



## Family Agathotanaidae Lang, 1971a\*

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### Abstract

The family Agathotanaidae was represented in the trench material by one new species of *Agathotanaeis*, *A. hadalis*; one new species of *Paragathotanaeis*, *P. abyssorum* and one previously described species of *Paranarthrura*. The new species are described and both genders of *P. vitjazi* Kudinova-Pasternak, 1970 are re-described. *Paranarthrura zeviniae* Kudinova-Pasternak, 1970 is transferred to *Paragathotanaeis*.

**Key words:** Japan, deep-sea, Kurile-Kamchatka Trench, Japan Trench, Tanaidomorpha, *Agathotanaeis*, *Paragathotanaeis*, *Paranarthrura*

### Introduction

The family Agathotanaidae was first erected by Lang (1971a) but later synonymized with an enlarged family Anarthruridae by Sieg (1986). Larsen & Wilson (2002) re-erected the family as a result of a phylogenetic analysis and this family seems to be fairly stable and well-defined compared to many other Tanaidacean families. Currently Agathotanaidae includes the following genera: *Agathotanaeis* Hansen, 1913; *Metagathotanaeis* Bird & Holdich, 1988; *Paragathotanaeis* Lang, 1971b; *Paranarthrura* Hansen, 1913; and *Paranarthrurella* Lang, 1971a.

This is a cosmopolitan family and the genera *Agathotanaeis*, *Paragathotanaeis*, and *Paranarthrura* can be found in deep-sea samples from any part of the world.

The terminology follows Larsen (2003).

### Systematics

#### Genus *Agathotanaeis* Hansen, 1913

Type species. *Agathotanaeis ingolfi* Hansen, 1913

**Generic remarks.** Hansen (1913) erected this genus to accommodate his new species *A. ingolfi* from the Danish Ingolf expedition (by monotypy). Lang (1971b) described the ‘second’ species of the genus, *A. hanseni*, but was apparently not aware that Kudinova-Pasternak (1970) already had described *A. splendidus* from the Kurile-Kamchatka Trench. Later several additional species were described, primarily from the Indo-Pacific region (Kudinova-Pasternak 1989, 1990; Larsen 1999b).

*Agathotanaeis* is a cosmopolitan genus to be found in any deep-water samples around the world (Bird & Holdich 1988; Larsen 1999a, b). The most recent key to the genus is given by Larsen (1999b).

***Agathotanaïs hadalis* n. sp.**

Figures 1–5

**Material examined. Holotype**, non-ovigerous female (KMNH IvR 500.163), station XR12, 41°37.67'–41°37.08'N, 146°54.19'–146°52.72'E. 5473–5484 metres, 22–23 September 2001. **Paratypes**: 5 non-ovigerous females, 5 males, 3 mancae (KMNH IvR 500.164) station TD-8, 39°15.54'–39°17.01'N, 144°45.37'–144°42.46'E. 5762–5733 metres, 29 September 2001.

**Diagnosis (both genders)**. Pereonites 1, 2 and 6 shoulders weakly demarcated. Pereonite 6 short, almost trapezoid. Pereopod 1–3 propodus with two dorsal spines.

**Etymology**. Name derived from the deep-sea habitat.

**Description**. Adult female.

*Body* (Fig. 1A,B). Nine times as long as wide. Lateral shoulders weakly defined.

*Cephalothorax*. With smooth lateral edges in dorsal view. Longer than wide. Shorter than pereonites 1 and 2 combined.

*Pereonites*. Pereonites 1 and 6 wider than long. Pereonite 2 square. Pereonites 3–5 longer than wide.

*Pleon*. Short (including pleotelson only 0.15 times as long as total body length). All pleonites subequal. Pleotelson almost as long as all pleonites combined, acorn-shaped, apex rounded and covered by dorsal plate.

*Antennule* (Fig. 1C). Shorter than carapace, with three articles. Article 1 longer than rest of antennule combined, with outer medial process (only visible in dorso/ventral view) carrying simple and setulate setae. Article 2 less than one-third as long as article 3, with one simple and setulate distal setae. Article 3 longer than half of article 2, with five simple distal setae and one aesthetasc.

*Antenna* (Fig. 1D). Uniaarticulated, shorter than antennule article 3, with one distal seta.

*Mouthparts*. Labrum (Fig. 2A) large, only marginally narrower than clypeus, distal edge setose. Mandibular molar indistinct and membranous. Left mandible (Fig. 2B) lacinia mobilis absent, incisor blunt without denticles. Right mandible (Fig. 2C) incisor slightly narrower than on left mandible, otherwise without denticles. Labium (Fig. 2D) lobes setose, with spiniform outer process and medial setulose seta. Maxillule (Fig. 2E) endite with ten spiniform distal setae; palp longer than endite, with two long terminal setae. Maxilla (Fig. 2F) triangular. Maxilliped (Fig. 2G) endites without setae. Palp (twisted during dissection) article 1 naked, article 2 and 3 with three setae on inner margin, article 4 only 0.5 times as wide and half as long as article 3, with five setae. Epignath (Fig. 2H) naked, widest at basis, terminal setae present but naked.

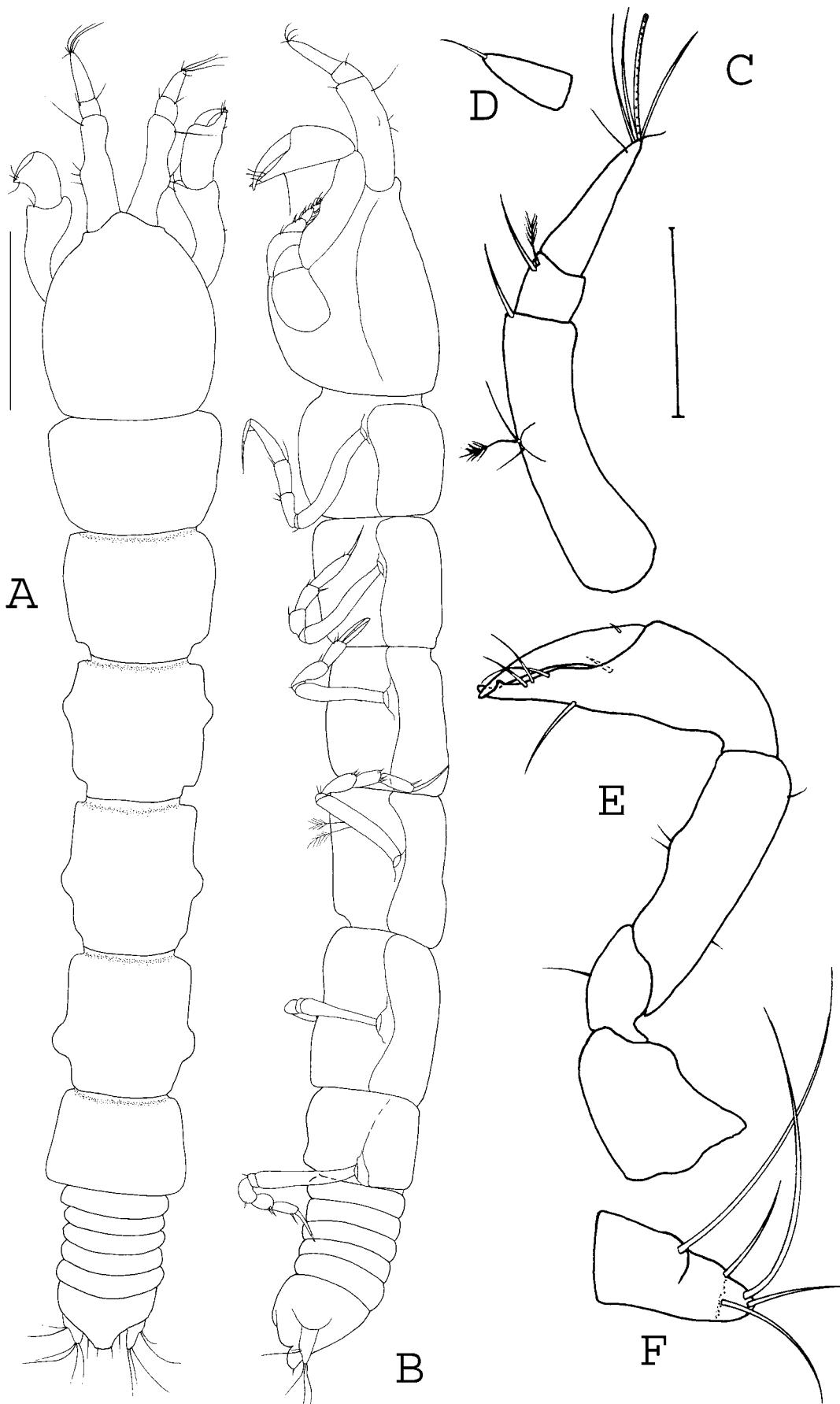
*Cheliped* (Fig. 1E). Basis naked, only twice as long as merus. Merus prominent, with one medial seta. Carpus marginally shorter than propodus including fixed finger, with two medio-ventral setae and one dorsal seta in each end. Propodus with one seta at dactylus insertion. Fixed finger with one ventral seta and three setae on inner margin, inner margin with one prominent distal tooth. Dactylus as long as fixed finger, with one small dorsal-proximal seta.

*Pereopod 1* (Fig. 3A). Coxa rounded, with one seta. Basis as long as combined length of merus, carpus and propodus, with one dorso-medial setulated seta. Ischium with one simple seta. Merus more than 0.5 times as long as carpus, widening distally, with two simple setae. Carpus less than one-third as long as basis, with three distal setae. Propodus longer than carpus, with one ventro-distal seta and two dorsal spines. Dactylus and unguis combined as long as propodus and not fused.

