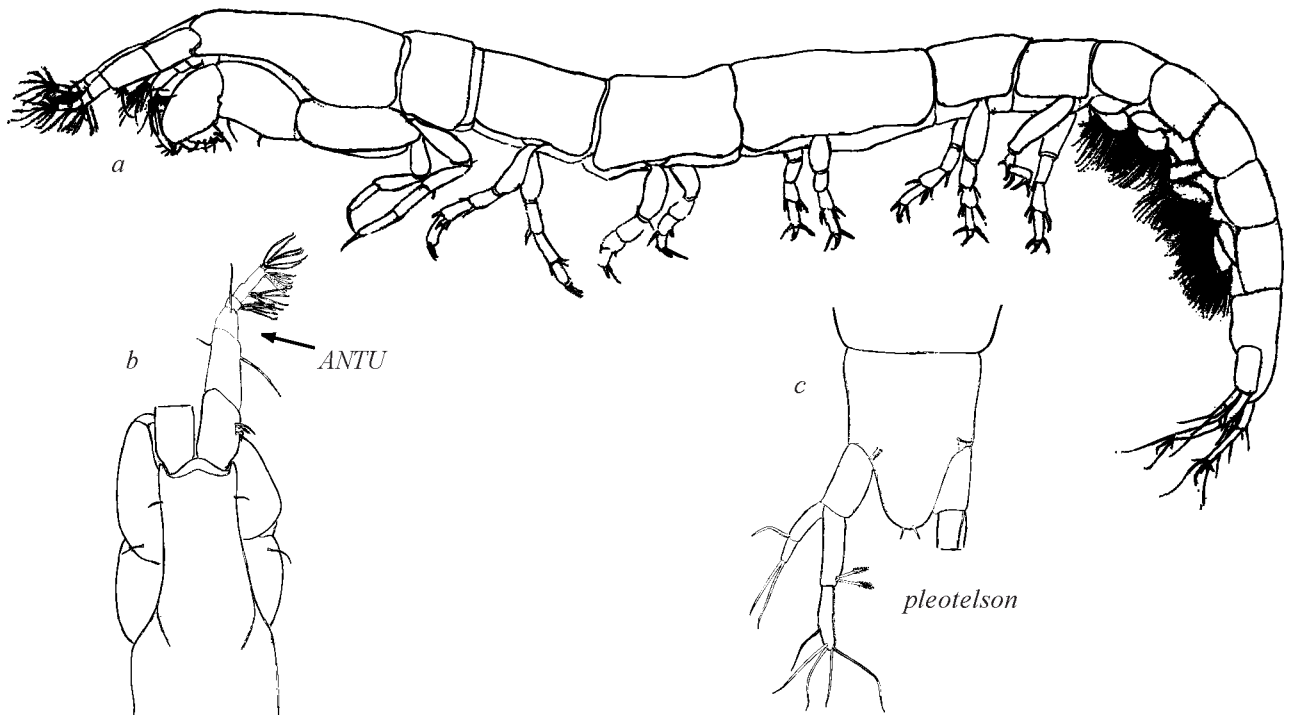


Figure 160

- Antennule composed of 3 articles. Maxilliped and mouthparts present and well developed 4

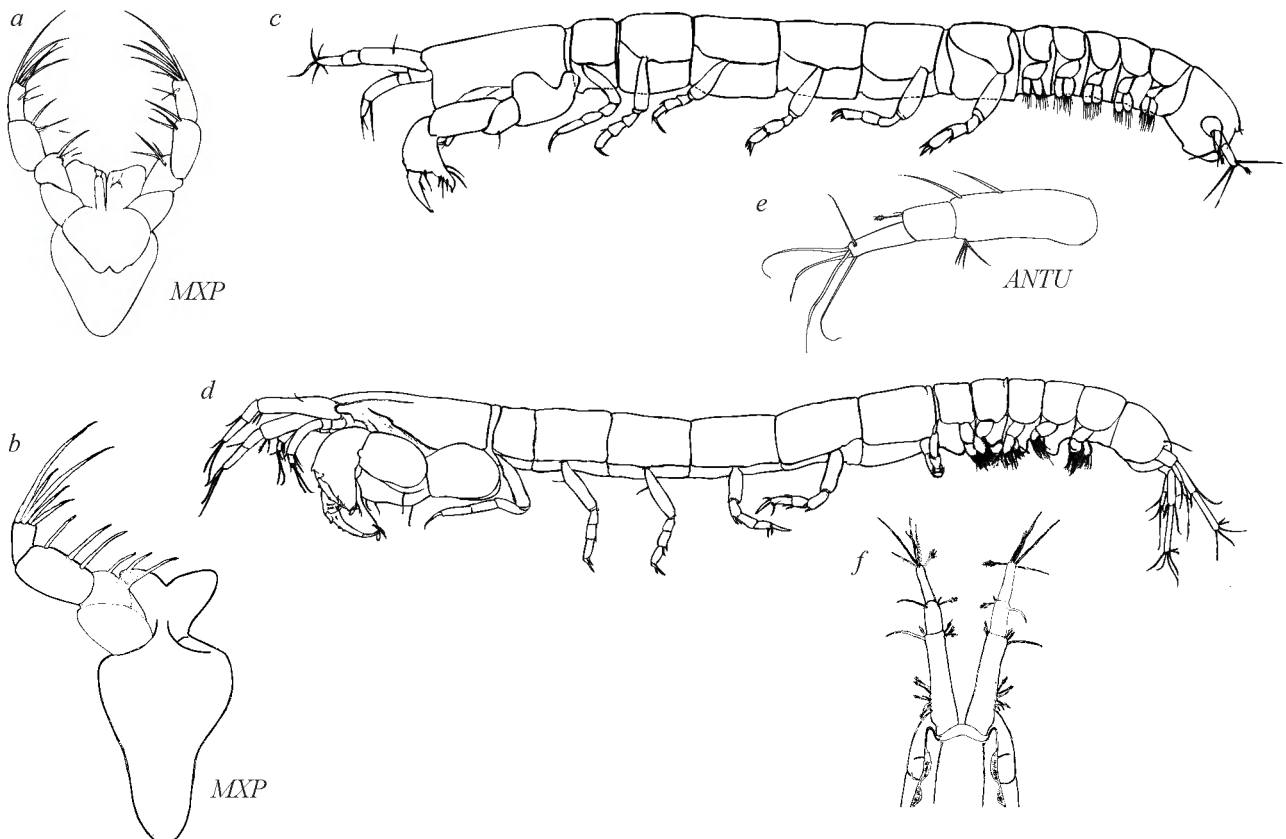


Figure 161

4. • Maxilliped with endites unfused distally. Uropod with exopod uniarticulate (female; male unknown) *Protanaïssis floridensis*

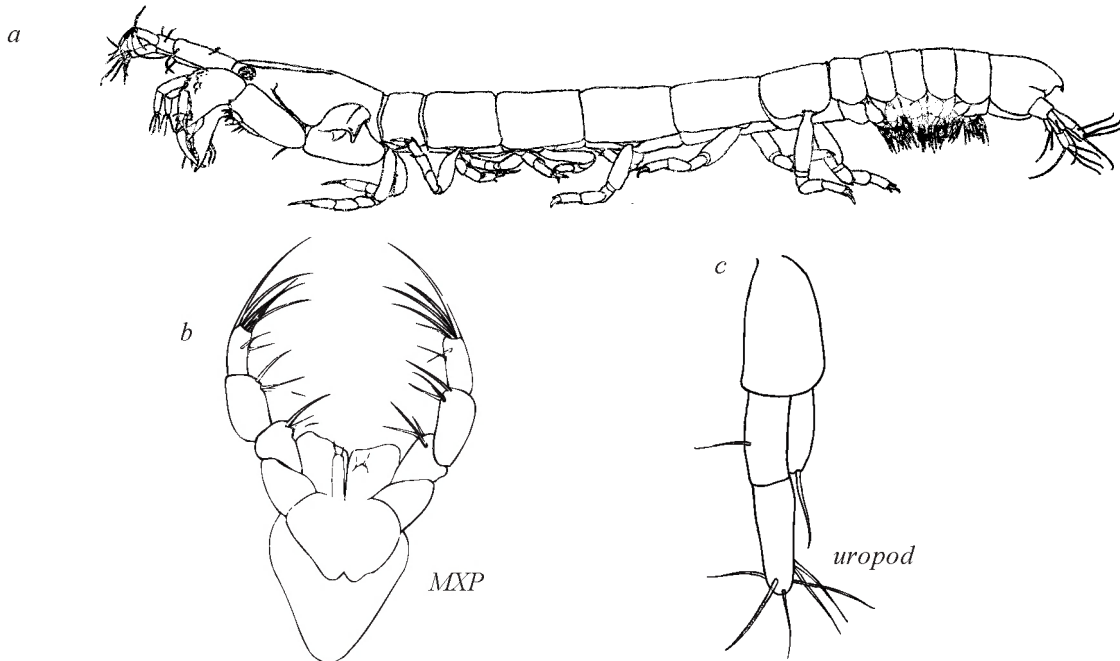


Figure 162

- Maxilliped with endites fused. Uropod with exopod biarticulate.... (genus *Tanaïssis*: females).....5

