

AN UNUSUAL SPECIES COMPLEX IN THE GENUS *EURYCOPE* (CRUSTACEA: ISOPODA: ASELLOTA) FROM THE DEEP NORTH ATLANTIC OCEAN

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Abstract.—A finely differentiated species flock or species complex in the asellote isopod genus *Eurycope* is described. The complex consists of four new species, plus three individuals that may belong to a fifth new species. The characters of these closely related species agree with the present definition of *Eurycope*, but several features of this complex make them distinct from their congeners. The most unusual of these traits is the very elongate stylet on the male pleopod II. The occurrence of this character in the Asellota and its phylogenetic significance are discussed. The elongate stylet is considered to be a derived trait that has evolved independently on numerous occasions in the Asellota Janiroidea.

Introduction

The genus *Eurycope*, recently revised by Wilson and Hessler (1981), contains numerous discrete species groups. Two such groups are the *E. complanata* complex and the *E. inermis* cluster (Wilson 1983). Here, another species complex is described within the genus which, while classifiable as *Eurycope* under the present system, is unique compared to its congeners.

This group is designated the *longiflagrata* complex, after its most completely known species *E. longiflagrata* n. sp. The species of the complex all fit the present diagnosis of *Eurycope*, but are distinct in several traits from the other species in the genus. All males have a very distinctive external sexual apparatus: extremely long and whiplike stylets of the second pleopods that lie external to the pleopodal cavity, sometimes in grooves on the pleotelson dorsal surface. The body is generally longer and narrower than in typical species of *Eurycope*. The medial length of pereonite 4 is less than that of pereonites 1-3, in contrast to the typical situation of 4 anterior pereonites of similar length. The body depth is also unusual: deepest at pereonite 1 instead of at pereonite 5 or 6 as generally found within *Eurycope*.

The complex of species described here illustrates problems common in the study of deep-sea asellotes.

1. Even though the genus *Eurycope* has been revised, with a number of species removed to other genera, many species in the genus are poorly known, creating uncertainty about additional divisions of the genus. The characters of the *longiflagrata* complex fall within the definition of the genus, but its possession of unusual characters opens the possibility of the creation of a new genus, or the division of *Eurycope* into subgenera. Lack of knowledge prevents making a clear decision, so this complex is retained in *Eurycope* for the present.

2. Separation of the species of the *longiflagrata* complex is often difficult, because they are rare in deep-sea samples. Consequently, there are few individuals for a study of character variation, making range overlaps, where they occur, difficult to interpret. In addition, females are difficult to classify because the

species are very similar and the most definitive characters are found in the males. Therefore, one species is described here on a provisional basis, with the hope that additional material will appear which will clarify some of the problems remaining. Three specimens are described without any specific designation, although they may belong to a fifth new species.

Materials and Methods

The specimens on which this paper is based came from two sources. A long-standing deep-sea benthic ecology program at the Woods Hole Oceanographic Institution (WHOI samples), directed by H. L. Sanders, J. F. Grassle, and previously R. R. Hessler, has provided isopods collected on sampling transects on most of the major basins of the Atlantic Ocean. The Centre National de Tri d'Océanographie Biologique, directed by M. Segonzac is the second important source of specimens. This French national sorting center has kindly sent isopods that were collected on three major oceanographic expeditions: Intercalibration (INCAL samples), led by M. Sibuet; Abyplaine (ABYPL samples), led by C. Monniot; and Demeraby (DEMERABY samples), led by M. Sibuet and C. Monniot.

Types have been deposited at the United States National Museum of Natural History (cited as USNM). Remaining paratype and non-type specimens are retained in the research collection of Robert R. Hessler, Scripps Institution of Oceanography (RRH).

The methods and terminology used in this paper are those developed by Wilson and Hessler (1980) and Wilson (1983). Measurement characters are generally stated as ratios to factor out allometric variation; these values are given to a precision of two significant figures. Because the sample sizes are very small, no statistical accuracy is implied for these values, although ranges are given where measurements for more than one individual were available. Descriptions are based on adult type-specimens.

In the figures, mouthparts (except the mandible), pleopods, and uropods are shown in ventral view. Arrows indicate either enlarged sections of a limb, or structures of special interest which are labelled by a letter. In some cases, all setae are not shown but are indicated by u-shaped or circular marks at their insertions.

Systematics

Eurycope Sars, 1864

The *Eurycope longiflagrata* complex

Type species.—*Eurycope longiflagrata* n. sp.

Diagnosis.—*Eurycope* with elongate body, body length approximately 3 times body width, body deepest at pereonite 1. Rostrum of cephalon short, narrow, anteriorly rounded, often overhanging frons, lacking cephalic keels but with small stout setae. Cephalic frons sloping anteriorly in front of rostrum; frons-clypeal ridge distinct, rounded, not shaped like an inverted V, often projecting anteriorly above clypeal insertion. Posterolateral corner of mandible inserting on cephalon into distinct notch (Fig. 1C, D–N). Pereonite 4 dorsomedial length reduced com-

pared to other pereonites. Male sexual morphology modified: pleopod I distally u- or v-shaped with lateral lobes extending posteriorly and medial lobes reduced or absent; pleopod II stylet extremely elongate, about 3–4 times protopod length in adult; pleotelson dorsal surface often with groove or incision beginning on posterolateral margin behind uropod insertions and extending anteriorly (Fig. 1F–G). Uropodal protopod not broadened medially; rami longer than protopod width.

Description.—Cephalon posterior to antennulae shorter than and almost as deep as pereonite 1. Lateral spine blunt and broad. Rostrum separated from cephalic dorsal surface by transverse depression; male rostrum often longer and narrower than that of female.

Pereonite 7 and pleon lateral margins flattened, with cuticular ridges. Pereonite 1 with greatest medial length of ambulosomites, lengths decrease to pereonite 4. Dorsal surfaces with scattered fine setae. Pereonite 7 longest natasomite, pereonite 6 shortest. Pereonite 7 ventrolateral area anterior to coxae of pereopod VII lacking bulla, with single large seta anterior to coxa; posterior margin of pereon with dense row of plumose setae.

Pleotelson lateral margin rounded, with anterior corners curving medially.

Antennulae approximately one-third body length; more robust, longer, and with more flagellar articles in male than in female. Article 1 medial lobe short, not protruding, shorter than article 2; lateral plate rounded, not angular or protruding, with unusually large broom seta on lateral margin.

Mandible typical, with palp shorter than mandibular body length and condyle shorter than molar process.

Maxilliped with broad palp, palp article 4 medial lobe much shorter than article 5. Epipod longer than wide, slightly shorter than basis, distally pointed; lateral projection small, angular.

Pereopod I–II bases broader than in pereopods III–IV. Coxal plate of pereopod IV short, rounded, not projecting anteriorly as in more anterior pereonites.

Pereopod V–VII bases slightly different in length: basis VI longest, basis V shortest. Carpus V–VII widest at less than quarter distance from distal edge.

Pleopod II of female deep, with broad keel; posterior margin rounded or flattened. Apex variably expressed. Lateral margins with plumose (not hemiplumose) setae.

Pleopod II of male with subterminal exopod having brush of long thin setae on posterolateral rounded edge.

Uropodal protopod with long unequally bifid setae on ventral and distal margin. Endopod and exopod with distal rosette of robust unequally bifid setae.