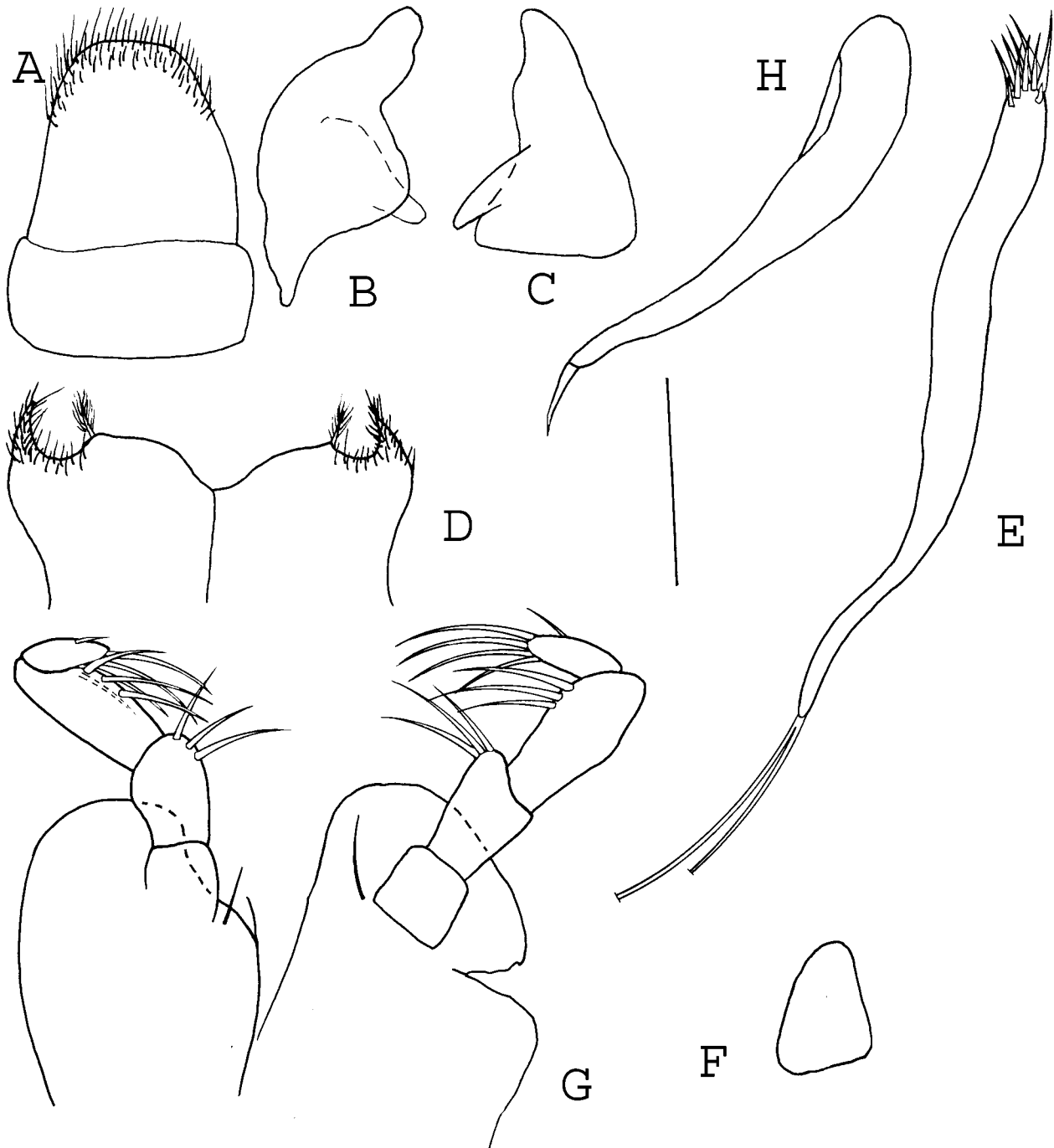
*Pereopods 2–3* (Fig. 3B,C). As pereopod 1 except merus with only one seta.

*Pereopod 4* (Fig. 3D). Basis longer than the three succeeding articles combined, with three setulated setae. Ischium with two setae. Merus almost as long as carpus, widening distally, with two spiniform setae. Carpus shorter than half as long as basis, with one simple and three spiniform setae. Propodus longer than carpus, with two spiniform setae and blunt dorsal spine. Dactylus and unguis combined longer than propodus, not fused, and unguis with ventral serration.

*Pereopod 5* (Fig. 3E). As pereopod 4 except: ischium apparently with only one seta.



**FIGURE 1.** *Agathotanais hadalis* n.sp., female. A, holotype, dorsal view; B, same lateral view, C, antennule; D, antenna; E, cheliped; F, uropod. Scale bar habitus 0.5 mm, other scale bar = 0.2 mm.

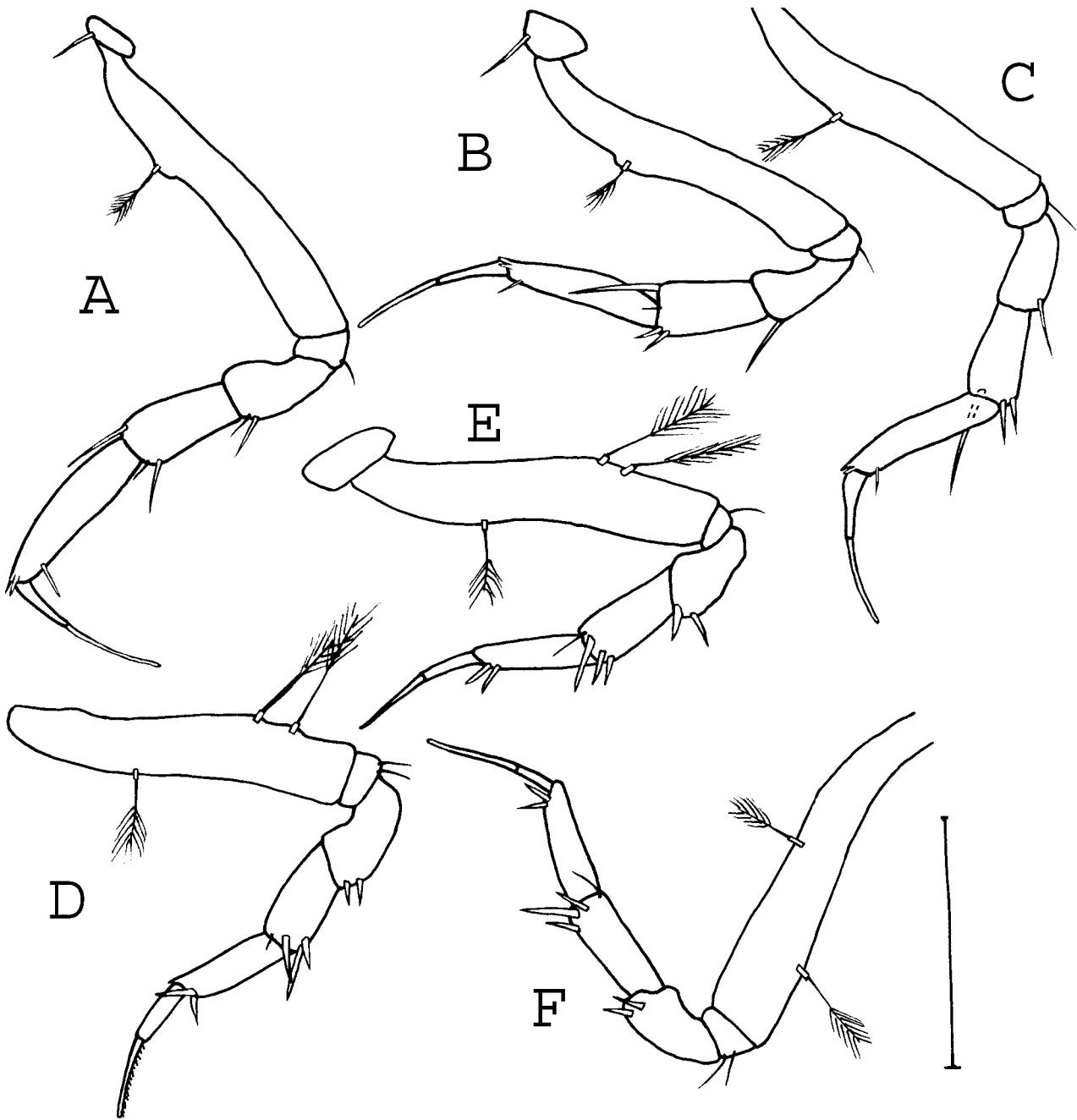


**FIGURE 2.** *Agathotanais hadalis* n. sp., female, paratype. A, labrum; B, left mandible; C, right mandible; D, labium; E, maxillule; F, maxilla; G, maxilliped; H, epignath. Scale bars = 0.1 mm.

*Pereopod 6* (Fig. 3F). As pereopod 4 except: basis with only two setulate setae.

*Pleopods* not present in females.

*Uropod* (Fig. 1F). Marginally shorter than pleotelson. Basal article naked, about one third as long as endopod, exopodal spur reduced to little more than a blunt process with two setae. Endopod uniaarticulated, fused with basal article, with one subdistal and two to four distal setae.



**FIGURE 3.** *Agathotanais hadalis* n. sp., female, paratype. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6. Scale bar = 0.2 mm.