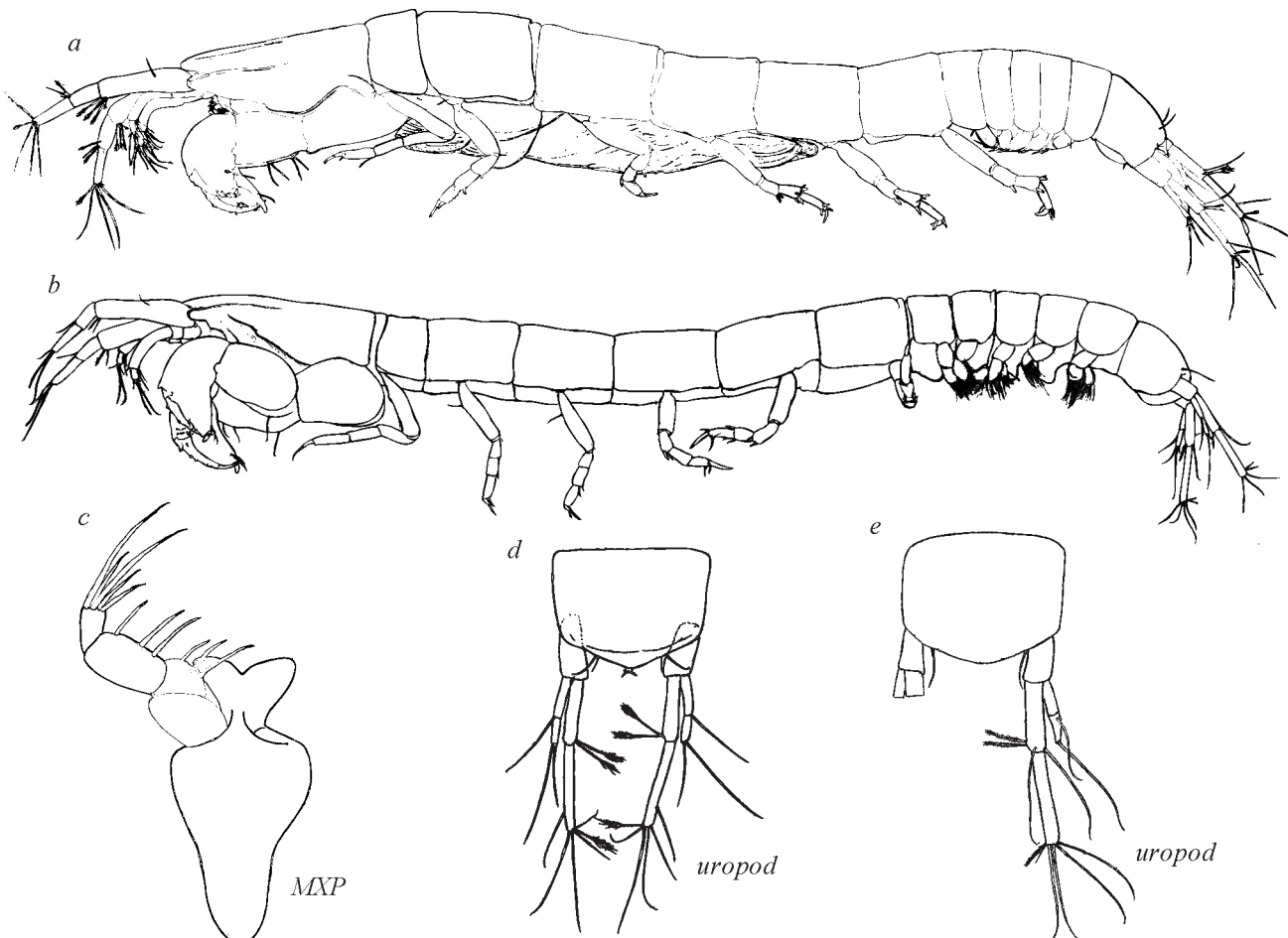


Figure 163

5. •Rostral (frontal) margin entire. Uropod with exopod extending to or slightly beyond article 1 of endopod *Tanaissis psammophilus*

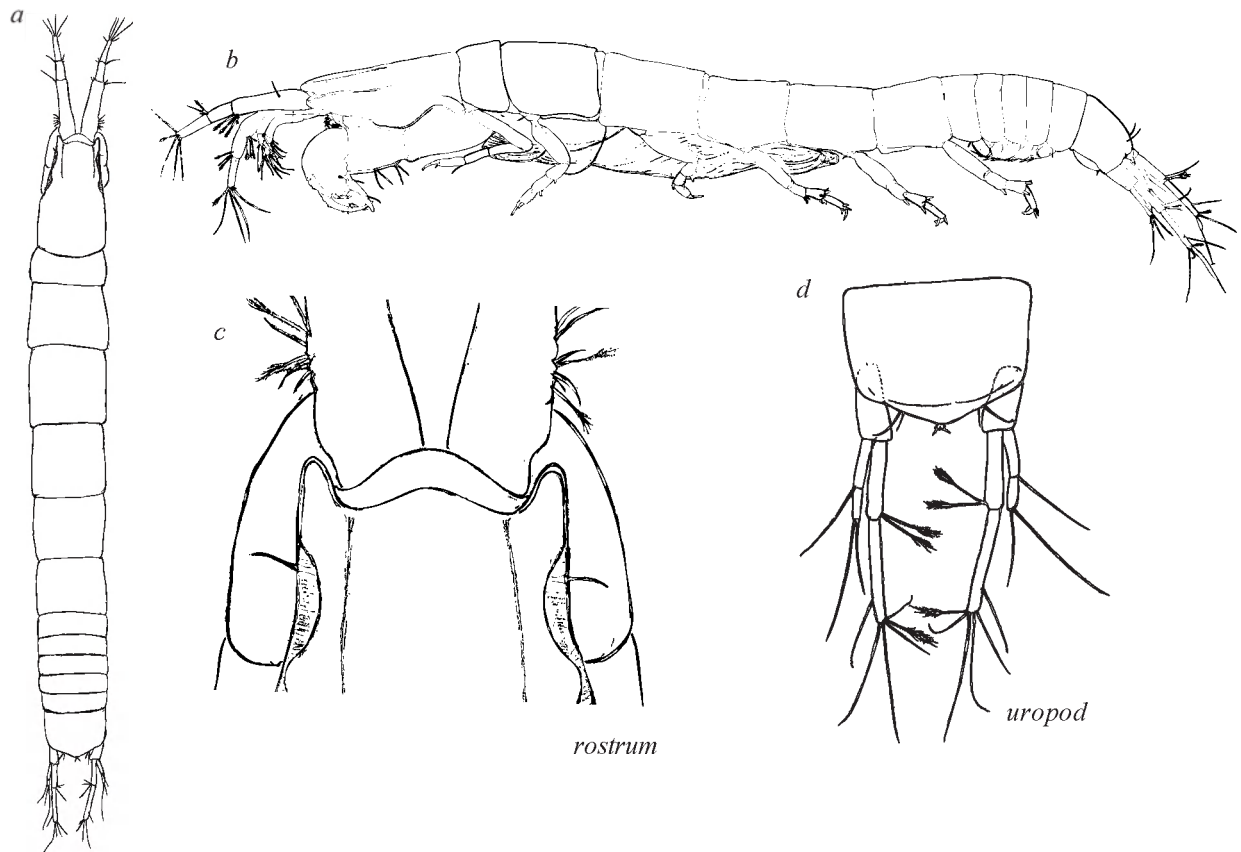


Figure 164

- Rostral margin crenulate. Uropod with exopod not extending beyond article 1 of endopod
..... *Tanaissis* sp. A (male unknown)

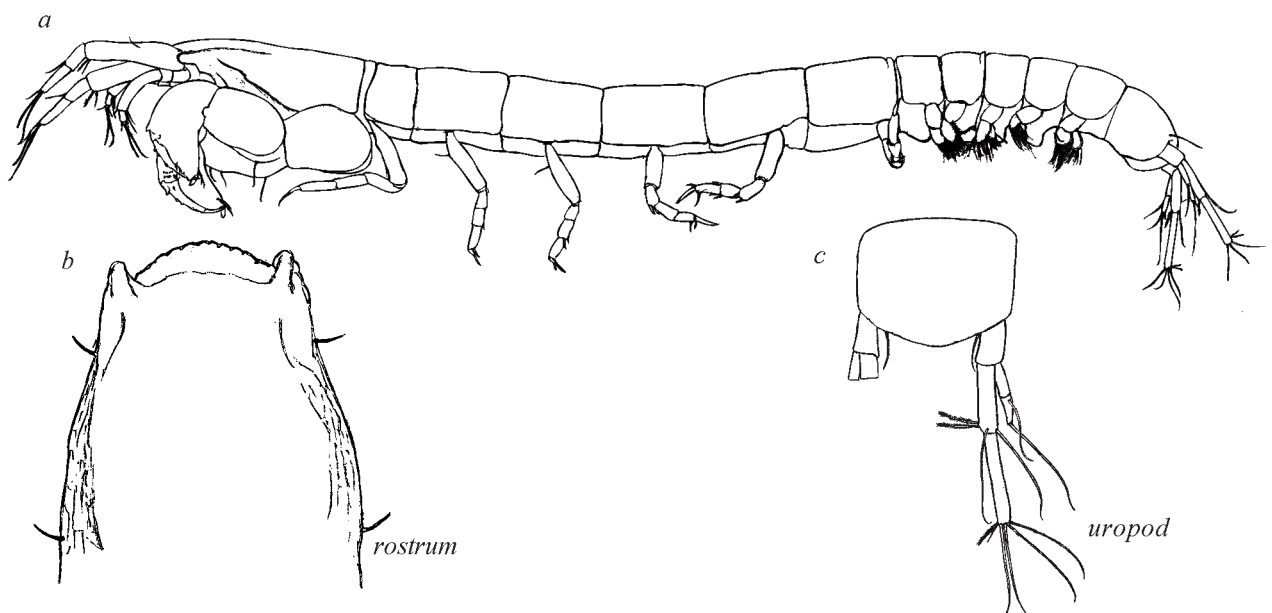


Figure 165

6.	• Antennule with 4 apparent articles	7
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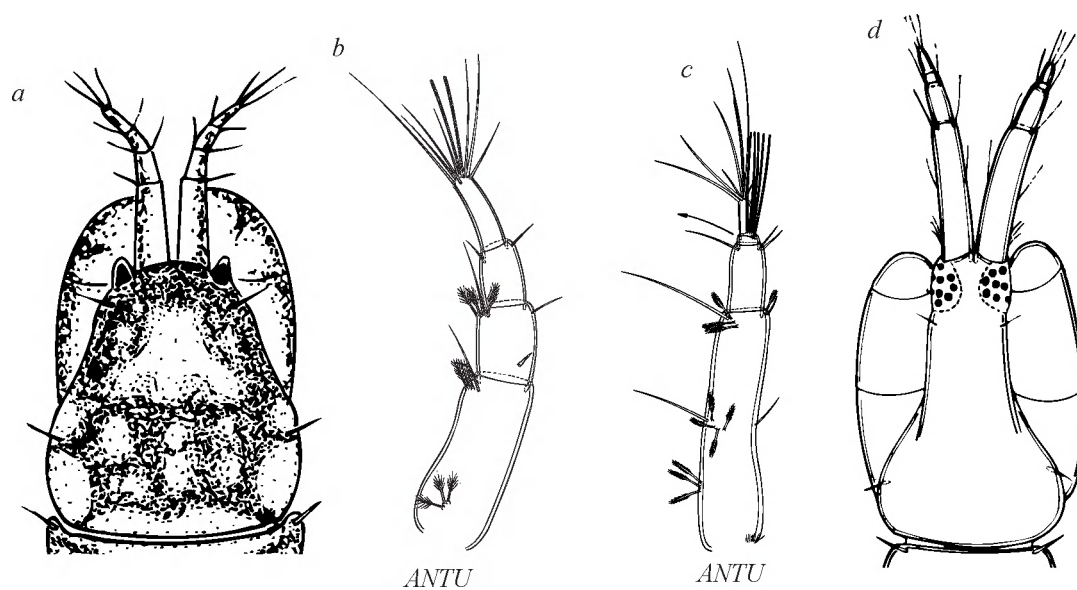