Remarks.—Members of the *longiflagrata* complex are most easily identified by their specialized male pleopod morphology, the somewhat narrowed body, the reduced dorsomedial length of pereonite 4 and by the sloping and protruding frons of the cephalon. The condition of the uropod is very similar to that seen in *E. cornuta*.

The elongate stylet on the endopod of the male second pleopod is the most unusual feature of the *longiflagrata* complex. This type of stylet is not found in other Eurycopidae, but it makes scattered appearances in various forms on the species level in other Janiroidean genera. The advanced deep-sea genera in which this character is found are *Munnopsis*, *Ischnomesus*, *Haploniscus*, *Acanthomunna*, and *Dendromunna*. Illustrations of this condition may be found in Sars (1899),

Wolff (1962), and Menzies (1962). An elongate stylet also occurs frequently in the more primitive janiroideans: *Acanthaspidia*, *Ianthopsis*, *Ectias*, *Neojaera*, and *Caecianiropsis* (see Hansen 1895; Kensley 1977; Nordenstam 1933; Schultz 1976; Sivertsen and Holthuis 1980; Menzies and Pettit 1956). One could speculate that this type of stylet is a primitive character in the Janiroidea because of its widespread occurrence, and because of its appearance in the primitive groups. On the other hand, the stylet is quite variable in the genera in which it is elongated. For example, in *Munnopsis* one sees a range from an elongate stylet (*M. typica*) to a highly reduced stylet (*M. abyssalis*). In the very primitive genus *Notasellus*, which might be considered to be an outgroup to the more advanced Janiroidea by virtue of its non-opercular second pleopods, the stylet is not elongate. Therefore, the elongate stylet must be an apomorphy that appears convergently in many diverse janiroidean groups, comparable to the loss of the seventh pereopod in adults (Wilson 1976). The *longiflagrata* complex is unusual in that this character has become established in all of its species.

Eurycope longiflagrata, new species

Figs. 1, 2

Material examined.—Holotype preparatory female, 3.8 mm, USNM 195071. Paratypes: copulatory male, 3.2 mm, USNM 195072; 8 individuals, RRH. Type-locality WHOI 131, 36°28.9'N, 67°58.2'W, 2178 m. Other material: Juvenile female, WHOI GH4, 39°29'N, 70°34'W, 2469 m, RRH.

Distribution.—Continental slope off New England, USA, 2178–2469 m.

Etymology.—*Longiflagrata* is a Latin compound adjective meaning “with long whip.”

Diagnosis.—Adult body length approximately 3–4 mm. Rostrum not overhanging frons; medial part of frons ridge low, sloping smoothly into clypeal articulation. Pleotelson of male with dorsal groove extending no further than anterior articulation of uropod. Male pleopod I with tapering lateral lobes, medial region smoothly v-shaped, medial lobes not expressed; distance from dorsal orifice to distal tip 0.27 pleopod I length. Female pleopod II with definite apex approximately quarter pleopod length from distal tip. Uropodal endopod length 1.5 or greater protopod width.

Description.—Body characters (Fig. 1A–B, E–F): Length 2.7–2.9 width. In holotype, pereonite 1 depth 0.3 length. In female, pleotelson round posteriorly. In male, pleotelson distal tip folds down abruptly, somewhat flattened in dorsal view.

Cephalic rostrum (Fig. 1C–D, G): Anterior tip with 2 small but stout setae, rostrum length-cephalic width ratio 0.15 in female, 0.19 in males (2 measured).

Antennula (Figs. 1G, 2A): Length 0.3–0.4 body length, longest and most robust in males. Flagellum (distal to article 4) with 7–11 annuli and 2 distal aesthetascs in females, and 14–25 annuli, each supplied with single aesthetasc, in males. Article 2 length 0.5 medial length of article 1 in females, 0.7 in males. Article 3 length 1.3–1.6 article 2 length.

Mandible (Fig. 2B–D): Left incisor process with 3 subequal teeth, right incisor process with 4 irregularly spaced teeth. Lacinia mobilis with 6 short teeth. Spine row with 4–6 members. Molar process distal surface oval, with only low bumps