**Description of the adult male (where different from female).**

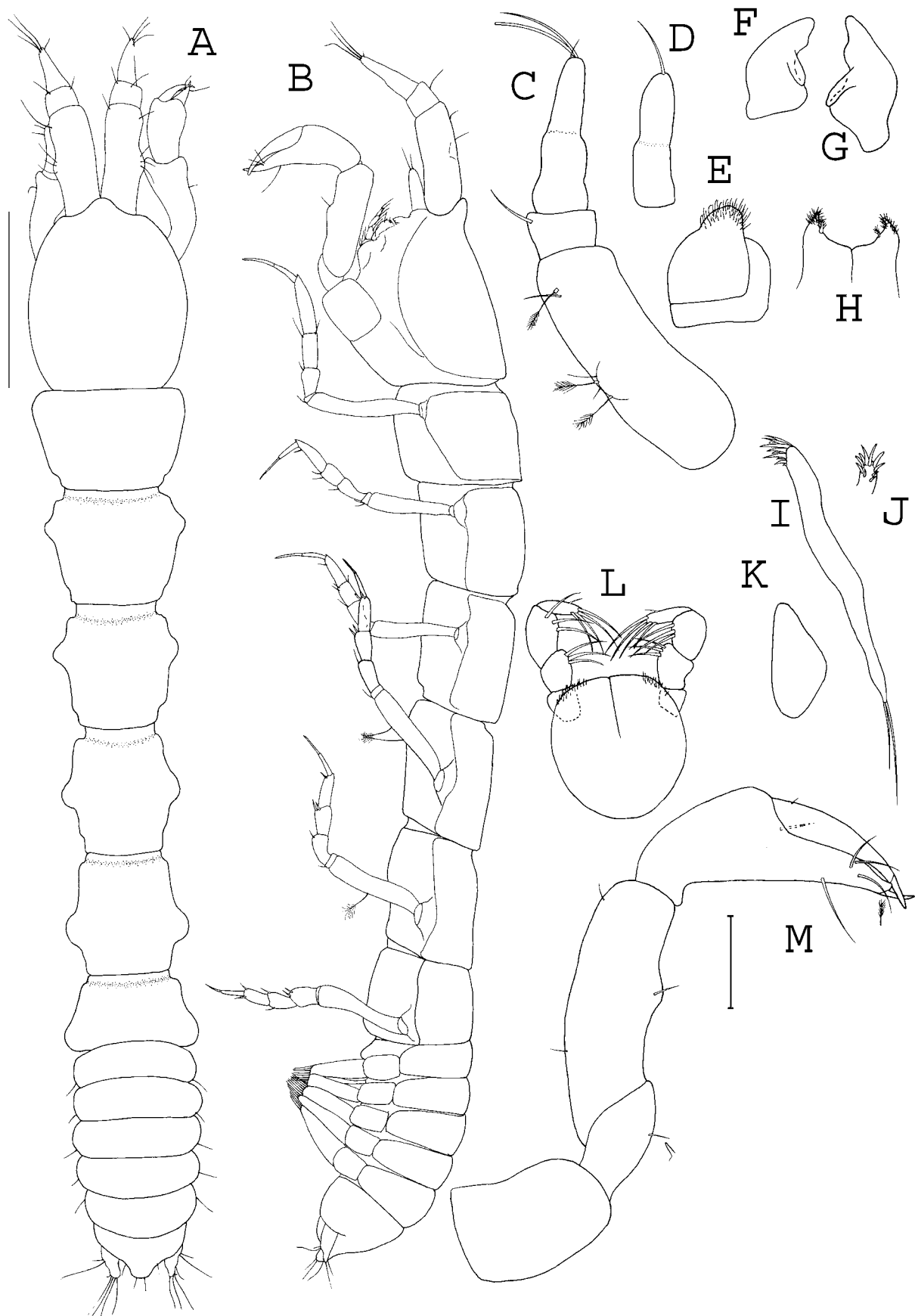
*Body* (Fig. 4A, B). Pleon as wide as pereon and pleotelson.

*Antennule* (Fig. 4C). Thicker than that of female. Article 1 shorter than rest of antennule. Article 4 longer than in female, with sharply decreasing width midlength.

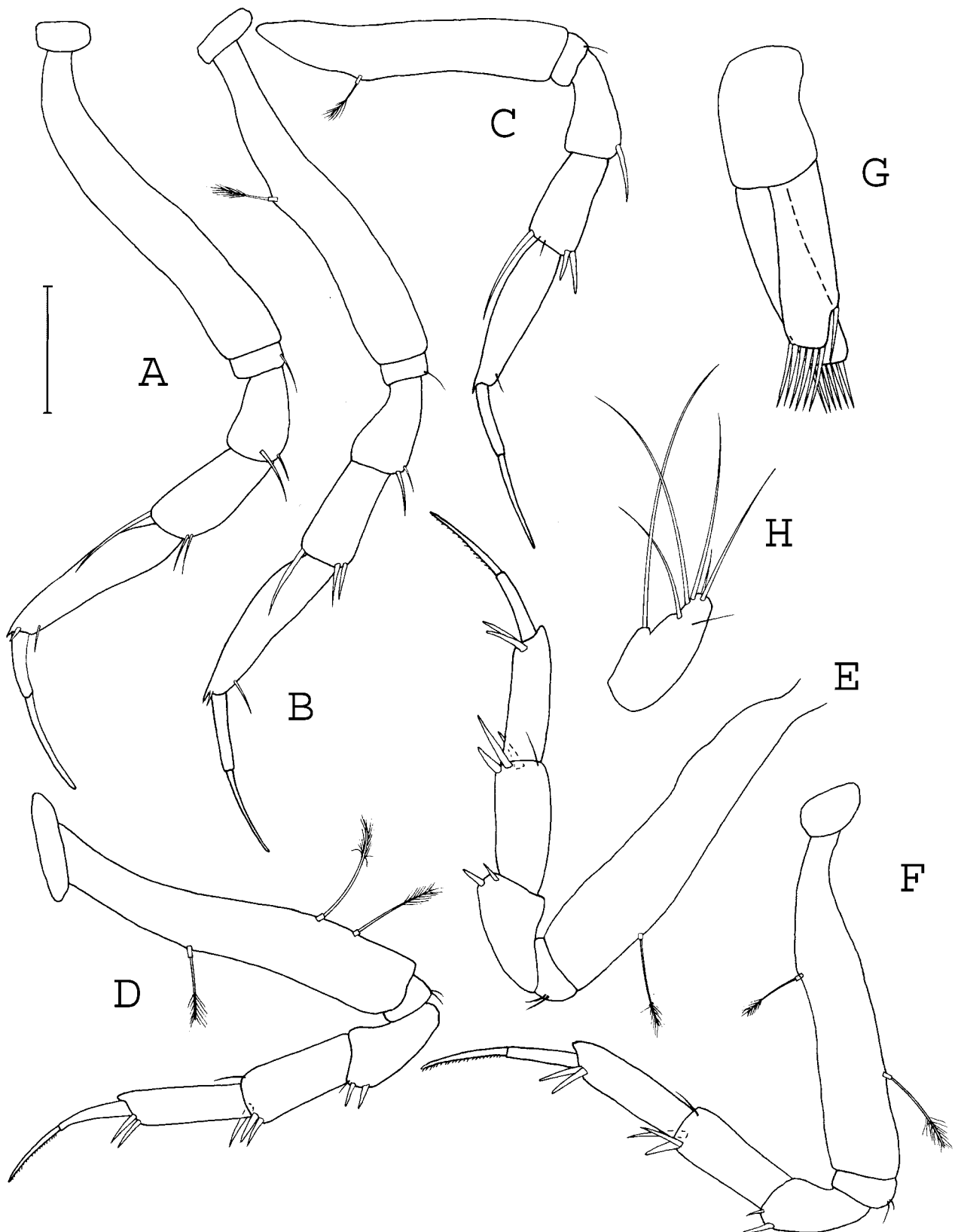
*Antenna* (Fig. 4D). Longer than that of female, with medial abrupt decrease in width.

*Pereopods* (Fig. 5A–F). Except for the odd setae, the pereopods are identical to those of the female.

*Pleopods* (Fig. 5G). All pairs subequal, rectangular and coalesced, with six or seven simple setae.



**FIGURE 4.** *Agathotanis hadalis* n.sp., male, paratype. A, dorsal view; B, same lateral view; C, antennule; D, antenna; E, labrum; F, left mandible; G, right mandible; H, labium; I, maxillule; J, same, endite, different angle; K, maxilla; L, maxilliped; M, cheliped. Scale bar habitus 0.5 mm, other scale bar = 0.1 mm.



**FIGURE 5.** *Agathotanaïs hadalis* n. sp., male, paratype. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale bar = 0.1 mm.

**Remarks.** Kudinova-Pasternak (1970) recorded the species *Agathotanaeis splendidus* and *A. ingolfi* from the Kamchatka Trench and as *A. hadalis* looks indeed very similar to *A. ingolfi*, it is likely that the records of *A. ingolfi sensu* Kudinova-Pasternak, 1970 refer to *A. hadalis*. However, this cannot be assured without access to the material collected by Kudinova-Pasternak (which is reported lost by Błażewicz-Paszkowycz pers. comm.). *Agathotanaeis hadalis* differs from the original *A. ingolfi sensu* Hansen, 1913 by the short, almost trapezoid pereonite 6; the inconspicuous pereonite 1, 2 & 6 corners and the two dorsal spines on pereopod 1–3 propodus. Also the pereonites 1, 2 and 6 shoulders are less demarcated in *A. hadalis* than *A. ingolfi*.

It is established that an easy way to recognize the males of *Agathotanaeis* (and many other Tanaidomorpha) is by the presence of pleopods and thicker antennules (Lang 1971b; Bird & Holdich 1988; Larsen 1999b). One additional character seems to be that the male antennule distal article is subdivided by an abrupt decrease in width or even fusion-line. This character is not previously described but was somewhat illustrated by Lang (1971b:64,fig.4) and Bird & Holdich (1988:1599,fig.3a). The male antenna is about one-third longer than that of the female.

### **Genus *Paragathotanaeis* Lang, 1971b**

Type species. *Paragathotanaeis typicus* Lang, 1971b

**Generic remarks.** This genus was erected by Lang (1971b) to accommodate his new species *P. typicus* (by monotypy) from the Vema Expedition in the Caribbean Sea. *Paragathotanaeis* is also a cosmopolitan genus to be found in any deep-water sampling around the world (Kudinova-Pasternak 1970; Bird & Holdich 1988; Larsen 2002). The most recent key to the genus is given by Larsen (2005) but the addition of new taxa requires a modification of that key.