Figure 166

	• Antennule with 3 apparent articles	8
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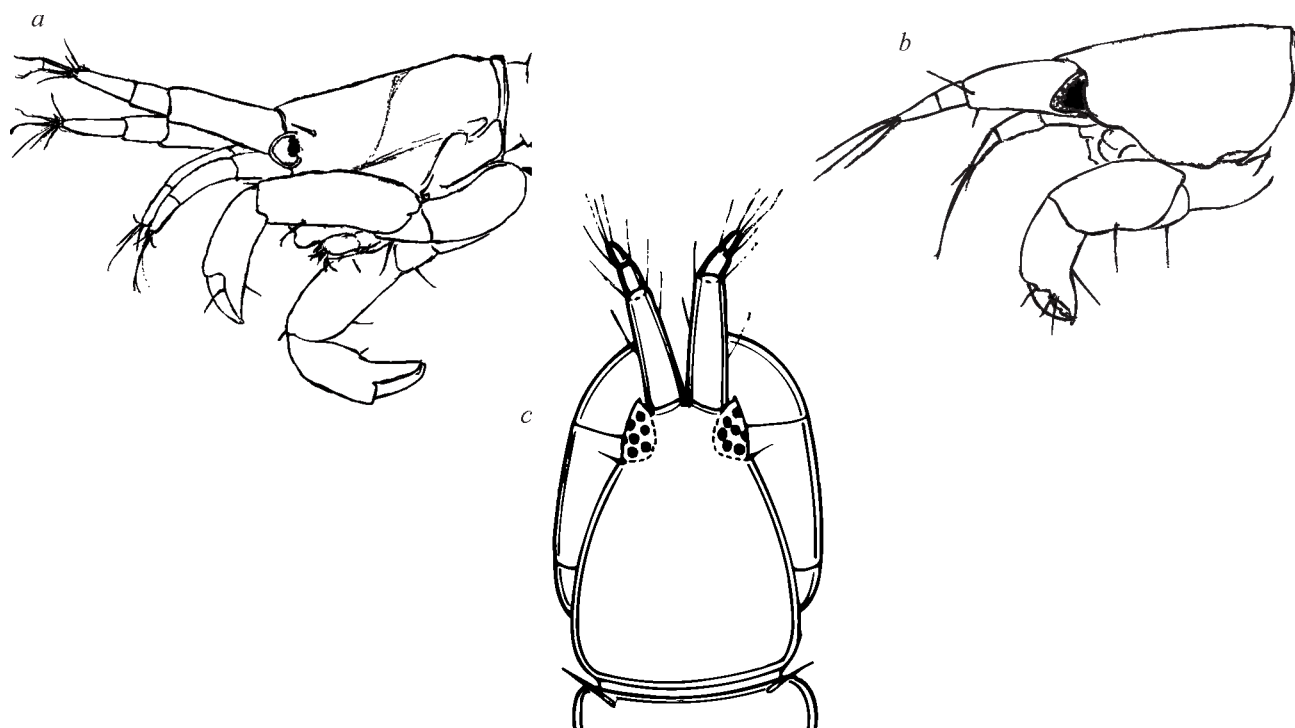


Figure 167

7. • Body not distinctly pigmented. Antennule with penultimate article reduced, wider than long and less than 1/3 length of distal article; distal 2 articles bearing 6 esthetes. Maxilliped reduced, but present. Chela with tooth on dactyl (movable finger); propodus with inner distal face having comb row bearing 8-9 (primary male) or over 20 (terminal male) *Nototanoides trifurcatus* (males)

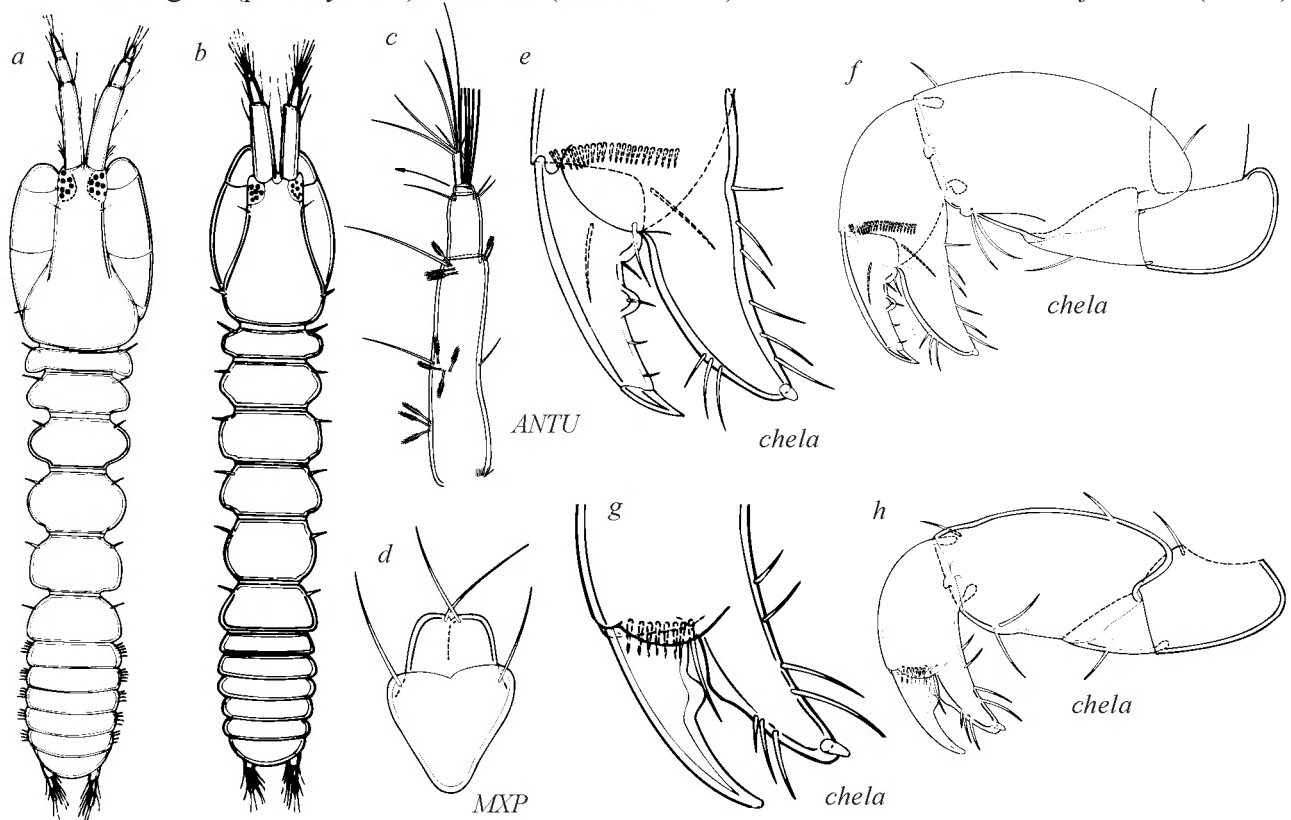


Figure 168

- Body pigmented. Antennule with penultimate article over half length of distal article. Maxilliped well-developed. Chela lacking tooth on dactyl; propodus inner distal face with 4 comb setae, medial almost twice as long as others *Teletanais gerlachi* (female, male unknown)

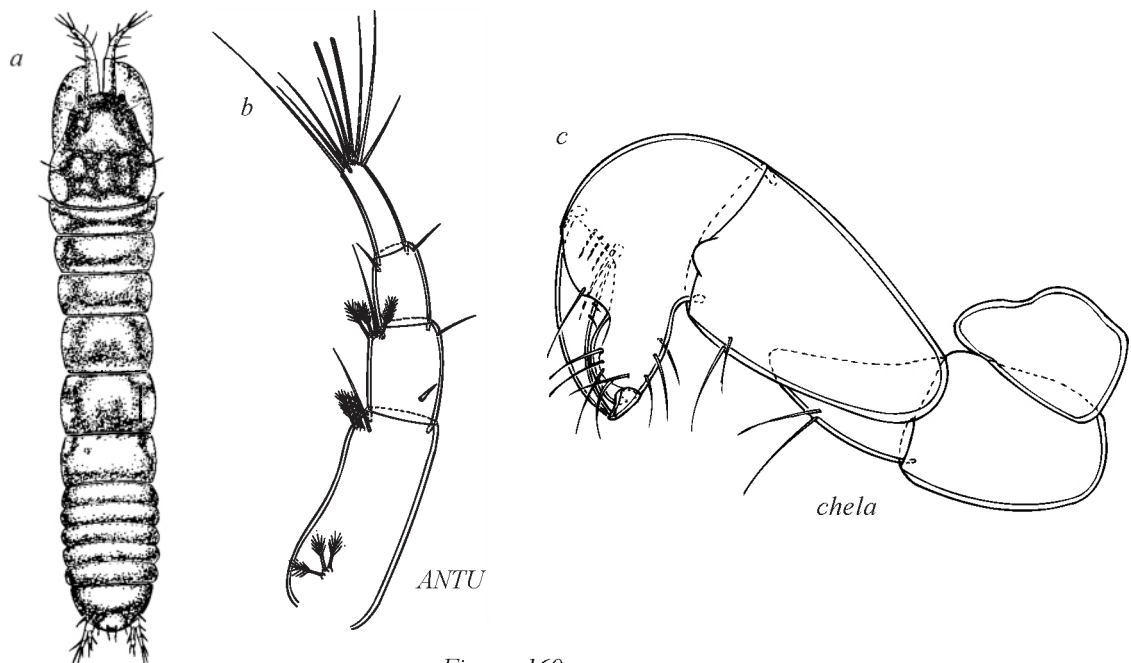


Figure 169

8. • Antennule with 5 esthetes on distal articles. Palp of maxilliped with distinctive trifurcate spiniform seta on inner margin of article 2. Chela with inner distal face of propodus having a comb row of 11-14 short setulate setae *Nototanoides trifurcatus* (female)

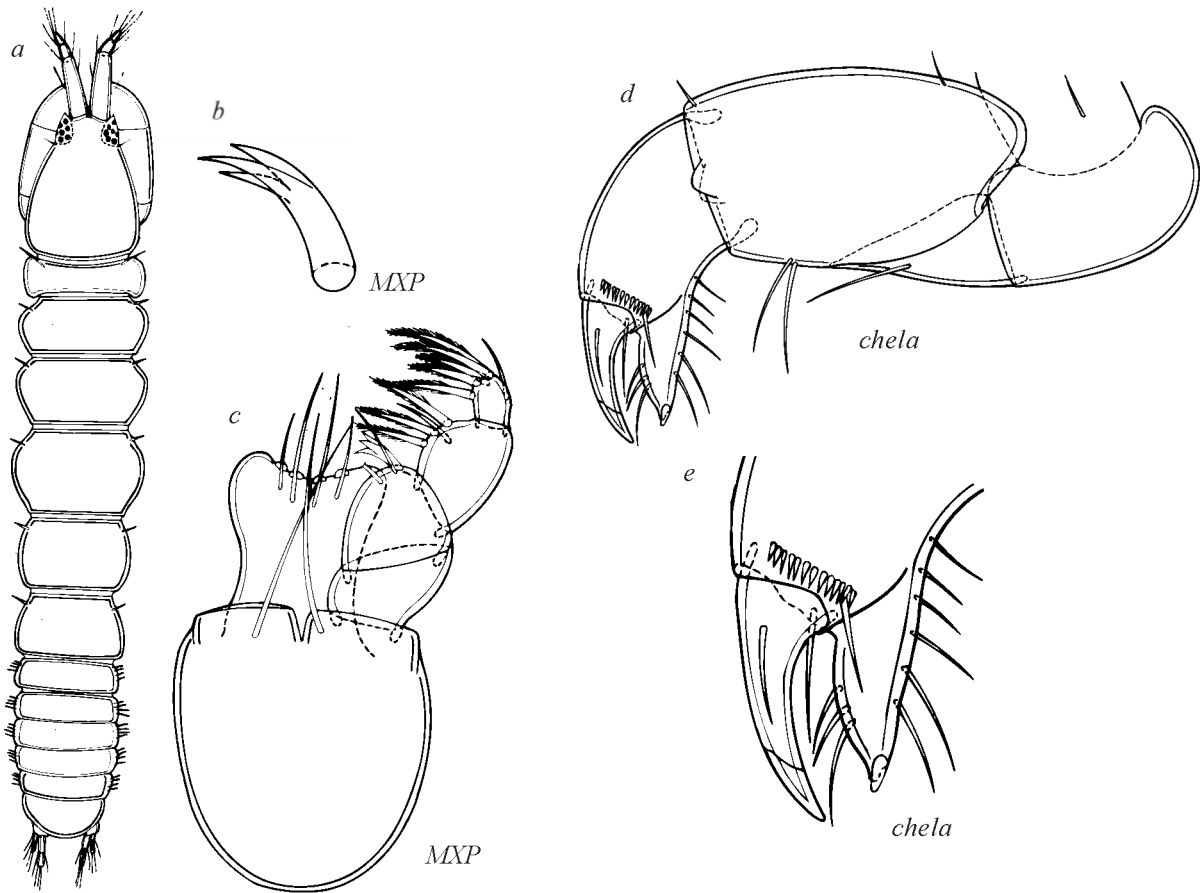


Figure 170

- Body small, less than 0.5 mm long (excluding antennae). Palp of maxilliped without trifurcate spiniform seta on inner margin of article 2. Chela with inner distal face of propodus having comb row of less than 5 setae 9