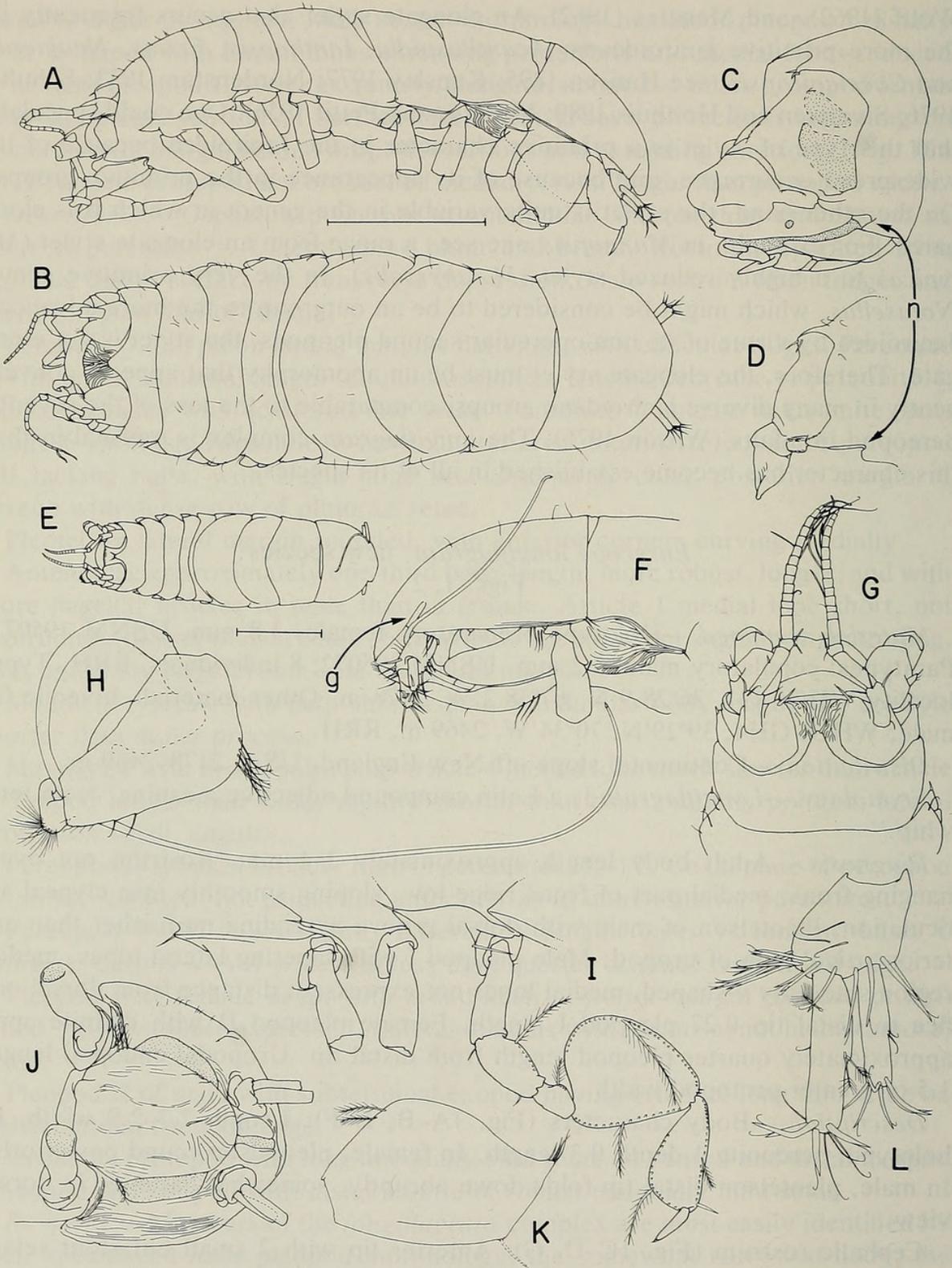


Fig. 1. *Eurycope longiflagrata*, types: A-B, I-J, 3.8 mm holotype preparatory female; C, H, 3.6 mm copulatory male; D, brooding female fragment; E-F, 3.2 mm copulatory male; K-L, 3.0 mm preparatory female. A-B, Holotype, lateral and dorsal views, scale bar 1.0 mm; C-D, Cephalon, oblique and lateral views, antenna and antennula removed, n = notch at posterior part of mandibular insertion; E, Copulatory male, dorsal view, scale bar 1.0 mm; F, Pleotelson and pereonite 7, lateral view, g = groove in dorsal surface; G, Male cephalon, dorsal view; H, Male pleopod II, ventral view; I, Lateral margin of natasomites, pereopod VII intact, in plan view; J, Female pleotelson, ventral view; K, Female pleopod II, lateral view; L, Uropod, ventral view.

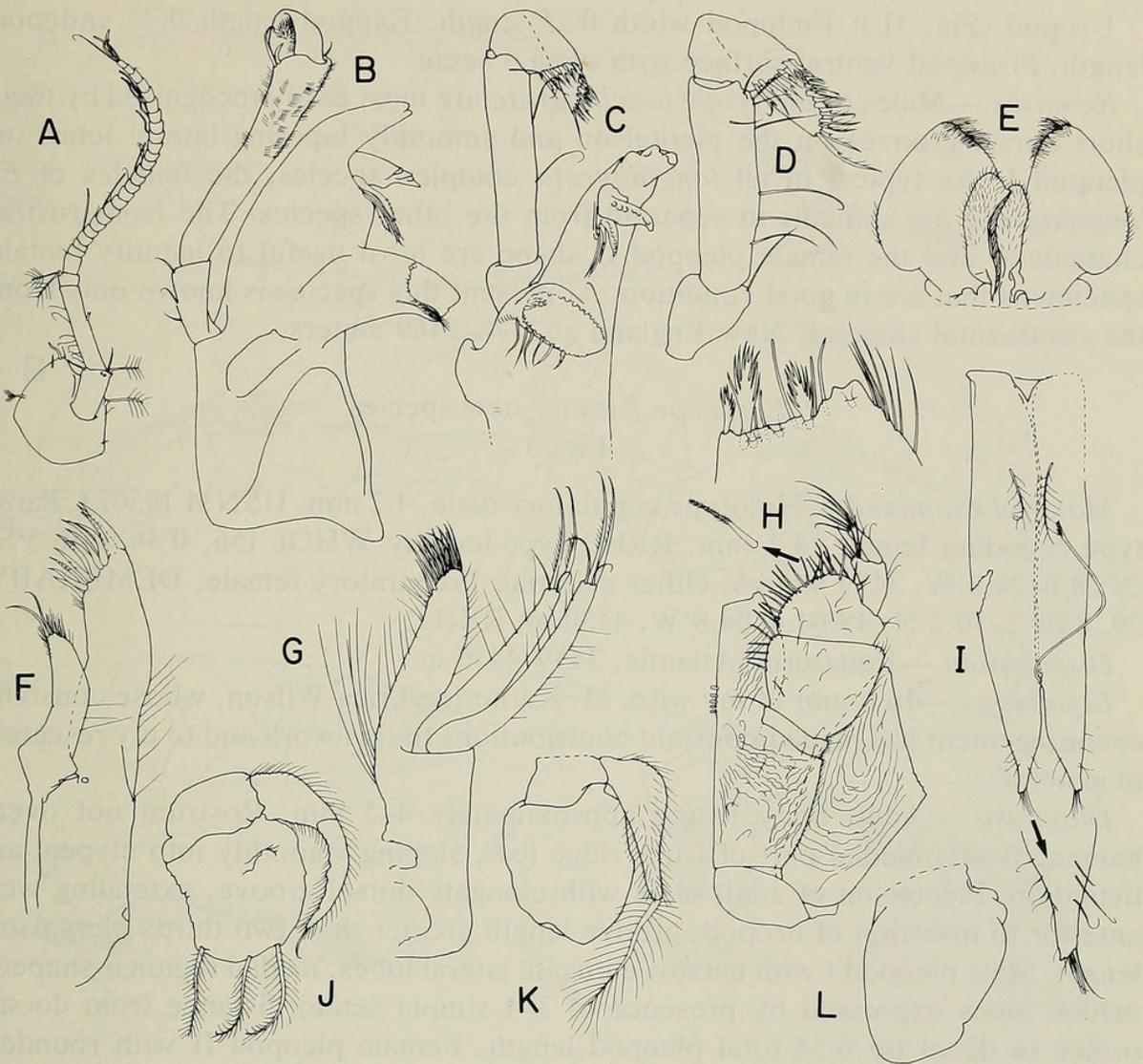


Fig. 2. *Eurycope longiflagrata*, paratypes: A, D, H-I, 3.6 mm copulatory male; B-C, E-G, J-L, 3.0 mm preparatory female. A, Antennula; B-D, Mandible; B, Dorsal view; C, Medial view; D, Male palp; E, Paragnaths; F, Maxillula; G, Maxilla; H, Maxilliped, with enlargements of endite distal tip and seta on medial margin of palp article 3; I, Male pleopod I, spermatophore protruding from dorsal orifice, with enlargement of lateral lobe; J-L, Pleopods III-V.

and 4-6 setae on posterior edge. Condyle length 0.19 mandibular body length. Palp second article length 0.51 mandibular body length.

Maxilliped (Fig. 2H): Endite with 5 small and 1 large fan setae distally, and 5 coupling hooks medially; lateral part of distal margin with one bicuspid projection. Palp articles 2 and 3 medial to lateral length ratios 0.67, 3.4 respectively. Epipod length 0.91 basis length, length 2.2 width.

Pleopod I of male (Fig. 2I): Length 4.5 width at dorsal orifice. Ventral surface with 2 plumose setae, and 2 rows of fine setae near each distal tip. Lateral lobe tip somewhat truncate, sloping anteromedially, with fine setae; dorsal part of lateral lobe not curling into ventral view.

Pleopod II of male (Fig. 1H): Protopod length 1.8 width; lateral margin with 4 plumose setae. Endopod length including stylet 5.1 protopod length.

Pleopod II of female (Fig. 1J, K): Depth 0.31 length. Lateral margin with 2 plumose setae.

Uropod (Fig. 1L): Endopod width 0.25 length. Exopod length 0.75 endopod length. Protopod ventral surface with circa 3 setae.

Remarks.—Males of *Eurycope longiflagrata* are most easily recognised by their short dorsal grooves on the pleotelson and smoothly tapering lateral lobes on pleopod I. As typical in all *longiflagrata* complex species, the females of *E. longiflagrata* are difficult to separate from the other species. The frons-rostral characters, and the female pleopod II shape are most useful to identify female specimens that are in good condition. At present this species is known only from the continental slope off New England at 2178–2469 meters.