Although there are no problems in separating *Agathotanaeis* and *Paragathotanaeis* there seem to be some difficulties in separating the genera *Paragathotanaeis* from *Paranarthrura*, although the characters given by Lang (1971a) appear to be fairly easy at first glance. The diagnostic characters for *Paragathotanaeis* separating it from *Paranarthrura*, are (as stated by Lang): “labium as in *Agathotanaeis*; cheliped without pseudocoxa; uropod without exopod process”. However, as quite often within Tanaidacean systematics, things are not quite as simple as expected. The labium of *Paragathotanaeis* does indeed have a setulate medial seta or projection, but is hardly ‘as in *Agathotanaeis*’ as it is lacking the prominent process on the outer lateral corners found in the labium of *Agathotanaeis* (Bird & Holdich 1988; Larsen 2002, 2005). Regarding the uropod exopodal process, this is much more obvious and often acute in *Paranarthrura* but still, such a structure is visible in certain species of *Paragathotanaeis* (Bird & Holdich 1988; Gurreo-Kommritz 2003) albeit very reduced. As for the cheliped pseudocoxa the situation is not quite clear cut either. Larsen (2002) described *P. medius* as having a pseudocoxa, although later he (2005) withdrew that character, stating that this was the result of a bad dissection. It is now clear that the *Paragathotanaeis* cheliped is attached to the carapace via a large sclerite (which often comes off with the cheliped during dissection). Also Bird & Holdich (1989) noted and illustrated the differences in the degree of fusion/no fusion of ‘sclerite/pseudocoxa’ within the *Paranarthrura* and suggested potential taxonomic value. This sclerite has also been suggested homologous with the pseudocoxa by Larsen & Wilson (2002) and this is supported by the observations conducted in this study. Although the cheliped sclerite of *Paragathotanaeis* can be morphologically separated from the pseudocoxa of *Paranarthrura*, some species of *Paranarthrura* does not possess a pseudocoxa but rather a sclerite. Thus we are left without any clear-cut differentiating characters between *Paragathotanaeis* and *Paranarthrura* and these genera must be seen as gradual evolutionary line, in the direction from *Paranarthrura* via *Paragathotanaeis* to *Agathotanaeis*. It is here suggested that the best way to separate *Paranarthrura* from *Paragathotanaeis*, is by the larger and more lateral attachment of the uropods in *Paranarthrura*. For identification it is recommended to view the



animal habitus from the dorsal view; if the uropods protrude latero-distally from the pleotelson, the species can be referred to *Paranarthrura*, if they are not visible then to *Paragathotanaeis*.

Kudinova-Pasternak (1970) described *Paranarthrura zeviniae* from the Kurile-Kamchatka Trench (before the genus *Paragathotanaeis* was established), although her species does not display any uropod exopodal process. She did not illustrate the labium but did (Kudinova-Pasternak 1970:368, plate 19) illustrate a structure which could be either a sclereite or a pseudocoxa. Given the considerations raised above, *Paranarthrura zeviniae* should be placed in *Paragathotanaeis* rather than in *Paranarthrura* owing to the small ventrally-attached uropods.

### ***Paragathotanaeis abyssorum* n. sp.**

Figures 6–9

**Material examined.** **Holotype**, ovigerous female (KMNH IvR 500.165), station TD-8, 39°15.54'–39°17.01'N, 144°45.37'–144°42.46'E. 5762–5733 metres, 29 September 2001. **Paratypes**: 1 male (damaged) same locality. 3 non-ovigerous females, 1 male, 2 mancae (KMNH IvR 500.166), same locality.

**Diagnosis, female.** Pereonite shoulder well demarcated. Antenna with five articles; article 3 without distal fusion line. Pereopods 4–6 propodus with double row of distal spines; dactylus without spines.

Male. As female except antennule wider. Only double row of spines on pereopod 4–5. Pleonites with pleopods.

**Etymology.** Name derived from the deep-sea habitat.

**Description**, adult female.

*Body* (Fig. 6A,B): 7.5 times as long as broad.

*Cephalothorax*. Marginally shorter than combined length of pereonites 1 and 2, almost rectangular.

*Pereonites*. Pereonite shoulder well demarcated. Pereonites 1 and 6 wider than long. Pereonite 2 length subequal in width. Pereonites 3, 4 and 5 longer than wide.

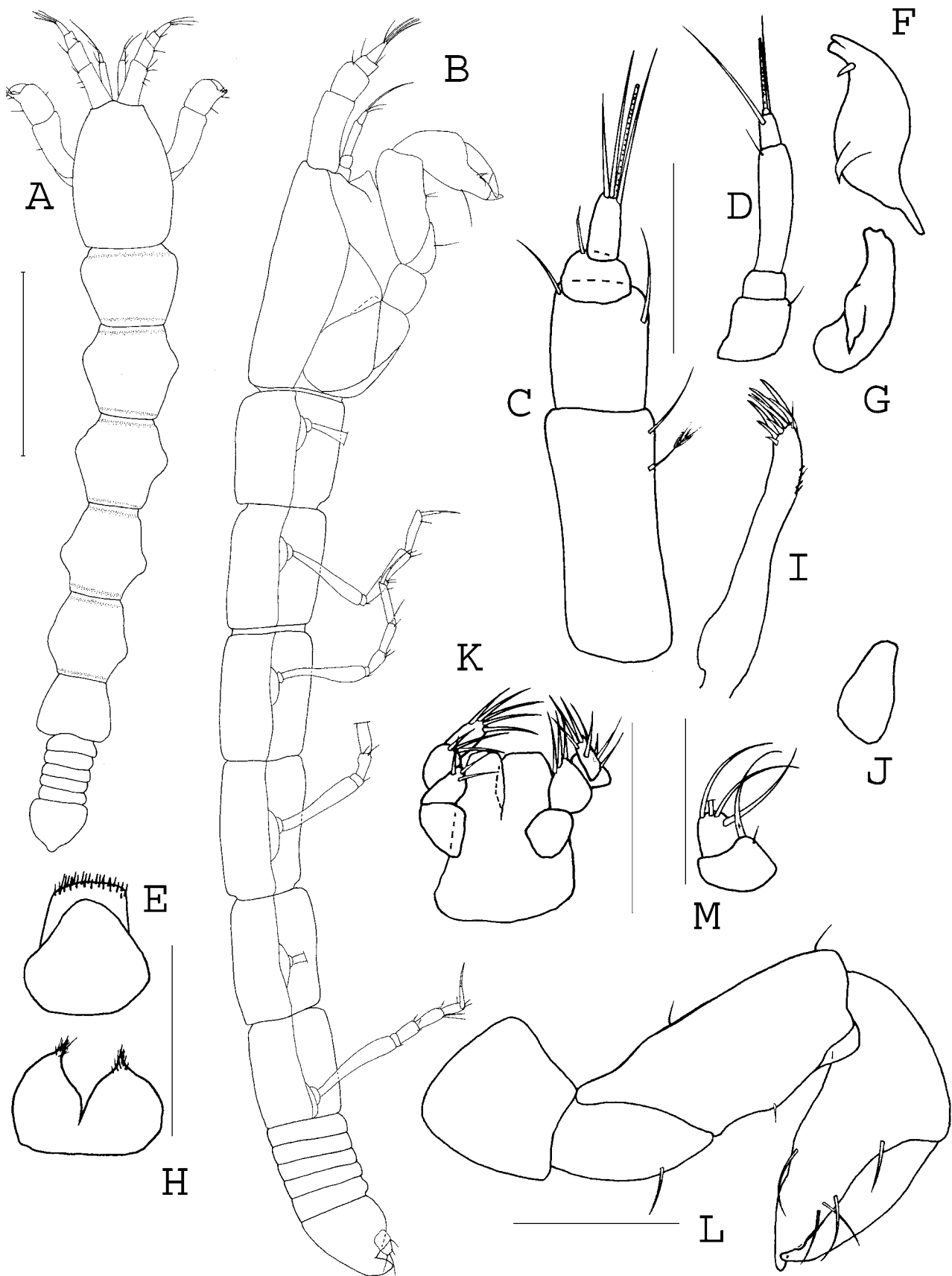
*Pleon*. All pleonites subequal and narrower than pereonites and pleon. Pleotelson with dorsal distal plate and blunt apex.

*Antennule* (Fig. 6C). With four articles. Length shorter than cephalothorax. Article 1 longer than rest of antennule, with one simple and one setulated setae. Article 2 longer than article 4, with two simple distal setae. Article 3 band-shaped and shorter than other articles, with one simple distal seta. Article 4 less than three times article 1, with three simple distal setae and one aesthetasc.