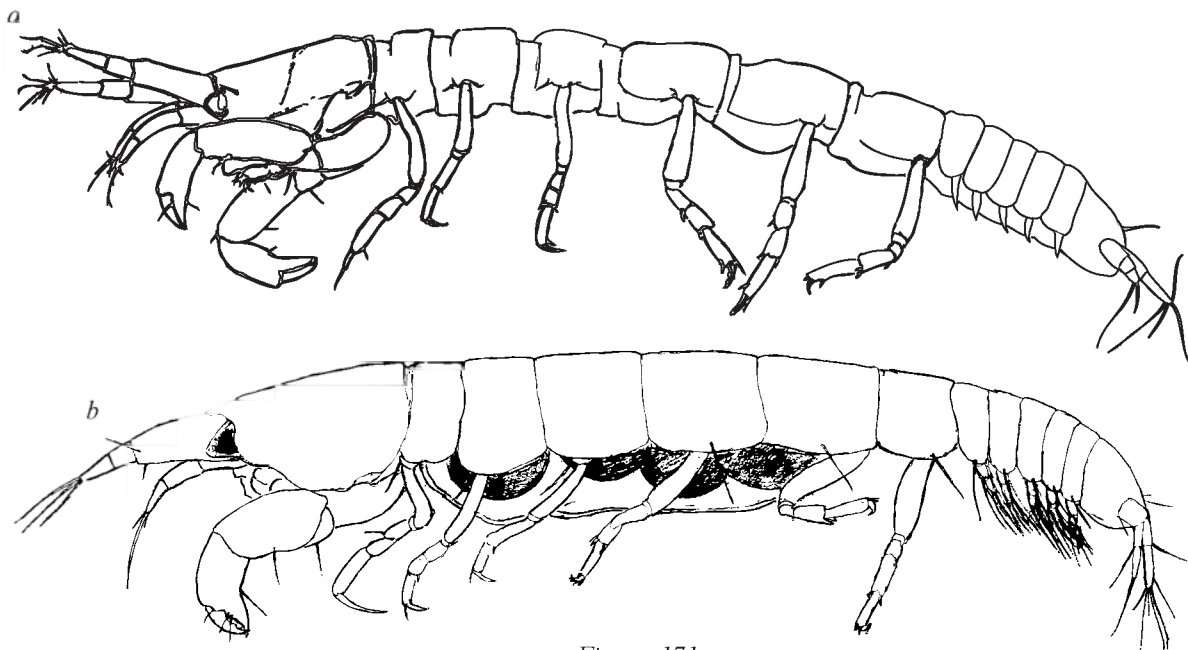


Figure 171

9. •Dactyl of pereopods 4-6 with tip simple, entire. Pleopods biramous, well-developed
 Nototanaid? sp. A (female)

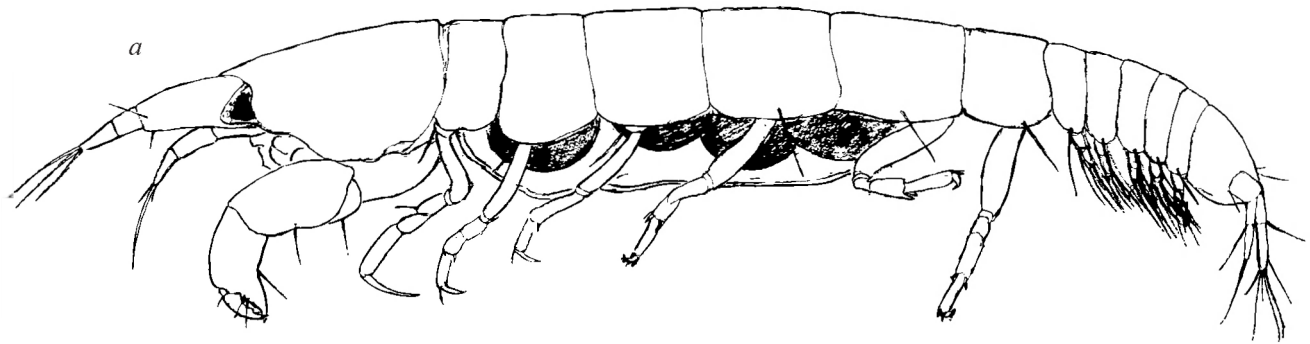


Figure 172

- Dactyls of pereopods 4-6 bifurcate. Pleopods rudimentary and uniramous or absent
 Nototanaid? sp. B

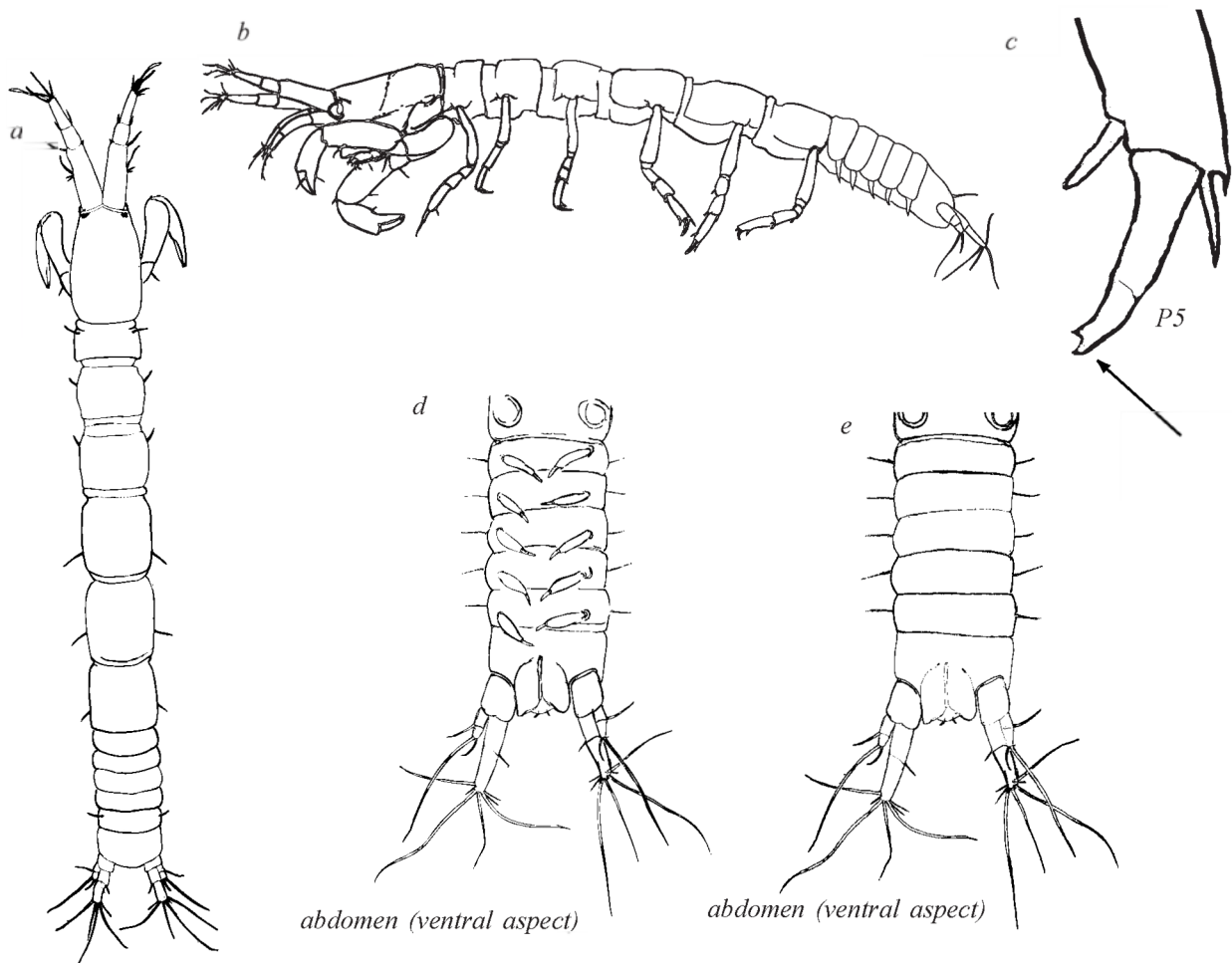


Figure 173

Family Nototanaidae Sieg, 1976

Nototanoides Sieg and Heard, 1985

Nototanoides trifurcatus Sieg and Heard, 1985

Recognition characters.—Female: Body cylindrical. Eyes present, well-developed with distinct lobe. Antennule with 3 articles, article 2 with several aesthetascs. Antennule with 3 articles, article 1 distinctly longer and articles 2 and 3 combined, article 2 with 4 aesthetascs and article 3 with 1. Maxilliped with basis fused and endites partly fused, narrower than basis; palp with article 2 having distinctive trifurcate spiniform seta on inner distal margin. Chela with carpus longer and more massive than propodus; dactyl and fixed finger without obvious denticles, inner face of palm as base of fixed finger with row about 12-13 short finely setulate setae and larger setulate seta slightly more distal longer setulate seta. Pereopod 1-3 with small coxa. Pereopod 4-6 lacking coxa, dactyl and unguis shorter than propodus, basis with groove on distoposterior margin. Pleopods present. Uropod with both endopod and exopod biarticulate and relatively short, exopod about ½ length of endopod.

Male: Large and small form recognized. Carapace elongate and laterally compressed anteriorly to accommodate chelae. Antennule with 4 apparent articles; article 3 reduced, 1 aesthetasc on distal margin; article 4 about 3 times length of article 3 with 5 aesthetascs, 4 arising proximally on “scale” at base, and at 1 tip. Mouthparts reduced, vestigial maxilliped present. Cheliped similar to female, but more massive, propodus inner face having row of about 22 setulate setae; dactyl with rounded tooth.

Distribution/Ecology.—*Nototanoides trifurcatus* is presently known from hard bottom shelf habitats of the Gulf of Mexico. In Florida waters it has been collected at depths of 19 -72 m. Off the Texas coast it has been taken in depths of 70 to 190 m and was found in association with sulfurous oil seeps and anoxic conditions (Sieg and Heard 1985).

Remarks.—Larsen and Wilson (2002) considered this monotypic species as an atypical of the Nototanaidae, but tentatively retained it within the family pending further study. Two male forms for *N. trifurcatus* were described by Sieg and Heard (1985). In both forms certain aspects of the antennular articulation are difficult to determine, specifically the origins of the aesthetascs at the articulation of articles 3 and 4. It is possible that the “scale bearing 4 aesthetascs” which Sieg and Heard considered part of the base of article 4, represents a vestigial article. In the female this may also be the origin of the articulated scale bearing the 4 aesthetascs between antennular articles 2 and 3. The use of SEM is needed to better understand the morphology and possible origins antennular “scale.”