Eurycope friesae, new species

Fig. 3

Material examined.—Holotype copulatory male, 4.2 mm, USNM 195073. Paratype brooding female, 4.7 mm, RRH. Type-locality WHOI 156, 0°46.0–46.5'S, 29°28.0–24.0'W, 3459 meters. Other material: Preparatory female, DEMERABY 29, 8°09.2–10.2'N, 49°04.4–04.8'W, 4430 m, RRH.

Distribution.—Equatorial Atlantic, 3459–4430 m.

Etymology.—In honor of my wife, M. Katherine Fries-Wilson, whose constant encouragement has made important contributions to this work and to my research in general.

Diagnosis.—Adult body length approximately 4–5 mm. Rostrum not overhanging frons; medial part of frons ridge low, sloping smoothly into clypeal articulation. Pleotelson of adult male with elongate dorsal groove, extending well anterior to insertion of uropod; groove length greater than two thirds pleotelson length. Male pleopod I with narrow elongate lateral lobes, medial region u-shaped, medial lobes expressed by presence of 3–4 simple setae; distance from dorsal orifice to distal tip 0.34 total pleopod length. Female pleopod II with rounded keel and no distinct apex. Uropodal endopod length 1.5 protopod width.

Description (in ranges, holotype male value stated first, female second).—Body characters (Fig. 3A–C): Length 3.0–3.1 width. In holotype, pereonite 1 depth 0.23 body length. Pleotelson posterior to uropods obtusely angular in dorsal view.

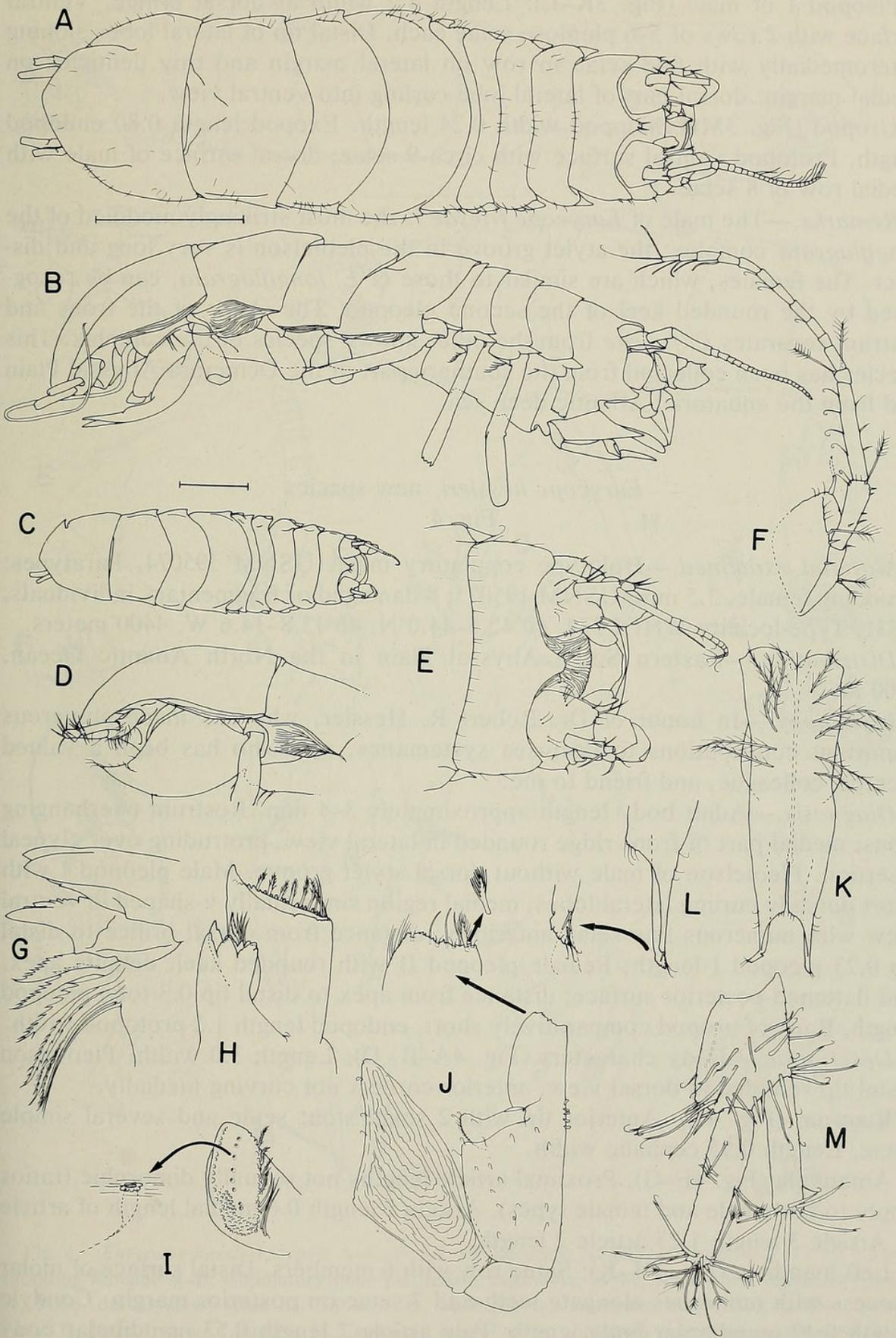
Rostrum (Fig. 3E): Anterior margin with 4 stout and 2 fine setae. Length 0.19–0.16 cephalon width.

Antennula (Fig. 3E–F): Length–body length ratio 0.34–0.29. Flagellum with 20–11 annuli. Article 2 length 0.70–0.62 medial length of article 1. Article 3 length 1.8–1.4 article 2 length.

Left mandible (Fig. 3G–I): Spine row with 8 members. Molar process triturating surface with 11 setae and numerous distinct teeth on posterior margin. Condyle length 0.17 mandibular body length. Palp second article length 0.51 mandibular body length.

Maxilliped (Fig. 3J): Endite distal tip with tiny pointed denticles laterally. Epipod length 0.95 basis length; length 2.2 width.

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Fig. 3. *Eurycope friesae*, types: A–B, K–M, 4.2 mm holotype copulatory male; C–J, 4.7 mm paratype brooding female; A–B, Holotype, dorsal and lateral views, scale bar 1.0 mm; C, Female paratype, dorsal view, scale bar 1.0 mm; D, Pleotelson, lateral view; E, Cephalon, dorsal view; F,



Antennula, lateral view; G-I, Left mandible; G, Incisor process and spine row, ventral view; H, Incisor process and molar process, anterior view; I, Molar process, medial view, with enlargement of sensory pore; J, Maxilliped with enlargement of endite distal tip; K-L, Male pleopod I and enlargement of lateral lobe, respectively; M, Uropod.

Pleopod I of male (Fig. 3K–L): Length 4.2 width at dorsal orifice. Ventral surface with 2 rows of 5–6 plumose setae each. Distal tip of lateral lobes sloping anteromedially with fine setae in row on lateral margin and tiny denticles on medial margin; dorsal part of lateral lobe curling into ventral view.

Uropod (Fig. 3M): Endopod width 0.24 length. Exopod length 0.80 endopod length. Protopod ventral surface with circa 9 setae; dorsal surface of male with medial row of 8 setae.