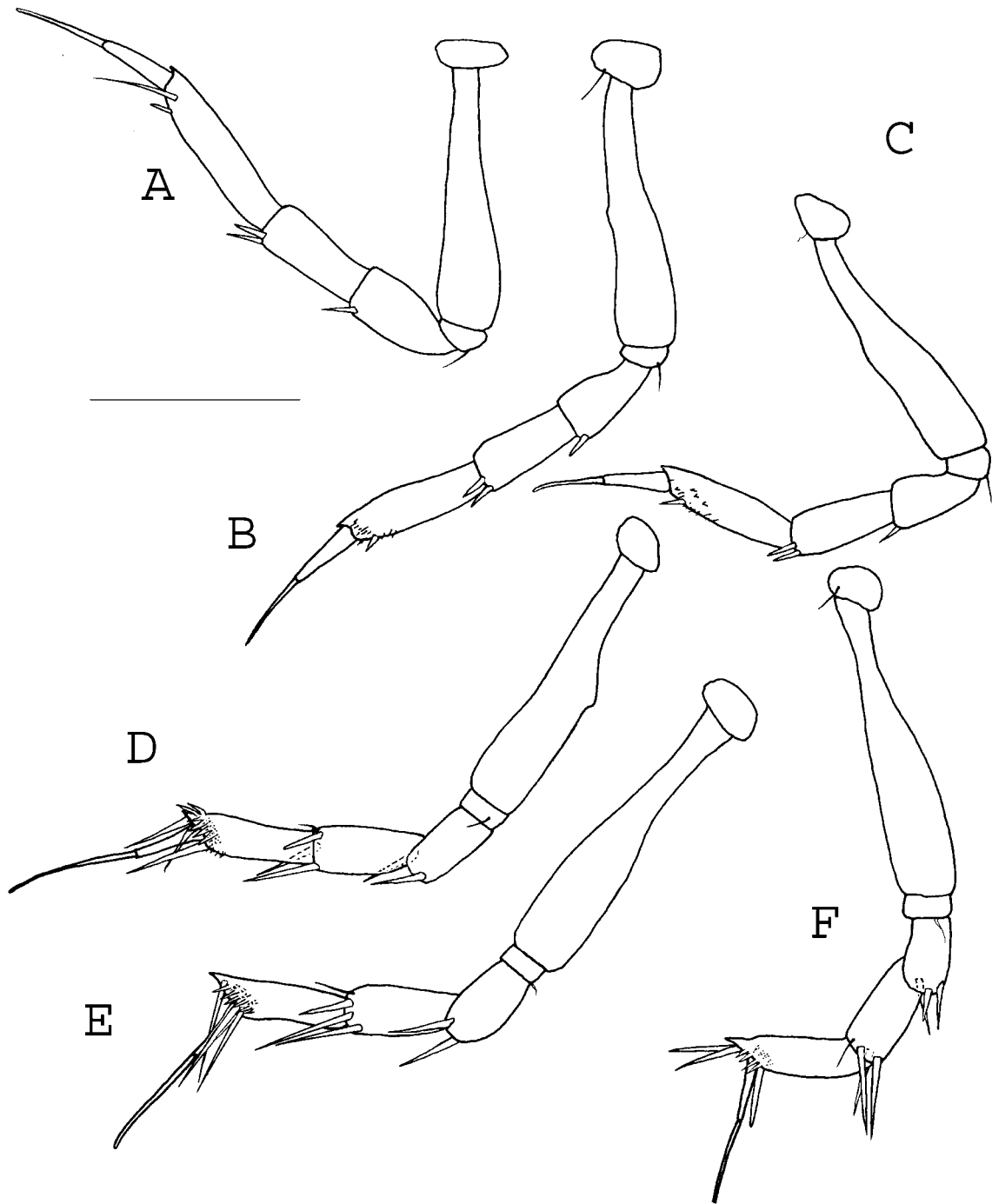
*Antenna* (Fig. 6D). With five articles. About as long as antennule article 1. Article 1 wider than other articles, with one dorsodistal seta. Article 2 band-shaped, naked. Article 3 longer than combined length of other antenna articles, without fusion line, with one distal simple seta. Article 4 longer than article 2, tapering and with one simple distal seta. Article 5 minute with one distal seta and one aesthetasc.

*Mouthparts*. Labrum (Fig. 6E) with flat setose distal edge. Left mandible (Fig. 6F) lacinia mobilis short and shaped as a blunt spine, incisor broad and bifurcate, molar thin and tapering. Right mandible (Fig. 6G) incisor broader than on left mandible, with three denticles. Labium (Fig. 6H) lobes tapering distally, with distal setules. Maxillule (Fig. 6I) endite with nine distal spiniform setae, palp lost during dissection. Maxilla (Fig. 6J) small and featureless. Maxilliped (Fig. 6K) endites without setae. Palp article 1 naked; article 2 with three inner setae. Article 3 with three inner setae. Article 4 with five distal setae. Epignath not recovered (see male).

*Cheliped* (Fig. 6L). Basis shorter but wider than merus. Merus triangular, with one ventral seta. Carpus as long as propodus including fixed finger, with one medio-dorsal, one dorso-distal and one ventral setae, with small carpal shield. Propodus with one seta at dactylus insertion. Fixed finger with one ventral seta, three setae and one distal denticle on inner margin. Dactylus as long as fixed finger.



**FIGURE 6.** *Paragathotanaïs abyssorum* n.sp., female. A, holotype, dorsal view; B, paratype, lateral view; C, antennule; D, antenna; E, labrum; F, left mandible; G, right mandible; H, labium; I, maxillule; J, maxilla; K, maxilliped; L, cheliped; M, uropod. Scale bar habitus 0.5 mm, other scale bar = 0.1 mm.

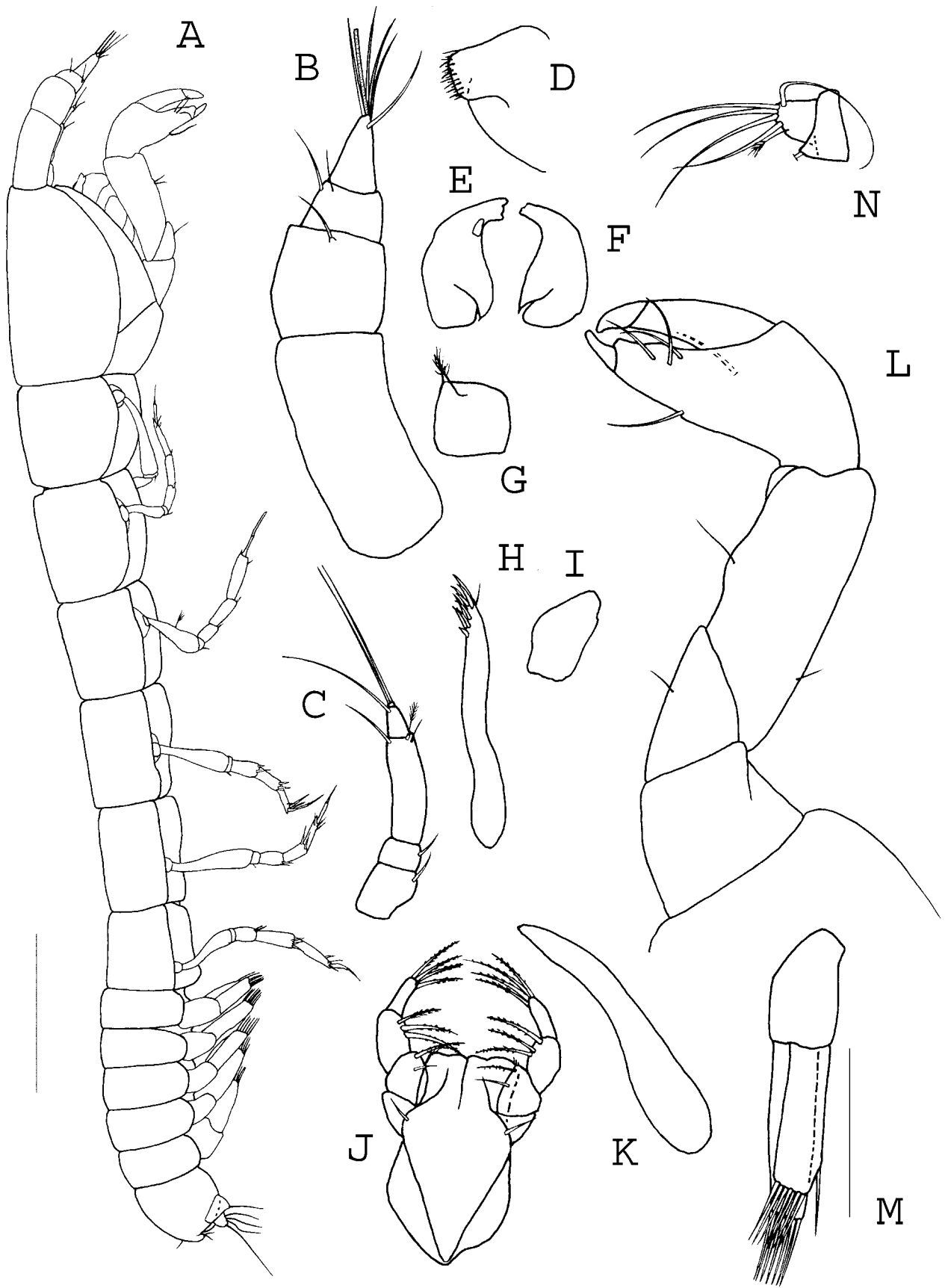


**FIGURE 7.** *Paragathotanaïs abyssorum* n. sp., female, paratype. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6. Scale bar = 0.1 mm.