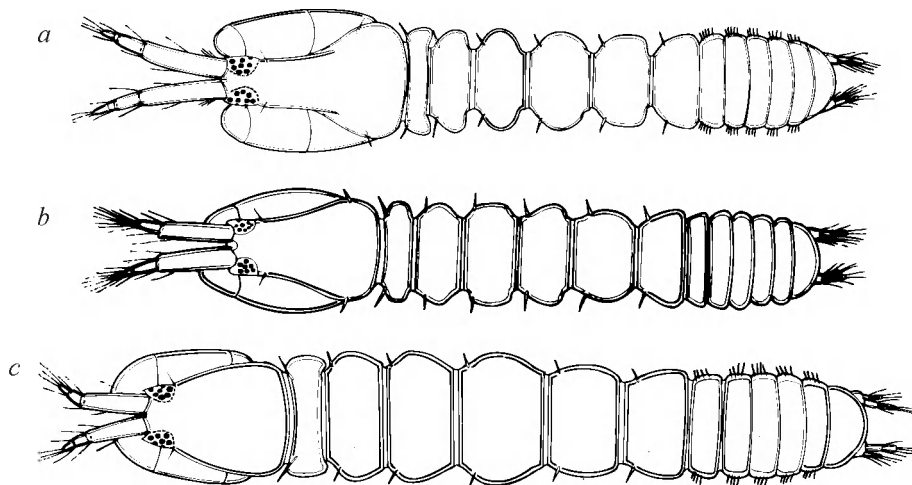


Figure 174

Protanaissus Sieg, 1982

Protanaissus floridensis Larsen and Heard, 2004

Recognition characters.—Female: Body elongate and cylindrical. Antennule with 3 articles. Antenna with 5-6 articles. Maxilliped basis fused distally, endites not fused, narrower than basis and with 2 simple subdistal denticles. Chela with movable finger having proximal spine on the inner margin and proximal process on the outer margin, fixed finger with 3-4 denticles on the inner margin. Pereopod 1-3 with small coxa, pereopod 1 with dactyl shorter than combined length of the propodus and carpus. Pereopod 4-6 without coxa and fused dactyl and unguis shorter than propodus. Pleopods present. Uropod biramous; endopod biarticulate; exopod uniarticulate.

Male: Unknown.

Distribution/Ecology.— This small species is presently known only from Biscayne Bay in southeastern Florida. Specimens were collected at a depth of 7 m in muddy sand substrata with associated aquatic vegetation (*Thalassia testudinum*).

Remarks.— Besides *P. floridensis*, three other species, *P. longidactylus* (Shiino, 1970), *P. makrotrichos* Sieg, 1986 and *P. alvesi* Gutu, 1996, comprise the genus *Protanaissus*. Of these only *P. floridensis* occurs in the North Atlantic. The type species, *P. longidactylus* (Shiino, 1970), is known from the Antarctic; *P. makrotrichos* Sieg, 1986 is found off the southern tip of South America; and *P. alvesi* Gutu, 1996 occurs off the coast of Brazil, just south of Rio de Janeiro.

Protanaissus floridensis is distinguished from its three southern hemisphere congeners by a combination of characters, including having (1) the movable finger of the chela with a proximal spine on the inner margin, and a proximal process on the outer margin, (2) the fixed finger of the chela with 3-4 denticles on the inner margin, (3) the dactyl of pereopod 1 shorter than the combined length of the propodus and carpus, and (4) the uropod with an uniarticulate exopod.

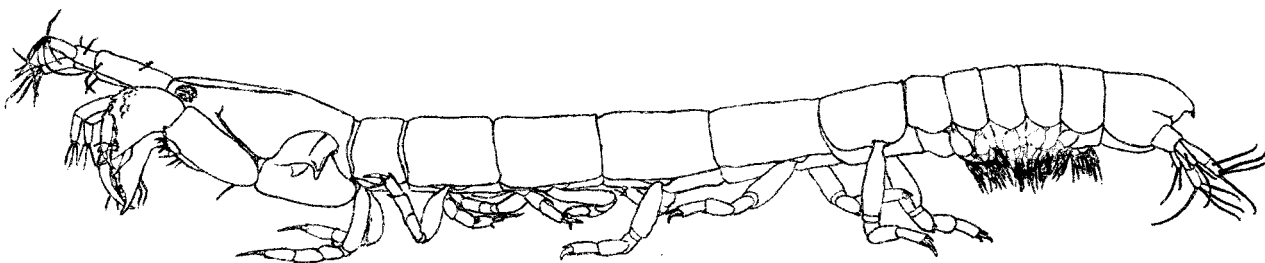


Figure 175

Tanaissus Norman and Scott, 1906

Tanaissus psammophilus (Wallace, 1919)

Recognition characters.—Female: Body elongate and cylindrical. Margin of rostrum entire. Eye lobes weakly developed with vestiges of visual elements. Antennule with 3 articles. Maxilliped with basis and endites fused, narrower than basis and without distal denticles or setae. Cheliped with dactyl lacking spines, fixed finger with 1 distal denticle on inner margin. Pleopods well developed. Pleotelson short (broader than long). Uropod with endopod and exopod biarticulate, exopod reaching to, or past, first article of endopod.

Male: Sexual dimorphism pronounced. Body much slimmer and usually longer than that of female. Carapace laterally compressed anteriorly to accommodate chelipeds. Antennule with 7 or more articles and numerous aesthetascs. Mouthparts strongly reduced. Pleotelson attenuated, longer than that of female (longer than broad). Pleopod endites more slender and setae much longer than those of female.

Distribution/Ecology.—*Tanaissus psammophilus* is found shelf waters along the Atlantic coast of North America, from Canada in northeastern Florida. Constructs tubes on soft bottom habitats.

Remarks.—The genus *Tanaissus*, which is presently known only from the northern Atlantic, is closely related to *Protanaissus* Sieg, 1976, but it differs mainly by having the endites of the maxilliped smooth and fused. *Tanaissus psammophilus* was originally described as *Typhlotanais psammophilus* by Wallace (1919) from Atlantic shelf waters off southeastern Canada. Besides *T. psammophilus* two other species *Tanaissus lilljeborgi* (Stebbing, 1891), the type species, and *T. danica* comprise the genus (see Bird 2003).

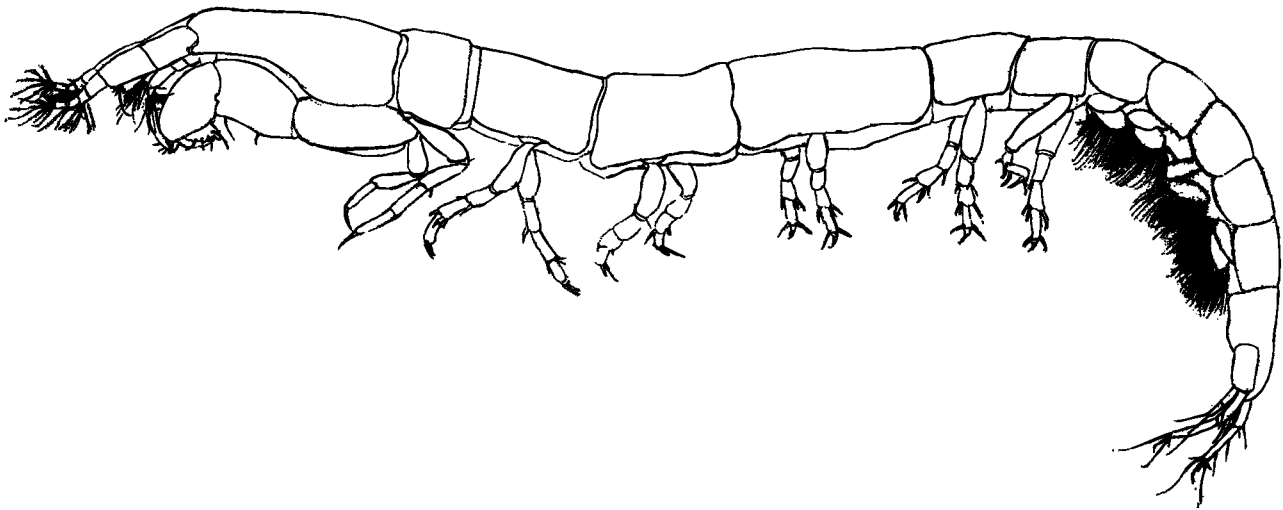


Figure 176

Tanaissus sp. A

Recognition characters.—Female: Very similar to *Tanaissus psammophilus*. Margin of rostrum weakly crenulated. Uropod with endopod and exopod biarticulate, exopod not quite reaching to first article of endopod. Male: unknown.

Distribution/Ecology.—At present, *Tanaissus* sp. A is represented by only two specimens, which were collected from shelf waters in the southeastern Gulf of Mexico west of Florida Bay, just north of the Florida Keys.

Remarks.— This form, which is known only from 2 apparent juvenile females, may simply represent a southern variant of *T. psammophilus*, or the difference observed may be an artifact of fixation and the processing of the specimens prior to examination. Pending the examination of additional material, ideally including adult males and females from off Florida Bay (Southeastern Gulf of Mexico), we have tentatively recognized this form as a distinct taxon based on the crenulated margin of the rostrum the slightly shorter uropodal exopods, as well as subtle differences in the armature of the chelae.

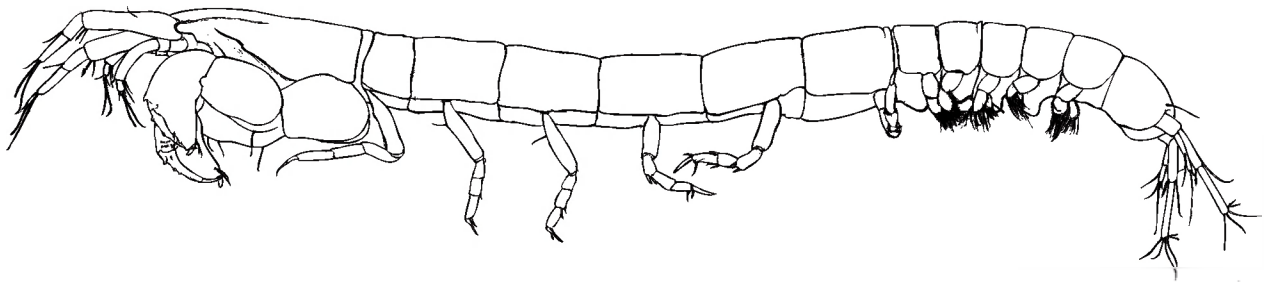


Figure 177

Teleotanaïs Lang, 1956

Teleotanaïs gerlachi Lang, 1956

Recognition characters.—Female: Body elongate, cylindrical (stouter than in *Tanaissus* and *Protanaissus*), with brown pigment dispersed throughout. Eyes well-developed. Antennule article 4 shorter than combined length of article 2 and 3. Labium consisting of 2 pair of lobes without lateral and medial processes. Maxilliped with basis fused distally, endites not fused, narrower than basis armed with 1 long simple subdistal seta and several small setules. Chela with dactyl (movable finger) aspinose; fixed finger without obvious denticles, 4 setae on inner margin and 2 on outer margin. Pereopod 1-3 with small coxa. Pereopod 4-6 without coxa, dactyl and unguis shorter than propodus. Pleopods present. Uropod with both endopod and exopod biarticulate, exopod about 3/4 length of endopod, extending beyond article 1 of endopod. Male. Unknown.