Remarks.—The male of *Eurycope friesae* is the most strikingly modified of the *longiflagrata* complex: the stylet groove in the pleotelson is very long and distinct. The females, which are similar to those of *E. longiflagrata*, can be recognised by the rounded keel of the second pleopod. The shape of the frons and rostrum separates *E. friesae* from the other known species of the complex. This species has been collected from the southern part of the Demerara Abyssal Plain and from the equatorial Atlantic deep sea.

Eurycope hessleri, new species

Fig. 4

Material examined.—Holotype copulatory male, USNM 195074. Paratypes: Brooding female, 3.5 mm, USNM 195075; 8 damaged or fragmentary individuals, RRH. Type-locality WHOI 334, 40°42.6–44.0'N, 46°13.8–14.6'W, 4400 meters.

Distribution.—Eastern Sohm Abyssal Plain in the North Atlantic Ocean, 4400 m.

Etymology.—In honor of Dr. Robert R. Hessler, who has made numerous important contributions to deep-sea systematics, and who has been a valued mentor, colleague, and friend to me.

Diagnosis.—Adult body length approximately 3–4 mm. Rostrum overhanging frons; medial part of frons ridge rounded in lateral view, protruding over clypeal insertion. Pleotelson of male without dorsal stylet groove. Male pleopod I with short dorsally curling lateral lobes, medial region sinusoidally v-shaped in ventral view with numerous fine setae anteriorly; distance from dorsal orifice to distal tip 0.23 pleopod I length. Female pleopod II with rounded keel, definite apex, and flattened posterior surface; distance from apex to distal tip 0.3 total pleopod length. Rami of uropod comparatively short, endopod length 1.2 protopod width.

Description.—Body characters (Fig. 4A–B, D): Length 3.0 width. Pleotelson distal tip rounded in dorsal view; anterior corners not curving medially.

Rostrum (Fig. 4E): Anterior tip with 2 small stout setae and several simple setae. Length 0.15 cephalic width.

Antennula (Fig. 4F–G): Proximal article lengths not sexually dimorphic (ratios apply to both male and female types). Article 2 length 0.6 medial length of article 1. Article 3 length 1.25 article 2 length.

Left mandible (Fig. 4H–K): Spine row with 6 members. Distal surface of molar process with numerous elongate teeth and 7 setae on posterior margin. Condyle length 0.17 mandibular body length. Palp article 2 length 0.53 mandibular body length.

Maxilliped (Fig. 4M): Endite with 4 coupling hooks; lateral part of distal margin with 2 triangular projections. Palp article 2 medial margin with 3 setae, medial length 0.61 lateral length. Epipod length 0.96 endite length.

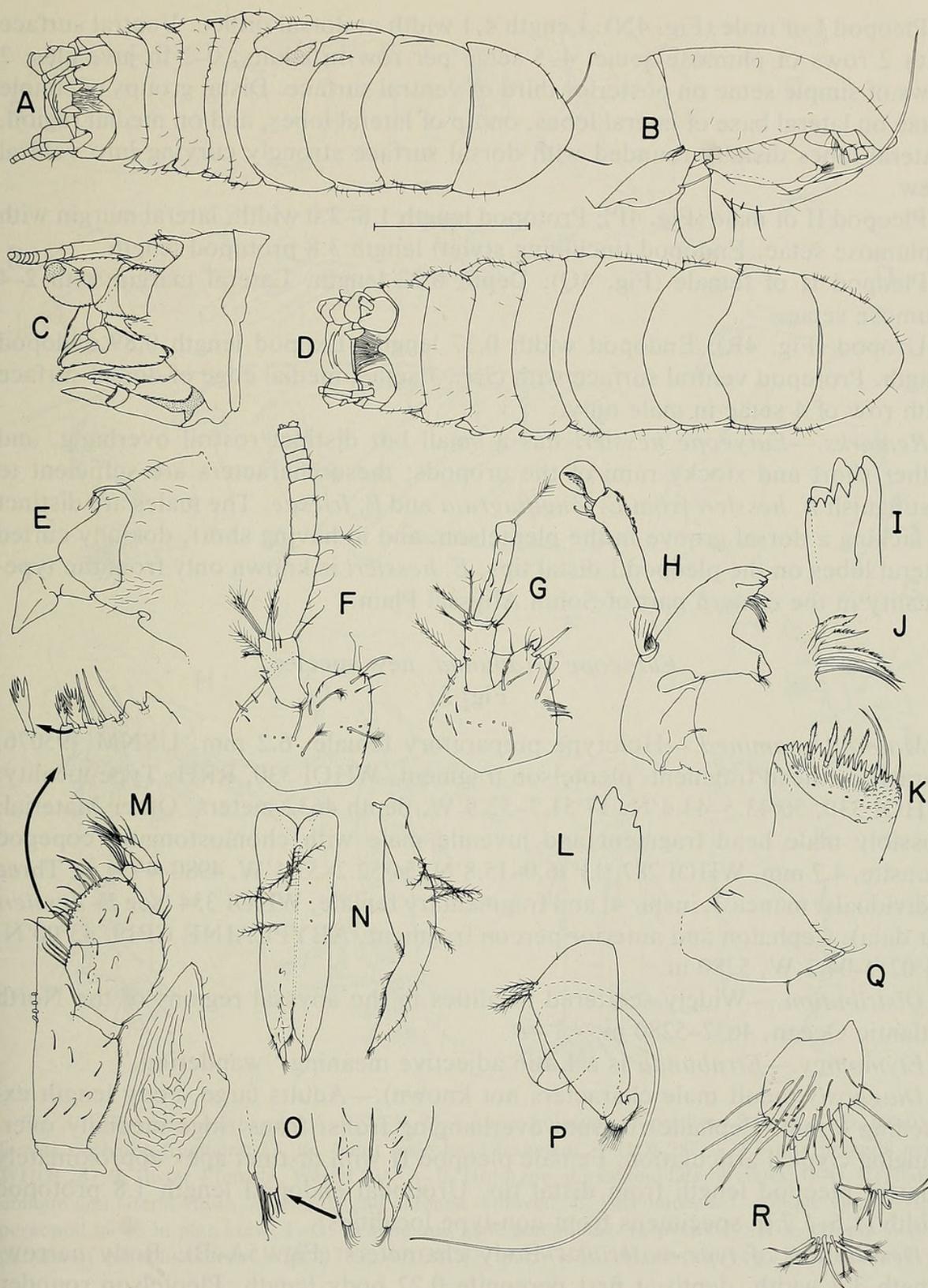


Fig. 4. *Eurycope hessleri*, types: A-C, F, 3.2 mm holotype copulatory male; D-E, G, Q, 3.5 mm brooding female; N-P, Copulatory male pleotelson fragments; H-M, R, 2.9 mm copulatory male. A, Male, dorsal view, scale bar 1.0 mm; B, Male pleotelson, lateral view; C, Cephalon, lateral view; D, Dorsal view of female; E, Cephalon, lateral view, antennula and antenna removed; F-G, Male and female antennulae, respectively; H-K, Left mandible; H, Dorsal view; I, Incisor process and lacinia mobilis, posterior view; J, Spine row, dorsal view; K, Molar process, anterior view; L, Right mandible, incisor process, posterior view; M, Maxilliped with enlargement of endite distal tip; N-O, Male pleopod I; N, Ventral and lateral views; O, Distal tip with enlargement of lateral lobe; P, Male pleopod II; Q, Female pleopod II, lateral view; R, Uropod.