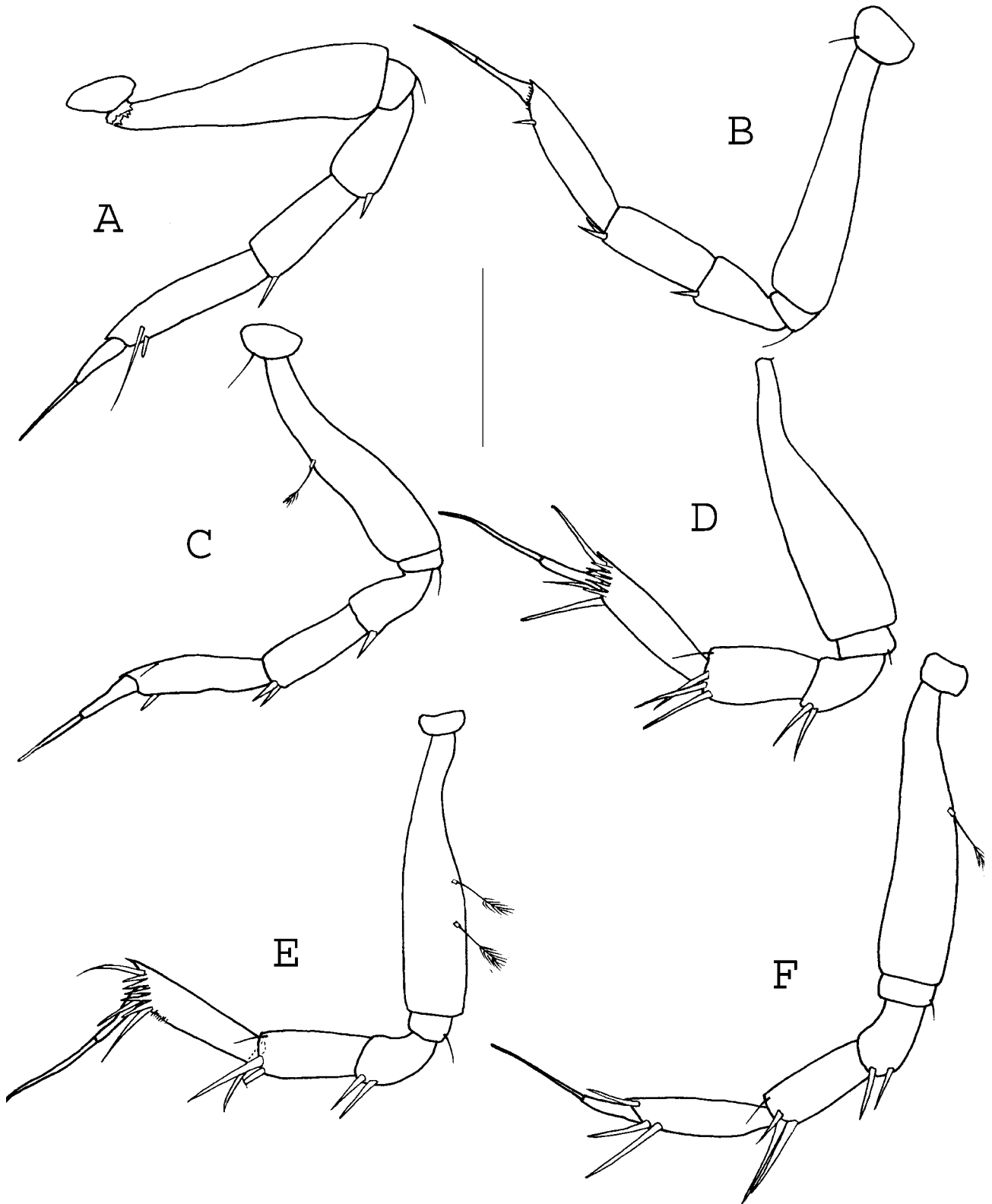
*Pereopod 1* (Fig. 7A). Coxa naked. Basis shorter than combined length of the four succeeding articles, naked. Ischium with one ventral seta. Merus shorter than carpus, widening distally, with one spiniform ventral seta. Carpus shorter than propodus, rectangular, with two spiniform distal setae. Propodus about half as long as basis, with one long and one spiniform ventro-distal setae and dorsal spine. Dactylus and unguis combined as long as propodus, unguis without distal processes.

*Pereopod 2* (Fig. 7B). As pereopod 1 except coxa with one seta and propodus without long seta.

*Pereopod 3* (Fig. 7C). As pereopod 2.



**FIGURE 8.** *Paragathotanaïs abyssorum* n.sp., male, paratype. A, lateral view; B, antennule; C, antenna; D, labrum; E, left mandible; F, right mandible; G, labium; H, maxillule; I, maxilla; J, maxilliped; K, epignath; L, cheliped; M, pleopod; N, uropod. Scale bar habitus 0.5 mm, other scale bar = 0.1 mm.



**FIGURE 9.** *Paragathotanaïs abyssorum* n. sp., male, paratype. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6. Scale bar = 0.1 mm.

*Pereopod 4* (Fig. 7D). Basis not wider than on pereopods 1–3, apparently naked but with medial process (which usually contains a sensory seta, suggesting this has been lost during handling). Ischium with one ven-

tral seta. Merus with two spiniform setae, shorter than carpus. Carpus with three spiniform and one simple distal setae. Propodus with three long (longer than half of dactylus/unguis), distal spiniform setae, dorsal spine, and two rows of spines. Dactylus and unguis combined longer than propodus, dactylus without spines.

*Pereopod 5* (Fig. 7E). As pereopod 4 except basis without process.

*Pereopod 6* (Fig. 7F). A as pereopod 4 except coxa with one seta.

*Pleopods* lacking in females.

*Uropods* (Fig. 6M). Basal article wider but shorter than endopod. Exopod process obvious, with one short and one long simple distal setae. Endopod with four long simple distal setae.

Description of male, (where differing from female).

*Body* (Fig 8A). Pleon wider than in female.

*Antennule* (Fig. 8B). With traces of fifth terminal article. Wider than in female.

*Epignath* (Fig. 8K). Naked, terminal spine absent.

*Pereopod 4* (Fig. 9D). Propodus spines not as prominent as in female.

*Pereopod 6* (Fig. 9F). Propodus spines absent.

*Pleopods* (Fig. 8M). All pairs similar, with short, stiff, simple setae only. Held in a cone but not coalescent. Endopod with nine distal setae, exopod with nine distal and one subdistal setae.

**Remarks.** This species is fairly easily recognizable from other species in the genus by the distal propodal spination of pereopods 4–6 and lack of dactylus spines. The male completely lacks the propodal spines on pereopod 6 while these are prominent on pereopod 5 and less prominent on pereopod 4. The reason for such variation is not clear.

### Genus *Paranarthrura* Hansen, 1913

**Generic remarks.** This genus was erected by Hansen (1913) to accommodate his new species *P. insignis*, *P. subtilis*, and *P. clavipes* from the Danish Ingolf expedition. However, Hansen only described *P. insignis* in detail and Lang (1971a:354) pointed out that *P. subtilis* differs from the generic diagnosis in having smoothly rounded setose apical processes on the labium, instead of the conspicuous pointed triangular lobes of the diagnosis. Lang did not pursue the issue about *P. subtilis* further, but for some reason, he did change the diagnosis of *Paranarthrura* to specify a ‘flat’ labium; a character in direct violation of the diagnosis of the type species *P. insignis*. Lang (1971a:368) then proceeded to redescribe and illustrate *P. insignis* with pointed, not flat, triangular labium lobes. Also Bird & Holdich (1989) commented on the heterogeneous nature of this genus – and it may prove to be polyphyletic.

*Paranarthrura* is a cosmopolitan genus to be found in any deep-water sampling around the world. The most recent key to the genus is given by Larsen (2005).

### *Paranarthrura vitjazi* Kudinova-Pasternak, 1970

Figures 10–13

**Material examined.** **Neotype**, non-ovigerous female ((KMNH IvR 500.167), station XR12, 41°37.67′–41°37.08′N, 146°54.19′–146°52.72′E. 5473–5484 metres, 22–23 September 2001. 1 non-ovigerous female (dissected; KMNH IvR 500.168), 1 male (dissected; KMNH IvR 500.169), 3 females, 3 males, 4 mancae (KMNH IvR 500.170), same locality. 3 non-ovigerous females, 1 male (KMNH IvR 500.171), station TD-8, 39°15.54′–39°17.01′N, 144°45.37′–144°42.46′E. 5762–5733 metres, 29 September 2002. 1 non-ovigerous female (KMNH IvR 500.172), station XR-7, 42°12.87′–42°12.10′N 145°33.93′–145°32.05′E, 3853–3858 metres, 17 September 2001.

**Diagnosis** (modified from Kudinova-Pasternak 1970), female. Carapace in dorsal view with smooth lateral edges; longer than wide; longer than pereonites 1 and 2 combined. Pereonite 1 wider than long. Pleonites combined length, only marginally longer than pleotelson. Antennular article 1 as long as rest of antennule. Cheliped propodus with inferior margin 1.4 times as long as carpus; fixed finger and apex of dactylus not thickened. Pereopods 1–3 with unguis without dorsal process but with sharp reduction in width at midlength. Pereopod 4–6 dactyli with one or no setae. Pleon narrower than pereon. Uropods about the length of pleotelson, endopod longer than basal article; endopod uniarticulated; exopod process tiny and barely visible.

**Description. Adult female.**

*Body* (Fig. 10A) nine times as long as wide. Lateral shoulders weakly defined.

*Cephalothorax*. With smooth lateral edges in dorsal view. Longer than wide. Longer than pereonites 1 and 2 combined.

*Pereonites*. Pereonite 1 wider than long. Pereonites 2 and 6 square. Pereonites 3–5 longer than wide.

*Pleon*. Short (including pleotelson only 0.15 times as long as total body length). All pleonites subequal. Pleotelson almost as long as all pleonites combined, acorn-shaped, apex rounded and covered by dorsal plate.

*Antennule* (Fig. 10B). Shorter than carapace, with four articles. Article 1 as long as rest of antennule combined, with three distal setae. Article 2 less than twice as long as article 3, with two distal setae. Article 3 shorter than other articles, with two distal setae. Article 4 shorter than article 2, with four simple distal setae and one aesthetasc.

*Antenna* (Fig. 10C). With five articles, 0.8 times as long as antennule. Article 1 longer than article 2, naked. Article 2 shorter than article 4, with one dorsodistal seta. Article 3 longer than other articles, with two distal setae. Article 4 shorter than article 1, naked. Article 5 minute, with two long setae and one aesthetasc.

*Mouthparts*. Labrum (Fig. 10D) setose. Mandibular molar indistinct and membranous. Left mandible (Fig. 10E) lacinia mobilis shorter than incisor; incisor broad with three denticles. Right mandible (Fig. 10F) incisor blunt. Labium (Fig. 10G) lobes rounded and setose. Maxillule (Fig. 10H) endite with nine spiniform distal setae; palp longer than endite, with two long terminal setae. Maxilla (Fig. 10I) small, tip pointed. Maxilliped (Fig. 10J) endites with medial process and one seta. Palp (twisted during dissection) article 1 naked, article 2 and 3 with three setae on inner margin, article 4 only 0.5 times as wide as article 3, with five setae. Epignath (Fig. 10K) naked, widest at basis.