Distribution/ Ecology.—*Teleotanaïs gerlachi* has been reported from Brazil (type locality), Pacific coast of Central America (El Salvador), Gulf of Mexico (Texas [R. Heard, per. observations] and Florida West Coast), and West Africa (Nigeria) (see Sieg and Heard 1983). This euryhaline species is known from intertidal and shallow subtidal, estuarine habitats, including mangroves, tidal marshes, and oyster reefs (Sieg and Heard 1983). On one occasion it was reported from a fresh water pool on the Pacific coast of El Salvador (Sieg 1976)

Remarks. The monotypic genus *Teleotanaïs* was designated for *T. gerlachi* by Lang (1956) based on specimens collected from Brazil. In some ways *Teleotanaïs* superficially resembles members of the genus *Paratanaïs*, but differs by (1) lacking a stout spiniform seta on the distodorsal margin of antennal article 3, (2) having narrow maxillipedal endites, (3) lacking distinctive setulate setae with swollen bases laterally on pleonites 1-4, and (3) having a uropod with subequal biarticulate exopod extending beyond first article of endopod. Unlike species of *Paratanaïs*, *T. gerlachi* also has distinctive brownish pigment spots and blotches spread throughout the body reminiscent of some species belonging to the family Tanaidae (Sieg and Heard 1983).



Figure 178

Nototanaid? sp. A

Recognition characters.—Female: Body small, less than 0.5 mm, cylindrical narrow. Eye lobe and visual elements (omatidia) present, Antennule with 3 articles, first article swollen. Maxilliped with endite unfused distally, not expanded (as in paratanaid females). Chela moderately developed, chela with fixed and movable fingers small, short having small and indistinct teeth. Pereopods 1-6 with dactyl simple. Pleopods present and well-developed. Uropod with both rami biarticulate, narrow; exopod about 3/4 length of endopod, distinctly longer than article 1 of endopod. Male: Body, very short, compressed, minute. Eyes very large and well-developed. Antennule with 6 apparent articles, basal article massive, inflated. Mouth parts degenerate. Cheliped not overly developed, chela with fingers relatively short and small. Pereopods more slender and delicate than in female. Uropod as in female, but more slender.

Distribution/Ecology.— This minute, cryptic species is presently known from shallow (1-4 m) live bottom or sponges communities in southern from Port Everglades southward to the Florida Keys (Long Key).

Remarks.—Nototanaid sp. A may be one of the most numerous tanaidaceans occurring on live bottom and reef habitats in South Florida shallow waters. Because of its small size it can easily pass through a 0.5 mm sieve and because the female superficially resembles a small specimen of *Leptochelia*, it may have been misidentified or overlooked in previous benthic studies conducted in South Florida waters. Upon microscopic examination, however, Nototanaid sp. A is immediately distinguished from the those of leptochellids by having (1) a uropodal endopod with 2 articles, (2) the uropodal exopod elongate (3/4 length of endopod) and with 2 articles. The minute dwarf male of Nototanaid sp. superficially resembles that of *Paratanaid*, but is separated by its minute size and the presence of elongate and biarticulate uropodal endopod and exopod (those of *Paratanaid* are relatively short with a uniramous exopod. The male of Nototanaid sp. A probably represents one of the smallest known adult tanaidaceans.

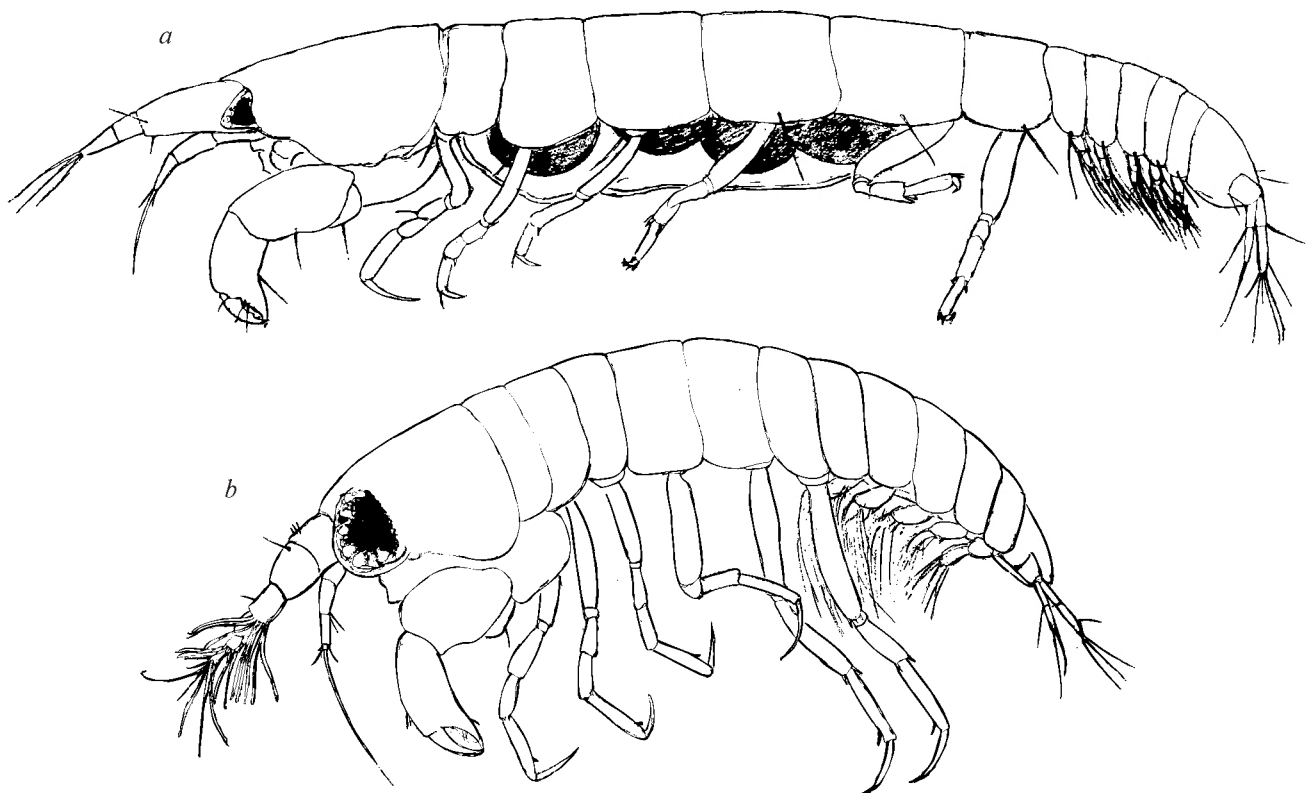


Figure 179

Nototanaid? sp. B

Recognition characters.— Body small, less than 0.5 mm, narrow and attenuated. Eye lobe present, but visual elements indistinct. Antennule with 3 articles. Cheliped narrow with chela lacking distinct teeth. Pereopods 4-6 with tip of dactyl bifid. Pleopods present (male?) or absent (female?), if present, reduced and uniramous. Uropod with both rami biarticulate; exopod about 1/2 length of endopod, as long or nearly as long as article 1 of endopod.

Distribution/Ecology.— This minute, cryptic species is presently known from shallow (1-4 m) live bottom or sponges communities in southern from Port Everglades southward to the Florida Keys (Long Key).

Remarks.— Nototanaid sp. B may be more common than our collections indicate. Because of its very small and elongate body, it can easily pass through a 0.5 mm sieve and may have been overlooked in previous benthic surveys of the region. At present the taxonomic and systematic status of this cryptic species is undetermined. Like some deep water tanaidomorphs the pleopods are reduced or absent. Whether the presence of reduced, pleopods in some specimens indicates a male condition is as yet undetermined; however, if it does, this small species shows no apparent sexual dimorphism in the morphology of the chela and articulation and setation of the antennule. As for Nototanaid sp. A, the taxonomic status and formal description of this enigmatic species are now in progress.

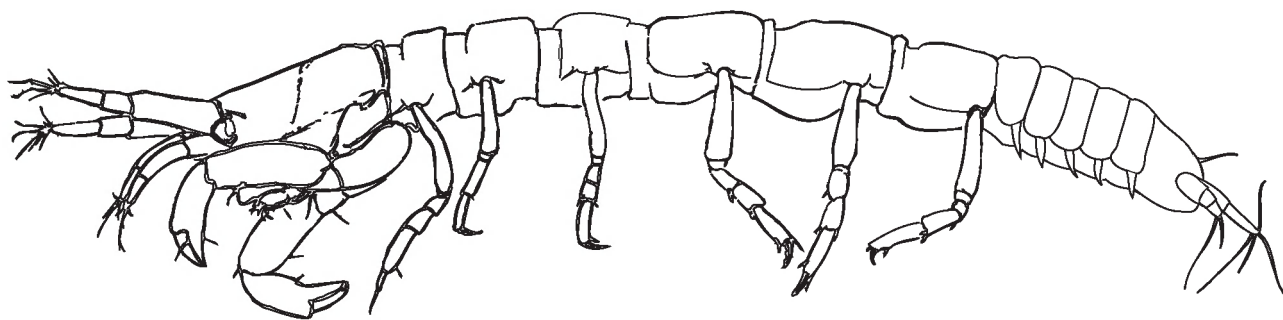


Figure 180

ACKNOWLEDGMENTS

We wish to thank Ken Espy and Gitta Schmitt, of the Florida Department of Environmental Quality for their help, support, and patience during preparation of the guide. Special thanks go to Micah Bakenhaster and Brent Thoma for their untiring transcribing of the illustrations into the graphics images and for formatting, and incorporating the document into PageMaker and PDF files. Appreciation is expressed to Sara LeCroy, Jana Thoma, Megan Bakenhaster, and Jerry McLelland for reading the text and for their constructive comments. Some of the specimens used in this study were kindly loaned by the National Museum of Natural History (Smithsonian Institution), Barry A. Vittor & Associates, and the Harbor Branch Foundation. Additional important material was kindly made available to us through the kindness of Judy Robinson and Charles Messing of Nova Southeastern University. This study was funded through the Florida Department of Environmental Quality.

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Figure 4(a) modified from Dennell (1937) and (b) from Sieg (1977)

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Figure 96 b, c, g from McSweeny (1968)

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Figure 97 a-d McSweeny (1968), e, f after Sieg (1980)

Figure 98 b from Sieg (1980), e & f after Sieg (1980)

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Figure 99 a-c from Moore, 1894; d, e modified from Sieg (1980)

Figure 100 c after Sieg (1980)

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Figure 110 a,c,d from Sieg and Heard (1988)

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Figure 154 a, b from Sieg and Heard (1989)

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Figure 157 a from Larsen and Heard 2004; g, h from Sieg and Heard (1985); i from Sieg and Heard 1983.

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Figure 158 a, b, d from Larsen and Heard (2004); c from Sieg (1982)

Figure 159 a, b, d,e, g from Sieg and Heard (1985); c, d, h from Sieg and Heard (1983).

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Figure 161 a, c, e from Larsen and Heard (2004); b after Sieg (1982).

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Figure 162 a, b, c from Larsen and Heard (2004)

Figure 163 c after Sieg (1982).

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Figure 166 a, b from Sieg and Heard (1983); c, d from Sieg and Heard (1985)

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Figure 168 a-h after Sieg and Heard (1983).