Pleopod I of male (Fig. 4N): Length 4.1 width at dorsal orifice. Ventral surface with 2 rows of plumose setae, 4–5 setae per row in adults, 0–2 in juveniles; 2 rows of simple setae on posterior third of ventral surface. Distal groups of simple setae on lateral base of lateral lobes, on tip of lateral lobes, and on medial region. Lateral lobes distally rounded with dorsal surface strongly curving into ventral view.

Pleopod II of male (Fig. 4P): Protopod length 1.8–2.0 width; lateral margin with 3 plumose setae. Endopod (including stylet) length 3.8 protopod length.

Pleopod II of female (Fig. 4Q): Depth 0.27 length. Lateral margin with 2–4 plumose setae.

Uropod (Fig. 4R): Endopod width 0.37 length. Exopod length 0.89 endopod length. Protopod ventral surface with circa 7 setae; medial edge of dorsal surface with row of 4 setae in male only.

Remarks.—*Eurycope hessleri* has a small but distinct rostral overhang, and rather short and stocky rami of the uropods; these characters are sufficient to distinguish *E. hessleri* from *E. longiflagrata* and *E. friesae*. The males are distinct in lacking a dorsal groove in the pleotelson, and in having short, dorsally curled lateral lobes on the pleopod I distal tips. *E. hessleri* is known only from the type-locality in the eastern part of Sohm Abyssal Plain.

Eurycope errabunda, new species

Fig. 5

Material examined.—Holotype preparatory female, 6.2 mm, USNM 195076. Paratypes: head fragment, pleotelson fragment, WHOI 330, RRH. Type locality: WHOI 330, 50°43.5–43.4'N, 17°51.7–52.9'W, depth 4632 meters. Other Material: possibly male head fragment and juvenile male with choniostomatid copepod parasite, 4.7 mm, WHOI 287, 13°16.0–15.8'N, 54°52.2–53.1'W, 4980–4934 m. Three individuals: manca 3, instar 4, and fragmentary female, WHOI 334 (see *E. hessleri* for data). Cephalon and anterior pereon fragment, ABYPLAINE CP19, 43°00'N, 14°02.9–04.3'W, 5280 m.

Distribution.—Widely scattered localities in the abyssal regions of the North Atlantic Ocean, 4632–5280 m.

Etymology.—*Errabunda* is a Latin adjective meaning “wandering.”

Diagnosis (adult male characters not known).—Adults large, body length exceeding 6 mm. Cephalic rostrum overhanging frons; frons ridge medially overhanging clypeal articulation. Female pleopod II with distinct apex approximately quarter pleopod length from distal tip. Uropodal endopod length 1.8 protopod width (1.6–1.7 in specimens from non-type localities).

Description of type-material.—Body characters (Fig. 5A–B): Body narrow, length 3.2 width, depth at first pereonite 0.22 body length. Pleotelson rounded posteriorly.

Rostrum (Fig. 5C–D): Length 0.16 cephalic width. Anterior tip with 2 stout setae and several fine setae.

Antennula (Fig. 5F): Article 2 length 0.7 medial length of article 1. Article 3 length 1.7 article 2 length.

Left mandible: Spine row with 12 members. Molar process with 14 distal setae. Condyle length 0.18 mandibular body length. Palp article 2 length 0.49 mandibular body length.

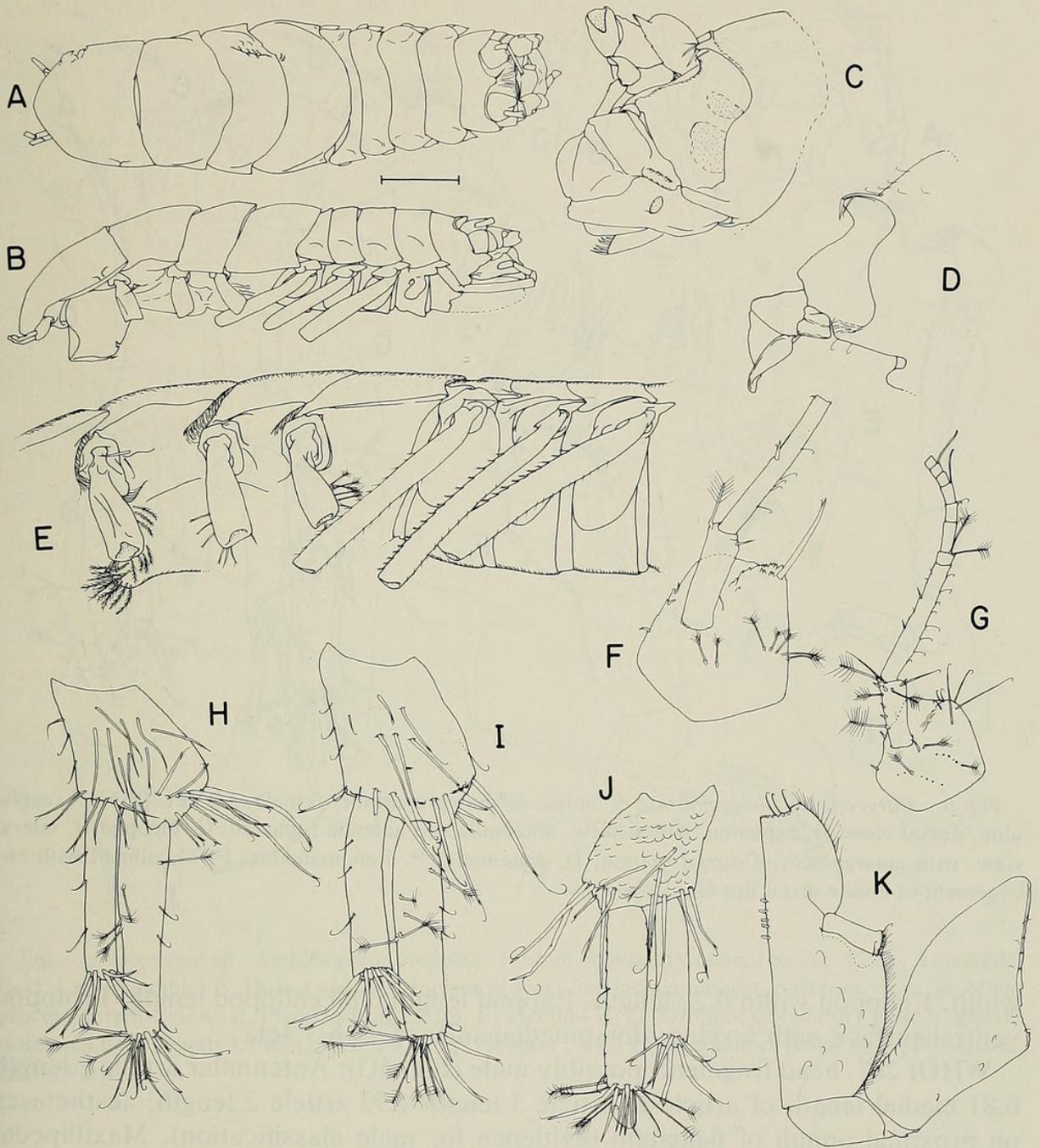


Fig. 5. *Eurycope errabunda*: A–B, E–F, H, 6.2 mm holotype preparatory female; C–D, Paratype female cephalon fragment; G, K, Adult male head fragment, WHOI 287; I, 4.7 mm juvenile male, WHOI 287; J, Instar 4 female, WHOI 334. A–B, Holotype, dorsal and lateral views; C–D, Cephalon, oblique and lateral views, antennula and antenna removed; E, Pereonites 2–7, oblique ventral view, pereopod bases in plan view; F–G, Female and male antennulae, respectively; H–J, Uropods, comparison of individuals from WHOI 330, WHOI 287, and WHOI 334, respectively; K, Maxilliped.