*Cheliped* (Fig. 10L). Pseudocoxa wider than and more than two times as long as basis. Basis naked. Merus prominent, with one medial seta. Carpus shorter than propodus including fixed finger, with two dorsal and two ventral setae. Propodus as long as pseudocoxa. Fixed finger with one ventral seta and three setae on inner margin. Dactylus as long as fixed finger.

*Pereopod 1* (Fig. 11A). Coxa rounded and naked. Basis as long as the three succeeding articles combined, naked. Ischium with one simple seta. Merus more than half as long as carpus, widening distally, with two simple setae. Carpus half as long as basis, with three distal setae. Propodus marginally longer than carpus, with two simple and one spiniform distal setae. Dactylus and unguis combined shorter than propodus and not fused.

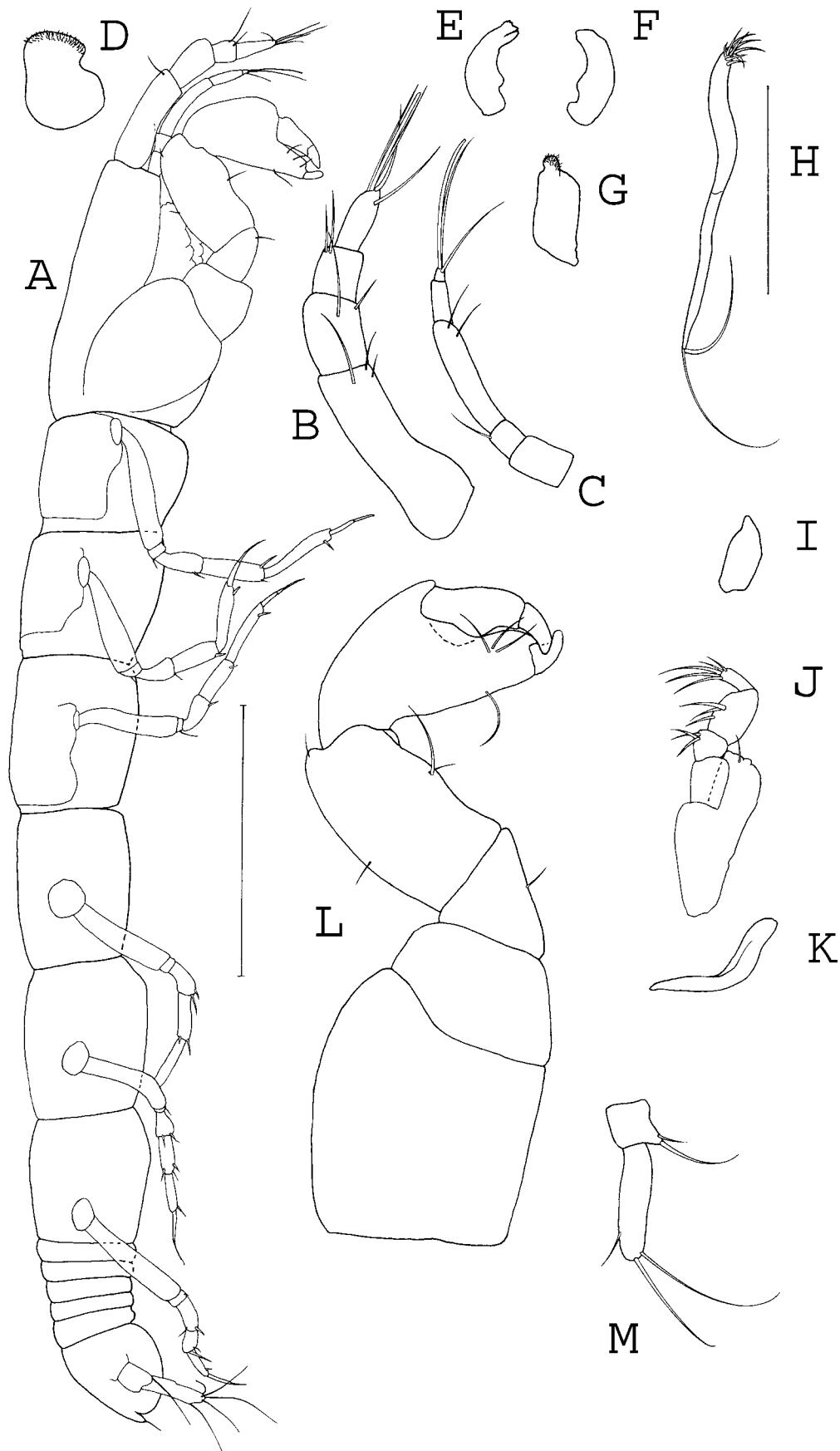
*Pereopods 2–3* (Fig. 11B,C). As pereopod 1 except: propodus with only one spiniform seta.

*Pereopod 4* (Fig. 11D) Basis longer than the three succeeding articles combined, naked. Ischium with one seta. Merus more than half as long as carpus, widening distally, and with two spiniform setae. Carpus shorter than half as long as basis, with one simple and two spiniform setae. Propodus longer than carpus, with three spiniform setae and dorsal. Dactylus and unguis combined longer than propodus, not fused, and unguis without decline in width at midlength.

*Pereopod 5* (Fig. 11E). As pereopod 4 except: basis with two setulate setae. Ischium with two setae.

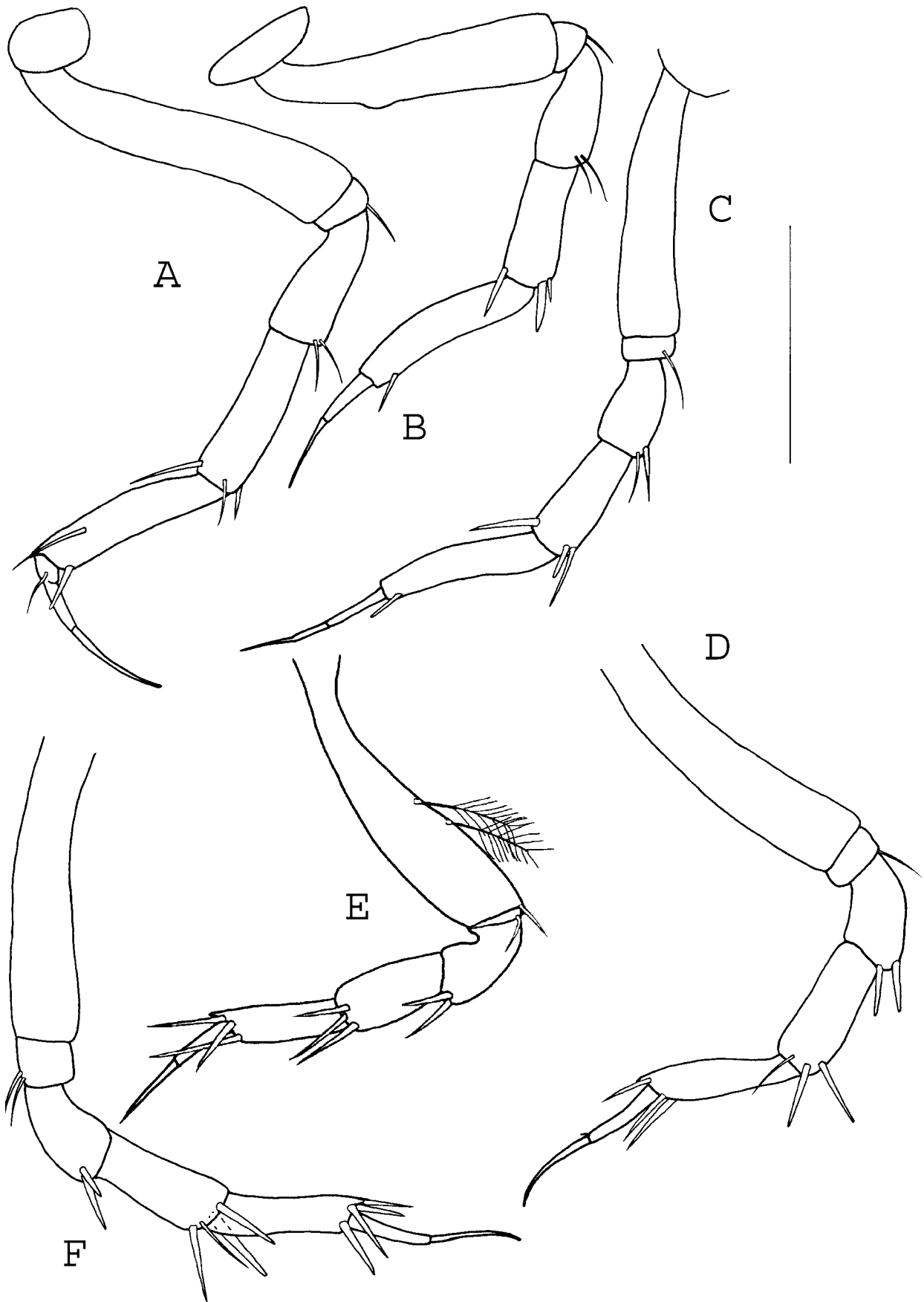
*Pereopod 6* (Fig. 11F). As pereopod 4 except: ischium with two setae. Carpus with one simple and three spiniform setae. Propodus with four distal spiniform setae.

*Pleopods* not present in females.