Figure a-c from Sieg and Heard (1983).

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Figure 170 a-e after Sieg and Heard (1985).

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Figure 175 Larsen and Heard (2004)

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Figure 178 from Sieg and Heard (1983)

GLOSSARY

In part modified from Bousfield (1973), Dojiri and Sieg (1997), Holdich and Jones (1983), LeCroy (2000), Lincoln et al. (1987), McLaughlin (1980), and Williams (1984).

Abdomen - tagma (body section) between the thorax and telson. It consists of 6 segments (somites); the pleopods are typically attached to the first 5 segments and a pair of uropods are attached to the last abdominal segment, which in Tanaidacea is fused with the telson (see pleotelson). In some groups (e.g., metapseudids and some tanaidomorphan families and genera) the abdominal somites are fused or partially fused. Synonym: pleon.

Abdominal somite(s) - body segment(s) between thorax and telson. Synonym: pleomere, pleonite.

Accessory flagellum - small secondary ramus of antennule (antenna 1) attached to the distomedial margin of the last article of the peduncle, rarely as long as the primary flagellum; for Tanaidacea found on members of the Apseudomorpha, but may be vestigial or lacking in some kalliapseudids (subfamily Tanapseudinae). Absent in suborders Neotanaidomorpha and Tanaidomorpha.

Acuminate - produced into a sharp point.

Acute - sharply pointed.

Aesthetasc(s) - simple, tubular, non-rigid, thin-walled, chemosensory seta often found on the antennular flagellum of tanaidaceans, especially natatory males, and other malacostracan groups. Synonyms: esthetasc, esthete, and olfactory hair.

Allotype - in taxonomy a designated paratype of opposite sex to the holotype. It has no more standing than any other paratype in the type series. If the holotype is lost, unless there are no paratypes of the same sex available, it would be prudent not to designate an allotype as the lectotype. This especially true in the Tanaidacea where in some families a high degree of polymorphism and sexual dimorphism is present.

Ambulatory leg - see pereopod.

American Mediterranean - a general geographic term for the region encompassing the Gulf of Mexico, the Caribbean Sea and the Bahamas.

Anal plate - posteriorly directed spatulate process arising from the ventral surface of the pleotelson. A prominent feature on the male of the leptocheliid genus *Hargeria* and the only character that defines this genus.

Anus - posterior opening of the digestive tract located on the pleotelson in Tanaidacea and Isopoda.

Antenna (antennae) - second pair of cephalic or head appendages; multi-articulate attached to the anterodorsal margin of the head, anterior to the mouthparts; referred to as "antenna 2" or "second antenna" in some groups of Crustacea. A squama or uniarticulate process is present on the antenna of most members of the suborder Apseudomorpha.

Antennule (antennules) - first pair of cephalic (head) appendages; multi-articulate; referred to as “antenna 1” or “first antenna” by some specialists; an accessory flagellum is present in the suborder Apseudomorpha, but absent in the suborders Neotanaidomorpha and Tanaidomorpha.

Anterior - front end; towards the front.

Apical - at the apex, tip or distal end; terminal.

Apomorphic - describing a condition derived from and differing from an ancestral state.

Apomorphic character - a character derived from and differing from an ancestral state.

Article - individual unit or subdivision of an appendage.

Basis - article 2 of chela or peraeopod; located between the coxa and ischium, or between the coxa and merus when the ischium is absent (e.g., members of the Tanaidae and most tanaidacean chelae).

Benthic - relating to the bottom of a body of water (e.g., lake, river, estuary, ocean).

Biarticulate - composed of two articles.

Bifurcate - divided into two non-branches; forked.

Biramous - having two articulating branches (rami), the inner branch being the endopod and outer branch the exopod.

Branchial chamber - cavity between the carapace and body wall into which the palp of the maxillule and the epipodite (epignath) of the maxilliped extend.

Brood plate - see oostegite.

Brood pouch - see marsupium.

Brood sac - pouch or sack-like marsupium formed by one or two oostegites; found in females of the family Tanaidae. Synonym: ovasac of Lang (1960).

Buccal mass - conical, subquadrate or styliform bundle made up of closely appressed mouthparts, located on the ventral surface of the head.

Carapace - cuticular layer attached to the posterior margin of the head (maxillary segment) and extending anteriorly and posteriorly, often covering the entire head and thorax; present in many crustaceans, but not found in amphipods or isopods. In Tanaidacea it is relatively small and formed by the fusion of the first two thoracic segments (thoracomeres) with head (cephalon). It is curved ventrally to form a branchial chamber with the inner surface covered with the respiratory epithelium.

Carina - any keel-like structure or well-defined projecting ridge on the outer surface of the exoskeleton.

Carinate - having at least one laterally compressed, acute ridge, carina, or keel; usually dorsal.

Carpus - article 5 of the chela or a peraeopod; located between the merus and propodus.

Caudal - see posterior.

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.

Cephalon - anterior most tagma (body section), bearing eyes, mouth, antennule, antennae, and 3 pairs of mouth parts (mandible, maxillule, and maxilla).

Cephalothorax - in Tanaidacea, the anterior tagma or body division resulting in the fusion of cephalon and thoracomeres, part of which forms the carapace.

Chela - arrangement of distal 2 articles of the crustacean limb (thoracic endopod) in which the terminal article (dactyl) is opposed to the distal extension (fixed finger or pollex) of the article (propodus) proceeding it in an adaptation for grasping, tearing, and cutting.

Cheliped(s) - in Tanaidacea the second thoracic appendage bearing the chela(e).

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

Clavate - club-shaped; broadened distally.

Claw - peraeopodal structure resulting from the fusion of dactyl and the terminal spine. Synonym: chela.

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

Comb row - row of short, stiff, straight or slightly curved spiniform setae.

Comb setae - the setae making up a comb row.

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

Coxa - article 1 chela or peraeopod; often reduced or fused with peraeonite.

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

Cryptic - hidden, camouflaged.

Cusp - small tooth or process.

Dactyl or dactylus - terminal article of a thoracic appendage such as the chela, peraeopod (article 7), or of the palp of the maxilliped (article 4). Forms the movable finger in a typical propochelate appendage.

Dendritic - branching.

Dentate - toothed.

Derived character - see apomorphic character.

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; refers to the upper or top surface or margin. Synonym: tergal.

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

Endite - inward or medially directed lobe of the precoxa, coxa, basis, or ischium. The condition (fused, partially fused, or unfused) of maxillipedal endites is an important character in tanaidacean taxonomy and systematics.

Endopod (endopodite) - inner ramus of a thoracic or abdominal appendage.

Entire - complete; having a simple, smooth, unmodified margin; not cleft, dentate, or serrate.

Epibenthic - living on the surface of the bottom substratum in lakes, streams, rivers, estuaries, and oceans.

Epignath - epipodite of the maxilliped.

Epipodite - in Tanaidacea the exite of the coxa with brachial function, and exclusively found on the maxilliped. The epignath of tanaidacean is sometimes considered an epipodite of the maxilliped.

Epistome - anterior plate of the head (cephalon) between the labrum (upper lip) and the bases of the antennae. Sometimes, especially in members of the Apseudomorpha, it is produced into an anteriorly directed spine.

Epistsomal spine - an anteriorly directed spinous process of the epistome.

Esthete - see aesthetasc.

Euryhaline - applied to a species cable of osmoregulating over a salinity range from nearly fresh (oligohaline) to oceanic (polyhaline) conditions. Antonym: stenohaline.

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

Exite - lateral lobe on the outer margin of the sympod or protopod.

Exopod (exopodite) - outer ramus of thoracic or abdominal appendages.

Exoskeleton - chitinous or calcified outer integument of crustaceans.

Falcate - sickle-shaped or hooked.

Fingers - narrow scissor or clipper-like processes or blades of the pincer end of the cheliped, movable finger being the dactyl and fixed finger being the non-palm extension of the propodus.

Fixed finger - distal immovable process of the propodus of the chela upon which the dactyl closes for grasping. Synonym: pollex.

Flagellum - multiarticulate distal part (ramus) of the antennule and antenna, exclusive of the peduncle. It can be distinguished from the peduncle in the Apseudomorpha, but often indistinguishable from the peduncle in Tanaidomorpha, especially in females.

Fossorial - adapted for burrowing in the substratum. Many benthic Apseudomorpha have the distal articles of the first peraeopod (stab leg, fossorial leg) flattened and armed with large spiniform setae to facilitate a fossorial existence in estuarine and ocean sediments.

Geniculate - bent and fixed at a right angle, knee-like (i. e., antennule of some apseudomorphs).

Genital cone - conical structure located on the ventral surface of peraeonite 6 (thoracomere 8). This feature was an important systematic character in the classification of Lang (1949), who divided the Tanaidacea in the Monokonophora and Dikonophora based on the presence of a single or paired of genital cones, respectively.

Glabrous - smooth, glossy; having no hairs, projections, or pubescence

Globular - round, bulbous, globe-like.

Gonochoristic - unisexual, remaining as the same sex throughout life cycle.

Gnathal lobe - masticatory endite of the mandible. Also called the masticatory process.

Gnathopod - modified peraeopods, usually uniramus, appendage or appendages attached to first two, and sometimes third, peraeonal segments; usually subchelate or otherwise dissimilar to the remaining paired peraeonal appendages (peraeopods). Characteristic of Amphipoda, Isopoda, and some Mysida.

Habitus - body form.

Hermaphroditism - condition of having both male and female organs; simultaneously or sequentially (see protandry, protogyny).

Holotype - in taxonomy, the single specimen originally designated or indicated as the type specimen of nominal species, or the only specimen available when a species was originally described and formally named.

Hyposphaenium (plural hyposphaenia) - an acute or hook-like process on the ventral surface of thoracomere (sternite).

Ischium - article 3 of thoracopods 2-7 (chela and peraeopods) between the basis and merus; in Tanaidacea reduced, and in some incidences appearing absent (e.g., chelae and on all thoracopods in the family Tanaidae).

Incisor process - terminal biting or “cutting” part of the gnathal lobe of the mandible, which bears the incisor and associated *lucina mobilis* (left mandible) and subterminal “spine-row” of setae. Synonym: *pars incisiva*.

Infauna - benthic animals living within the substratum. Adjective: infaunal.

Juvenile(s) - post embryonic stage(s) that have not morphologically differentiated sexually. See neuter.

Labium - a fleshy, bilobed plate, with or without a uniarticulate distal palp, located on the posterior margin of the mouth. Synonym: lower lip, paragnath.

Labrum - 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. Synonym: upper lip.

Lacinia mobilis - small toothed process on the peracarid mandible, which is articulated with incisor process just distal to the spine row. In Tanaidacea it is usually only present or well-developed on the left mandible and is used as an important taxonomic character for separating members of the family Tanaidae (Sieg 1977).

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.

Lectotype - a type specimen selected from the type series (i.e., syntypes) when no holotype has been designated in the original description of the species, or a type species (preferably of the same sex) selected after the publication of the original description to replace a lost or completely destroyed holotype.

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

Lower lip - see labium.

Malacostraca - a class of the Crustacea, which represents the most highly advanced members of the subphylum. The class is generally characterized by paired compound eyes, usually biramous antennules and antennae (antennae with exopod modified into squama or scaphocerite), 5-8 pairs of uniramous or biramous thoracic appendages (peraeopods), abdomen usually bearing 5 pairs of biramous pleopods and 1 pair of uropods (except Amphipoda with 3 pairs of each), and telson.