Uropod (Fig. 5H): Endopod width 0.21 length. Exopod length 0.77 endopod length. Protopod ventral surface with circa 9 setae.

Description and variation in specimens from other localities.—WHOI 334, instar 4 juvenile female (Fig. 5J): Uropodal endopod 1.6 protopod width. Endopod width 0.23 length. Exopod length 0.83 endopod length. Protopod ventral surface with 3 setae.

WHOI 287, parasitized juvenile male (Fig. 5I): Uropodal endopod 1.7 protopod

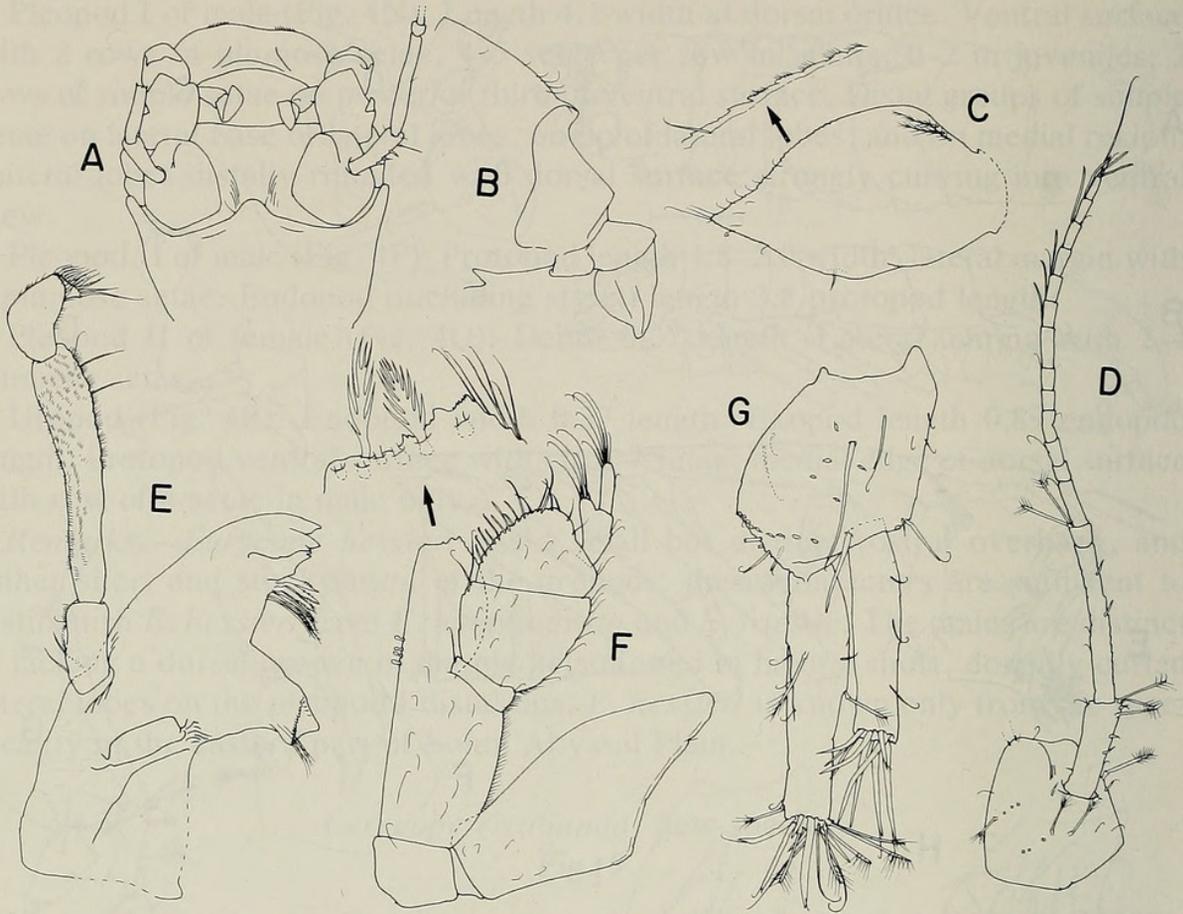


Fig. 6. *Eurycope* sp., *longiflagrata* complex, 4.7 mm preparatory female, ABYPL DS11: A, cephalon, dorsal view; B, cephalon, lateral view, antennula and antenna removed; C, Pleopod II, lateral view, with enlargement of dorsal margin; D, Antennula; E, Left mandible; F, Maxilliped with enlargement of endite distal tip; G, Uropod.

width. Endopod width 0.22 length. Exopod length 0.80 endopod length. Protopod ventral surface with 6 setae; dorsomedial surface with 1 seta.

WHOI 287, head fragment, possibly male (Fig. 5G): Antennular article 2 length 0.81 medial length of article 1; article 3 length 1.92 article 2 length; aesthetascs on proximal annuli of flagellum (evidence for male classification). Maxillipedal endite with 7 small and one large fan setae distally, and 5 coupling hooks medially; lateral part of distal margin with quadrate projection. Maxillipedal epipod length 0.93 basis length; length 2.0 width.

Remarks.—The individuals classified as *Eurycope errabunda* are recognizably different from the other species in the *longiflagrata* complex: all are large, and have a distinctive configuration of the frons and rostrum. Because the adult male pleopods are unknown it is uncertain whether *E. errabunda* represents one or several species. The variation observed in the uropods and in the antennulae of specimens from the different localities could be explained by ontogenetic changes or sexual dimorphism (Wilson 1981), but differences characteristic of geographically-separated populations cannot be ruled out. Therefore, *E. errabunda* is provisionally considered to be a single species pending the collection of additional material and characterization of the male pleopods.