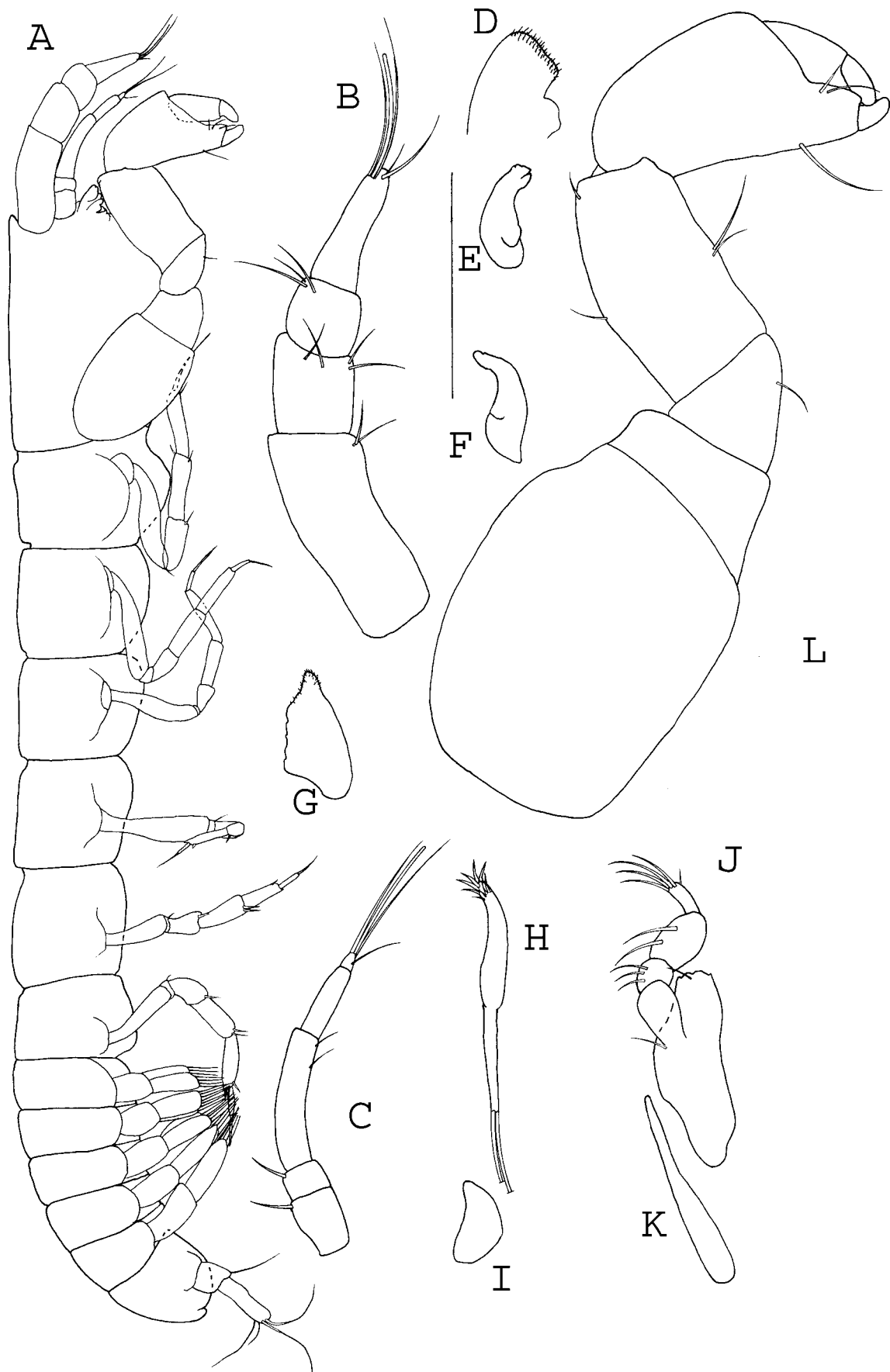


**FIGURE 10.** *Paranarthrura vitjazi* Kudinova-Pasternak, 1970, female. A, neotype, lateral view, scale bar B, antennule; C, antenna; D, labrum, lateral view; E, left mandible; F, right mandible; G, labium; H, maxillule; I, maxilla; J, maxilliped; K, epignath; L, cheliped; M, uropod. Scale bar habitus = 0.5 mm, antennae and cheliped = 0.2 mm, others = 0.1 mm.

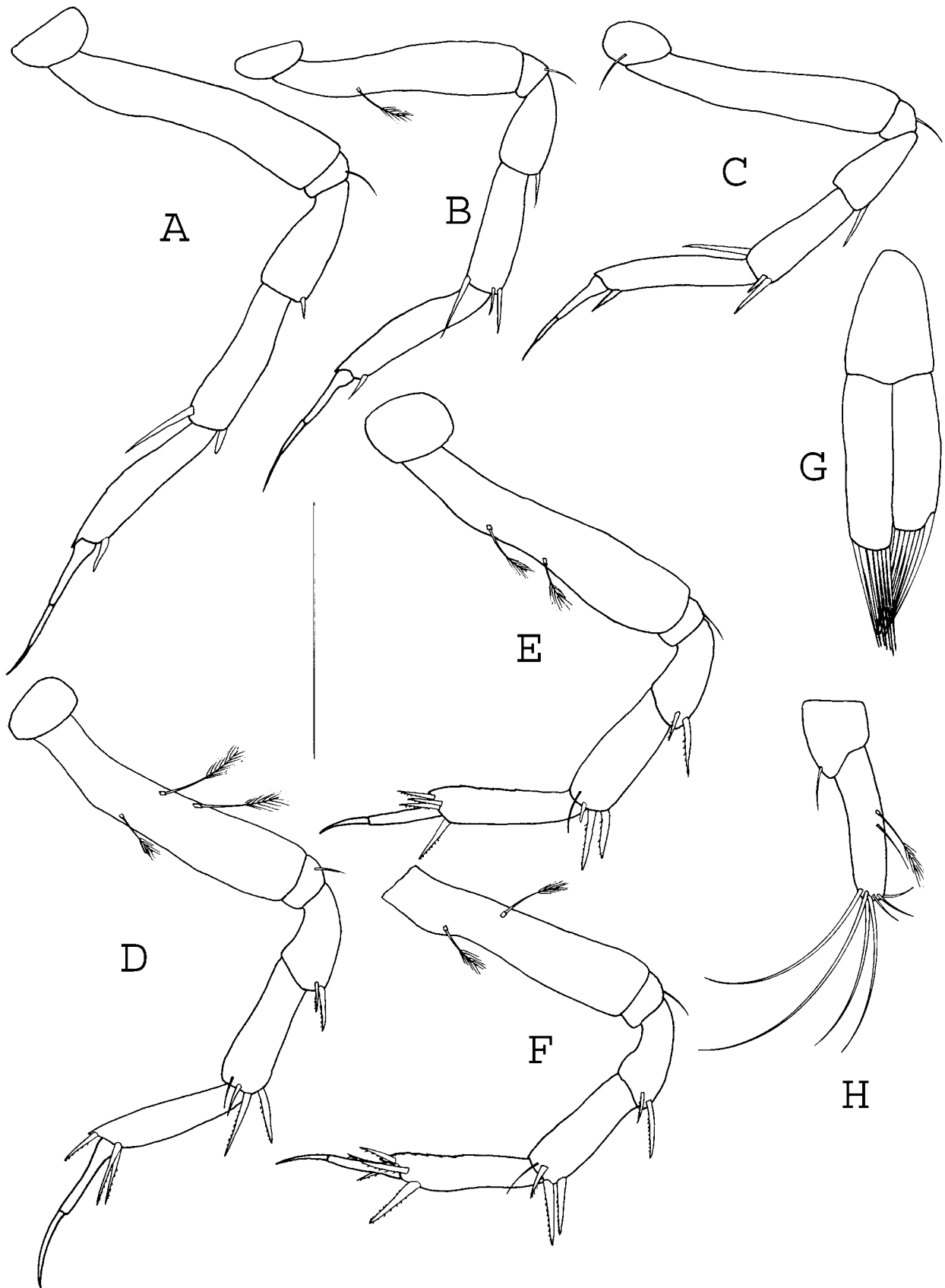




**FIGURE 11.** *Paranarthrura vitjazi* Kudinova-Pasternak, 1970, female. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6. Scale bar = 0.2 mm.



**FIGURE 12.** *Paranarthrura vitjazi* Kudinova-Pasternak, 1970, male. A, lateral view; B, antennule; C, antenna; D, labrum, lateral view; E, left mandible; F, right mandible; G, labium; H, maxillule; I, maxilla; J, maxilliped; K, epignath; L, L, cheliped. Scale bar habitus = 0.5 mm, antennae and cheliped = 0.2 mm, others = 0.1 mm.



**FIGURE 13.** *Paranarthrura vitjazi* Kudinova-Pasternak, 1970, female. A, pereopod 1; B, pereopod 2; C, pereopod 3; D, pereopod 4; E, pereopod 5; F, pereopod 6; G, pleopod; H, uropod. Scale bar = 0.2 mm.  
 Families Anarthruridae Lang, 1971, Colletteidae Larsen & Wilson, 2002, and Leptognathiidae Sieg, 1976

*Uropod* (Fig. 10M). Marginally shorter than pleotelson. Basal article naked, about one third as long as endopod. Exopodal spur reduced and little more than a blunt process with two setae. Endopod uniarticulated, with one subdistal and two–four distal setae.

**Description of adult male (where different from female).**

*Body* (Fig. 12A). Pleon as wide as pereon and pleotelson.

*Antennule* (Fig. 12B). Thicker than that of female. Article 1 shorter than rest of antennule. Article 4 longer than in female.

*Cheliped* (Fig. 12L). With pseudocoxa even more prominent than in female.

*Pereopods* (Fig. 13A–F). Identical to those of the female except for the odd setae.

*Pleopods* (Fig. 13G). All pairs subequal, not coalesced, with simple setae only.

*Uropod* (Fig. 13H). Apparently more setose than in female.

**Remarks.** This species was originally very poorly described; only the antennae, molar, cheliped and uropods were described/illustrated (Kudinova-Pasternak 1970). To make things worse, the type material is reported lost (pers. comm. M. Błażewicz-Paszkowycz). The new material from the type locality has made a full redescription possible, for both male and female genders. *Paranarthrura vitjazi* is fairly easily diagnosed by the short pleonites, the uniarticulated uropodal endopod and tiny blunt exopod process.

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