Manca - post embryonic stage in the Tanaidacea, Cumacea, and Isopoda. There are normally two manca stages: the manca 1 or first manca stage lacks peraeopod 6 (or last pair of peraeopods or thoracopods) and manca 2 or second manca stage is free living and has the buds of the developing peraeopod 6.

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; palp present or absent.

Mandibular palp - palp composed 1-3 articles found on the mandible of most members of the suborder Apseudomorpha (absent in the sphyrapid subfamily Sphyrapinae); absent in the suborders Neotanaidomorpha and Tanaidomorpha.

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

Maxillule - one of the second pair of mouthparts also referred to as maxilla 1 or first maxilla. In it is Tanaidacea typically composed of 1 (Tanaidomorpha) or 2 (Apseudomorpha) endites and a filiform palp (missing in suborder Neotanaidomorpha and in members of the apseudomorphan family Kalliapseudidae). When present the palp appears to be modified for cleaning the inner respiratory surface of carapace.

Maxilla 1 - see maxillule.

Maxilla - 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 midpoint.

Merus - article 4 of the chela or peraeopod; located between the ischium and carpus, except on the chela of most tanaidaceans where the ischium is apparently absent.

Molar process - grinding, subterminal portion of the gnathal lobe of the mandible. Synonym: pars molaris.

Monotypic - a taxa represented by a single species.

Morphology - shape, form.

Mouthpart bundle - see buccal mass.

Multiarticulate - composed of two or more articles.

Natatory - swimming. In Tanaidacea, especially in some of the tanaidomorphan families, such as the Paratanaidae, the males are highly modified and adapted for swimming (i.e., small bodies with well-developed pleopods with long plumose “swimming” setae). These males are referred to as “natatory males.”

Neotype - a proxy or replacement type specimen selected and designated for a lost or destroyed holotype when other type material (paratypes or syntypes) are unavailable to be selected as a lectotype. Ideally a neotype should be the same sex as the original holotype and come from the same habitat at or near the type locality.

Neuter - post manca stage that has not morphologically differentiated sexually. Synonym: juvenile.

Ocular lobe - see cephalic lobe.

Oligohaline - brackish water having a salinity between 0.5 and 3.0 ppt.

Ommatidia - individual facets (cylindrical or prismoidal visual element) of the subintegumentary compound eye.

Oostegite - thin, flat plate, attached to the posteromedial margin of the coxa of peraeopods 3-5 in females. In adult females, these plates interlock and overlap, forming the marsupium for holding eggs and newly hatched juveniles; in subadult females, they are more sack-like and lack setae.

Oostegite bud - sack-like developing oostegite found in preincubatory female peracarids.

Osmoregulate - the ability of an organism to maintain the osmotic concentration of its body fluids at a level independent of the surrounding ambient salinity.

Ovasac - modified pair of oostegites that form one or two “sacs”, instead of typical leaf-like oostegite plates, which hold the ova during incubation. These female structures are characteristic of members of the family Tanaidae.

Ovate - oval-shaped.

Ovigerous - bearing ova or eggs. In Tanaidacea referring to a female with eggs in the marsupium.

Palm - broad proximal part propodus of cheliped, excluding the fixed finger (pollex). Synonym: manus.

Palmate - condition of having the proximal part of the propodus being expanded to form a palm.

Palp (or palpus) - small, uniramous, articulated appendage found on the lateral margin of the mandible, labium, and maxilliped.

Parachelate - a term used in describing the gnathopods of amphipod and isopod crustaceans when the movable finger is distinct and well-developed, and in some cases strongly overreaches the apex of the reduced fixed finger (pollex) of the propodus. The propodus is non palmate or not expanded, and is usually linear. This condition is similar to that exhibited by the male chela of *Pseudoleptocheilia* sp. A.

Paragnath - see labium.

Pars molaris - see molar process.

Pars incisiva - see incisor process.

Paratype - specimens in the type series other than the designated holotype.

Peduncle - combined, typically robust, proximal or basal articles of the antennule, antenna, pleopods and uropods; multiarticulate in antennule and, antenna 1; uniarticulate in the pleopods and the uropods. Synonyms: protopod, sympod, sympodite, and basis. Note: the Tanaidacea terms protopod, and sympodite, as well as, peduncle are currently being used for the basal article of the uropod.

Penes - small, paired genital processes located on the ventral (sternal) surface just medial to the coxa of pereopod 7 in males, where gonopores open for the release of sperm.

Peracarida - a loosely formed superorder of malacostracans characterized the presence of brood plates or a marsupium in the female for incubating the young to an advance stage of development.

Peraeon - anterior portion of crustacean body or trunk with thoracopods, excluding the somites bearing the maxilliped(s) and in tanaidaceans the chela. In Tanaidacea the 6 free thoracic somites (segments), which are posterior to the carapace and anterior to the pleon, bearing the pereopods. Other spellings: pereion, pereon.

Pereopod - a paired, uniramous, or sometimes biramous thoracic, appendage attached to each peraeon segment; typically 7-articulate. The first 3 pairs are usually morphologically distinct and oriented differently from the last 3 pairs. Other spellings: pereopod, pereopod. Synonyms: thoracopod, walking leg.

Pleomere - see abdominal somite.

Pleon - combined anterior 5 abdominal segments, located just posterior to the peraeon and anterior to the pleotelson, usually bearing the paired, biramous pleopods.

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. Reduced or lost in some species or species groups.

Plesiomorphic - referring to ancestral or primitive characters or character states.

Plesiomorphic character(s) - a character or characters retained from an ancestral state or condition. "Primitive" characters or character states.

Pleotelson - body structure resulting from the fusion of the telson with one or more abdominal somites.

Plumose seta(e) - feather-like, or setulose seta, with hair-like setules (setal shaft lined with very fine microsetae).

Pollex - the distal extension of the propodus; fixed finger of the chela.

Polyhaline - seawater having a salinity of 34 part per thousand or greater.

Posterior - back, towards the rear, rear end.

Produced - narrowly expanded.

Propochelate - the typical chelate condition in which the dactyl or movable finger is opposed to the pollex or fixed finger of the propodus. Some other peracarid groups (e.g., leucothoid amphipods) can have carpochele peraeopods in which the dactyl is vestigial or greatly reduced and the propodus forms the movable finger with a distal extension of the carpus becoming the fixed finger.

Propodus - sixth or penultimate article of the chela or peraeopods.

Protogyny - sequentially hermaphroditic with female stage proceeding the male stage. This condition is known in some species of Tanaidomorpha (e.g., some members of the Leptocheliidae) where such males attain distinctly larger sizes than primary males, which have developed from subadult or neuter stages. Adjective: protogynous or protogynic.

Protandry - sequentially hermaphroditic with male stage preceding the female stage. May occur in Tanaidacea but has not been reliably documented. Adjective: protandrous, protandric.

Protopod - proximal part of an appendage thought to be made up of the coxa and basis or less frequently of the precoxa, coxa, and basis, which are sometimes fused. Larsen and Wilson (2002) apply this term to the basal article of the tanaidacean uropod. Also referred to as: peduncle, sympod, sympodite, and basis.

Proximal - relating to appendages; meaning located close to the body or point of attachment.

Pyriform - broadest at the base, pear-shaped.

Upper lip - see labrum.

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

Reniform - kidney-shaped.

Rostrum - forward projection of the anterodorsal margin of the head (cephalothorax) between the peduncles of the antennule.

Sclerite - structure to which the basis of the chela attaches to the thorax. Homologous to the coxa. Some authorities consider it to be a modified coxa.

Segment - individual unit (somite) or subdivision of the body or tagma. Synonyms: podomere, thoracomeres (segments of thorax); pleomeres (segments of the pleon).

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

Seta (plural: setae) - bristle or hair like; a slender, flexible chitinous extension of the cuticle, articulated with the surface of the body or appendage. There are many types (e.g., plumose, natatory, stout, spiniform, simple, serrate), but there is no overall standard terminology for the various types that is universally accepted by carcenologists.

Setose - having setae.

Setulate - with small hair-like setae (setules or microsetae).

Sexually dimorphic (sexual dimorphism) - having a different form or appearance in males and females especially in the size and morphology of the chelae and the setation and articulation of the antennules and uropods.

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

Somite - a segment of the body, including the exoskeleton, usually with a pair of appendages.

Spine - a stout, sharp process that is fused with the exoskeleton.

Spine row - row of setae, often setulate or serrate, at the base of incisor process of mandible.

Spiniform - spine-like.

Spinose - having spines.

Splayed - flared laterally.

Squama - a unarticulate, scale-like, structure attached laterally to the distal article of the antennal peduncle in most members of the Apseudomorpha (missing in members of the metapseudid subfamily Synapseudinae and in some species of the family Sphyrapiidae); considered an exopodite by some authorities. Missing in Neotanaidomorpha and Tanaidomorpha.

Stenohaline - applied to species that can only osmoregulate over a narrow salinity range. Antonym: euryhaline.

Sternal - see ventral.

Sternite - sclerotized ventral surface of a body segment (somite).

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

Subacute - nearly acute.

Subchelate - condition formed by the closure of the dactylus (article 7) on the oblique or transverse (non-parallel) expanded distal margin of the propodus (article 6).

Subconical - nearly conical.

Subcylindrical - nearly cylindrical.

Subequal - nearly equal.

Suboval - nearly oval.

Subquadrate - nearly square.

Subrectangular - nearly rectangular.

Sulcus - groove or furrow.

Sympod(ite) - see protopod and peduncle.

Syntypes - any two or more type specimens listed in the original description of a nominal species for which no holotype was designated.

Systematics - the study of the evolutionary relationships among organisms.

Tagma (Plural: tagmata) - major division of body (e.g., head, thorax, abdomen, telson), each with a distinctive number of somites.

Taxonomy - the identification and formal classification of organisms.

Telson - a single somite (segment), which represents the posterior most tagma of the malacostracan crustacean body form. In Tanaidacea it is fused with the last pleonal or abdominal somite to form the pleotelson, which bears a pair of uropods.

Tergal - see dorsal.

Terminal - at the tip or distal end.

Terminal adult - an individual with fully adult morphology.

Tooth - an acute, non-articulated process. Stout spine-like process.

Thoracomere - segment or somite of the thorax.

Thorax - tagma between the cephalon and abdomen.

Transverse - perpendicular to the long axis of an article.

Triturative - having a ridged surface used for grinding or crushing on the molar process.

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

Type species - see holotype.

Type locality - precise geographic locality or site where the type of a species or subspecies was collected.

Unguis - the scalatized tip or distally fused seta on dactyl. Sometimes referred to as the nail.

Uniarticulate - composed of one article.

Uniramous - having one branch (ramus).

Upper lip - see labrum.

Uropods - a paired, usually biramous, appendage attached to the sixth abdominal somite in Tanaidacea, Isopoda, Cumacea, and Mysida; in Amphipoda attached to the last 3 pairs of abdominal somites (urosome); in tanaidaceans usually composed of a peduncle and 2 rami, the outer (exopod) and inner (endopod) ramus. When present in tanaidaceans, the exopod is smaller than endopod. In isopods and tanaidaceans it is attached to the pleotelson.

Ventral - refers to the lower or bottom surface or margin; opposite of dorsal; synonymous with sternal.

Vestigial - very reduced, degenerate, poorly developed.

Walking leg - see peraeopod.

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