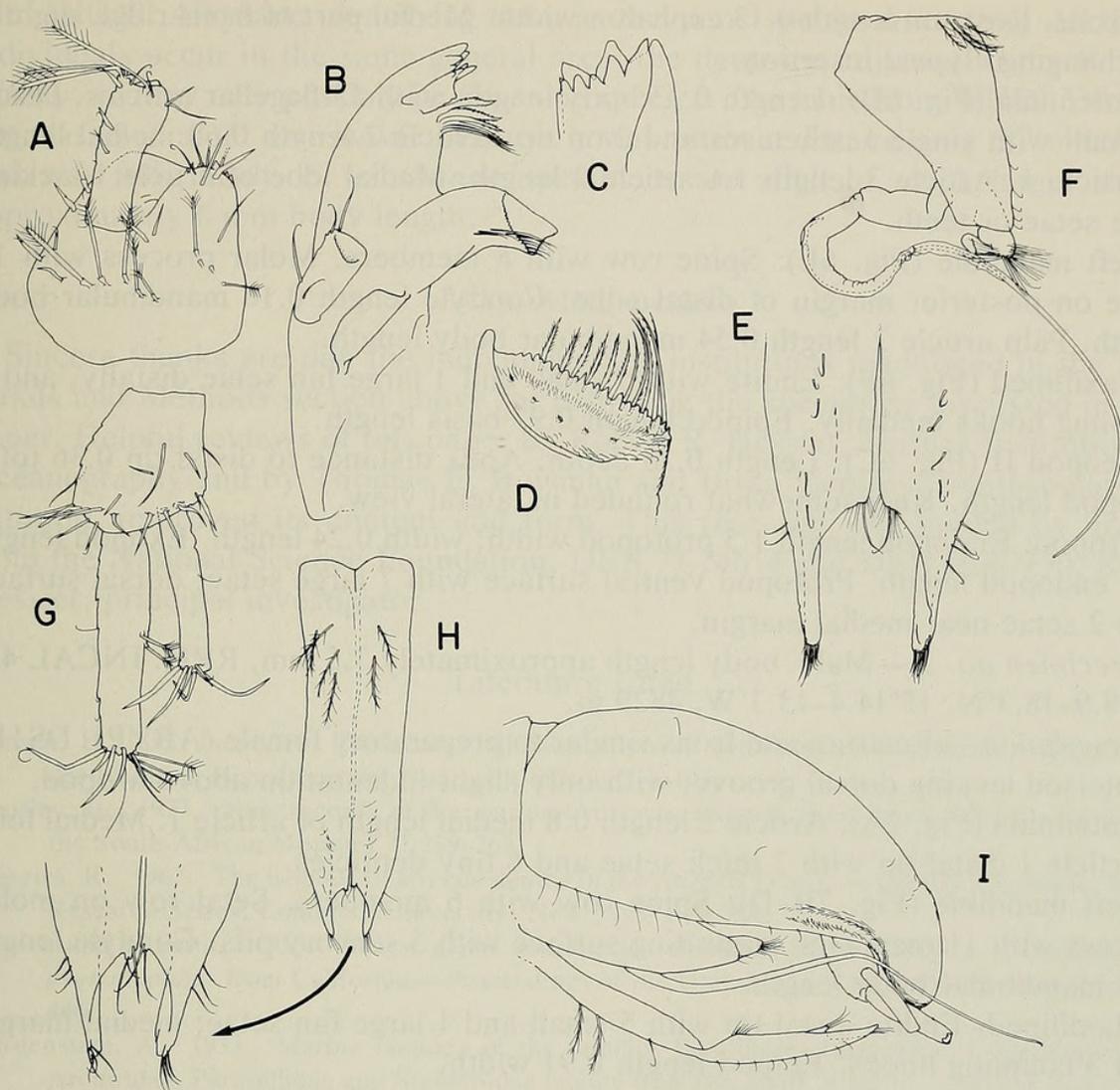


Fig. 7. *Eurycope* sp., *longiflagrata* complex. 3.5 mm copulatory male, INCAL 45: A, Antennula; B-D, Left mandible; B, Dorsal view; C, Incisor process and lacinia mobilis, posterior view; D, Molar process anterior view; E, Pleopod I, distal tip; F, Pleopod II; G, Uropod. Copulatory male fragment, estimated body length 3.7 mm, WHOI 330: H, Pleopod I with enlargement of distal tip; I, Pleotelson, lateral view.

Eurycope sp. (spp.?)
Figs. 6-7

Three individuals in the available material of the *longiflagrata* complex were not assignable to any of the species described above. The specimens occur at three different localities and are damaged or fragmented. At least one new species is represented in this material, but because of the condition and ambiguities in character states, a new species is not proposed here. The individuals are described and figured separately with the hope that future collections of the *longiflagrata* complex will aid in their classification.

Specimen no. 1.—Preparatory female, body length 4.7 mm, RRH. ABYPL DS11, 42°59.7–59.2'N, 14°05.4–03.4'W, 5260 m.

Description.—Frons and Rostrum (Fig. 6A–B): Anterior tip slightly overhang-

ing frons. Rostrum length 0.13 cephalon width. Medial part of frons ridge slightly overhanging clypeal insertion.

Antennula (Fig. 6D): Length 0.33 body length, with 13 flagellar articles. Distal 5 annuli with single aesthetascs and 2 on tip. Article 2 length 0.68 medial length of article 1. Article 3 length 1.6 article 2 length. Medial lobe of article 1 lacking large setae or teeth.

Left mandible (Fig. 6E): Spine row with 8 members. Molar process with 15 setae on posterior margin of distal edge. Condyle length 0.16 mandibular body length. Palp article 2 length 0.54 mandibular body length.

Maxilliped (Fig. 6F): Endite with 6 small and 1 large fan setae distally, and 4 coupling hooks medially. Epipod length 0.97 basis length.

Pleopod II (Fig. 6C): Length 0.28 depth. Apex distance to distal tip 0.36 total pleopod length. Keel somewhat rounded in lateral view.

Uropod: Endopod length 1.5 protopod width; width 0.24 length. Exopod length 0.82 endopod length. Protopod ventral surface with 7 large setae; dorsal surface with 2 setae near medial margin.

Specimen no. 2.—Male, body length approximately 3.5 mm, RRH. INCAL 45, 48°18.9–18.3'N, 15°14.4–13.3'W, 4829 m.

Description.—Rostrum and frons similar to preparatory female (ABYPL DS11). Pleotelson lacking dorsal groove, with only slight indentation above uropod.

Antennula (Fig. 7A): Article 2 length 0.8 medial length of article 1. Medial lobe of article 1 distal tip with 2 thick setae and 6 tiny denticles.

Left mandible (Fig. 7B–D): Spine row with 6 members. Setal row on molar process with 11 members; triturating surface with 5 sensory pits. Condyle length 0.18 mandibular body length.

Maxilliped: Endite distal tip with 5 small and 1 large fan setae; medial margin with 3 coupling hooks. Epipod length 0.91 width.

Pleopod I (Fig. 7E): Length 4.4 width at dorsal orifice. Distance from dorsal orifice to distal tip 0.30 total length. Ventral surface with pair of plumose setae proximally and 2 rows of fine setae distally. Lateral lobes similar to those in *E. hessleri* but longer; distally rounded with curved row of fine setae. Medial area of distal tip u-shaped with paired tufts of setae on inner edge.

Pleopod II (Fig. 7F): Protopod length 1.9 width; lateral margin with 4 plumose setae. Endopod (including stylet) length 3.0 protopod length.

Uropod (Fig. 7G): Endopod length 1.7 protopod width; width 0.23 length. Exopod length 0.76 width. Ventral surface of protopod with 4 large setae; medial edge of dorsal surface with 1 seta.

Specimen no. 3.—Male fragment, cephalon missing, estimated body length 3.7 mm, RRH. WHOI 330, see *E. errabunda* for station data.

Description.—Pleopod I (Fig. 7H): Length 3.8 width; distance from distal tip to dorsal orifice 0.33 total length. Ventral surface and distal tip similar to male from INCAL 45 except: 2 plumose setae on left side and 4 plumose setae on right; medial area of distal tip with setae on small projections.

Pleopod II: Protopod length 1.8 width; lateral margin with 2 plumose setae. Endopod length 3.1 protopod length.

Remarks.—These individuals are most similar to *Eurycope hessleri* although the uropod of *Eurycope* sp. has much longer rami, and the antennular article 3 is longer in the female. Differences in the pleopods from the two males (WHOI

330, INCAL 45) made identifying them as the same species uncertain. All three individuals occur in the same general area, the deep-sea adjacent to the Bay of Biscay, so they may possibly be the same species. The male from WHOI 330 was not classified as *E. errabunda* because it was estimated to be only 3.7 mm long and was fully adult; *E. errabunda* specimens are adult at much larger sizes, approximately 6 mm body length.

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